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OKAVANGO

Challenges and opportunities



Up to 30,000 elephants frequent the waters of the Okavango

OKAVANGO RIVER

BEFORE LOOKING FORWARDS it is useful to start with a glance backwards (much like the importance of understanding river flows upstream before considering how the Delta functions). First, some fundamental points that cover the whole Basin. The fact that much of the Okavango flows across flat Kalahari sands has several important consequences. Water flows are relatively slow and steady. Potentials for crop production are limited by the low nutrient content of the sands, and the supply of nutrients into the river water is very low. As a result, most of the Okavango's rivers have low fish stocks and numbers of wildlife. It is only in the Delta that biological production is rich because of the considerable accumulation of nutrients at the end of the river system.

People in the Basin have moved a great deal, and many continue doing so: trying to find jobs, business opportunities, better fields, greener pastures or access to water, or to escape hostilities. These are factors that determine where people are now, and where they will go in the future. Compared to surrounding areas in southern Africa, the number of people in the Basin is small. Although new forms of transport allow us to move in and out of the Basin within hours, the Okavango remains relatively remote from centres of economic and administrative activity in southern Africa. No minerals of economic importance are known in the Basin.

Second, what broad features characterize each country? Angola has the highest and most reliable falls of rain, the lowest evaporation rates, and many more rivers and streams than any other part of the Basin. Water is thus seldom a limiting factor, and it has much less value than further south where water becomes a precious, envied resource. Features of the soils, rocks and landscape in the western Cubango sub-Basin result in more rapid water flows than in the eastern Cuito catchment. Sediment and nutrient loads carried by the rivers are probably greater in the west, where there is also a greater potential for water-borne pollution as a result of the higher population.

Much of the Angolan Basin is pristine, occupied by small numbers of people who live close to the land. Parts of it have been rendered inhospitable by countless land mines, and the massive investment in warfare has been at the expense of development. Social conditions are very much poorer than further south, and services and infrastructure are in disarray. The most important use of the rivers is as a source of drinking and washing water, and for the moisture they bring to *onaka* fields (see page 146). Angola

appears to be trying to rebuild the country, but the Basin is unlikely to benefit from significant development for many years for the following reasons. The number of people in the Basin is a tiny fraction of the total Angolan population, and much of the Basin is remote and far from the 'vision' of decision-makers in Luanda. Priority will also be given to other parts of Angola that offer much greater potential for food production and economic gains. Also, while hostilities have ended, significant funds to develop the catchment will not be available as long as large-scale corruption and theft of Angola's riches continues.

The Namibian part of the Basin has been characterized by massive immigration from Angola, causing very rapid population growth, clearing of land and the loss of natural resources. As a result, a concentrated population now lives along the southern banks of the Cubango/Okavango River, and many others have moved far to the south of the river.¹ The river is really a waterway or channel, passing along and through the region. It is not surprising that most people see the water simply as a resource that comes in, goes out, and is there for the taking. This is true for the local inhabitants, who mainly use the river as a source of reeds for building material, water for domestic use and livestock, and as a fishing resource. It is also true for the Namibian government, which views the water as a source of energy for hydroelectric power, for agriculture, and to meet demands for water in urban areas elsewhere in the country. It also sees the valley of the Cubango/Okavango River as having good potential for crop production. Several new large and expanded irrigation schemes are being developed, mainly to improve Namibia's food security and reduce dependency on food imports (see below).

Botswana is the final recipient of water produced in Angola and passed on by Namibia. The Delta is a colossal sink for the water, sediments and nutrients originating in Angola. The abundance of water and nutrients, and patterns of sediment deposition, give the Delta its diversity of habitats, wildlife riches and beauty. From these natural resources, considerable benefits are derived through the wildlife tourism industry; jobs, income, tax revenues, services and infrastructure, and international acclaim. This use of natural resources in Botswana is quite different from uses of the river elsewhere with the small exception of the few lodges and camps east of Rundu and around the Mahango Game Reserve in Kavango.



