

WILDLIFE MANAGEMENT WORKING PAPER

Number 2

Some key issues in the context of
the future of protected area and wildlife management
in Africa

Contribution to the Forestry Outlook Study for Africa

René Czudek
August 2001



Disclaimer

The Wildlife Management Working Papers report on issues addressed in the work programme of FAO. The purpose of these papers is to provide information on on-going activities and programmes, and to stimulate discussion.

These working papers do not reflect any official position of FAO. The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

All rights reserved. Reproduction and dissemination of material in this information product for educational or other non-commercial purposes are authorized without any prior written permission from the copyright holders provided the source is fully acknowledged.

Comments and feedback are welcome.

For further information please contact:

Rene Czudek, Forestry Officer (Wildlife Management and Protected Areas)

Forestry Department

FAO

Viale delle Terme di Caracalla

00153 Rome, Italy

e-mail: rene.czudek@fao.org

or: FAO Publications and Information Coordinator:

andrea.perlis@fao.org

This working paper was prepared as part of the Forestry Outlook Study for Africa (FOSA) and regards a number of key wildlife and protected area management issues. FOSA is the most recent study in FAO's long-standing series of regional forestry outlook studies. FOSA aims to examine the future of African forests and the goods they provide, using 2020 as the reference year.

Some questions and a number of issues concerning both the present and future situation of protected areas in Africa were raised by the FOSA team and submitted for consideration to FORC's wildlife and protected area management team.

The list of issues involves the following questions :

1. During the last two decades international and national initiatives have led to a rapid increase in the extent of protected areas. What has been the increase in protected areas in the different sub-regions during the last 10 – 20 years? Is this trend likely to continue during the next 20 years or have we already reached a point of saturation that the scope for expansion will be very limited?
2. Does the system of protected areas in Africa adequately cover all the critical biomes?
3. How effective is the management of protected areas in Africa? What are the key constraints? What are the efforts to resolve conflicts with other uses, especially nomadic grazing?
4. In a number of countries (especially South Africa and Zimbabwe) the private sector has been active in establishing and managing protected areas (especially in the very large unused areas in the commercial farms). There are also ongoing efforts to privatise/ commercialise park management in a number of countries. What is the commercial viability of the private parks/ commercialised management? Does this help to meet the social and economic needs of the local communities? What is being done to resolve the conflicts between government policies on land reforms in Southern Africa and the maintenance of the private parks by the large commercial farmers?
5. Bush meat is a key source of protein for a large number of people in Africa. In the recent years there has been an increased trade of bush meat. How does the demand for bush meat reconciled in the context of wildlife management?
6. Increasingly there are efforts to involve local communities in park management (e.g. CAMPFIRE in Zimbabwe) What is the overall impact of such initiatives in protecting wildlife but still meeting the development aspirations of the local communities? What are the necessary and sufficient conditions for such initiatives? What is the potential to replicate such "success stories"?
7. Wildlife in Africa is regarded as a unique asset, which no other region possesses. What are the options available for African countries to maintain its comparative advantage in this and reap substantial economic benefits? What are the threats and constraints?
8. A number of countries are making effort to develop transboundary parks to ensure contiguity of ecosystems and to coordinate protection measures. What are the main issues in the management of transboundary parks?
9. What is the current state of wildlife research, education and training in Africa? Has there been an increase in this capacity or as in the case of forestry research, is the capacity declined?

Some hypothesis and/or answers have been formulated on the basis of available literature related to the different issues. The relevant questions being very complex and the time limited, the answers are not exhaustive and seek to cover the main difficulties

encountered in past and present protected areas management, and some principles and recommendations for the future. The findings and proposals will be used as a contribution to the regional FOSA report.

1. During the last two decades international and national initiatives have led to a rapid increase in the extent of protected areas. What has been the increase in protected areas in the different sub-regions during the last 10 – 20 years? Is this trend likely to continue during the next 20 years or have we already reached a point of saturation that the scope for expansion will be very limited?

The extend of protected areas (PA) in Africa has been increased over last years and represents currently about 5 % of land area. However, the data concerning the extend of protected areas in the region differe from one source to other. According to World Resource Institute, there are 746 protected areas in Africa, covering 1.54 million km², 5.2 per cent of the total land area (WRI, 1998). The data provided by WCMC are available in Annex 1. Although the rapid increase in the extend of PAs has been observed during the last 10-20 years, the quantitative information must be tempered, however, by a realistic appraisal of on-the-ground management effectiveness and the threats to existing sites and to biodiversity. Throught the region there tends to be inadequate legislation and ineffective application of the legal measures that do exist. Weak institutional support, management that is frequently deficient or even non-existent and inadequate funding are also ubiquitous. Consequently, there is a strong tendency towards ‘paper parks’ whose existence is largely theoretical and not reflected by substantive and durable conservation reserves on the ground.

