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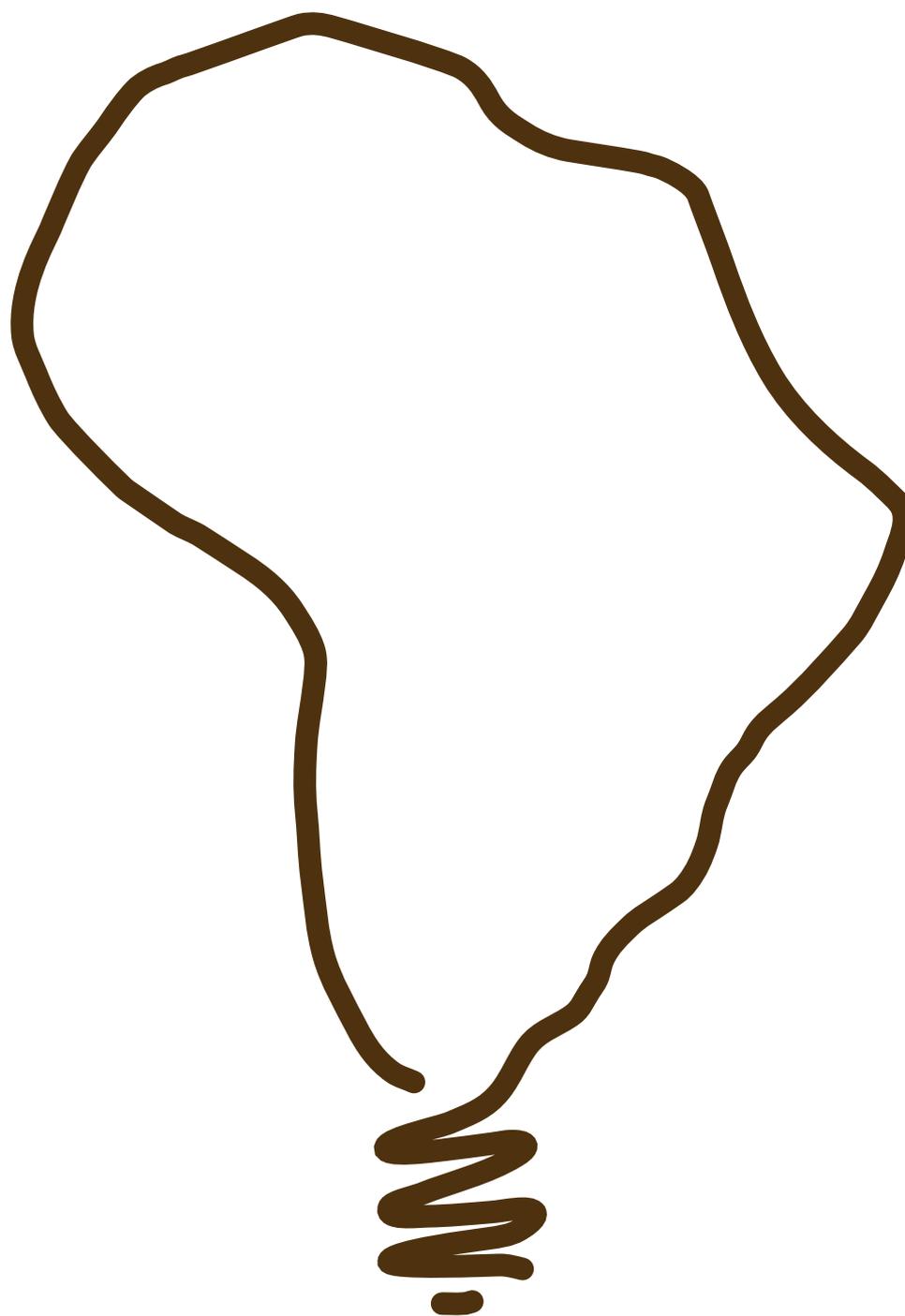
# Innovation

For Sustainable Development

LOCAL CASE STUDIES FROM AFRICA



United Nations



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TRACnet, Rwanda:



Buhoma Village, Uganda



Microcare, Uganda



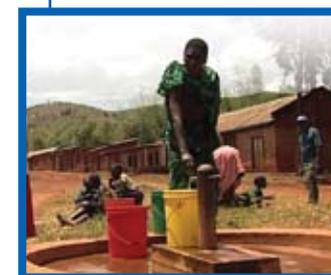
Cows to Kilowatts, Nigeria



Tiwai Island, Sierra Leone



Honey Care Africa Limited, Kenya



Lufumbu Village Water Project, Tanzania



Village of Andavadoaka, Madagascar

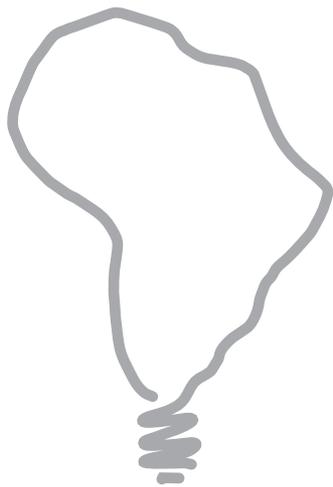


Bushbuck Ridge Project, South Africa



Restoring Kafue Flats, Zambia

**Source: DevInfo v5.0**  
 Note: The boundaries and the names shown and the designations used on these maps do not imply official endorsement or acceptance by the United Nations



**Innovation**  
For Sustainable Development  
LOCAL CASE STUDIES FROM AFRICA

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Photo Credits & References

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Many others have contributed through written comments, or through active participation in discussions. All these contributions are gratefully acknowledged as they have helped to build, refine and realise Innovation for Sustainable Development: Local Case Studies from Africa.

# FOREWORD

This volume aims to highlight many exciting innovations for sustainable development in Africa at the local level. It also begins to assess the scope for scaling up these innovations to make an impact on a larger scale. The case studies here are only a sample. Many more could have been included but for space constraints. An effort has been made to identify some of the most interesting and promising innovations for this volume. It is hoped that readers will find the innovations and lessons contained in these case studies valuable in their own work.

In addition to informing practitioners and policy makers in Africa, the volume is meant to inform and enrich the discussions within the Commission on Sustainable Development at its 16th and 17th sessions (2008 and 2009). The current cycle of the Commission's work focuses on Africa's sustainable development challenges and responses. It also covers the themes of agriculture, rural development, land, drought and desertification. Moreover, in the 16th session there will be a review of progress with implementation of water and sanitation decisions taken at the 13th session of the Commission. Hence the choice of themes for case studies in this collection.

The preparation of this volume is the result of a fruitful dialogue and interaction between the UN Secretariat and practitioners in the field in Africa. Several of the case studies were prepared by people directly involved in and uniquely informed about the projects, their history, challenges, implementation experience, lessons learned and future plans. Where engaging local author-practitioners proved impossible, the case studies draw heavily on documentation provided by those practitioners.

Africa faces daunting sustainable development challenges in coming decades, but also significant opportunities. The period since the beginning of this new millennium has been one of strong economic performance on the continent. If economic growth can be sustained and the benefits widely shared, Africa can accelerate social progress, including relieving the burden of poverty, hunger and disease on much of its population. African development also has the potential to follow a more sustainable path than has been the case in many other parts of the world, where development often resulted in severe environmental problems before governments and other actors began to get to grips with pollution and resource degradation. Following a more sustainable course will by no means be easy. It will call for innovative thinking and innovative practice.

Department of Economic and Social Affairs  
Division for Sustainable Development  
United Nations

# INTRODUCTION



Photo: Nokia Siemens Networks

The new millennium has brought progress in many African countries. A prolonged international commodity boom has boosted exports of both oil-exporting countries and other commodity-exporting countries. A number of African governments have significantly improved their macroeconomic management and political governance, though on both scores further progress could be made depending on the country. Member States of the United Nations have reiterated their willingness to support African countries through international cooperation. The Heavily Indebted and Poor Countries (HIPC) programme, initiated by the Bretton Woods institutions in 1996, provides debt relief and low-interest loans to reduce external debt repayments to sustainable levels. Large development projects have been launched with support from bilateral and multilateral institutions, particularly for the improvement and expansion of energy and transport infrastructures. As a result, many African countries have been enjoying some of the highest growth rates in their histories.

Substantial social and economic progress is also evident at the local level across the continent. Local innovations have played an essential role in this process and could prove crucial for long term sustainable development. Innovation is the “embodiment, combination or synthesis of knowledge in original, relevant, valued new products, processes or services”<sup>1</sup>. In the African context, it can involve the way business is done, production organised, a supply chain structured, financial resources distributed or essential services provided. It is more a process than a product and stems from both traditional knowledge and the application of modern science and technology. At the grass-roots level, it often involves local communities, utilising locally owned knowledge to create innovations which can then be disseminated to other communities and transferred to other activities. Ideally, local sustainable development initiatives can engender learning processes that go well beyond the projects themselves, pointing the way to solutions of national or regional significance. They can act as exemplars that, if successful, may be scaled-up and replicated. They will then generate externalities which benefit many while addressing needs which cash-and capacity-constrained governments have often found it difficult to meet.



Photo: Nokia Siemens Networks / Pasi Kemmo

## Technological leapfrogging for development

Technology alone is rarely the key to unlocking economic value, but it induces real wealth creation when it is combined with new ways of doing business. Information and communication technologies (ICT) afford an important opportunity for technological leapfrogging, in particular through mobile telephony. The adoption of mobile phones has been especially rapid in Africa (Note a), where an estimated 80 million people now have cell phones. This has paved the way for a range of cell phone-based innovations and new business opportunities. For instance, mobile telephony is transforming the financial landscape. Cell phone-based financial services are being developed in Africa to give rural people, many of them poor, access to banking, funds transfer, credit card and other financial services on a fee-per-transaction basis.

The Nokia Siemens Networks’ (NSN) “Village Connection” project offers a simple model to build rural connectivity village by village, enabling an innovative franchise-based business model between an operator and village entrepreneurs. The network helps provide affordable telecommunications services in rural communities, supporting banking operations and easing access to market and other information, thus contributing to rural economic development. By providing wider access to information, cell phones can also enable more people to take part in local decision-making within their communities.

However, Africa still lags behind in its pace of innovation. Apart from South Africa which experiences innovation rates comparable to the rates observed in developed countries<sup>2</sup>, most sub-Saharan African countries remain relatively slow to adopt innovations. The inadequacy of imported innovations to the context of least developed economies explains part of the difficulty to find solutions for Africa’s problems. The small size of most local markets, the lack of resources allocated to research and development activities, and the high rates of out-migration of educated Africans are also important constraints to technological innovation and diffusion. Besides, African indigenous innovators are generally overlooked in the search for solutions to endemic problems. Two main reasons<sup>3</sup> can be given for this: (i) innovations and discoveries they produce are mostly incremental, with modest prospect of income gains; and (ii) there is little knowledge sharing due to the application of innovations in isolation, lack of written or electronic records and inadequate communications infrastructure for knowledge sharing.

The build-up of a critical mass of indigenous capacity in sciences, including material sciences, biotechnology, engineering, medicine, and ICT remains essential. The elimination of institutional barriers, such as excessive regulation of innovative markets like telecommunications, is another core issue for the dissemination of innovations. At the local level, low levels of literacy and numeracy of prospective technology adopters, many of whom are poor, can also hinder diffusion.

### Notes on the approach

The objective of this report on Innovation for Sustainable Development: Local Case Studies from Africa is to shed light on the way innovative solutions have arisen to address local sustainable development challenges and on the determinants of success and the scope for replication. The report, which is a contribution to the documentation for the 16th and 17th sessions of the Commission on Sustainable Development, focuses on African experience, as Africa is one of the themes of the Commission's 2008/2009 biennium. The volume groups case studies under five headings: Enhancement of Agriculture and Fisheries, Protection of Ecosystems, Water Management, Health Improvement and Sustainable Tourism. Each theme is introduced by a general analysis of trends and challenges for Africa and then further developed through case studies. Two cases have been prepared for each theme and, of the 10 case studies, 6 have been written by practitioners actively involved with project implementation at the local level. The remaining 4 case studies have been written by DSD-DESA with input and guidance from project implementers.

The methodology for the selection and preparation of the case studies can be divided into three steps. First, five themes were identified based on an assessment of key African sustainable development challenges. Next, hundreds of case studies were screened and short-listed, of which ten truly innovative cases were selected. The selection relied on three main criteria: (i) The project should have a clear methodological or practical breakthrough and be effectively implemented; (ii) The project should have measurable and significant output; (iii) The project should generate a real improvement in social welfare and/or environmental protection. Thirdly, consultants who had effective experience in the implementation of these projects were identified and engaged in the preparation of the compendium of case studies wherever possible.

The report aims to draw practical conclusions from the 10 cases in the course of their presentation. A couple of those which emerge are as follows. Sustainable projects need to link environmental goals to income generation, draw upon local knowledge and ideas, ensure effective buy-in from stakeholders through local community involvement in project design and implementation, and employ financially self-sustaining business models (which are crucial for success but remain a challenge in some cases). External forces which impact on a project and affect conditions for success include international markets and national legislation. In some cases, though, local success can provide arguments for more accommodating national policies to facilitate replication and scaling up. Lastly, simplicity in project design, committed seed capital and integration of local traditions and cultural heritage appear to be important success factors for innovative local initiatives.

#### Note:

- a. International Telecommunication Union (ITU) figures.

*Drawing water at a well near Bandiagara, Mali. Access to water remains a key challenge in many African countries.*



# Enhancement of Agriculture & Fisheries



**A**griculture is fundamental to sustainable development in sub-Saharan Africa, where the sector employs 65 per cent of labour and generates about a third of GDP growth<sup>4</sup>. At the start of the 21st century, only 7 per cent of farm land in African least-developed countries (LDCs) was irrigated – the same as in the 1960s – while in Asian LDCs the ratio has trebled to more than 30 per cent<sup>5</sup>. The 2008 World Development Report notes that governments in sub-Saharan Africa spend far less on agriculture as a share of national budgets than the 11-14 per cent which helped fuel the Asian green revolution<sup>6</sup>. While developing countries as a group now spend more than developed countries on agricultural R&D, sub-Saharan Africa shows a declining trend in real terms (from US\$1.15bn in 1981 to US\$0.87bn in 2000, at 2000 international prices<sup>7</sup>).

A 2007 report from the OECD Development Centre<sup>8</sup> pinpoints three crucial domestic supply-side bottlenecks constraining agricultural and fisheries growth in Africa: (i) poor access to credit by smallholder farmers who dominate the farm sector (as a result of which they do not invest in irrigation, fertiliser or technical inputs); (ii) underdeveloped markets characterised by fragmentation and low purchasing power; and (iii) insufficient capacity to meet reliability, quality and health standards, notably in international markets. For example, Ugandan fish exports halved between 1996 and 2000 because of their inability to meet these standards. The same OECD study estimates that a sustained 1 per cent increase in agricultural yields would lift 2 million people out of extreme poverty in Africa.