Botswana has invested heavily to make good use of the Delta's riches, and has gone to considerable lengths to ensure that the Delta and its wildlife resources remain healthy.

OKAVANGO RIVER

Pressures to bear

Although much of the Basin's environment is as natural as it ever was, the Okavango faces pressure from several processes: water abstraction, changes to water and sediment flow, pollution and changes to nutrient levels, loss of vegetation, soil erosion and fires. The biggest pressures are from the major towns and other areas of dense settlement (Figure 50). This is where relatively large volumes of water are used, effluent may find its way into the river, and plant life is destroyed as a result of fields being cleared, the collection of building materials and fuel wood, and overgrazing.

Little water is now extracted from the river system, which is surprising since much of the Basin is so dry. No irrigation schemes pump water out of any of the rivers in Angola to our knowledge, and perhaps the only dam is a tiny one (about 40 hectares) on a tributary of the Cuebe at Menongue. None of the towns in Angola have bulk water supplies from the river, and it will probably be some years before pumped, treated water is provided to the towns. For example, the water supply system to Menongue was completed in 1974, but stopped working in 1977. Recent attempts to re-establish the scheme failed because most residents were unwilling to pay for water.

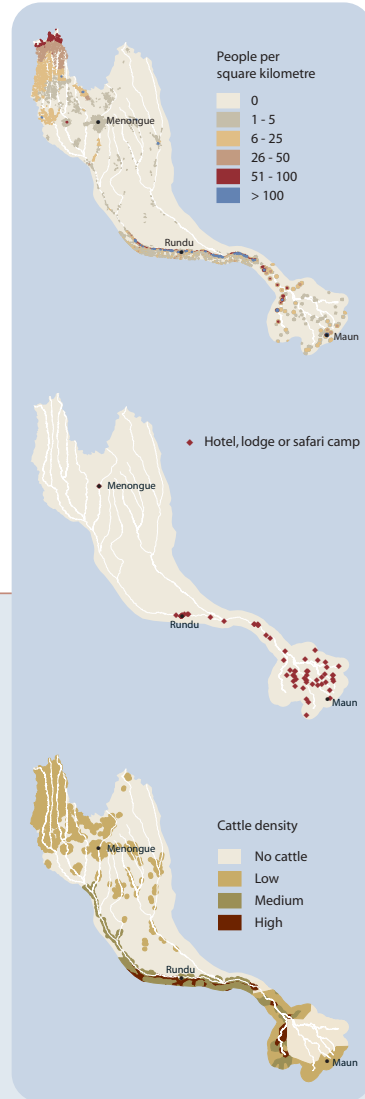
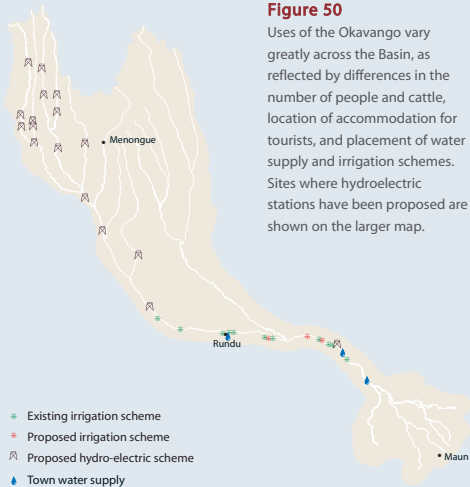


Figure 50

Uses of the Okavango vary greatly across the Basin, as reflected by differences in the number of people and cattle, location of accommodation for tourists, and placement of water supply and irrigation schemes. Sites where hydroelectric stations have been proposed are shown on the larger map.