International conservation organizations such as the World Conservation Union (IUCN) propose that 10 to 12% of the total land area of each nation or each ecosystem should be set aside for conservation. Soule and Sanjayan (1998) have warned that the mainstream conservation target of 10 to 12% of the total land area will not be sufficient for protecting global biodiversity. They suggested that about 50% of the total land area is needed. Although this figure is based on very few studies, it is important because it takes the need to protect all present biodiversity as a starting point, rather than the political feasibility of the target. At present, setting aside such large areas for nature conservation is unrealistic (Musters et al., 2000, *see below in the text*).

Some countries have recently developed ambitious PA’s network extension projects (e.g. Equatorial Guinea project plans to extend the PA network from 3196 to 5081 km², representing 18.1% of national land area [Machado, 1998]). Others initiatives aims create large Peace Parks covering ecosystems at transboundary level. Bud a further important increase of PA’s network in Africa may be rather problematic. PA are expensive to maintain and only in some cases they can create the important revenue through tourism. Furthermore, many PAs are by definition socially exclusive, a point receiving growing criticism from an increasingly democratized local people and from the international community. Recently, many agencies have responded through new initiatives, like Community-based Conservation (CBC) or Integrated Conservation and Development Projects (ICDP). But these activities are expensive, their conservation benefits are ambiguous, and they have little prospect of generating income to cover their costs. Biodiversity agencies remain financially strained and most of them have insufficient resources to meet the aspiration of effective park management. During the 1980s, a rough estimate of adequate investments in PAs was \$200 per square kilometer per year (Leader-Williams and Albon, 1988). Actual investment falls far short of this figure in many countries: Tanzania currently invests \$27, Cameroon \$20. Zimbabwe does better, investing \$132 (African Resources Trust, 1997). Furthermore, those sites that do exist are under increasing pressure from competing land uses. For exemple, in the Great Lakes region in Central and Eastern Africa, 125.000 square kilometers of farmland was found inside protected areas (UNEP, 1991). In Tanzania, half of the protected areas have been impacted by people moving in or using land for agricultural purposes (SARDC, 1994).

These present problems raise the question: How will the pressure on protected areas grow along with a growing population?

For an answer, Musters et al. (2000) present some calculation on the continental level, with specifications for each region. Using the most recent medium scenario population growth estimates from the United Nations, which take the effects of AIDS into consideration (PD-DESA-UN, 1999), the authors determined the expected human population in 2050 for each continent. To visualize potential land use conflicts, the authors formulated four nature conservation scenarios that are characterized by the amount of land to be set aside for nature: 1, 5, 10, and 50%. These percentages represent, respectively, an arbitrary minimum claim, the total area reserved for nature conservation in the beginning of the 1990s (Table 1), the mainstream nature conservation recommendation (IUCN), and the recommendation of Soule and Sanjayan (1998).

Land use versus land area

	Total Area (Mha)	Domestic. land (%)	Protected area (%)	Low disturb. area (%)
World	13041	37.0	6.1	48.0
Africa	2964	36.0	4.7	49.0
L. America & Caribbean	2053	36.6	11.3	56.2
N. America	1839	27.4	8.0	58.6
Asia	2679	45.0	4.5	30.0
Europe	2662	28.9	2.6	49.5
Oceania	845	57.0	10.1	61.0

Table 1. Domesticated area, protected area, and low disturbance area as percentage of total land area in 1989-91, based on World Resource Institute (WRI) Report (1994). Assumed from Musters et al., 2000.

On the basis of a combination of the present agricultural area per capita [permanent pastures and crop land from (WRI, 1994)] and the expected population in 2050 (PD-DESA-UN, 1999), the authors calculated the agricultural area predicted to be needed in 2050 and added the area to be set aside for nature conservation. Table 2 gives the potential spatial conflicts for each scenario, expressed as relative deficits in area for each continent.

	Population (M)		Area (Mha)		Area surplus (% of total area)			
	1995	2050	Present grass and crop land	Suitable for grass and crop land	Medium conservation scenario: 1%	5%	10%	50%
World	5688	8808	4799	8307	3.2	2.7	-0.3	-20.0
Africa	697	1158	1891	2008	-16.8	-19.7	-23.6	-54.1
L. America & Caribbean	480	808	741	932	18.7	16.3	11.6	-20.4
N. America	297	592	901	1038	19.5	17.2	14.4	-6.8
Asia	3437	5259	1246	1826	-12.7	-15.9	-17.8	-66.4
Europe	738	628	711	1131	18.4	16.7	14.5	-5.2
Oceania	28	46	481	648	-17.9	-19.8	-24.4	-35.1

Table 2. The difference between area suitable for grass and crop land [average suitability for grass land from (1)] and area needed for agriculture (grass and crop land) plus nature conservation (according to four nature conservation scenarios, see text) in 2050 as percentage of total area (Table 1). Positive numbers are surplus, negative numbers are deficits. Medium population growth, no agricultural production growth, and equal distribution of protected areas are assumed. Based on (2), (6), and (9).