Yield improvements crucially depend on innovation. Successful innovations often occur at the local level as solutions for unique farm-level problems, involving improvement or adaptation of traditional techniques. Local innovations can have positive country-wide impacts if there are effective communication and information-sharing channels to spread knowledge of them widely<sup>9</sup>. Innovations credited to R&D in Africa include the creation of drought resistant crop varieties of rice, maize and legumes. In addition, a new variety of maize has been developed at the University of Cape Town that is resistant to the maize-streak virus, an insect-borne disease<sup>10</sup>. These are the first such trials of a genetically modified crop in Africa and, if successful, this maize would be the first genetically modified crop created in a developing country.

Recent literature on African indigenous knowledge, especially in agriculture, emphasises that Africans are informed innovators with success stories in crop breeding, grafting against pests, water harvesting, soil management, conservation and processing<sup>11</sup>. Examples of innovative local practices include *zai* technology, which replaced traditional 'flat planting', in Burkina Faso and Niger. The technology enhances water and nutrient use efficiency, resulting in increased agricultural production. For example, the increase in millet yield in Burkina Faso and Niger was around 4 and 6 times, respectively, compared to the control<sup>12</sup>.

In Africa as in other parts of the world, many farmers are exploring new income-generating opportunities by experimenting with new crops as well as environmentally less harmful methods of growing traditional crops. Africa has begun to discover the niche market provided by the developed-country market preference for organic and other eco-labelled food products, but there is still considerable untapped market potential (Note a). Farmers are also actively diversifying to earn income from new sources. Honey Care Africa, a private sector company in Kenya, through a model of sustainable beekeeping, provides communities and individuals an opportunity to earn supplementary income.

In the area of fisheries, the village of Andavadoaka in Madagascar is another example of innovative local efforts. To address the growing threats to the coastal region, the community took control of marine resources and launched the world's first community-run Marine Protected Area (MPA) for octopus in 2004. This resulted in a significant increase in octopus fishing yield and mean size (both factors helped increased earnings of fishers). Within a year, the National Government of Madagascar used the project as a model to create seasonal octopus fishing bans across the country.

**Note:**

a. The development of an African eco-labelling scheme is one of the important activities identified in the African 10-year Framework Programme on Sustainable Consumption and Production (SCP).

# HONEY CARE AFRICA LIMITED, Kenya: Fighting Poverty with Honey



In Kenya, approximately 80 per cent of land is suitable for beekeeping. Yet, the potential of bee keeping and honey production has not been fully tapped in areas where the agro-ecological and climatic conditions as well as the land use patterns are near perfect. Traditionally, lack of market knowledge and the poor quality of the honey from rudimentary hives meant that honey sales were usually to producers of local liquor. Also, beekeepers were prone to exploitation by more knowledgeable middlemen. With the diffusion of its model of sustainable community-based beekeeping, Honey Care Africa (HCA) has been able to provide solutions to overcome these impediments.

**An original model of sustainable community-based beekeeping**  
This private sector company, established in 2000, links environmental conservation and poverty reduction, by providing beehives and related beekeeping equipment to organisations, communities and individuals. It guarantees market access for the honey produced by small-holder farmers, which it collects at farm-gate and pays for on-the-spot at fair trade prices. On the supply side, there are significant economic benefits. The project provides a second and possibly even a third source of income to small farmers. These farmers do not have to own large tracts of land, as beekeeping requires minimal land and, further, does not require large amounts of time to be spent on tending hives. The income generated through commercial bee-



keeping is sufficient to take all beneficiaries over the poverty line, defined as US\$16 per month<sup>13</sup>. In addition to the income generated through this project, the beehives will, indirectly, lead to additional pollination, thus increasing the yields of crops currently planted in the area.

All community beekeeping projects begin with a site visit. The area is studied with respect to potential for beekeeping and ecological suitability. Training is provided through both on-site and off-site demonstrations and field work. All training sessions have a variety of information embedded – information on HIV/AIDS, malaria and messages on the importance of education and health. Ongoing field visits are carried out to ensure farmers learn the right techniques and are implementing the project in the most efficient manner. As the harvest season approaches, Honey Care Africa's Project Officers assist in the harvesting and collection of honey, while ensuring timely and efficient payments to farmers. They also provide additional services, including siting of the hives and assistance in best practices for honey harvesting, and ways to maintain quality standards and ensure maximum yields from the hives. On-going support is defined as at least two visits to the beekeeper's apiary by HCA staff per year. Once collected, raw honey is processed and distributed in honey packs by Honey Care. These packs are pure high quality honey in 20g plastic tubs.



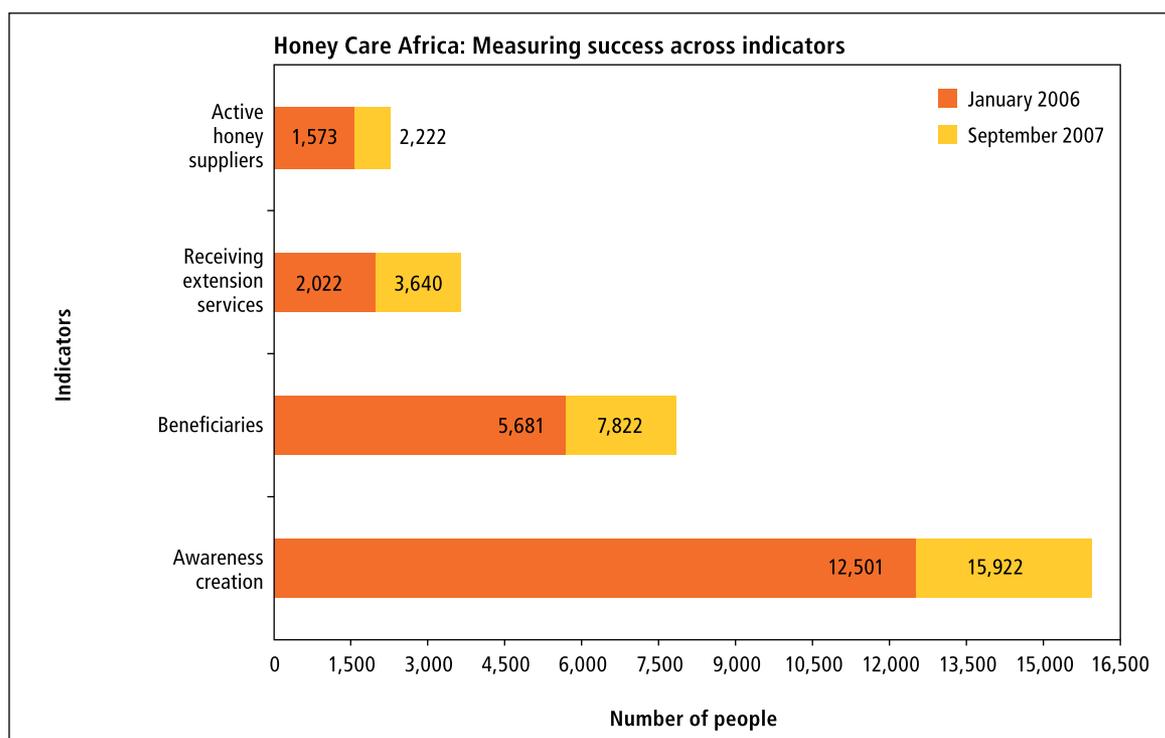
### Moving out of poverty

Honey Care Africa currently operates in all provinces in Kenya, with the exception of the North Eastern province, and has 7 collection centres across the country. It purchases and markets 65-100 metric tons of honey annually from roughly 20,000 hives managed by rural communities in Kenya. It works with over 4,000 beekeepers, who earn on average US\$1.76 per kilogramme of honey they produce. This represents additional income of approximately US\$250 on an annual basis. This initiative creates additional employment opportunities through contracts (bee suits & smoker manufacture) and upstream and downstream (timber & packaging materials) linkages. The total number of beneficiaries, which includes farmers who have been paid for honey collections as well as farmers who have received hives as samples or financed through micro-credit schemes or donors, increased almost 1.5 times in 18 months (January 2006 - September 2007) to 7,822.

Since the creation of Honey Care Africa, 15,922 individuals were informed and exposed to beekeeping in Kenya. Women and youth have been particularly encouraged to participate in the initiative. Awareness creation activities involve free training sessions on honey production, harvesting, cleaning of hives and processing activities. Honey Care Africa also organises trips for local farmers to view the product at supermarkets.

The environmental impact has also been significant. Honey Care Africa established a practice called “Bees for Trees,” where communities and individuals working to promote agro-forestry and the conservation of forests are given hives as a direct and immediate economic incentive to encourage them to plant and protect trees. It also promotes the use and protection of local sub-species of bees.

*The following graph shows monitoring and evaluation (M&E) data that has been tracked over 8 quarters, January 2006 to September 2007.*



## Vision

Honey Care Africa's goal is now to increase beneficiaries by 400 farmers every year, translating to an additional 2,000 Langstroth hives annually, and the number of distributors would increase in tandem. As it expands its distribution network for honey packs, some of the beekeepers and their relatives could also act as distributors, earning additional income. New partnerships will be built throughout the project areas with distributors and focus groups. There are also plans to extend facilities and provide more value-added services to farmers. Pilot projects are underway to create libraries in collection centres. These centres consist of a 2-room structure – with facilities for honey extraction and storage and for farmer payments. The eventual goal is to process honey at these centres by involving farmer groups in the processing phase so as to further supplement their incomes.

For marketing purposes, leaflets and posters advertising the various flavours of honey on offer and highlighting the advantages of honey will be disseminated to the communities. There are also plans to supply the product to schools. In addition to selling the honey packs, the distributors will also work with Honey Care Africa to disseminate other information relevant to good health and healthy living. Besides, a strategy is under development to collect waste tubs for shipment to Mombasa and processing into value added products like straws.

Honey Care Africa will forge linkages with a network of women groups through the Kenya Women's Finance Trust. It is also in the process of linking with institutions that grow horticultural produce such as green beans. It will invest in the training and sensitisation of these communities to beekeeping and will provide a guaranteed market for the product. Further leverage will come through co-sharing of the collection centres for products other than honey – as this would build critical mass and increase usage.



# VILLAGE OF ANDAVADOAKA, Madagascar: Marine Reserves for Octopus

Fish stocks are dropping rapidly in number and diversity. Scientists believe the number of large fish in the oceans has fallen by 90 per cent since the 1950s. Even species at the bottom of the sea are at risk. Establishing and enforcing fishing bans in deep-sea reserves holds promise for countering this process. Marine biologists have been campaigning for marine reserves for decades, yet when they were first suggested the reaction from fishermen ranged from suspicion to disapproval. Now, more and more fishermen are convinced that reserves will help maintain their livelihoods. The case of the Village of Andavadoaka, in remote southwest Madagascar, illustrates how these new practices can be successfully adopted by a fisher community.

## Adapting to change

Fishing is the primary economic activity for 71 per cent of villagers in Andavadoaka. However, fishing pressure has been considerably exacerbated by commercialisation of traditional fisheries. Between 2002 and 2003 there was a 35 per cent increase in octopus exports to France<sup>14</sup>. Commercial collectors and exporters first arrived in the Andavadoaka region in 2003, providing ready access to a higher paying market for fresh octopus and large reef and pelagic fish species. Although fishing

methods are still traditional, the recent introduction of commercial markets for fresh fish, as opposed to the traditional dried and salted fish market, has led to an increase in the value and exploitation rates of target species such as the reef octopus. This increase has been accompanied by a change in recent years from a largely barter and subsistence economy to a fisheries-driven cash-based economy. As international fisheries businesses expand their operations in Madagascar, marine resources are being exploited at unprecedented rates to supply the global market.

Effectively managing ecosystems and conflicting needs of resource users is therefore a major challenge to environmental management decision-makers in the region. Working in partnership with Madagascar's Institute of Marine Sciences (Institut Halieutique et des Sciences Marines – IHSM), UK-based NGO Blue Ventures Conservation commenced monitoring the region's marine environment in 2003. The overall objective of the Partnership is to

*Villagers in Andavadoaka returning from octopus fishing on the day the Nosy Fasy NTZ was reopened to fishing in 2005. The octopi are much larger on average than pre-closure levels*



© Blue Ventures Conservation



protect marine and coastal biodiversity whilst improving livelihood sustainability in the region of Andavadoaka. The coral reefs of Andavadoaka have since attracted the attention of other research and conservation NGOs and the Malagasy government as a key site for developing marine conservation initiatives in the country.

Vezo communities in Andavadoaka and surrounding villages have also understood that the livelihoods and economic security of community members are inextricably linked to the health of local marine systems. Witnessing the growing threats to the region's coastal ecosystems, the village of Andavadoaka decided to take control of its marine resources. Community leaders worked to develop and launch the country's first community-managed marine no-take zone (NTZ) for octopus. The goal of the NTZ was to ensure that octopus, the region's most vital commodity, would remain a viable resource for years to come.

Village elders and local fishers combined traditional knowledge with fisheries science to implement seasonal fishing bans and allow octopus to grow in size and number. The strategy ensures long-term survival of octopus and greater yields for local fishers when the bans are lifted. In parallel, project leaders have been working with local communities to stimulate and diversify the local economy through the development of alternative sustainable livelihoods, including eco-tourism and mariculture (Note a) businesses, providing financial alternatives to overexploitation of natural resources, the primary non-climate-related threat to the region's biodiversity.

The project remains vulnerable to other outside forces beyond local community control. Hence, commercial trawlers regularly operate within the shallow coastal waters, unmindful of the fisheries restrictions that have been agreed by local resource users. Despite this, the results have been strikingly positive. Following the first experimental closure, the number of octopus caught by locals increased 13 times, and the mean sum weight of octopus caught jumped 25 times, compared to the pre-closure levels. Following a second closure several months later, the number of octopus caught was more than four times pre-closure levels and average weight of octopus caught was more than double pre-closure levels. Furthermore, increasing the average size of the octopus population also increases its reproductive output. Results have confirmed that decreasing fishing intensity on the opening days can increase the duration of fisheries benefits from the NTZs.