About 22 million cubic metres (Mm³) (equivalent to 0,022 cubic kilometres) are now extracted from the river each year in Kavango. Approximately 74% of this supplies agricultural irrigation schemes, 15% is taken by rural people for their livestock, and 11% is used for Rundu.² The 22 Mm³ amounts to less than 0.25 of a percent of the total average volume of water that enters Botswana at Mochimo. Even during years and months with low flows, the volumes pumped are relatively small. About 1,100 hectares (ha) are now farmed under irrigation, the largest areas being at Shitemo (350 ha), Shadikongoro (266 ha), Musese (180 ha) and Bagani Prison farm (90 ha). However, new schemes or expansions are being developed to irrigate another 7,400 ha. Most of this is north of Mukwe (4,000 ha), while the rest is at Kangongo (2,000 ha), Ndonga (700 ha), Vungu Vungu (250 ha), Shadikongoro (180 ha), Musese (120 ha) and Shitemo (120 ha). Once implemented, these would raise the total amount of water extracted from the river to about 134 Mm³ per year, or 1.4% of all water that leaves Namibia. The proportion remains small but much irrigation water would be pumped at the start of the

growing season in early summer when the river is at its lowest, and substantial proportions of water could be extracted during years when flows are unusually low.

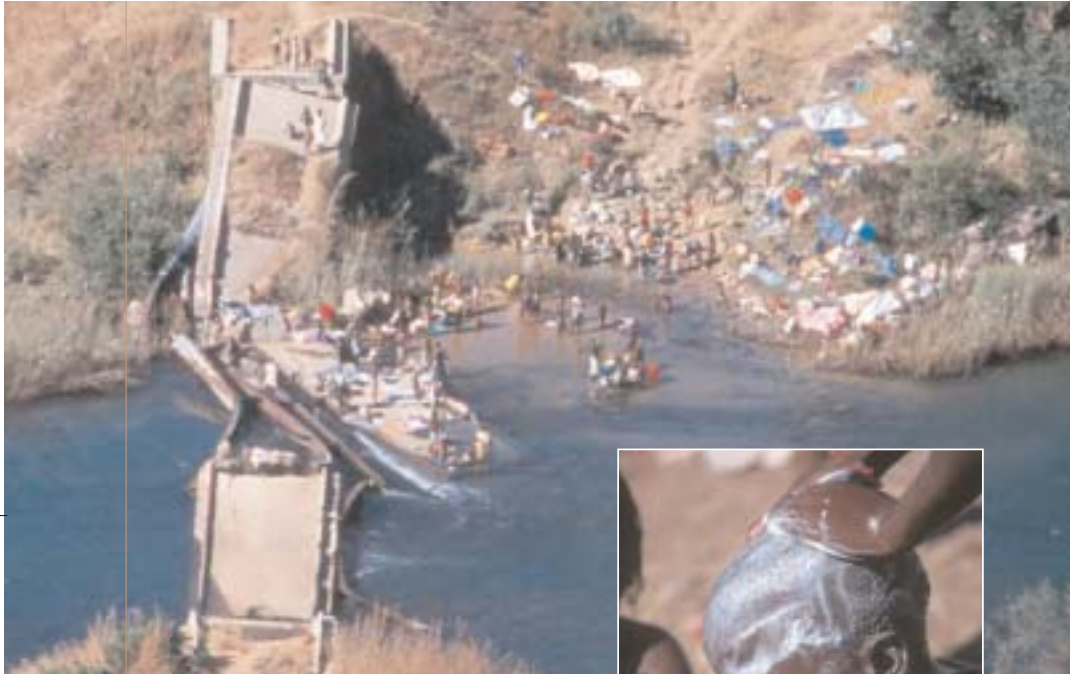
Botswana extracts little surface water. There is one small irrigation scheme at Samochina, and water is piped to villages in and around Mochimo, Shakawe and from Sepopa down to Gumare. In total, these add up to about 2 Mm³. Small additional amounts are taken directly by livestock and for domestic purposes. Water supplies to Maun, Sehitwa, Tsau and Shorobe are all from underground sources replenished by seepage from the Delta. Taking all these uses and amounts together, Botswana probably uses less than 0.1% of all water entering the Delta each year.³

Perhaps more concern has been voiced about possible changes to patterns and levels of water flow than any other threat. These fears were foremost during the mid-1990s when Namibia considered pumping Okavango water to supply Windhoek. Similar fears are reflected in the common claim that the lack of high floodwaters during the past two decades (see page 86) was due to the alleged construction of dams in

Over 700 hectares of bush were cleared in 2003 for this new irrigation scheme at Ndonga. The farm is one of several new schemes being developed to improve Namibia's food security. Assessments of the environmental impacts of this farm and the programme to greatly expand food production using Okavango water for irrigation have not been done. The clearing is bordered by the Rundu-Divundu road on the right, the Omatako Omuramba below, and the Okavango River to the left.