10.-FAO, 1997 ; 2.-WRI, 1994 ; 6.-PD-DESA-UN, 1999 ; 9.- Luyten, 1995

From Musters et al., 2000

Because not all land area is suitable for agriculture, the authors used suitability estimations for grass and crops from Luyten (1995) to calculate the deficits. If 50% of the total area is protected, deficits can be expected in all continents. The 1, 5, and 10% scenarios also might result in area deficits in Africa, Asia, and Oceania. From this it is clear that agricultural efficiency must be improved in any nature conservation scenario in Africa, Asia, and Oceania. How much efficiency improvement will be needed?

The authors focus on the Soule and Sanjayan recommendation of 50%. To analyze this target, they assume that the low human disturbance area cannot decrease and the area for agriculture can no longer be expanded. In other words, land use will remain as depicted in Table 1. In that scenario, all growth in agricultural productivity must be achieved within current agricultural areas. Furthermore, the authors assumed that present food availability per capita should not decrease. With these provisions, they calculated a minimum food productivity growth rate per hectare needed to feed the 2050 medium population (Fig. 1). If one agrees that all people should be able to eat the same amount of proteins as someone in a developed country, the required food productivity growth rate will be larger than the current one in most continents. The authors multiplied present food availability by a factor equal to the proportion of proteins in the present diets to find this extra growth rate needed. This results in a minimum and maximum estimate of the needed production growth rate of, respectively, 1.8 and 3.0% per year over the 1995-2050 period in Sub-Saharan Africa (Fig. 1).

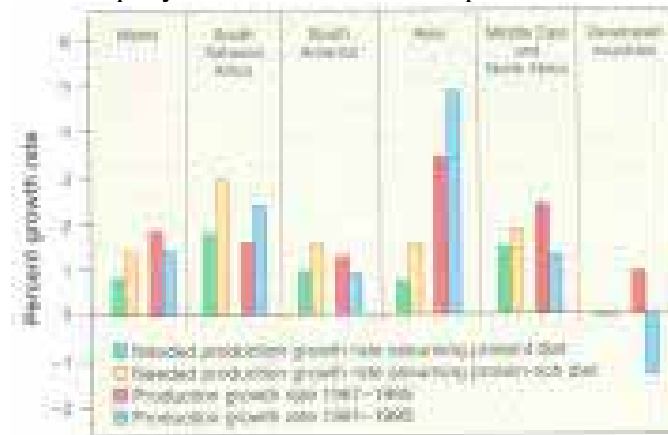


Fig. 1. Agricultural production growth rates needed to feed a medium population in 2050 compared with historical production growth rates. The needed production growth rate is either based on present diet or on a protein-rich diet as in developed countries. Actual production growth rate per year is regarded as being the difference in production per hectare between two subsequent years expressed as a percentage of the production of the first of the 2 years. Production per hectare is defined as FAO agricultural production at a year divided by the total of FAO arable land plus FAO permanent crops of that year. Based on (6) and (11).

These growth rates can be compared with the actual growth rates calculated from recent data generated by the Food and Agriculture Organization of the United Nations (FAO, 1997): the average yearly growth rate of 1967-1995 (1.6% in Sub-Saharan Africa) and the average yearly growth rate of the last 5 years of that period, 1991-1995 (2.4% in Sub-Saharan Africa) (Fig. 1). The authors excluded pasture land from these growth rate calculations, because in Africa overexploitation becomes manifest in the loss of pasture land (UNEP, 1991; FAO, 1997). Their calculations should approach estimates of the sustainable production

growth rate, even though they still might overestimate it. Nevertheless, lower production growth rates only strengthen their argument.

The comparison shows that if the productivity growth of the last 30 years does not continue or improve, sufficient food will not be produced for the expected population of Sub-Saharan Africa. To reach equality in food availability, production must become considerably higher than that of 1991-1995. Although this might not seem impossible, it can only be achieved by continued technological progress, which requires financial and political support (Goklany, 1998). Economic development will be a key factor (Goklany, 1998), also reducing population growth.

The authors conclude, therefore, that without any serious and long-lasting investment in economic development, a 50% nature conservation scheme doesn't have a chance in Africa. At the continental level of scale and over the long term, nature conservation and economic development are not in conflict. Economic development is a condition sine qua non for ambitious nature conservation projects in Africa (Kramer and van Schaik, 1997).