*A villager catches octopus off the coast of Andavadoaka*

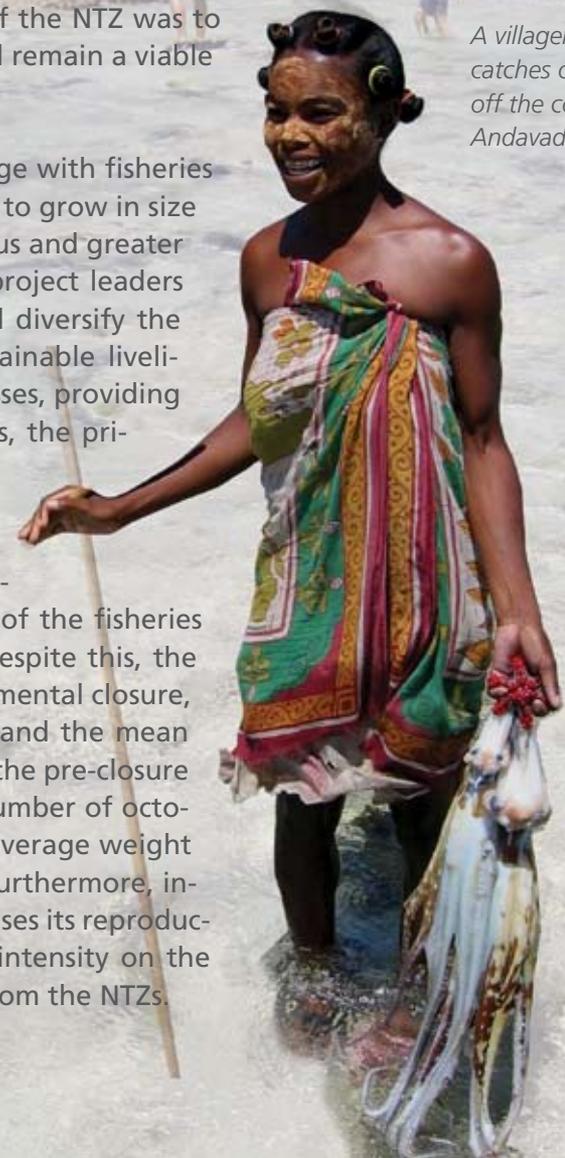


Photo: Blue Ventures Conservation

The project has fed technical reports and policy briefs to local and national governments, as well as international networks (particularly the Western Indian Ocean Marine Science Association (WIOMSA), Coral Reef Degradation in the Indian Ocean (CORDIO), Indian Ocean Commission, and the newly-formed Western Indian Ocean Marine Ecoregion (WIOMER) MPA Managers' Forum. Whilst the precise circumstances of the Velondriake

project may not be directly replicable beyond the Vezo communities of southwest Madagascar, the bottom-up approach to community-management and partnership processes employed in the project's development have provided Madagascar's first potentially replicable blueprint for community-centred marine and coastal conservation planning. In doing so this initiative is expanding national capacity for biodiversity conservation and improving the availability of data, lessons learned and best practice guidelines.

*Villagers from Andavadoaka and neighbouring communities develop maps for the Velondriake project, designating specific areas they would like to protect*



Photo: Blue Ventures Conservation

### Replicating success

The project has proved so successful that neighbouring villages have requested support in establishing their own NTZs for octopus and the government of Madagascar consulted the project's results when it created in 2005 a seasonal closure area across the southwest of the country. By early 2006, a network of four short-term octopus NTZs had been implemented.

As a result of ongoing requests for project expansion, Andavadoaka's village elders are now working with 23 neighbouring villages, Blue Ventures, IHSM, the Wildlife Conservation Society (WCS) and fisheries collection and export companies to expand conservation projects to promote the long-term sustainability of a variety of marine and coastal species and habitats. A regional marine conservation plan is now being developed with local communities stretching along the coast over 20 kilometres south and north of Andavadoaka, as a means of protecting threatened marine resources through the cooperative endeavours of villagers (Note b).

The conservation plan, named Velondriake (which means 'to live with the sea'), is a network of marine and coastal protected areas aimed at protecting the area's biodiversity from

# VILLAGE OF ANDAVADOAKA, Madagascar: Marine Reserves for Octopus

unsustainable overexploitation and ensuring that these marine systems remain healthy and productive for future generations. The marine conservation intervention was made possible by the full participation of the local community, brought about by a multi-stakeholder approach establishing accepted local laws.

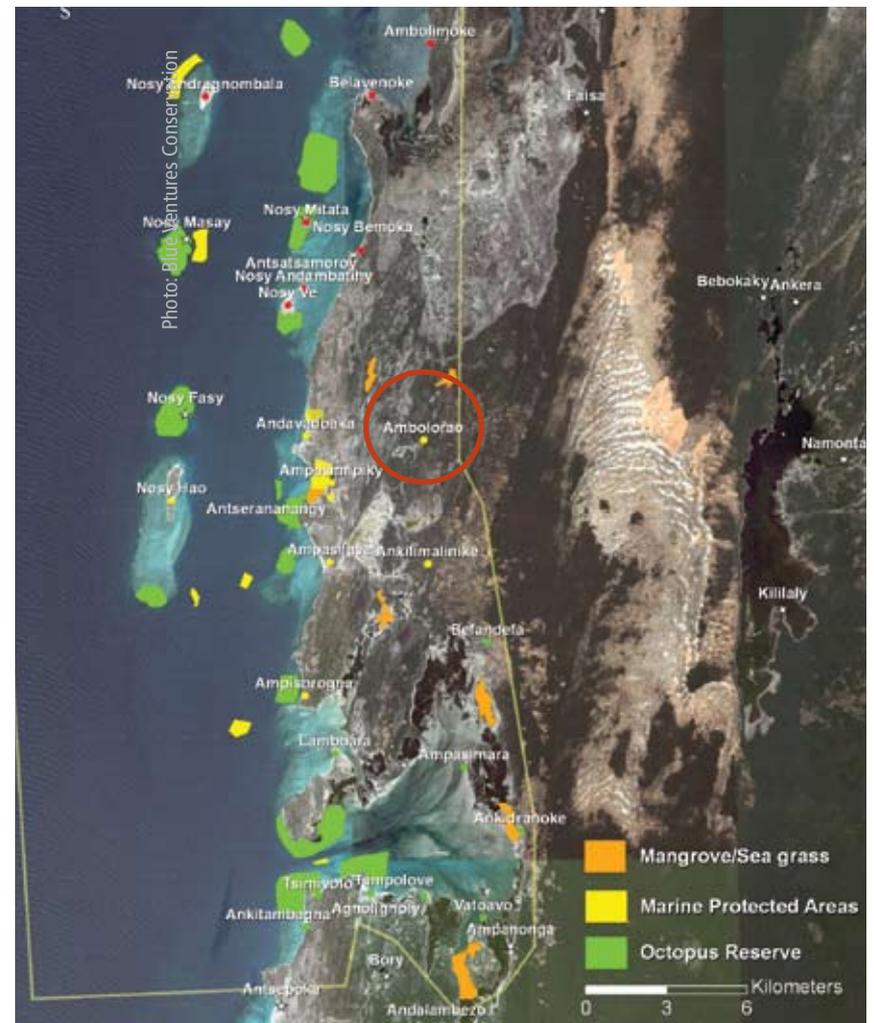
It remains to be seen what the long-term ecological and fisheries effects of the octopus NTZs will be. The rapid growth of the number and area of the reserves incorporated within the network, although encouraging, has meant that the detailed and rigorous monitoring that was prioritised through the first phase cannot be continued at the same focused level across the broader Velondriake region, due to limitations of human and financial resources available for the project.

## Next steps

In addition to its central role in the Velondriake process, Andavadoaka is working to build an Ecolodge that will be fully owned and managed by the community. The eco-lodge will serve as an economic incentive to conserve the region's natural beauty and resources while providing villagers with an alternative source of income to fishing. The village has designated 21 acres of beach-front land for the location of the lodge.

## Note:

- Mariculture is the cultivation of marine organisms in their natural environment.
- Blue Ventures, IHSM, Copefrito and aquaculture research group Aqualab are working together to establish a sea cucumber farm in the region. The partnership currently provides Andavadoaka's Women's Association with 250 juvenile sea cucumbers every 3 months. The Association is then responsible for farming the juveniles into marketable products that Copefrito has agreed to buy for sale to international markets.



# Water Management



Improving water management is an essential component of sustainable development policies. It is critical for African development as it conditions various dimensions of economic growth and social welfare. Irrigation is a key determinant of agricultural productivity. Hydro-electricity can represent a large share of energy in countries where rivers are abundant. Access to drinking water is decisive for public health.

The management of water resources still poses challenges in many African countries. Fourteen of them, mostly located in the Sahel region and the Horn of Africa, experience water stress (less than 1,700 m<sup>3</sup> per capita/year) or water scarcity (less than 1,000 m<sup>3</sup> per capita/year)<sup>15</sup>. Natural conditions account for a large part of this difficult situation as most of Africa's continental landmass is classified as arid or semi-arid and 60 per cent of the population lives in zones with mean annual runoff of 300 millimetres or less<sup>16</sup>. However, water stress is also the consequence of underdeveloped infrastructure. The lack of dams and deep wells seriously reduces the capacity of local populations to collect and store water. Also, weak water and wastewater management plays an important role in the degradation of water bodies. The lack of water treatment facilities in urban areas reduces the access of the local population to potable water. The use of unsustainable agricultural practices contributes to soil depletion, land degradation, and wasteful use of scarce water resources.

If large-scale projects are needed to address strategic water issues, particularly to improve water infrastructure, local initiatives can also play a major role in improving water management. In terms of access to water, small infrastructure projects can provide coverage in areas not covered by larger municipal water networks. Hence, the Lunfumbu village case, presented in the first subsection, shows how a community of poor villagers can organise itself to define its priorities and manage the construction of a local water supply scheme. With this initiative, villagers challenged the long-held tradition among rural people of waiting for external resources or Government support funds to develop water infrastructure. They also showed that the improvement in local water management has widespread side-benefits for a community, from reductions in poverty and gender imbalance to biodiversity protection. Similarly, improvements in the micromanagement of large infrastructure, such as dams, can generate considerable benefits for human living conditions and for biodiversity. Thus, the second case study treated in this section, the Kafue Flat restoration case, highlights the importance of day-to-day management of water infrastructure. Following the construction of the Kafue Gorge hydro-electric dam downstream of the Flats, the Itezhi-tezhi Dam was built upstream in 1978 to store wet season peak flows, disrupting one of the richest wildlife habitats. Through dialogue and scientific research, local communities, non-governmental organisations and dam managers succeeded in restoring a water flow pattern similar to the one existing before the construction of the dam. Around 300,000 people are expected to benefit from the restoration of the Flat's ecological health.

# LUFUMBU VILLAGE WATER PROJECT, Tanzania: Offsetting Shortage in Water Infrastructure

How can water be supplied to areas that are not covered by the public water network? In sub-Saharan Africa, this question is of crucial importance. As of 2004, only 16 per cent of the population had household water connections (mostly in urban areas), and only 56 per cent had access to safe drinking water (only 42 per cent of the rural population). As a result, local initiatives are needed to fill the water gap. The case of the Lufumbu village, in South West Tanzania, illustrates how a small community can decide to build its own water supply scheme and effectively construct and manage such a scheme.

Lufumbu is a small village, in the Ludewa district, with a population of 6,180 people. Almost all the people in the village are poor, living on less than US\$ 1 per day. Villagers earn a living through agriculture, growing food crops, namely maize, beans and other legumes, as well as cash crops, mainly coffee and banana. Incomes from agriculture are low due to absence of a reliable market for their crops. The problem of crop marketing is compounded by the remote location of the village and poor access roads.

## Mobilising community effort for water supply

In 1992, the government conducted a survey to determine villages in dire need of water so that water projects could be constructed by using government funds. For reasons of budgetary constraints, Lufumbu was not selected. This disappointed the villagers. They sat down and, in a participatory way, voted to raise their own resources to establish a village water supply scheme.

*The Water Tank*



Photo: UNDP/CWI – Lufumbu water supply project



The scheme, which relies on a simple gravity principle, was designed jointly by the villagers and water technicians. Its costs, which did not exceed US\$50,000, were shared between the villagers (48 per cent), the Roman Catholic Church (10 per cent) and the United Nations Development Programme (42 per cent). With 10 kilometres of mains, a reservoir tank of 60,000 litres and 56 drawing points, the scheme was designed to serve the whole community. It was effectively implemented by the community itself, through a clear division of tasks. Adult men were in charge of the collection of sand, aggregates and stones, the construction of intake and reservoir tank as well as the excavation of the gravity main and distribution mains. Adult women were responsible for ferrying and loading of building materials and water, while older persons and children provided support, for example by cooking food for the workers. Consequently, the implementation of the Lufumbu project was quick. It took the villagers only 4½ months to finish the project.

Upon completion, the Lufumbu water scheme produced a wide range of results, going far beyond the anticipated objective. Access to water was dramatically improved, leading to a significant reduction in the incidence of water borne disease in the community. Agricultural productivity has increased, while additional initiatives to establish nurseries for coffee have contributed to the expansion of coffee farming. Housing has also benefited from this better access to water, as water is required to make brick houses. Hence, over 327 modern brick houses can now be seen towering around the Lufumbu village.