OKAVANGO RIVER



Tens of thousands of people living along the rivers in Angola do their washing in them every day. The impacts of so much soap on water quality may not be serious because most soap molecules are broken down quite rapidly. More severe problems could arise as a result of infectious bacteria and other parasites finding their way into water, particularly when summer rains wash through local latrines and other waste.

Angola and Kavango. But fears of reduced and changed patterns of flow are indeed warranted because so much of the river system's functioning depends on regular strong flows and flooding that, for example, carry sediments into the Delta and enable fish to breed in floodplains. The variety of habitats in the Delta is largely the result of changing water levels, mainly because different plant communities occupy different flood zones.

The whole river system is characterized by low nutrients. Greater levels of nutrients, for instance in the



form of nitrogen and phosphorous fertilizers washing out of large agricultural projects, would lead to more biological production, particularly in the Delta where the extra nutrients would accumulate. Beds of papyrus might expand, causing channels to close more quickly and rapid changes to the distribution of water. It is also likely that the abundance of Kariba weed, *Salvinia molesta*, would increase. This could have severe consequences for the Delta, since the weed forms dense mats covering large surface areas of calm water. The mats cause a reduction in the water's oxygen content.

Higher levels of other chemicals, such as calcium, magnesium, sodium and silica, would probably accompany nutrient increases. In this case, a severe reduction in papyrus could result from concentrations of these harmful solutes. Patterns of sediment accumulation and the way in which water is distributed in the Delta could change, habitat diversity may decrease, and the Delta might gradually change from a freshwater to a saline wetland. Levels of pollution from urban effluent and other sources are evidently negligible, but every effort needs to be made to safeguard the river from these and other toxic chemicals, such as pesticides. It is widely agreed that Botswana's use of endosulphan to kill tsetse flies reduced fish stocks in the Delta between the 1970s and early 1990s.

Angola considered the construction of hydroelectric schemes at 17 sites during the 1960s (Figure 50) but none of these have been developed. However, Namibia's announcement in 2003 that it intended to develop a similar scheme near Popa Falls elicited much alarm and criticism. The most important environmental fear to emerge during an initial impact assessment of the Popa scheme was the possible reduction in sediment movement because a dam would slow the speed of water flow. Sand washed down the river accumulates and raises bed levels in the Delta's channels, and this leads to channel switching once water levels rise (see page 91). The changes result in new areas being flooded, again contributing to the diversity of flood levels, plant communities and animal life.

Finally, Kavango has lost most of the natural plant life in the southern river valley, while the larger Angolan towns are

surrounded by swathes of land cleared for crops (see the image on page 16). Many trees have also been killed for fuel wood and charcoal production in Angola, while soil erosion has increased as a result of land clearing and the creation of paths to the water. It is hard to argue that vegetation should be preserved if rural farmers need crops and fuel, but care should be taken in promoting policies and practices that lead to unsustainable use of these resources. It is so often argued that social and economic conditions can be improved by rural development, especially through small-scale farming. However, farming can only be profitable in the Basin under exceptional circumstances, and most small-scale farming practices are damaging to the environment. More importantly, most people will remain poor as small-scale farmers because farming conditions in the Basin are so limited and the lack of markets restricts the selling of surplus produce. Indeed, it is not surprising that so many people turn their backs on farming, rural livelihoods and poverty by moving to towns.