The conflicts between, on the one hand, nature conservation and, on the other, poverty and food scarcity, should also be addressed at the community level (Daily et al., 1998; Diouf, 1999). Over the short term (5 to 10 years) and at the local level of scale, there exist huge conflicts between nature conservation and economic development. First, it cannot be assumed that the population growth rate will be constant over time. As a matter of fact, in the short term, population growth rate will be higher than in the long term (50 to 100 years) (PD-DESA-UN, 1999). Consequently, the short-term need for agricultural productivity growth will be higher than the one estimated here. The same is true for the amount of financial and political support that will be needed. Second, not all governments in Africa are able or prepared to invest adequately in managing protected areas (Inamdar et al., 1999). Furthermore, local people who are confronting the harsh rules of market economics and needing to make ends meet are more likely to give top priority to their own survival instead of nature conservation and biodiversity (vanSchaik and Kramer, 1997). Aversion to protected areas often also reflects attitudes against governments. National authorities frequently mandate land use and establish protection areas without taking into consideration earlier arrangements or the interests of local communities.

These types of problems cry out for local solutions that try to combine economic development and nature conservation, which are acceptable to the local people involved and supported by them. This has led to many "community-based conservation" projects (Western and Wright, 1994). These projects tend to be expensive and many of them are not very successful (Inamdar et al., 1999). Therefore, the authors plead for local, sustainable development projects, preferably in presently domesticated areas (de Graaf et al., 1999). Such projects should not focus on nature conservation while compensating for economic losses (James et al., 1999), neither should their objective be to maximize economic growth (Helmuth, 1999). Optimal solutions should be sought by carefully considering economic, social, and ecological side effects of potential developments (de Graaf et al., 1999). If successful, these projects will lead to developments that no longer require external financial support. The African Development Foundation claims that such projects were realized in several African countries (Ford, 1999). What is needed now are investments in researching the prospects of such projects (Helmuth, 1999).

Conclusion

In certain circumstances (international support, political will, conservation policy enforcement, research into new approaches to community-based management, investments in economic development and better agricultural production) it is possible to increase the extent of the protected areas in the future so as to cover Africa's bio-diversity more accurately. Some

recent work demonstrates the political interest in the future development of the PA network on a national and sub-regional level (Equatorial Guinea's PA project, Cameroon's assessment of the PA network and cost evaluation, Central African countries' declaration in Yaoundé for the creation of a great transboundary park, Southern Africa's Peace Park). But this increase will be relatively limited. Instead of investing in huge new 'paper' areas, the agencies should try to find a more effective way of managing the existing areas. Otherwise there is a risk of losing the bio-diversity rather than conserving it. Of course, as the human population grows, the protected areas in Africa will become more and more isolated as the surrounding land is cultivated.

To reach the conservation goals, better national and regional planning is needed. Such activities are still rare and are not implemented in the field. Most countries still lack effective policies on biodiversity conservation, especially for the development of protected areas. Furthermore, many African governments, which can no longer satisfy the basic needs of their populations, have downgraded the importance of protecting nature. Both improved and attuned national legislation and political interest is needed to give more emphasis to biodiversity conservation. A clear conservation strategy and government commitment to cover recurrent management costs would be positive signs that could further attract international funding and technical assistance for promoting environmental protection and to develop the African PA network more adequately.

2. Does the system of protected areas in Africa adequately cover all the critical biomes?

The coverage of African biodiversity by protected area network is considered by many specialists as insufficient (MacKinnon, 1986; IUCN 1992; Soulé and Sanjayan, 1998; Doumenge et al., 2001). The existing system is not very coherent, the siting of protected areas has often been influenced primarily by socio-economic rather than biological consideration. Protected areas are frequently established in areas not in demand for other forms of land use. The establishment of PAs network by default often leaves important gaps in coverage of species and habitats. The efforts of planning in national or sub-regional level are recent and only partially concretized in the field. Considerable extension of the protected area network is required if Africa's rich biodiversity is to be effectively conserved (IUCN, 1992; Soulé and Sanjayan, 1998; Doumenge et al., 2001). But the feasibility of such an extension in Africa's economic and social conditions is "debatable" (See question 1.), as the management authorities in the current PA system are often weak and unable to limit destructive activities within the boundaries of reserves.

Some other reasons that can partly explain the inadequacy of the PAs vis-à-vis the bio-diversity and ineffective management of national systems are :

- recurrent conflicts with the services in charge of forest exploitation and the weakness of authorities in charge of conservation
- a lack of human capacities and financial means allocated to PA managers
- conflicts or compromise of certain members of conservation services with forestry actors in the field (rural population, private sector)
- insufficient development of tourist products and promotion of tourist activities
- a lack of political priority by governments who only allocate low budgets to conservation activities
- very slow co-ordination of policies and action, even if supported by the international community (Ecofac, Cefdhac).