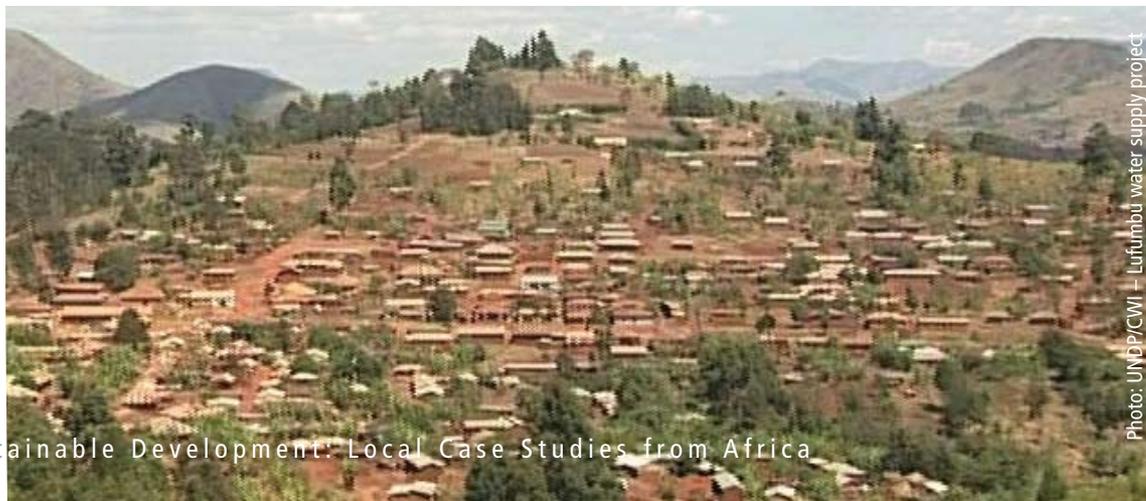


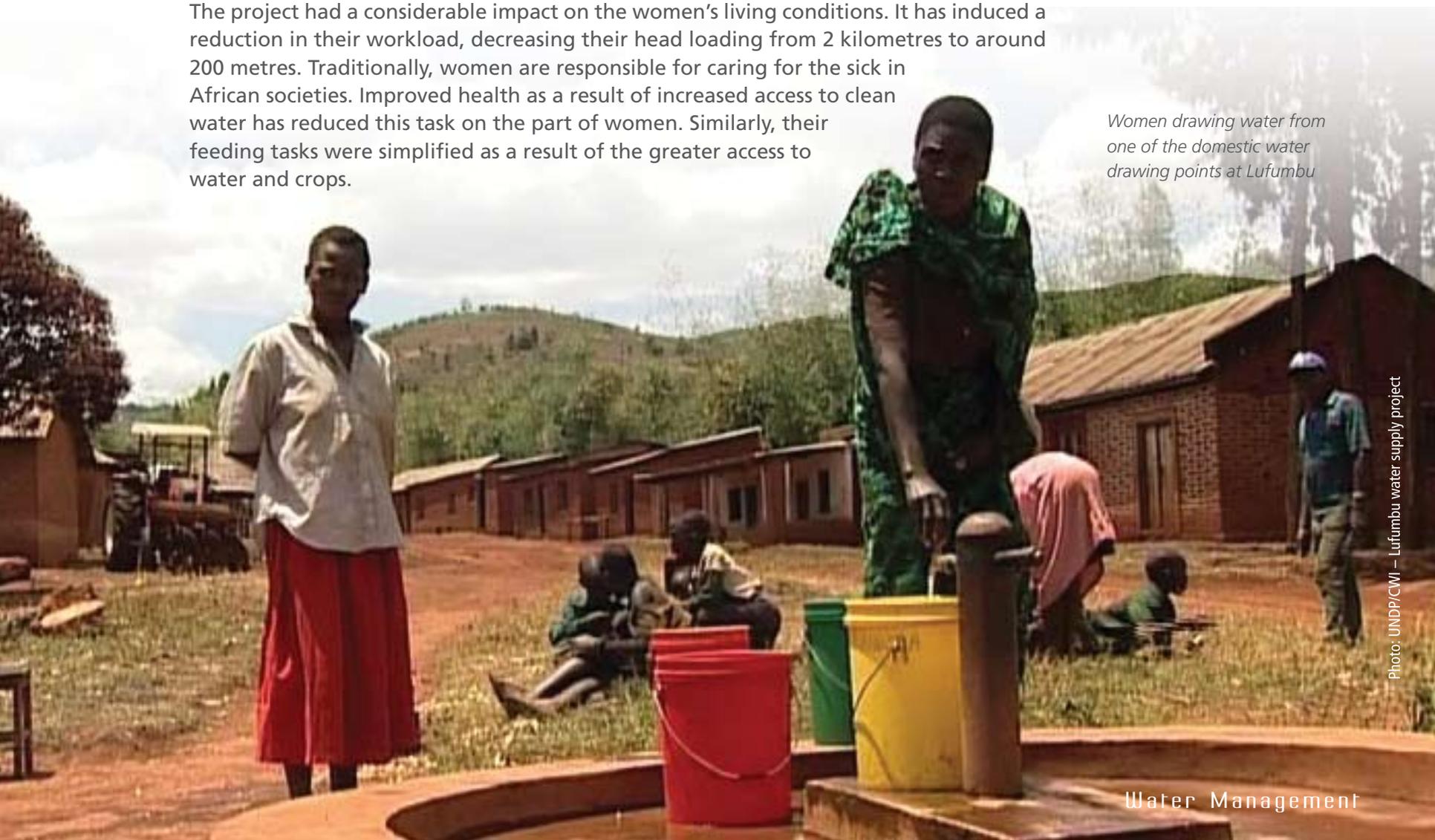
Photo: UNDP/CWI – Lufumbu water supply project

*An overview of the Lufumbu Village*

The easy access to water has also encouraged villagers to afforest and reforest their land. Valleys and hills that used to be bare are now covered by vegetation, attracting various species of birds, insects and small wild animals that had long disappeared. A long-term conservation strategy for the water source has been put in place. Villagers have planted and maintained trees with water retention properties in the catchment areas.

The project had a considerable impact on the women's living conditions. It has induced a reduction in their workload, decreasing their head loading from 2 kilometres to around 200 metres. Traditionally, women are responsible for caring for the sick in African societies. Improved health as a result of increased access to clean water has reduced this task on the part of women. Similarly, their feeding tasks were simplified as a result of the greater access to water and crops.

*Women drawing water from one of the domestic water drawing points at Lufumbu*



# LUFUMBU VILLAGE WATER PROJECT, Tanzania: Offsetting Shortage in Water Infrastructure

## Showcasing innovative water governance

The Lufumbu village case is truly innovative for at least three reasons. First, it shows how even infrastructure projects, which are assumed to be more technical and complex than other projects, can be owned by a community of poor villagers. The villagers, guided by their leaders, conducted an analysis of their situation and ranked water as their priority need without involvement of external support. Similarly, they participated fully in the design and the implementation of the scheme, although technicians were hired. They used their own resources to kick start the project. External resources came later to complement resources that had been provided by the villagers themselves.

Next, the water governance in this project has proved particularly efficient and transparent. The implementation of the scheme was divided into seven segments, each of them being managed by a committee. Through these committees, all community members were involved in project implementation. Likewise, the management of the scheme is ensured by a water committee that is elected democratically. It is constituted of villagers that have undergone training.

*The village dispensary at Lufumbu is connected to the Lufumbu water supply system. Before the project, it was a huge challenge running a dispensary without a reliable water supply*



Photo: UNDP/CWI – Lufumbu water supply project

*Construction of Village Roman Catholic Church building, using burnt brick, was made possible due to easy accessibility of water from the Lufumbu water scheme*

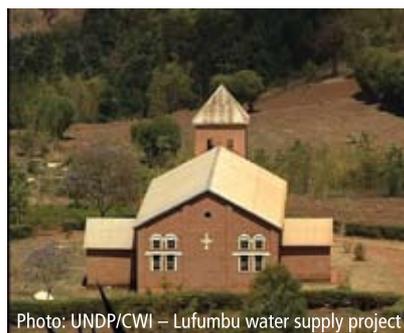


Photo: UNDP/CWI – Lufumbu water supply project

Furthermore, the project has generated positive feedback for the whole region, through technological innovations. Lufumbu villagers invented and designed low cost reservoir tanks that use locally obtainable materials, namely stones and corrugated iron sheets. This invention has now been adopted by the District Government as the standard design for all community-based water schemes in the district.

# KAFUE FLATS, Zambia: Preserving Biodiversity through Water Management

Africa needs more infrastructure to collect, store and distribute water. However, this infrastructure, particularly large dams, tends to disrupt the natural water cycles and the ecosystems relying on them. How can water and hydropower management be reconciled with these fragile ecosystems? The Kafue Flats case illustrates the role that technological innovation and cooperation can play in this respect.

The Kafue River in Zambia is a major tributary of the Zambezi River. The Kafue Flats is a 6,500 square kilometre floodplain midway along the river that was once one of the richest wildlife habitats in Africa and sustained local peoples through hunting, fishing, and cropping on the Flats as floods receded at the end of the wet season. Following construction of the Kafue Gorge hydro-electric dam downstream of the Flats, the Itezhi-tezhi Dam was built upstream in 1978 to store wet season peak flows to maximise hydropower production at the lower dam, which is the primary power source for Zambia. The operations of the upper dam interrupted the beneficial wet season flooding of the Kafue Flats, resulting in serious social and ecological impacts. Around 1.3 million Zambians from several ethnic groups live in the greater watershed and about 300,000 of these people rely directly on the Kafue Flats.



Photo: WWF-Canon / Frans Schepfer



Photo: WWF-Canon / Martin Harvey

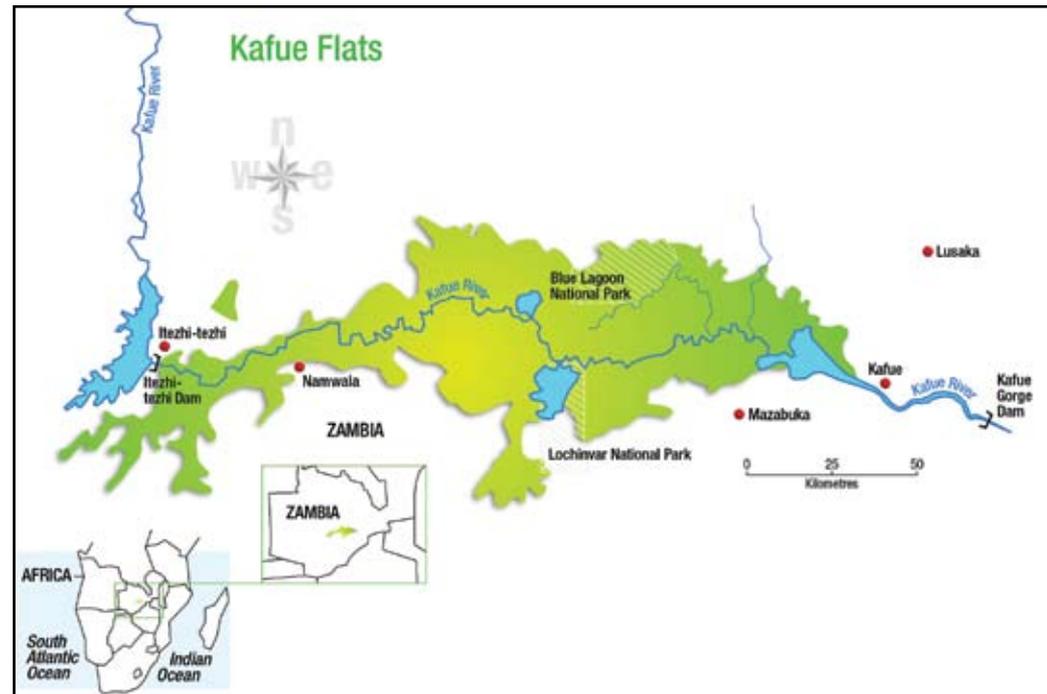
*Sugar cane farms rely heavily on water from the Kafue River for irrigation, and effluents from sugar-cane processing are discharged back into the river. Rich in nutrients this causes plant growth (Water hyacinth) which clogs up waterways. Local people have problems navigating the river and fish suffocate.*



### Working together for multi-stakeholder gain

In 1999, the World Wildlife Fund (WWF) initiated dialogue among the Zambian Government, the Zambia Electricity Supply Corporation (ZESCO), local peoples and commercial farmers, to restore a more natural flow pattern to water releases from the Itezhi-tezhi Dam. It brought in Dutch technical expertise on flows management, and served as an advocate for conservation. The Zambian Government's Ministry of Energy and Water Development (MEWD) is the government regulator that has sought to reconcile conflicting objectives in managing the dams, while also promoting development. ZESCO is the government owned supplier of electricity who operates the dams, and has sought to minimise their impacts on local people and the environment. Local peoples are from different cultures and have different interests, ranging from traditional owners who wanted to see restoration of the environment and traditional livelihood activities, commercial farmers wanting a reliable irrigation water supply, and recent residents of the region looking for improved livelihoods. Local people were involved via their local chiefs and headmen and community steering committees.

The two following years (1999-2000) were spent scoping the project and building working relationships. Between 2000 and 2002, an integrated water resources management study for the flats was undertaken by Dutch consultants, using WWF funding and under the supervision of ZESCO and MEWD. The KAFRIBA (Kafue River Basin) hydrology model was developed, based on a Pitman rainfall model. It has been linked with real time data, obtained from the new rainfall and river gauging stations installed in the catchment to predict water flows and reservoir levels. In 2004, an agreement was reached among all partners to implement new dam operating rules associated with the KAFRIBA model.



In early 2007, a major flow mimicking natural wet season flooding was released for the first time. Concurrent modules have been launched for wetlands rehabilitation, focusing on infrastructure development, tourism enhancement and community-based natural resource management.

The long term results are expected to be considerable. It is anticipated that, as a result of the restoration of a wet season flood from 2007, the environmental health of Kafue Flats will start to improve. The livelihoods of local people are expected to show a similar trend, with increased fish and pasture productivity, the development of a wildlife based tourism industry and sustained irrigation capacity. Environmental health is expected to improve, especially in reserves, where populations of the threatened Kafue lechwe antelope should increase. Besides, hydro-electricity production will be maintained or increased, thanks to a better management of water flows.

### Increasing impacts

The project has already had dramatic implications in terms of water governance. It has influenced development of Zambian Government policy on water resources. The Integrated Water Resources Management Strategy for the Kafue Flats developed under this partnership was endorsed by the Ministry of Energy & Water Development in 2002. The project has also seen the designation of over 3 million hectares of wetlands as Ramsar sites in the Kafue River basin, fulfilling Zambia's commitments under the Ramsar Convention on Wetlands. WWF is in dialogue with the Zambian Government on the integration of the successful methods at Kafue Flats into the proposed new Water Act, including provisions for establishment of Sub-Catchment Councils. The project has also informed the national Water Resources Action Plan and National Wetlands Strategy.

The results are clearly conditioned by the specificities of the Kafue Flats. Besides water abundance that characterises the Zambezi River and has helped ease the sharing of water, the initiative has benefited from the long-term commitment of the various partners. The implementation of this project has been time consuming, lasting more than 8 years so far, and costly. For the first 6 years alone, the Kafue Flats initiative cost more than US\$1 million. Furthermore, effective

environmental flow systems require agreements in the societies concerned on the social, economic and environmental values to be sustained by these flows, to determine the needed volume, quality and timing of water flows. This can be a powerful process for improving governance and promoting societal harmony.

There is considerable opportunity to replicate in other areas where dams are having ongoing environmental and social impacts. Successful projects will depend on the willingness of governments, dam operators, NGOs and local communities to collaborate; good water governance; availability of funding and data; access to technicians; and limited development on floodplain areas that will enable restoration of environmental flows. Re-operating dams to provide environmental flow releases is being undertaken in many places in the developed world, including in the European Union, United States of America and Australia. Rarely have these methods been successfully applied in developing countries, despite the potential for substantial benefits for people.



Photo: WWF-Canon / Frans Schepper



Photo: WWF-Canon / Frans Schepper

# KAFUE FLATS, Zambia: Preserving Biodiversity through Water Management

At a Zambezi River basin scale, discussions are underway on the feasibility of up-scaling of the environmental flows model from Kafue Flats to other dams, mainly the Kafue Gorge, Cahorra Bassa and Kariba dams, so as to extend benefits to the entire course of the rivers in Zambia and Mozambique.