Taken individually, most of these different pressures now have little effect on the river. However, the cumulative effects may be considerable, especially along the Namibian section. Densities of people and cattle are highest here, most natural vegetation has been lost, and soil erosion is greatest. There are also several agricultural schemes that draw off water and from which pollutant chemicals and nutrients might be washed into the Okavango. All indications are that such pressures will increase as Namibia increasingly aims to use the river for irrigation, urban water supplies and hydroelectric power.

The frequent burning of large areas of natural vegetation (see page 111) has substantial consequences on the availability of pastures, swamp vegetation, woodlands and valuable timber species, and on soil nutrients.



OKAVANGO RIVER

Opportunities

The Okavango thus faces several kinds of pressures. Perhaps the biggest challenge, however, is that it is so difficult to achieve consensus on how the Okavango should be used and managed, and what its future might be. This is because there are so many differences in the use of resources and perspectives on the value of the river. Angolans use the river mainly for crops, drinking and washing, while in Namibia the river is used largely for watering and grazing livestock, Rundu's water supply, irrigating fields and to provide building materials and fish. In Botswana, the main uses are for tourism and building materials. Scales of use and interest also differ, from those of individual rural households to tribal communities, regional administrations, national governments and the international community. The three countries see the river differently: Angola is rich in water, and the catchment area is not a priority. Namibia has little water and as a temporary custodian of the river sees the passing flow as an opportunity not to let pass. Botswana, too, has little water, and has invested heavily to extract high profits from the Okavango, and has no intention of losing its investment or future income. Sharing water among so many different needs and perceptions is not easy.

Another severe problem is that the Okavango is less important to the governments of Angola, Namibia and Botswana than we might assume. First, the Basin is remote from their capitals and economic centres – out of sight, out of mind. Second, the Okavango offers each country little in the way of food or hydroelectric power (this could change for Namibia if its planned developments go ahead). Third, there are no known mineral resources to provide governments or politicians with good incomes. Finally, too few people live in the Basin to make the area politically important (see page 126). All of this is negative – perhaps cynical – but the reality is that governments are unlikely to pay much attention to the Okavango.

But there are many people who would like to see a secure future for the Okavango River system, a future in which water, sediments and nutrients continue to move down the network of rivers unhindered, for example. There is also the hope that resources are used on a sustainable basis, so that present generations treat the natural environment in ways that do not jeopardize the options of future generations. How might this be achieved? We offer several suggestions to conclude this journey down the Okavango.

A first step is to enlarge the Okavango's constituency of supporters. The Basin should mean more to many more people. The range of benefits derived from the rivers' natural resources has to be increased, and greater value must be attached to areas upstream of the Delta, for example through tourism. This is a particular challenge in Angola and Namibia where the number of supporters of the river is small. By contrast, backing and acclaim for the river is much greater in Botswana because of the substantial gains from the Delta. But even here there is a need to broaden the support base. Progress has been made by promoting community-based management and profit sharing from wildlife-based tourism to bring benefits to rural people. However, they have little official or political influence, and there is a challenge to involve wealthier, more influential citizens. The biggest challenge, of course, is to promote benefits derived from the careful management and use of natural resources across a broad spectrum of Angolan society.

Secondly, land in the Basin should be managed more effectively. Most land in the Basin is now communal or tribal land, such that no one owns land or takes responsibility for the resources it offers. Mechanisms that enable people to obtain long-term, tangible benefits from land are also lacking in most places. Botswana offers useful experience in its attempts to move from a system of common, open access to one of private property management. Tribal chiefs and headmen managed land tenure up until 1970, when land boards took over as trustees over tribal lands. The boards now allocate land for residential purposes and dry-land crop farming, and may cancel land rights and restrict certain land uses. Much of the land in and around the Delta has been designated as wildlife management areas in which the use and conservation of wildlife is the primary land use. Wildlife management areas in tribal areas can be leased as controlled hunting areas to recognized community groups. The leases are for nominal amounts, and the groups may earn substantial incomes by negotiating contracts with safari operators to use their areas for tourism or big game hunting.⁴