Other problems of many national PA systems concern the protection statute and its definition. Many PAs only have feeble protection statutes (forest reserve- réserve forestière) but some of them are of great interest for country or even sub-regional bio-diversity conservation, especially in Central Africa. These reserves should be reclassified and given a more important protection statute.

The denominations of different protected area categories rarely correspond to the reality on-the-ground and are often rather confusing. Very little legislation includes the idea of a buffer-zone and not very much is clearly based on IUCN international recommendations for PA definition. Certain PAs have an international statute with overlapping national denomination, but they are not always considered by legislation. For example, the Dja site is classified as a wildlife reserve by Cameroon's legislation, but it is also a World Heritage Site and Biosphere Reserve. This multiple-denomination does not really help to explain the juridical situation of the PA's and can make the work complicated for managers. On the other hand, these international labels can enhance the national image and increase the availability of international funding. There are, however, certain obligations that, generally speaking, the countries cannot maintain, if not without great difficulty.

The representation of different categories is inadequate in different countries. For example, at present there is still not a National Park in Gabon. Strict Nature Reserves (Cat. I), Natural Monuments (Cat. III) and Protected Landscapes (Cat.V) are rare in Africa.

Concerning the first Category, this statute should ensure the strict protection of the ecosystem and the species, and be used for scientific purposes and for protecting the ecosystem in its natural state. With the exception of special protection for small central cores, this statute no longer takes into consideration the actual PA situation, where natural resources are vital for local communities. Most of the Strict Nature Reserves in Africa are Strict Reserves in name only.

The degradation of certain current wildlife reserves should be considered and the statutes updated. Some of the PAs were destroyed or extensively degraded ten years ago but have not been declassified. This situation leads to incorrect statistics.

In Cameroon, the Ministry of Forestry in collaboration with WWF recently assessed the existing PA network and financial needs, completed by an extension proposal in order to cover the country's entire bio-diversity. Others countries plan to improve their national PA network (Equatorial Guinea, Gabon , Cameroon).

3. How effective is the management of protected areas in Africa? What are the key constraints? What are the efforts to resolve conflicts with other uses, especially nomadic grazing?

Management of protected areas is only effective at a few sites and the plan to involve various stakeholders in this management is still only in the budding stage. The lack of coordination and even the competition between services in charge of managing protected areas and those responsible for allocating forest permits is not helping the situation. Most countries still lack effective policies for biodiversity conservation. National legislation is often inadequate and application of the legal measures that do exist ineffective. Due to weak institutional support, management is frequently deficient or even non-existent and budgets for conservation inadequate. Growing human population and their increasing demand for natural resources intensify the pressure of rural people on protected areas.

In the field, limits of PA are not generally materialized (expensive and ineffective). Even if known, borders are often transgressed by local people for exploitation of natural resources (grazing, agriculture, logging, hunting). Compromise and corruption of certain members of conservation services in the field are also ubiquitous.

Specific measures to improve management include delimiting clearly the areas, creation of infrastructures to survey and manage them and ensuring adequate trained personnel to manage wildlife and conserve biodiversity. Theoretically, the management plans should be available for each PA but only few areas dispose of any plan, often only in the case if a conservation-development project is implemented in the area with technical and financial support of international communities. For forest authorities, conservation activities and PAs management is not as interesting as industrial forest exploitation. There is a lack of an adequate management system, monitoring and planning within PAs.

Figures on staffing levels reinforce the overall picture of a major mismatch between resources and needs in Africa. In Congo-Brazzaville, for example, each park guard is responsible for over 300 km² of territory. IUCN considers 10 km² to be the most that one guard can patrol (Sayer *et al.*, 1992).

An important effort is needed to solve the conflicts between different groups concerned by natural resources and for an effective integration of those groups in the management. Education and extension for a community-based management, technical assistance (monitoring, planning) and training of PA managers must be urgently enforced.

- 4. In a number of countries (especially South Africa and Zimbabwe) the private sector has been active in establishing and managing protected areas (especially in the very large unused areas in the commercial farms). There are also ongoing efforts to privatise/ commercialise park management in a number of countries. What is the commercial viability of the private parks/ commercialised management? Does this help to meet the social and economic needs of the local communities? What is being done to resolve the conflicts between government policies on land reforms in Southern Africa and the maintenance of the private parks by the large commercial farmers?**

Private sector development

As numerous examples from Zimbabwe and South Africa show, on private lands, game ranching and the effective use of wildlife for meat production, combined with tourism and sport hunting, has ability to achieve substantial conservation success. Game ranching on private lands, if well managed, can be a profitable land use option as well as an ecological management option within the semi-arid and unproductive areas of the region. The experiences about superiority of wildlife utilization for greater meat production potential and its multi-use aspects as providing the ideal solution to effecting wildlife conservation and combating environmental degradation on a wide scale throughout the semi-arid rangelands of the region motivated private investments in this sector. However, the fundamental prerequisite for beginning to achieve the economic and environmental benefits of utilizing wildlife can only be realized by those people who have long term ownership of the lands and resources they presently derive a living from. When land tenure is unstable, the first option is to pursue extractive use so that short-term gains are achieved, and in these cases livestock and even agriculture offer the most efficient production system for achieving these goals.