These discussions include the Zambezi River Authority, the Joint Operational Technical Committee for Cahorra Bassa and Kariba dams, and the SADC agreement for an IWRM strategy for the Zambezi under the auspices of its shared water protocol. Further, preparations are underway to develop a conjoint operation and management strategy for the three dams.

*Inspection of drying fish in  
Shimungalu fishing village  
on the Kafue River*



# Protection of Ecosystems



**A**frica is endowed with abundant natural resources, accounting for about 10 per cent of global freshwater resources, 17 per cent of global forest cover, a quarter of mammal species and a fifth of bird and plant species. Most rural households rely on these resources to meet their nutrition, health and energy needs. If well managed, this exceptional richness offers opportunities for improving human well-being.

However, ecosystems are under growing threat throughout the African continent. For instance, from 1990 to 2000 deforestation took place at a rate of 0.8 per cent per year in Africa, versus 0.2 per cent at the global level. Population and economic growth are major factors fuelling increased demand on resources. Another underlying cause of environmental and land degradation is inadequate management of natural resources on which a large part of the economy is based<sup>17</sup>. In many officially protected areas, effective safeguards of ecosystems and biodiversity remain a concern due to inadequate protection funding<sup>18</sup>. Disruption of ecosystems through over-logging and overfishing reduces the resilience of many species, making the recovery of ecosystems difficult if not impossible<sup>19</sup>. In addition to threatening the livelihoods of the rural poor, natural resource depletion and degradation has widespread effects on ecosystem services, on Africa's river systems and on the expansion of deserts.

Ecosystems and the biodiversity they support form part of the 'natural capital' of a country, which includes cropland, subsoil resources, pasture, forests, marine and freshwater resources, and protected areas<sup>20</sup>. Substitutes are available for some ecosystem services, although often the cost of technological substitutions is too high and not all services can be replaced. For example, although water treatment plants can substitute for ecosystems in providing clean drinking water, they may be expensive and will not overcome the impacts of water pollution on other components of the ecosystem and the services they provide. Therefore, the preservation of African ecosystems is a priority for the sustainable development of the region. As the Millennium Ecosystem Assessment (MEA) points out, "many of the (Millennium Development Goals, MDGs) targets are unlikely to be achieved without significant improvement in management of ecosystems<sup>21</sup>." The two case studies here present innovative solutions to achieve this objective.

Wetlands cover about 1 per cent of Africa's total land area and are found in virtually all countries<sup>22</sup>. They form an important component of agro-pastoral production systems and local livelihoods<sup>23</sup>. The vital role played by wetlands in many rural economies (for the provision of highly productive agricultural land, dry season grazing for migrant herds, fish, fuel wood, timber needs and medicines) is only now being adequately considered in national water policies. As a result, wetlands have been increasingly endangered by poor cultivation, deforestation, draining to increase agricultural land and overgrazing<sup>24</sup>. The 'Working for Wetlands' programme restores degraded wetlands across South Africa to enhance water supplies and conserve biodiversity.

In the second case study, the 'Cows to Kilowatts' project, a south-south partnership, uses the waste produced by a local abattoir in Nigeria to manufacture low-cost household cooking gas and organic fertiliser. Before the project was conceived, the waste caused high levels of organic pollution and pathogens in the Bodija River. Communities located downstream from the slaughterhouse were affected as they used the polluted river water for domestic purposes, such as washing and sometimes drinking.

# BUSHBUCK RIDGE PROJECT, South Africa: Working for Wetlands



*Lake Fundudzi, another Working for Wetlands project site in South Africa, is an important source of fish for the local communities.*

A dry country with exceptionally rich biodiversity, South Africa has particular reason to value the water-related services that wetlands provide. The National Spatial Biodiversity Assessment 2004 found that 44 per cent of freshwater ecosystems associated with the main rivers in South Africa are critically endangered, compared with only 5 per cent of terrestrial ecosystems. The South African Government reports that, by 2025, the nation will be one of 14 African countries subject to water scarcity (less than 1000 m<sup>3</sup> per person per year). As of 2004, 12 per cent of South Africans still lacked access to adequate water supplies and 35 per cent lacked access to adequate sanitation services, despite a remarkable extension of water services to poor communities since the end of apartheid.

## **Restoring, conserving and empowering**

The 'Working for Wetlands' Programme undertakes wetlands restoration across South Africa. Its guiding principle is to restore degraded wetlands to enhance water supplies and conserve biodiversity for the benefit of society. Also, by employing the most disadvantaged to undertake this task (from six to twenty-four months), the pay, skills and experience obtained

provide participants with the opportunity to escape poverty. Hence, the Programme selects its employees from among the long term unemployed; prioritising employment of single parents, youth (20 per cent target; 18 per cent in FY05), women (60 per cent; 54 per cent) and people with disabilities (2 per cent; 4 per cent)<sup>25</sup>. Prior to the Programme's establishment in July 2000, there was no nation-wide government effort to restore wetlands, and employment relief programmes did not exist.

The project sites are all in areas identified by the South African Government as 'poverty nodes'. The Programme selects wetlands for conservation that are a priority for conservation and water supplies, and where on-ground works can enhance the health of the wetlands. The projects have focused on construction of structures to halt erosion and restore the hydrology of wetlands sites, as many wetlands are degraded by erosion gullies. Works commonly include blocking drains originally dug to dry out the wetlands, removal of invasive alien plants (thirsty species such as exotic eucalypts and wattles can reduce water supplies) and propagation and planting of indigenous species. At specific sites, other interventions have included the construction of a boardwalk for visitor access and breaching a road embankment to restore water flows.

'Working for Wetlands' is partnering with private sector companies in the mining and forestry industry to expand both the funding base and program outreach. In 2006, the mining industry contributed around R7 million (~US\$ 1 million) towards projects that impact on their operations. Farmers and forestry companies contribute a further 3-5 per cent of program costs for wetlands restoration involving their lands, and are committed to ongoing management responsibilities.



### Tracking performance

In the 5 years to 2005, the Working for Wetlands Programme rehabilitated 175 wetlands nation-wide and employed 8,000 disadvantaged South Africans at a cost of R195 million (USD\$ 28 million). In 2007, the Programme completed 12,905 m<sup>3</sup> of gabion (rock basket) structures, 6,591 m<sup>3</sup> of concrete structures, 16,599 m<sup>3</sup> of earthen structures, and 43,206 m<sup>3</sup> of earthworks; it re-vegetated 183,048 m<sup>2</sup>, cleared 1,052 ha of invasive plants, and propagated 112,711 indigenous plants. It has raised public awareness of wetland conservation, helped maintain cultural values, and enhanced local water supplies.

An independent study in 2005 (Note a) revealed that the beneficiaries' livelihoods were most likely to have stayed unchanged without the programme's intervention. Prior to its implementation, people were without stable sources of income and depended mainly on state grants, especially child-support grants. Programme participants have benefited from life-skills education, through basic adult education courses on first aid, HIV/AIDS, financial management and technical skills such as construction techniques.

*Pilot Malele and team hard at work, constructing gabions at Bushbuck Ridge*

Furthermore, large multiplier effects are experienced in most project sites, as the projects empower local communities and strengthens the relationship between communities, their leaders and public authorities. Other benefits include poverty reduction through job creation, skill development and enhanced self esteem; restoration of environmental health and of fish resources and maintenance of domestic water quality, as in Lake Fundudzi and surrounding wetlands; enhanced livestock production through more reliable water supply and grazing on wetland vegetation; improved food production from more reliable irrigation; potential for the community to generate incomes from sale of crafts based on weaving using wetland plant fibres; increased use of traditional roof thatching using wetland plants; and potential for lake-based tourism.

Photo: WWF-Canon



Photo: WWF-Canon



Photo: WWF-Canon

*The rehabilitation of the wetlands has restored the condition of these wetlands providing more water for food garden cultivation, increasing community food security.*

### **Safeguarding food production through water and sediment regulation**

The Bushbuck Ridge project of the Working for Wetlands programme has employed 41 people per year over the last 6 years, and cost R6 million (US\$860,000). The project, started in April 2000, aims to rehabilitate three wetlands in the water-stressed Sand River catchment area. A primary reason for intervention in this area plagued by unemployment and poverty is to safeguard food gardens in the wetlands being threatened by erosion gradually destroying the wetlands. Recent rehabilitation work included deactivating gully head erosion and stabilising gully channel erosion in the wetland; blocking drains to raise the water table and restore the hydrological regime; and creating awareness of wetlands and their importance amongst the local community. Also included is the maintenance work required for previously constructed erosion control gabion structures that have been damaged, as well as ensuring there is no damage on previously eroded parts of the wetland that have been re-sloped and re-vegetated by Working for Wetlands.

A cost-benefit analysis (Note b) of the Bushbuck Ridge project was being conducted at the time of writing to evaluate provisioning

services across the 3.5 ha Manalana wetland in the Bushbuck Ridge area under two scenarios: with and without rehabilitation intervention. The Manalana wetland was under severe threat from actively advancing erosion gullies that would have continued throughout the wetland and degraded the entire area were it not for the rehabilitation intervention that successfully halted the advance. The Manalana wetland was kept intact and the provisioning services (including crop and reed production, water for domestic purposes and livestock, and grazing) were maintained by safeguarding two key regulatory functions: water regulation and sediment control. The preliminary analysis indicates that over a 50-year period, the rehabilitation will cost approximately R1 million (US\$140,850). The provisioning benefits attributed to the rehabilitation, supplied over this period to 34 local households, amount to an estimated R2 million (US\$280,000).



Photo: WWF-Canon

# BUSHBUCK RIDGE PROJECT, South Africa: Working for Wetlands

## Strengths, obstacles and next steps

The Working for Wetlands Programme protects wetlands and creates local employment, offering opportunities to those who would otherwise be working informally and living in poverty. During the period of employment, significant improvements were reported in nutrition and education among the households of those employed. The project will also have a sustained environmental impact.

Since 2001 the wetland conservation work has evolved to include enhancement of traditional cultural and livelihood activities, such as basket production from wetland plant fibres and growing wetland tolerant crops, particularly indigenous tubers, to improve food security. This has enhanced the income of local people and secured participatory, sustainable management of communally-owned wetlands.

Following its investment in 2000, and responding to the success of the initial stages of the Working for Wetlands Programme, the national government substantially increased investment in 2004. The programme has encouraged both government and industry to invest more heavily in conservation of wetlands to benefit both people and nature. The South African government has already replicated the Working for Wetlands model in other programmes created for eradication of invasive alien plants, community-based natural resource management, combating desertification, tourism infrastructure development, and the sustainable use of agricultural natural resources.

To replicate the Working for Wetlands approach in another area or country, a commitment to a multi-stakeholder approach linking economic, social and environmental organisations is needed. Development cooperation agencies can play a key role in funding pilot programmes in new countries. Inventories of wetlands and technical knowledge of restoration and management techniques need to be built. Early attention to the social needs of participants can improve the socio-economic benefits.

*Wetlands Project  
Fishing at Lake  
Fundudzi*

## Note:

- a. Nkoko and Macun of consultants CASE undertook an independent qualitative socio-economic research based on 13 focus groups from 3 of the 39 Working for Wetlands Projects in February 2005
- b. A cost-benefit analysis is being conducted by AWARD (Association for Water and Rural Development), the University of Kea Zulu Natal, and the London School of Economics



Photo: WWF-Canon / Mondri

# COWS TO KILOWATTS, Nigeria: Turning Waste into Energy and Fertiliser (Note a)



*Pilot biogas  
plant*

The consequences of abattoir waste pollution are felt by both humans and the environment. Adverse effects on air quality, agriculture, potable water supplies, and aquatic life negatively impact health and well-being. Poor local communities, in particular, have little choice but to consume water polluted with abattoir waste.

This is also true in Nigeria, where standards regulating abattoir water discharge are poorly enforced and water treatment plant capacity is inadequate. Ibadan, the second largest city in Nigeria with a population of over three million, has experienced rapid urbanisation in recent years, coupled with intensified environmental problems. In the city's Bodija Municipal Abattoir, where nearly two-thirds of the animals in Oyo State are slaughtered<sup>26</sup>, the wastes from the slaughtering process are currently rinsed into open drains that connect to surface water and percolate into groundwater. Abattoir waste carries high levels of disease-causing microorganisms, such as Salmonella, Escherichia coli bacteria, and Rift Valley fever virus. Hence, the Global Network for Environment and Economic Development Research (GNEEDR) discovered in 2000 that the effluent from the Bodija River downstream from the abattoir had BOD

values (biochemical oxygen demand, an indicator of organic pollution) that far exceeded the national threshold for food processing industries. The communities located downstream from the slaughterhouse were particularly affected, as they used the polluted river water for domestic purposes, like washing and sometimes even for consumption.

### **Building partnerships for sustainable solutions**

The Global Network for Environment and Economic Development Research (GNEEDER), an NGO, the Centre for Youth, Family and the Law, a community-based organisation, and the Sustainable Ibadan Project, a quasi-governmental organisation joined forces to find a solution to this problem. The initial idea was to construct an effluent treatment plant, which would treat the abattoir waste, thus preventing it from polluting the surface and groundwater sources. While the partnership was highly innovative and feasible, the critical problem was that, while solving the problem of water pollution, the effluent water treatment plant was creating another. Decomposing organic material releases methane and carbon dioxide (CO<sup>2</sup>). While CO<sup>2</sup> is a primary culprit in climate change, methane is 23 times more potent than CO<sup>2</sup>.<sup>27</sup>



Therefore, it was decided to consider an alternative solution: employ biogas technology, which converts biological waste into energy and simultaneously helps to improve the quality of life, livelihoods, and health. Biogas technology, which is used worldwide by about 16 million households through small-scale biogas digesters<sup>28</sup>, will transform the waste produced by the abattoir into low-cost household cooking gas and organic fertiliser. The local partners, in conjunction with a technology institute in Thailand (the Biogas Technology Research Centre of King Mongkut's University of Technology Thonburi, KMUTT) decided to design, construct, and operate a biogas plant in Ibadan. This plant will be one of the largest biogas installations in Africa, providing gas to 5,400 families a month at around a quarter the cost of liquefied natural gas. The pilot biogas plant which is under construction is scheduled to be in operation in May 2008.

The methane produced by the anaerobic digestion of abattoir waste has several end-use applications. In the form of biogas: it can be used domestically (for cooking, heating, and cooling), to generate electricity, and as biofuel for transport. The partners' initial idea had been to use the biogas to generate electricity. At a rate of 1,000 cows slaughtered per day, the plant would generate approximately 3,600 KWh of electricity per day. Given the high capital costs of a biogas-fired generating plant, it was decided in the end to use the gas for cooking. The option is particularly attractive in Nigeria, where the demand and price for cooking gas has been increasing steadily (Note b).