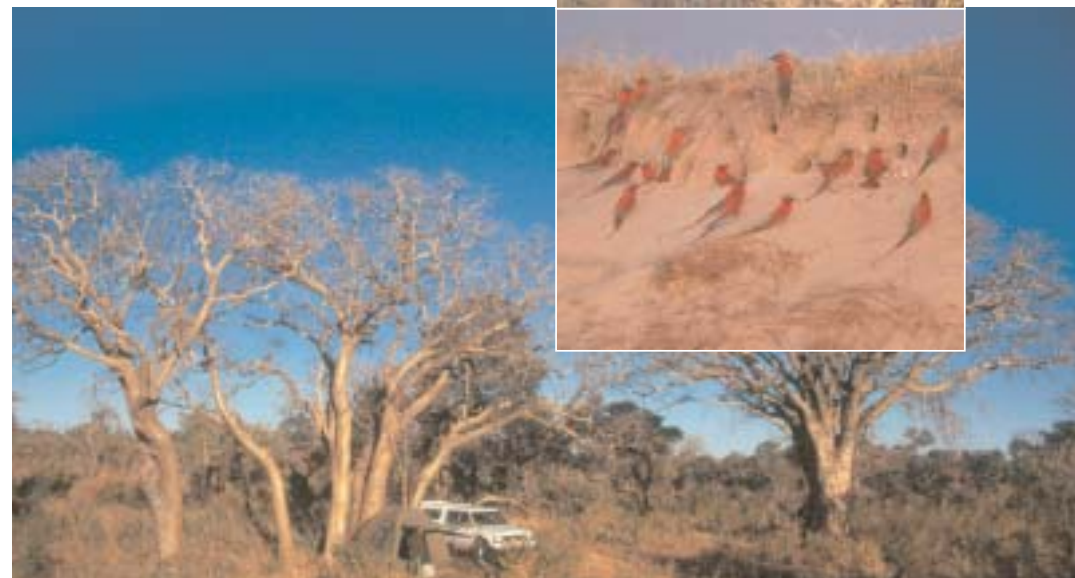
The key element behind controlled hunting areas is that communities are given long-term rights over wildlife and the opportunity to benefit from these resources. This helps boost the value of wildlife and hence the Basin area in which the animals live. Attempts are now being made to establish conservancies in several places along the Cubango/Okavango River in Kavango. Since there is very little wildlife in these areas,

community involvement is rather aimed at improving and securing the management of scarce or depleted resources, such as fish, woodlands and pastures.

Almost the only interest in the Okavango ever expressed by the Namibian and Angolan governments is for irrigation, water supply and hydroelectric power schemes. There is room for such developments, but we believe the scope to be limited, and extreme care must be taken to restrict environmental damage. More importantly, and as a third recommendation, alternative uses of the Basin should be sought for Angola and Namibia. The most logical is to greatly expand the tourism industry upstream from the Delta. Indeed, there is scope for developing (and marketing) the whole Basin as a massive destination for international tourists. Wildlife attractions are now limited in most areas of Angola and Kavango, but there is much to offer in scenic beauty, fishing, remoteness and historical interest. The upper reaches of the Cuito and Cuanavale rivers appear to support fair numbers of wildlife, and populations throughout the catchment should increase as a result of protection.

Tourism in the Basin could complement nearby tourist attractions, such as Chobe, Victoria Falls and Etosha. The development of accommodation and attractions along the river in Kavango would also link tourism to the Okavango with Etosha and the many other well-developed destinations in north-western Namibia. Visitors could thus move between these broader areas on more extended visits. Developing tourism in south-eastern Angola will be challenging because

The development of the Okavango catchment in south-eastern Angola as a major tourism attraction would improve livelihoods and safeguard the area's pristine environment.