As such the land tenure issue has been largely responsible for contributing to the development of wildlife ranching on private lands where tenure is secure, and wildlife cropping schemes on communal lands where tenure is less defined. Consequently, wildlife ranching and the commercial utilization of wildlife have only been undertaken in areas of the region in which ownership of the resource is secure thus laying the necessary foundations for persuading landowners to invest in the sustainable productivity of their land for greater benefits to be realized in the future. The advantages of wildlife utilization for increased and more efficient meat production, and the potential options it provides for alternative, more sustainable and profitable land uses, have not reached the rural African population living in loose tenure arrangements in the semi-arid rangelands to the same extent as large private ranchers. A limited number of community-based cropping and culling schemes have been initiated which are trying to remedy this situation, but are still largely regarded as pilot initiatives, and require in most cases the managerial and technical support of external agencies such as government institutions and NGOs.

Further expansion of the wildlife industry is in many cases still restricted by lack of necessary policy and legislative change that would enable ownership of wildlife on private land or a greater devolution of wildlife user rights to land owners. Such restrictions were largely responsible for game ranching not being attempted seriously in many countries with a great potential such as Tanzania and Mozambique. Experiences from South Africa, and increasingly from game ranches within the other eastern and southern region countries, led to the recognition that wildlife management could only justify itself as a feasible land use option if the variety of its uses were fully utilized rather than relying purely on meat production. The mixed production of wildlife and domestic livestock on a ranch could result in satisfactory financial returns that justified keeping wildlife on the property. In addition, by incorporating all the wildlife utilization options ranging from photographic tourism, safari hunting, resident

hunting and game meat production, the total value of wildlife was increased considerably. This multi-use approach was facilitated in countries such as Zimbabwe and Botswana, with the introduction of safari hunting on private lands that provided a lucrative wildlife use option to game ranches. In Zimbabwe where devolution of wildlife user rights by private land holders has been fully incorporated into legislation, the result was a rapid expansion of the game ranching industry due its increased financial viability when fully incorporating the large variety of consumptive and non-consumptive wildlife use options in ranch management.

On the other hand, if other wildlife use options such as safari hunting result in the greatest economic return per animal, such use is restricted to only a small proportion of all available wildlife species on a ranch such as male trophy animals of particular preferred species such as Cape Buffalo. Good organization skills and adequate infrastructures are needed for successful safari hunting and tourism-based wildlife use. Others government policies can restrict commercial farms development. In Kenya, game industry remains under-developed and restricted by lack of permanent devolution of wildlife user rights to private landholders that has limited investment in the sector. Th industry relies primary on meat production due to Kenya's restrictive consumptive use wildlife policy, which does not allow the use of safari huntong as a wildlife use option, as opposed to Zimbabwe. Excessive veterinary and health regulations on the processing and marketing of game meat in certain countries have also restricted revenues accrued. Those restrictions affect commercial farms' profitability and legal game trade development. Other risk for further private commercial ranch development represents recent Zimbabwe's prezident Mugabe government policies on land reforms. This can have negative effects in all southern Africa region, both by influencing domestic politics and undermining regional economic confidence.

Land matters

If all the potential fault-lines coincide, the land issue can be very damaging. Historically, access to land was part of the attraction of liberation movements in countries where white ownership was an issue Kenya, Namibia, South Africa, Zimbabwe and also Zambia, Mozambique and Angola. There is always the possibility of politicians using land reform for populist appeal. They may pay little attention to the very real complexities of the issue and the collateral damage that can follow poorly managed change.

Many of Zimbabwe's neighbours share its key characteristics. There is a history of white rule, greater or lesser reliance on agriculture, large semi-arid areas with fragile ecologies and economic growth barely keeping pace with population. Modern farming sectors coexist with small-scale producers, some of them successful in the market. But there are still a large number of households at or below subsistence. Rapid population growth presses on limited economic and environmental resources. In the cities, an urban population boxes above its weight politically

But there are also important intercountry differences. They are based, not least, on post-independence experience. At independence much of Africa set off with state-led development based on strong central planning and market controls, protected industrialisation, and the modernisation of agriculture.