The Ibadan system will employ a sophisticated design known as an anaerobic fixed film digester. Properly designed and used, a biogas digester mitigates a wide spectrum of environmental undesirables and it provides a high-quality organic fertiliser. It improves water quality, mitigates greenhouse gas emissions and reduces the demand for wood and charcoal for cooking, therefore helping preserve forested areas and natural vegetation. A well-maintained digester can last over 20 years and will pay for itself in one-fifth that time. But for the developing world, the greatest benefit of biogas may be that it can help alleviate a very serious health hazard: poor indoor air quality.

The estimated capital cost of the project is US\$480,000 which includes costs for the construction and design of the plant. The United Nations Development Programme (UNDP) in Nigeria is providing full funding for the biogas plant. The project business plan calculates that the biogas plant, operating as a business enterprise, will achieve a return on investment within approximately two years. It is estimated to have a useful lifetime of fifteen years, but its actual service lifetime may well exceed that.

About 1,000 cows are slaughtered at the Bodija Market abattoir on a daily basis, which would provide 1,500 cubic metres of biogas (900 cubic metres of pure methane) per day. This, in turn, amounts to 5,400 cylinders of cooking gas per month. A sales point could be established at the Bodija Market. Cooking gas could be sold at US\$7.50 for a 25-litre cylinder, well below the current market price for



cooking gas (Note c). This low price is explained by the fact that the abattoir waste generates “almost free” raw materials for biogas production (Note d). The sludge from the biogas reactor, transformed into organic fertiliser, will be sold to the Oyo State Fertiliser Board, a governmental agency that markets fertiliser. In turn, the fertiliser could be sold to urban low-income farmers at a reduced price of US\$1 for 10 litres, about 5 per cent of the standard price of chemical fertiliser in Nigeria.



#### **Producing progress with pilots**

Plans are underway to replicate the project in 6 other major Nigerian cities. The funding would be provided by UNDP in partnership with the Nigerian Federal Ministry of Environment based on the successful implementation of the pilot biogas plant. The ‘Cows to Kilowatts’ team has been contacted by other African countries including Cameroon and Ghana for advice on replication.

# COWS TO KILOWATTS, Nigeria: Turning Waste into Energy and Fertiliser

The partnership has also received international recognition and several awards. It was a 2005 winner of the Supporting Entrepreneurs for Environment & Development (SEED) Awards (Note e), which honour locally-led, innovative entrepreneurial ideas for sustainable development worldwide. Other awards include the Global Social Benefit Incubator Program (GSBI), Santa Clara University, California, USA (July, 2006); feature of Cows to Kilowatts at AFRICA LEADS (June, 2006); feature of Cows to Kilowatts in World Economic Forum publication (September, 2007).



*From abattoir to energy. A biodigester converts slaughterhouse waste into energy and solves two environmental problems—unhealthy waste and a need for clean energy—at once.*

## Note:

- a. The Cows to Kilowatts Case study has been written with guidance from Dr. Joseph Adelegan, the Founder and Executive Director of Global Network for Environment and Economic Development Research. Further input has been gained from Valerie J. Brown's article entitled 'Biogas: a bright idea for Africa' in *Environ Health Perspective* (May 2006)<sup>29</sup> and the case study written by GPPI's Elisabeth Heid for the SEED Initiative Partnership Report 2006<sup>30</sup>.
- b. On the other hand there is a risk of competition in the cooking gas sector, as the national government is embarking on a liquefied natural gas project. This may, in time, cause a drop in the unit cost of the cooking gas.
- c. The price for cooking gas fluctuates (by season) from US\$ 25 to \$30.
- d. The cost of construction is approximately US\$ 60 per cubic metre. The figure of US\$ 328,000 is for construction costs only, and does not include maintenance or electricity and water connections and charges.
- e. The SEED Initiative assists young and promising initiatives in strengthening and scaling up the impact of their activities. This is not a cash award. Instead, a comprehensive package of tailor-made support services, with a value of US\$25,000, will be provided to Winners.

A healthcare worker in a white coat is administering a vaccine to a baby held by a woman in a patterned dress. The woman is wearing a white headwrap and a yellow and black patterned dress. The baby is wrapped in a purple cloth. The healthcare worker is holding a small vial and a needle, and is injecting the vaccine into the baby's arm. The woman is looking down at the baby with a focused expression. The background is slightly blurred, showing other people in a community setting.

## Health Improvement

**A**chieving sustainable development depends on healthy people. In this regard, public health is critical for long term development. It affects the quality of life as well as life expectancy, It determines the individual's and household's ability to plan for the future. Ill health of breadwinners is a major reason why families fall into poverty. Furthermore, it conditions economic development through multiple channels, including investment in education and enhanced labour productivity. Thus, improving health is critical for the well-being of Africa's people.

African populations are severely afflicted a variety of debilitating diseases, many readily preventable with adequate resources. Sub-Saharan Africa is the only region of the world where life expectancy has fallen over the last decades, reaching levels below 40 years in Botswana, Lesotho, Zambia and Zimbabwe<sup>31</sup>. Child mortality is the highest in the world, with an average under-five mortality rate of 163 per 1,000 in 2005 – double South Asia's. Maternal mortality is on average one hundred times higher than in developed countries. Malaria and HIV/AIDS kill more people in Africa than anywhere in the world, with some 800,000 children under the age of five dying each year of malaria in 2000-03 and with 2 million people dying from AIDS in 2006<sup>32</sup>.

Health improvements are blocked by serious impediments in the region. Many are related to poverty, which reduces the payment capacity for health services while increasing the risks associated with insufficient nutrition, unsafe drinking water and reliance on traditional biomass for fuel. Through limited government budgets, poverty affects health infrastructures. With less than 2 hospital beds and 1 physician for 1,000 people in most countries, Africa lags behind other developing regions. Moreover, health infrastructure has not kept pace with rapid population growth, causing a deterioration of health services in many African countries.

Coping with these health issues is a long term process, involving a number of structural factors such as poverty alleviation. Yet, local initiatives may also play a part in this process, as evidenced by the two following cases. The Microcare experience illustrates the potential of a local community-based health financing project in Africa. Adjusting health coverage to the needs and resources of each community has allowed this insurer to cover categories of people that were never before covered by any type of private or public health insurance. With the utilisation of new information technologies, this project has been able to develop a range of affordable services, while minimising common risks of individual-based insurance schemes, e.g., that mostly those already in ill health will take cover and that they will seek to withhold vital health information from the insurer. In the same vein, the TRACnet experience, initiated by the Rwandan government, shows how new technologies can be utilised by African administrations to "leapfrog" towards a modern management of HIV/AIDS prevention and treatment. Where information technologies and transport infrastructures are missing, paperwork creates considerable bottlenecks in the management of medical information and hampers practitioners in their fight against pandemics. The introduction of a real-time information system has made it possible to cut paperwork, improve the management of drugs and reduce delays in diagnosis access.

# MICROCARE, Uganda: Financing Health through Communities

Health insurance coverage remains limited in most African countries. Africa poses multiple challenges to effective health insurance delivery, including the common ones of adverse selection, moral hazard and potential fraud, all of which increase risks to insurers and costs to prospective customers. In Africa, high costs run up against widespread poverty and poor health to make for limited insurance cover, high premia and limited affordability. Thus, most households are forced to pay user fees for health care which is often of substandard quality.

Microinsurance has emerged as an innovation aimed at providing health insurance protection to low-income people against specific perils in exchange for regular premium payments proportionate to the likelihood and cost of the risk involved<sup>34</sup>. The approach places a stress on prevention and health education as first best interventions.

In Uganda, per capita public health expenditure does not even reach US\$5. In order to make up for the shortcomings of the existing system, the Ugandan Ministry of Health (MoH) introduced a regulation for Community Based Health Financing (CBHF) in 1995. CBHF empowers communities to meet their health financing needs through the pooling of resources. It is an alternative option to a national insurance plan, favouring the local management of health financing and the development of a coverage adjusted to the needs and resources of each community.

## Building on opportunity

In 2000, a non-profit organisation named Microcare was created out of a Community Health Financing Micro-Insurance initiative in Uganda and has grown into the largest provider of group health insurance in Uganda, servicing both formal and informal sectors and operating in urban and rural areas. Microcare provides health coverage to people who had remained excluded from the existing schemes by employing a unique approach to deliver affordable health insurance, including

comprehensive information technology (IT) systems and controls. The multidisciplinary team integrates medical, IT, insurance, preventive health, financial and general management expertise.

Microcare has developed a well-calibrated range of health services, integrating malaria and HIV treatment in its coverage after 2005. Every plan is negotiated with the customer community, with premium adjusted to the service required. The company has managed to control its costs, implementing a cost-effective

administrative process based on real time monitoring of its receipts and expenditures.

Its customers belong to communities or worker groups that have agreed on the services they want and the premium they are ready to pay. In the design phase, Microcare discussed with the local community the premium members would be able to afford, the level of services they expected and the group



Photo: Microcare



*Front and Rear views of client smart card. The reverse side of a family card can carry photos of up to ten dependents. This arrangement is used for particularly cost-sensitive community groups who cannot afford to pay for individual cards.*

Photo: Microcare

structures required to avoid adverse selection. This consultative process has continued with community schemes, particularly where the communities are organised into traditional burial societies.

In the first stages of its development, the non-profit organisation, which became a private company in 2004, developed a network among other micro-finance institutions, corporations, and communities that has provided a customer base and helped reduce adverse selection risk. Hence, new customers always represent a significant share of their community or group. Re-insurance companies which pool insurance risks, health service providers and various international donors were also associated with the creation of Microcare.

### Thinking ahead

Microcare integrates insurance with preventive health interventions targeting malaria, HIV, water-borne diseases and maternal child health. This has the benefit of preventing illnesses and thus reducing claims costs but also overcomes one of the difficulties associated with insurance which is lack of product

tangibility. When clients have received obvious physical items such as insecticide treated mosquito nets and jerry cans with water purification tablets or benefited from health education sessions, they feel they have received something from the insurance program even if they have not fallen ill and had an insurance claim. This increases their likelihood of renewing, thus improving client retention, especially of healthier clients. In addition, a dedicated customer care team within Microcare also handles feedback from clients and medical service providers on a daily basis, enabling a rapid response to market needs.

Microcare has introduced efficient measures to reduce fraud, such as fingerprints with electronic recognition. Consequently, it has been able to keep fees in a range from US\$90 to US\$300 per year. In 2007, it has become the main Ugandan insurer, with 85,000 customers. Its network covers most Ugandan districts and includes 170 approved clinics and hospitals.



Photo: Microcare



Photo: Microcare

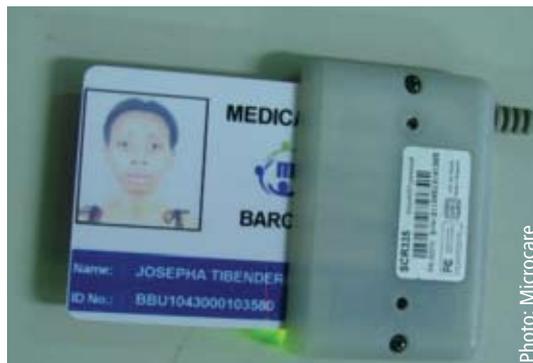


Photo: Microcare

The impact of Microcare has been significant. For populations that were not covered before, the insurance products provided by this company have changed the quality of life. For instance, customers do not postpone seeking health care until they are very ill as they do not have to pay onerous user fee. They do not need to self medicate, risking drug complications and waste of resources. Furthermore, timely access to health services reduces vulnerability to serious household health crises. Microcare also provides broader benefits, contributing to health education and sensitising its members to the value of long-term planning and saving. Furthermore, Microcare's development strategy has favoured community dialogue and empowered local management. As each scheme is negotiated at the local level, communities realise how crucial their involvement is for the management of public issues such as health.

Microcare has operated without any substantial donor support since mid-2006. Tight controls, appropriate pricing, cost containment and disease prevention all work together towards commercial viability. However, it is the unique capacity of Microcare to achieve economies of scale through servicing both the community level market and the corporate employee market that differentiates Microcare from other commercial or



Photo: Microcare

community insurers and makes it most likely to continue to succeed. The commercial market brings with it profitability and a rapid achievement of self sufficiency. However the community market segment, despite tight operating margins, provides an almost unlimited potential for ongoing expansion, innovation and economies of scale as it reaches into the informal and agrarian populace.

Microcare is the fastest growing insurance company in Uganda (2005-7) with annual growth rates in excess of 200 per cent. In 2007 it achieved adequate scale to enter profitability and expects sustained growth in 2008. The desirable result will be an increase in the availability and variety of healthcare products and services available to members of the local community.

### Scaling up

The current model is ready for a scale-up to national level. This could work in close partnership with the Uganda Government through the inception of the proposed National Health Insurance Scheme (planned for 2009). Deeper penetration into low-income groups in Uganda lies at the heart of Microcare's expansion plans. In 2008, Microcare intends expanding aggressively into informal sector groups.

Microcare has provided technical assistance to the Aga Khan Health Service Pakistan, in its Gates Foundation-funded pilot project to provide quality healthcare to 30,000 low-income people in the northern provinces:

# MICROCARE, Uganda: Financing Health through Communities

Microfinance  
Clients



insurance for inpatients and a prepaid voucher scheme for outpatients. Microcare has incorporated a health management company in Zambia, servicing the needs of multinationals. Expansion into other East African countries is also planned, but Microcare is clear that sufficient funding for initial market surveys and start-up costs is required – all initiatives must be self-sustaining.

Microinsurance ventures and projects have now spread all over the country, as well as to other African countries like Kenya. They have certain limitations. On the one hand, they do not cover the poorest who cannot afford their services. On the other hand, their development as commercial entities is challenging and requires managerial expertise. Hence, some projects collapse as premia never cover costs. The understanding of the insurance principle is sometimes difficult when local communities expect to recover a portion of the premium at the end of the year if the cost of medical services used falls below the premium paid. These misunderstandings may affect the trust between CBHF companies and communities.

However, these companies or non-profit organisations have introduced a wide range of innovations that deserve to be mentioned. First, they have developed a range of services adapted to low-to-medium income populations that were not covered before. Next, they manage adverse selection risk by an original



William Gates Sr. at Microcare check-in desk

and efficient process. Community-based selection appears to be reliable in most cases. Further, they keep loyalty of healthy customers by offering a range of useful services like health education and prophylaxis against malaria and other communicable diseases. Besides their simple and transparent management, with upfront premium payments and immediate repayment for customers, a modern information system – based on a single administrative document – to monitor resources in real time permits cost reduction to levels acceptable for many African households. Furthermore, they empower community participation and local initiatives.