OKAVANGO RIVER



Each one of the hundreds of tanks (above) now strewn around south-eastern Angola probably cost roughly the same as an up market lodge in Botswana that now attracts wealthy tourists (inset) from around the world: millions of dollars wasted upstream but used wisely downstream. Each of the thousands of missiles produced and blown to oblivion by some of the world's most sophisticated armies cost many times the amount paid to teachers and nurses each year. Likewise, how many well-equipped schools and clinics could have been built with the dollars paid for each jet fighter that now lies wrecked in Angola? One may only hope that governments will spend money more wisely in the future so that people in the Okavango have decent lives and that lechwe (opposite) continue to run wild through the waters of the Okavango.

the area is so remote and poorly served with infrastructure. However, access by air and by boat along the main rivers is relatively easy. The most logical people to spearhead these developments are safari and lodge operators from Botswana. They would bring valuable experience to the area. By having investments at both ends (so to speak) of the Okavango, they would also have incentives to promote the overall value of the river system.

Finally, most assessments of environmental concerns in the Basin have focused on individual developments, such as the Popa Falls hydroelectric scheme or the pumping of water to Windhoek. Each of these small projects is unlikely to have a major impact on the Okavango. Rather, it is the cumulative effects of water uses that are the real problem: of water lost here and there, pollutants added in different places, or new rural settlements, for example. We therefore suggest that planning of a more strategic nature is really needed to ensure the long-term health of the river system. Such

planning requires an overall assessment of the Okavango that recognizes the widely differing views and values that people in different parts of the Basin hold. The assessment should highlight comparative advantages and benefits offered at different places and to different people or land uses.

All three countries should contribute to such an assessment, and the results should be developed into a management instrument that becomes binding on all participants. This might be achieved through government ratification of an agreement that upholds



the Okavango as an asset to be administered and developed as a single, ecological unit. Several treaties and conventions now offer frameworks for sharing water and managing river basins, but none are strong enough to force the three countries to manage the Basin co-operatively and wisely.⁵ Angola, Namibia and Botswana also formed the Permanent Okavango River Basin Water Commission (OKACOM) in 1994 to promote the joint management of the Basin. More specifically, OKACOM was intended to advise the governments on sustainable development, to co-ordinate investigations and research, to share information and to prevent environmental damage. However, the Commission needs considerable strengthening – both technically and strategically – to perform these functions.

Two groups seem best placed to spearhead and promote a unified view of the Basin as a healthy unit. The first is the international community, perhaps through donors who formulate assistance to promote the sustainable use of natural resources throughout the Okavango. The second is the government and tourism industry in Botswana, where investments and profits from the use of the Okavango have been greatest. Although Botswana has made mistakes, it has also accumulated considerable experience in the wise management of the river, and it should consider sharing its experience and benefits with Namibia and Angola. Botswana also has most to lose if the Okavango's health fails.

In Botswana, there are usually screams of horror whenever an irrigation scheme, pipeline or dam is planned. By contrast, viewpoints upstream are such that most people in Angola and Namibia may not care how much water reaches the downstream Delta. Both perspectives – at either end of the Basin – need to change. Most thoughts on co-operation between Angola, Namibia and Botswana concentrate on how

water can be shared. This is to be expected, but it would also be useful to improve the debate to see how *benefits* can be shared. Most importantly, there is a need to shift away from the assumption that most benefits will come from agriculture and rural development. Changing these perspectives and assumptions is a great challenge. It is our hope that this book will go some way towards promoting a useful vision and bright future for the Okavango lifeline.

Key points

- Although the Okavango is generally in good environmental health, pressures come from water abstraction, changes to water and sediment flow, pollution and changes to nutrient levels, loss of vegetation, soil erosion and fires.
- Pressures on the river are much higher along the Namibian section than elsewhere, and they are likely to increase as a result of development plans and land uses in Namibia.
- Uses and values attached to the river vary greatly between the three countries and different users.
- The Okavango's future and sustainable use of resources should be safeguarded by enlarging its constituency of supporters, improving the management of land, and developing better use of its resources (especially through wildlife-based tourism).
- The Okavango should be managed as far as possible as a single, integrated ecological unit. Initiatives to adopt such an approach to its management should come from the international community and Botswana.