During the 1980s and 1990s, the obvious lack of economic progress in many countries led to a general shift to market liberalisation and the removal of subsidies. Privatisation and a concentration on the private sector were supposed to produce rising incomes.

However, in Zimbabwe, the unilateral declaration of independence interlude and the ruling Zanu-PF's ideological roots, led to optimism over the ability of the state to take the lead in growth and redistribution persisting longer than elsewhere. It was not until the 1990s that very partial reform got under way.

Land and livelihoods

Land-based production is significant everywhere. Even in South Africa where agriculture directly accounts for only five percent of gross domestic product, its influence is strong enough to mean that shocks - most of them so far climatic, but also potentially political are felt disproportionately throughout the economy. This is even more true in other countries where agriculture is a much larger part of production and exports. The stakes are therefore high.

For rural people land is a necessary, but not sufficient, condition to raise and stabilise living standards. Most households try to diversify their means of support by farming.

The potential contribution of land to rural livelihoods varies greatly. Large parts of Zimbabwe, as of Namibia, Kenya and South Africa, which are suitable only for wildlife and extensive livestock production and which employ few workers, cannot sustain rainfed crops.

The land in zones with better agroecological potential, which are central to the current disputes in Zimbabwe, could create more livelihoods. However, whether this potential is realised, and whether these livelihoods are sustainable, depends on institutions providing the necessary support services and assets.

The regional record in such support is unfortunately disappointing. Unless performance is improved, the prospects are poor for land reform that would contribute rather than detract. In Zimbabwe, redistribution programmes, including an initiative to set up trained farmers on medium-sized plots in an intermediate small-scale commercial sector, have not performed well. There has been poor planning, under-funding and interruptions from droughts.

The worst-case scenario for the medium term would be the extension of the dreadful conditions of the communal lands to the whole agriculture sector. The best scenario would be steady progress towards sustainable agricultural systems in each zone with rising productivity based on supportive public and private services.

In most provinces of South Africa the land redistribution programme, which was launched in 1994/95, had inadequate aftercare. In Kenya, the declining rate of growth of smallholder productivity from the 1970s to the 1990s is largely explained by weak institutional support.

There is real reason to be concerned that, even if there is an opportunity for orderly change, the potential of land reform to contribute to growth and equitable income distribution will generally not be realised.

Knock-on effects

Is it likely that recent developments over land in Zimbabwe will have negative effects in southern Africa, both by influencing domestic politics and undermining regional economic confidence?

There is a threat of contagion through a demonstration effect. The events in Zimbabwe, whether or not state-sponsored, set a precedent for over-riding the rule of law and forcing through constitutional change to alter policy. These extra-legal challenges to property rights raise doubts about the commitment of politically influential groups to the rule of law. There is a risk to all-important business confidence in agriculture and beyond.

The short-term impact on South Africa has been unambiguously adverse. The Zimbabwe factor has produced a weakening exchange rate and falling stock markets.

For the longer term, however, this danger is tempered by the fact that the various regimes have lived with the land issue from the start. There has also been remarkably little land-grabbing and much of the popular demand for land in the 1960s and the 1970s has given way to the search for jobs and incomes. The degree of threat probably depends on the actions of a new generation of opportunistic politicians trying to dislodge long-standing governments.

The second source of risk stems from the economic effects of sudden land transfers in Zimbabwe, triggering wider economic contraction. Regions tend to rise or fall together, so the multiplier effect matters. Even though individual economies are more parallel than interlocked, the rapid descent of the economy of Zimbabwe has contributed to slowing South African growth. Tourism in particular depends on the perception of physical security, and an isolated incident in one country has a disproportionate effect on visitor numbers regionally.

Good governance

For donors helping the region, the possible knock-on effects are an extra constraint on reducing rural poverty through government development programmes. These increasingly rely on assumptions of good governance. To the extent that Zimbabwe's example weakens the quality of governance elsewhere in the region, the effectiveness of aid will be reduced. This will sharpen the old dilemma that poor people are punished with the withdrawal of aid because of the failings of their leaders.

What of the future?

African economies offer differing prospects and challenges. In South Africa, advanced urbanisation and economic diversification highlight the need for a successful commercial farming sector, with increasing numbers of black participants, alongside more equitable access to land by the rural poor. The land reform programme begun in 1994 is at last achieving more momentum and needs to be sustained to head off damaging land invasions.

The African National Congress' leadership will continue to face a dilemma. It needs to sustain the conditions for private investment and growth if urgently needed jobs are to be created, and yet is vulnerable to being outflanked by populist elements playing the land card.