# TRACNET, Rwanda: Fighting Pandemics through Information Technology

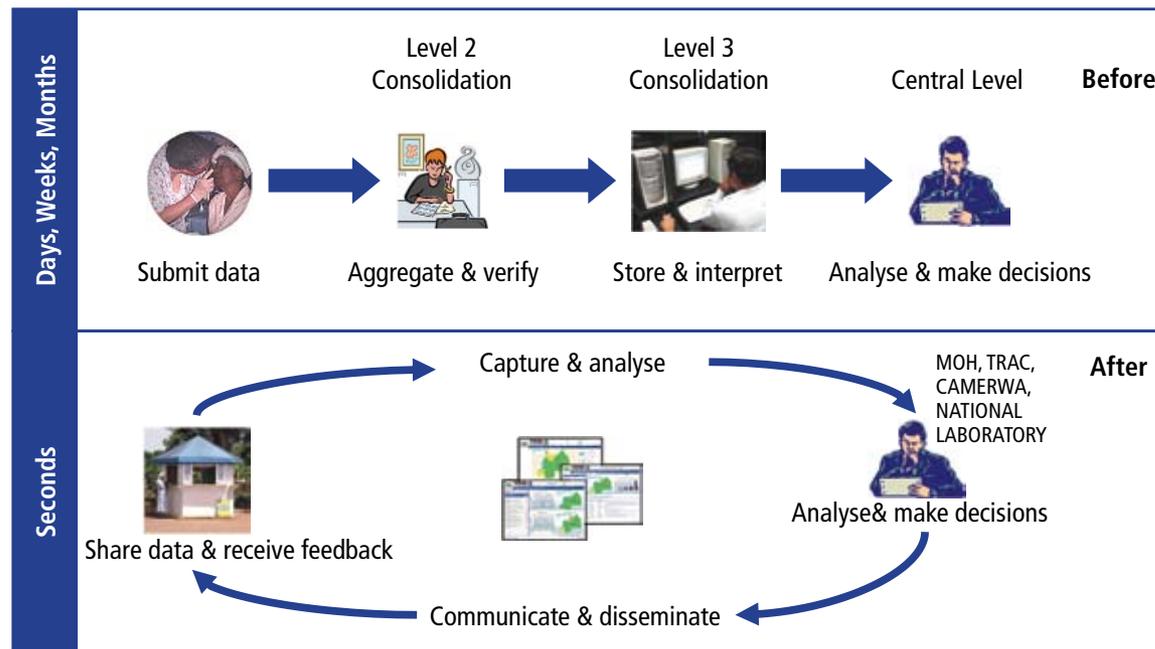


UN Photo

Africa is plagued with severe pandemics, such as HIV and malaria. To be contained, these diseases require strong public actions. The monitoring of population health and treatments is hence critical to ensure a timely response and to avoid the wider spread of the diseases. However, this monitoring is particularly difficult in countries where information does not circulate easily. As roads and communications infrastructure remain inadequate, many African countries are hampered in their struggle against HIV and malaria. When patients live far from the laboratories where diagnosis can be made precisely and from the main warehouses where drugs are stored, the treatment chain can be broken, immediately affecting those who suffer.

## **Broadening outreach and access to health systems through technology**

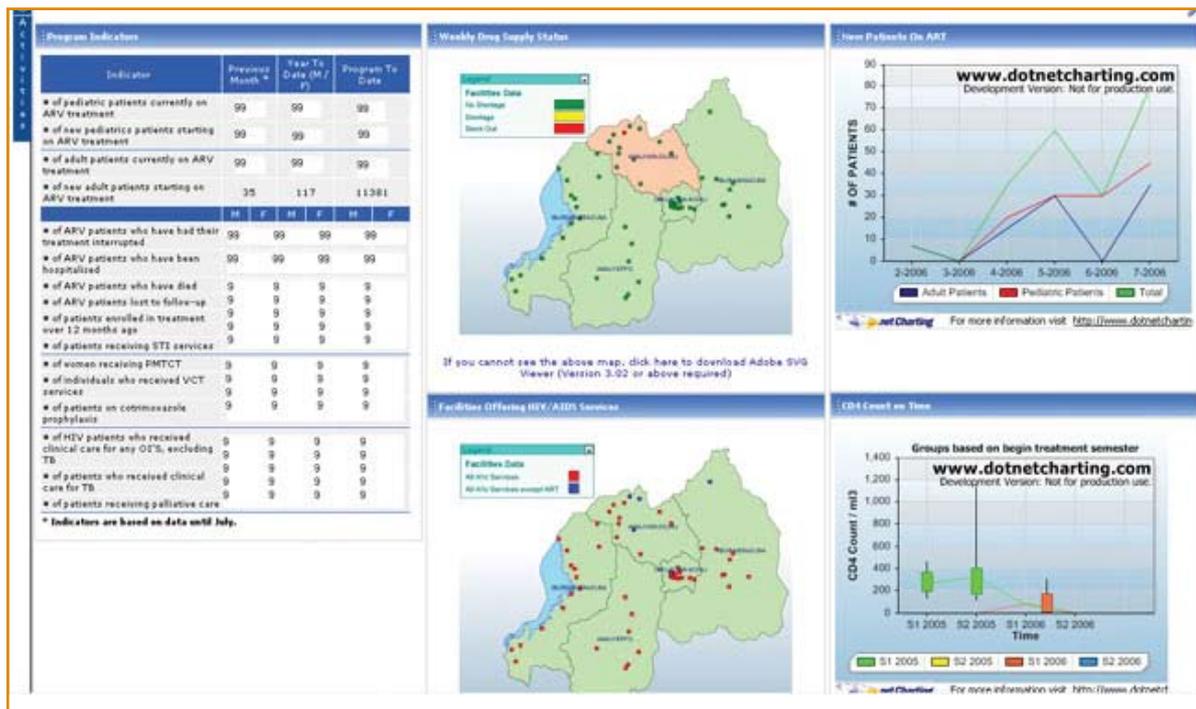
How to ensure that diagnosis and drugs are rapidly dispensed in areas where infrastructures are limited? In Rwanda, where it is estimated that 0.5 million persons are afflicted by HIV, an innovative solution has been found and successfully implemented. TRACnet was established and implemented by TRAC (Treatment and Research AIDS Centre), an institution of the Ministry of Health of Rwanda in 2005. It is a dynamic information technology system designed to collect, store, retrieve, display and disseminate critical program information, as well as to manage drug distribution and patient information related to the care and treatment of HIV/AIDS. This system enables practitioners involved in anti-retroviral (ARV) treatment programs to submit reports electronically and have timely access to vital information. By dialling 3456, a toll free number, or logging onto a bilingual website (English and French), health centre staffers can submit or receive programme results on HIV/AIDS patients as soon as they are processed. TRACnet uses solar energy chargeable mobile phones, which can be used in the most remote parts of the country.



TRACnet was planned in 2003 and has been gradually implemented since then. Rwanda Tel and MTN-Rwanda Cell both set up toll free numbers and donated free network time. Voxiva Inc, an American based company, provided ICT support to the project. The project has also been supported through the US-based Centres for Disease Control and Prevention (CDC). After 7 months of development and training, TRACnet became operational in December 2004. Initially, sites that started to use the electronic transmission had to keep the paper-based system (the type of forms and content were similar), which increased the burden on them. However, at the beginning of 2005, 21 sites were allowed to switch to TRACnet exclusively. The total cost of the project for the five years is US\$2.1 million.

The previous system was cumbersome, largely paper-based, with a one-way information flow which was time consuming. It usually took up to a month for HIV/AIDS patients and doctors in the countryside to have access to blood test results, as most laboratories are in Kigali.

TRACnet has enabled HIV/AIDS practitioners to monitor Anti-Retroviral (ARV) therapy drug stocks in real time, allowing local hospitals to send urgent requests to central managers to replenish stocks. Furthermore, it gives rapid and reliable access to CD4 molecule and viral blood test results in remote health facilities. Authorities get timely access to critical tracking indicators which permits a better public monitoring of HIV/AIDS patterns of transmission. Disease outbreaks at various levels can be better managed through national/regional/local tables, called "dashboards", which compile all sources of information related to HIV.



The National Reference Laboratory provides results of blood tests; CAMERWA, a pharmaceutical company keeps stock of the availability of ARV drugs; and TRAC monitors and supervises health facilities that provide ARV treatment in the country. TRAC also has a team of IT personnel, who train health care providers at the health facilities in how to use TRACnet, and who also monitor reporting into TRACnet and publish monthly reports.

### Improving monitoring and logistics

The deployment of TRACnet has faced challenges. For instance, there is still a need for increased education on HIV/AIDS, to encourage patients willingly to come forth to be tested and counselled. The new system has had to cope with a soaring demand among the population. At the same time, the shortage of health workers has been an obstacle to scaling up the number of patients and coverage areas. CAMERWA has experienced problems with drug coordination and maintaining adequate levels of stock for meeting demand. Finally, financial needs were sometimes difficult to meet in the early stages of the TRACnet deployment.

# TRACNET, Rwanda: Fighting Pandemics through Information Technology

However, the results have been striking. At the end of 2007, the system covered the 168 health facilities offering ARV therapy in Rwanda accounting for 100 per cent of the 43,000 ARV patients in Rwanda. In the long run, 400 health facilities are to be part of the network. Four hundred TRACnet users in health facilities have been trained to send their monthly programme indicator reports and their weekly consumables reports. Most users (over 90 per cent) are able to access the system conveniently and cheaply via the toll free telephone interface with Interactive Voice Response (IVR) technology. Physicians are now able easily and quickly to discuss with highly qualified specialists details of difficult cases all over the country. This technology has been easily adopted, as most users are accustomed to text messaging from phones after 15-30 minutes of training. As a result of the TRACnet implementation and deployment, the number of days between obtaining a blood specimen for a CD4 analysis and physicians' receiving results has been significantly reduced.

TRACnet has introduced improved information exchange between health facilities and central actors, which has reinforced their respective levels of accountability. The flexible nature of the Voxiva platform offers an easily scalable solution. The country now plans to offer universal access to care and treatment to all those needing it. Some 60,000 people living with HIV and AIDS were targeted to be reached by end of 2007 as compared to 8,000 in December 2004. In light of the TRACnet success, the Ministry of Health plans to monitor all other healthcare indicators with the same tool in line with the country's development vision to 2020.



Photo: Jonathan Donne

*Rwandan health workers are trained on the TRACnet system, which uses cellphones in the field to gather data about AIDS patients and their drug treatments.*

# Sustainable Tourism



Over the past quarter century, the number of tourists in Africa has more than quadrupled, bringing around US\$17.9 billion in revenue to sub-Saharan African countries in 2005<sup>35</sup>. Tanzanian, South African and Kenyan reserves are already well-known all over the world, attracting millions of tourists every year. Tourism could offer further economic opportunities in the region. A quarter of mammal species and a fifth of bird and plant species occur on the continent, with a large number of them endemic. The vitality of wildlife, the biodiversity, warm climate and cultural specificities constitute assets of significant value for African tourism.

However, if not well designed and managed, tourism development does not necessarily benefit all. Tourism may even disrupt the livelihoods on which communities rely – e.g., by restricting access to protected areas where they had traditionally gathered products needed for their daily lives. Furthermore, tourism sometimes has a negative effect on the environment and biodiversity. Its ecological footprint is significant as tourism requires energy, water and food consumption and is concentrated in biodiversity hotspots, where the variety of species is the highest.

Therefore, new practices have gradually emerged in Africa to reconcile tourism and sustainable development. These practices, sometimes labelled “ecotourism”, encompass a wide range of initiatives, from environmentally friendly infrastructure to micro-projects based on local community participation. The two following case studies illustrate the potential role of local community participation. The Tiwai Island in Sierra Leone demonstrates how tourists can be integrated in the traditional way of life of local communities and contribute to the preservation of the Tiwai Island Wildlife Sanctuary. Hence, the Tiwai complex offers a unique combination of ecological, historical and health tourism experiences to national and international tourists. Its healing and fitness services will be based on both Sierra Leonean ethno-medical practices and allopathic medicine, while the accommodations will be made from locally available materials. A university outreach program for ecotourism hospitality training, an indigenous knowledge research and biodiversity monitoring centre, as well as an integrated Traditional Medicine/Allopathic facility offering cross-training internship opportunities for medical staff will be integrated in the complex.

The second case study, the Buhoma Village Walk in Uganda, shows how tourism can be initiated and owned by local communities themselves. In a Ugandan village named Buhoma, the local community, in association with the Uganda Wildlife Agency, has developed a high quality community tourism product for tourists who visit Bwindi Impenetrable National Park (BINP). Incorporated in the village walk site is bird watching and a handicraft workshop to increase the variety of tourism activities offered in the area, while also providing members of the local community with an alternative source of income and contributing to the protection of the park.

# TIWAI ISLAND, Sierra Leone: Building Tourism on Traditional Knowledge

Tourism is a potential engine for development. It can help local communities to increase their incomes, even in regions where the economic infrastructure remains underdeveloped. However, it may also disrupt traditional livelihoods. For instance, craft tourism can substitute for other economic activities, leading locals to give up other livelihood activities and income sources. Communities must often confront the question: how is it possible to reconcile tourism expansion with the preservation of local culture?

The Health and Fitness Village project in Southern Sierra Leone illustrates ways to reach a compromise on this question. For more than three decades, the people of the Koya and Barrie Chiefdoms have agreed to preserve Tiwai Island from farming, logging, hunting, and mining. Tiwai Island Wildlife Sanctuary has gained widespread recognition for its contributions to ecological research, training, ecotourism, and participatory conservation. The island in the Moa River has one of the highest densities of primate species left on the planet and was a major haven for research on primate ecology, behaviour and population dynamics between the inception of such activities in 1982 and the outbreak of civil conflict later in the decade.

## Starting from scratch

A Management Plan, completed in 1988, was never implemented due to the interruption of all research and conservation programmes. At the end of the civil conflict in 2002, conservation and protection of environmentally sensitive areas was a high priority of local environmental NGOs. The large numbers of refugees encamped near high biodiversity

forest areas threatened wildlife populations as hunting for bush meat intensified. Funded by a US\$300,000 investment made by the Critical Ecosystems Partnership Fund (CEPF), a partnership between the Environmental Foundation for Africa (EFA), Njala University, and the local communities carried out reconstruction and rehabilitation of the Island's research and ecotourism facilities, formally re-opening the sanctuary in April 2006. The Tiwai initiative has therefore survived as the country's most successful model of community-

led conservation management, offering ecotourism access and creating opportunities for returning benefits to local communities. Along with the university, the Government Forestry Department, and a local NGO, these communities actively participate in a Tiwai Island Administrative Committee (TIAC).

However, the small size and inaccessibility of the central attraction – the Tiwai Island Wildlife Sanctuary – remains the biggest challenge to project sustainability. The island cannot support a high enough tourist traffic to ensure adequate revenues to deter landowners from exploiting the island for farming, hunting, mining and logging.

A need assessment survey of the eight surrounding communities carried out by TIAC identified an urgent need for improvements to local health and educational infrastructure. Giving tourists reasons to stay longer and interact with the economy

of the region was seen as a possible solution that could increase revenues, improve local perception of the benefits of conservation, while satisfying the local needs for education and health.

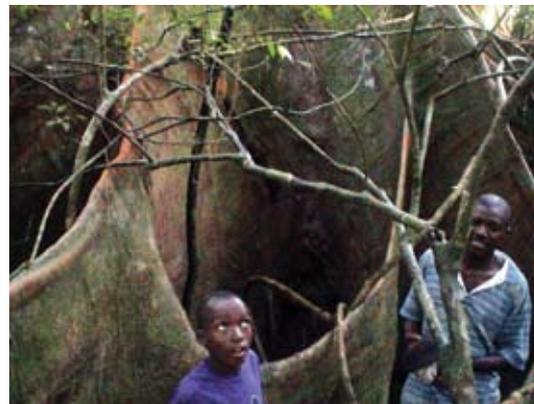


Photo:Tiwai Health & Fitness Villages/Eluemuno Blyden



The innovation of this project is to link the growing travel-for-health and travel-for-history trend in international tourism to the sustainable conservation of a high biodiversity region of Sierra Leone. Implementation of the project requires that the community mobilise its skills and creativity, and invest its own resources in the development of an international standard tourism complex.

### **Leveraging the ‘forest-as-healer’ for green gain**

The ‘forest-as-healer’ provides the overarching framework for designing the project. African traditional medicine systems rely on high biodiversity forests as their pharmaceutical factories. The concept of a ‘sacred bush’ is at the heart of almost all Sierra Leonean cultures, providing a motive for biodiversity conservation and a milieu for rites-of-passage and medical treatment of individuals. There are a variety of types of healing practice among the different ethnic groups of Sierra Leone – they broadly include herbal treatments, psychiatric treatments, physiotherapy, bone treatments and dental treatments.

*A view of the Tiwai Island*

The Health and Fitness Village will provide a centre at which the very best practitioners will be paid to provide (i) services to the community; (ii) services to visiting residents of the health and fitness village; (iii) formal training to medical students and traditional medicine students. The centre will initially offer services based on rigorous qualification by a joint committee consisting of the Sierra Leone Traditional Healers Association and the relevant Paramount Chief, which grants licenses for traditional practitioners under indigenous law and custom. The Centre will build up its services with a medium/long-term goal of offering the full medical and dental services available within Sierra Leone's indigenous healing arts.

A complex of villages including a Village Life Hotel, Integrated Traditional Medicine/Western Medicine Village, an Arts and Crafts Market Village, and horticultural gardens for traditional medicine plants and biofuels production, will be built among the eight communities surrounding the Tiwai Island Wildlife Sanctuary in south eastern Sierra Leone.

The complex will offer tourists unique healing and fitness services based on both Sierra Leonean ethno-medical practices and allopathic medicine. The Village Life Hotel will provide accom-

modation in authentic adobe and thatch houses and guided tours of ancient trails, the Moya River, farming, fishing and local market days. The Villages will incorporate university outreach programs for ecotourism hospitality training; indigenous knowledge research; and biodiversity monitoring. An integrated Traditional Medicine/Allopathic facility will offer cross-training internship opportunities for national and international trainee doctors, nurses and public health workers. It will offer jobs and career opportunities to local youth and, after a setup period, the Village would be run as a private enterprise, owned by all partners.

Primary beneficiaries would be local communities who are currently on the periphery of an over-burdened national allopathic healthcare system. They will benefit from the creation of alternative careers in healthcare and tourism that are less environmentally degrading, and that add value to the skills, knowledge and assets that they already possess. Another beneficiary type will be the traveller-for-health who will gain access to high-quality indigenous healing practices in a naturally beautiful and culturally authentic setting.

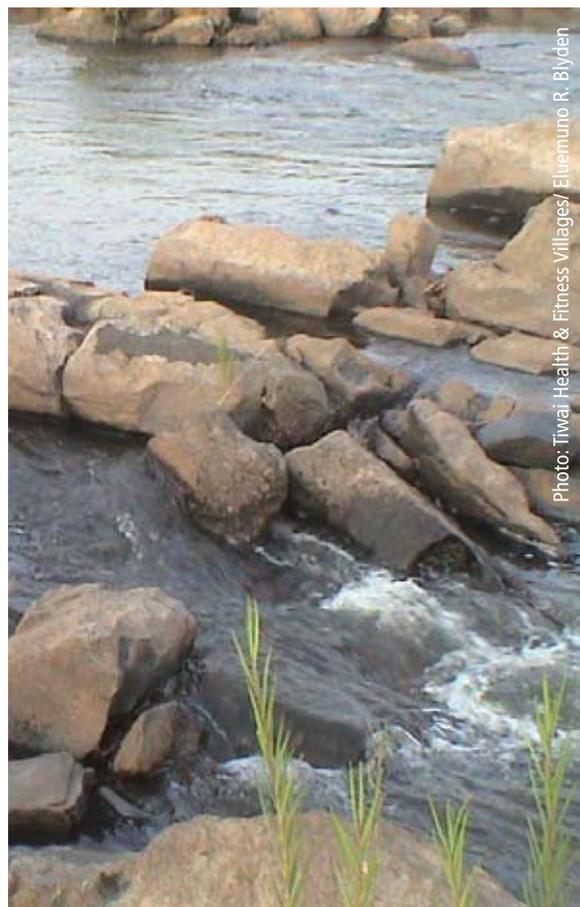


Photo: Tiwai Health & Fitness Villages/ Etemuno R. Blyden

# TIWAI ISLAND, Sierra Leone: Building Tourism on Traditional Knowledge

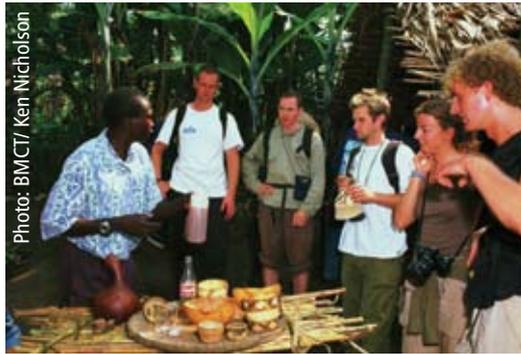
It is envisioned that the project will be transformed into a private venture once it is operating in a sustainable manner. This private entity should be able to undertake similar development projects in Sierra Leone and the region. Investment for such an entity could be raised by an issue of stock following the current laws of the country. A private entity would also provide access to the National Social Security Insurance Scheme (NASSIT) for employed members of the community and their families.



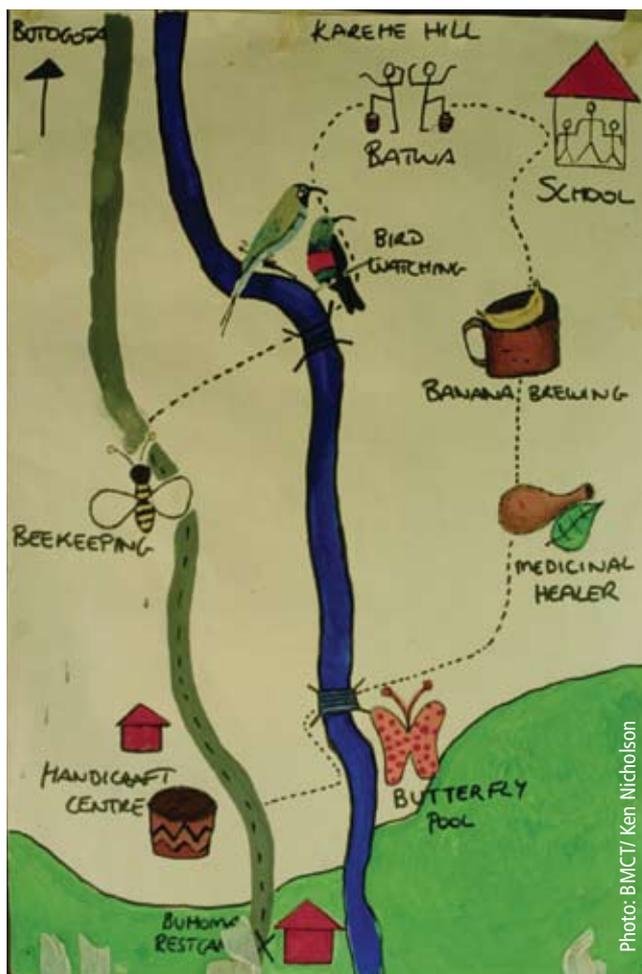
Photo: Tiwai Health & Fitness Villages/ Eluemuno R. Blyden

# BUHOMA VILLAGE, Uganda: Creating New Trails in Ecotourism

Guide explaining banana brewing products



Map of the Buhoma Village Walk



Wildlife tourism is expanding all over the African continent. How can a village benefit from this expansion when it does not have the infrastructure to welcome tourists? This issue was raised by the Buhoma community, which lives in the Bwindi Impenetrable National Park (BINP), Kanungu District in Uganda. With their unique forest environment, numerous gorillas and abundant wildlife, the villagers were aware of the considerable tourism potential of their place.

BINP was opened to tourists in 1991. The mountain gorillas are the primary attraction of the park. Tourists pay US\$500 to track one of the three groups of gorillas, plus US\$20 for park entrance fees. Only 20 per cent of the entrance fees are shared with the people living in the areas adjacent to the park. As entrance is limited to 24 persons per day, local communities receive only very small amounts of revenue from the park.

## Enhancing ecotourism services

Prior to the establishment of BINP as a national park in 1991, local communities in areas bordering the park depended on the forest for such resources as weaving materials, medicinal plants, bush meat, honey gathering, fruit collection and building poles. When Bwindi was gazetted as a national park, the local communities were barred from removing forest products, some of which played a crucial role in their livelihood. Currently about 10 per cent of the population in selected areas have access to multiple use zones (MUZs) for limited harvesting of these products. The existing harvesting quotas are very low and do not provide scope for enterprise development. The 20 per cent (US\$4) of the entrance fees received from Uganda Wildlife Authority (UWA) as revenue sharing is equally small.



A guide testing the banana juice



With the support of the Bwindi Mgahinga Conservation Trust (BMCT), the Food and Agricultural Organisation (FAO) and the Uganda Wildlife Authority (UWA), the villagers agreed to develop a high quality community tourism product in the form of a Village Walk. They decided on the procedure of site selection, sharing of proceeds and the institutional home of the walk.

In February 2002, a workshop was organised to assist members of the Village Walk in identifying the goals and objectives of the project. A survey was carried out by local community members, BMCT and UWA, to identify possible sites for the walk. About 20 sites were identified and a selection process

administered which narrowed the list to 9 sites. Community members brought their local knowledge of the area, its condition and terrain. These 9 sites display rich and in some cases unique natural and cultural settings. They include a handicraft centre run by women where they demonstrate traditional handicraft making; a waterfall in the middle of farmland; tea plantations where visitors can watch how tea is picked; and the butterfly pool on Munyaga River where women do their washing and where hundreds of multi-coloured butterflies can be found on the rocks. The banana brewing site is situated in the middle of a banana plantation, where the site owner demonstrates the stages of the banana brewing process. Tourists can also see the local gin distillery, the traditional healer, a community school and the Batwa centre and bird watching woodlot. Along the trail, they see different plants and gardens and meet the local people.

Photo: BMCT/Ken Nicholson



A community initiative was selected as a host institution, with all members of the community participating in the election of its officers. The owners of the nine identified sites, BMCT and UWA participated in the trail design. They elected their management team, which coordinates with UWA, and decided to meet on the fifth day of every month, together with guides, to discuss management issues of the trail.

The community defined a formula for sharing monthly proceeds so that 30 per cent of the income would be allocated to the guide, 5 per cent for stationery and brochure reprinting, 5 per cent for the coordinator and 20 per cent to the Buhoma Community Camp Ground to support community development projects. The remaining 40 per cent would be distributed among private site owners (70 per cent) and households of the Batwa, originally a forest people who perform their cultural dance (30 per cent).

The cost of the project has remained limited. The design of the trails, labour, small crossing bridges, steps on slopes and resting stools cost less than US\$900 in all. Radio hand sets were purchased for US\$1,060. A shed and a hut for the traditional healer were also built. After the launch of the initiative, running costs were met from the revenue generated from the walk. These revenues include US\$51.42 contributed by site owners each month that is used to maintain the trail and rehabilitate steps and bridges. Each site owner maintains its respective sites.

*Handicraft display  
by women*



Photo: BMCT/ Ken Nicholson

The project involves various local partners. Local community leaders identify viable eco-tourism sites. The Batwa people, who traditionally had no source of income perform their dance. Site owners are involved in the project with each site carrying out specific activities. The Uganda Wildlife Authority is responsible for selling tickets to the tourists on mountain gorilla tracks.

### **Knowledge sharing for replication**

In 2006, the project income amounted to US\$13,163, which was distributed following the formula agreed by the partners. The Buhoma Village Walk has directly improved the living conditions of the guides and site owners, and indirectly helped community members whose commodities/services are being purchased. The Batwas now have a source of income, earning US\$1,500 in 2006 thanks to the project. As a result, their access to medical care, schooling and other household purchases increased. The project has led to an improvement in the relationship between Uganda Wildlife Authority (UWA) and the communities concerning the conservation of the Bwindi Impenetrable National Park. The project has also enabled the communities in this eco-tourism zone to link an important source of income with the conservation of BINP.

The walk has been replicated at the Nkuringo gate in the BINP Kisoro district. Guides have gone there to give share their knowledge on site selection. Groups from the Queen Elizabeth National Park and the Kibale National Park also visited Buhoma and were fascinated at the simplicity of the walk and are now both in the process of establishing Walks of their own.

## BUHOMA VILLAGE, Uganda: Creating New Trails in Ecotourism

The Buhoma Village Walk was the first community-based initiative to develop tourism in Uganda. It constitutes a reference for other communities living in areas where tourism could potentially be developed. Its attraction lies in its simplicity. With limited investment, the community has managed to offer a wide range of services and attract hundreds of tourists. In 2007, 1,789 tourists were recorded on the trails of the Buhoma village, generating US\$15,179 in revenue. Furthermore, the simplicity of the initiative has permitted the villagers to own their own project. Though external support played an important role initially, it has since become a sustainable project managed locally.

Photo: BMCT/ Ken Nicholson

*Traditional healer displaying  
herbs used to treat different  
illnesses*

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**“There is always something new out of Africa.”**

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