In Kenya, apart from some early resettlement programmes, the agricultural sector has not changed greatly over more than three decades. This is largely because the ownership and control of many of the commercial farms passed to the economic elite. The remaining white and foreign owners are often protected by well-placed indigenous partners able to head off possible populist threats to their investments. While a few farm invasions may occur, the very different political context makes state support or tolerance unlikely. As in Zimbabwe, smallholder rural areas are economically disadvantaged, and have yet to benefit from liberalisation and the promotion of private enterprise.

Overall responsibility rests with the regional leadership to push ahead with agrarian reforms - not just for land but also for supporting institutions.

5. Bush meat is a key source of protein for a large number of people in Africa. In the recent years there has been an increased trade of bush meat. How does the demand for bush meat reconciled in the context of wildlife management?

Consumptive use of wildlife in the informal sector, particularly the consumption and trade in bushmeat are widely believed to be unsustainable in particular in Equatorial Africa. The situation differs in southern Africa where are some others issues of consumptive and non-consumptive uses in areas of high tourist potential. Several interesting models of the 'safari' type exist for community involvement in wildlife management in contexts such as these (CAMPFIRE being the best known example). Outside these high tourist potential areas, wildlife management is still highly problematic, though it is in such areas that the biodiversity concerns are often greatest (Brown, 1998).

The use of wildlife may have important social development aspects, for it is often most highly valued by the poorest sections of the population. Wildlife products are often major items of consumption or display in many human cultures and have a high medicinal and spiritual values. The most extensive research on the values of wildlife for local consumptive purposes has concerned the bushmeat trade. Bushmeat offers a number of benefits to forest-dwelling populations and, particularly in areas with poor infrastructure and communications, has few rivals as a store of tradeable value. Highly transportable, offering a high value/weight ratio, easily preserved at low cost and with good storage qualities when smoked, bushmeat is often both the primary source of animal protein and the main export commodity for the inhabitants of the humid forest regions of the tropics. Bushmeat production is a major component of the economies of much of Equatorial Africa, and a primary item of the diet (see Box 1 and Table 1). In many cases, bush meat represents a free good when it is subsistence hunted and plays important role in cost saving of rural people. In rural market, bush meat is considerably cheaper than domestic meat, and indicated than supply in such areas is still considerable. Different surveys suggest that although affordability of bush meat is still important in rural supply areas, there also exist a large demand for bush meat that is based on a preference for bush meat over domestic meat, that is especially prevalent in urbanized areas. Urbanized areas with reduced wildlife availability are characterized by maintaining a high demand for bush meat that is more expensive than domestic meat. Such demand is based on the perception that bush meat is superior product in comparison to domestic meat, and wealthier urban inhabitants are willing to purchase more expensive bush meat.

Box 1 The bushmeat trade in Equatorial Africa

Hunting and the bushmeat trade occupy a central place in the economies of Equatorial Africa, and the volumes traded are substantial. An inventory of the four main markets in the Cameroon capital, Yaoundé, indicates sales of 70–90 tonnes monthly, at an average of 2,300 kg per day (Baillon, 1996, quoted by Klein and van der Wal, 1998: 111). The annual bushmeat trade in Gabon has been valued at \$22 million (informal market) and \$3 million (formal market), with four tonnes entering Libreville monthly. 26,000 animals are said to be sold in Pointe Noire in the Republic of Congo each month, which given wastage rates, may imply half a million animals killed for this market each year (Wilson and Wilson, quoted in Colchester, 1994: 48–9).

Taken from Imandar et al. 1999

Table 1 Extent of bushmeat consumption in Equatorial Africa						
	Forest area	Popula tion			Bushmeat eaten	
Country	Km ²	Forest	Urban	Kg/year	kg/km ² year	kg/person/year*
Cameroon	155,330	1,424,000	2,214,620	78,077,172	503	21
CAR	52,236	219,500	539,775	12,976,507	248	17
Democractic Congo	1,190,737	22,127,000	3,782,369	1,067,873,491	897	41
Equatorial Guinea	17,004	183,000	227,500	9,762,838	574	24
Gabon	227,500	181,700	581,440	11,380,598	50	15
Rep. Congo	213,400	219,500	1,245,528	16,325,305	77	11
TOTAL	1,856,207	24,354,700	8,591,232	1,196,395,911	645	35

Taken from Imandar et al. 1999

Estimating both existing hunting yields and maximum sustainable harvest rates presents considerable difficulties in the conditions prevailing in tropical forests. The evidence from Equatorial Africa is overwhelmingly of unsustainable off-take, though the picture presented is often so extreme as to be difficult to accept at face value. In Cameroon, for example, rates for the commoner duiker species (such as the Blue Duiker, *Cephalophus monticola*) have been reported as up to about 25 times greater than sustainable levels, yet the off-take continues more or less unabated, implying gross inaccuracies in estimates of off-take, or of regenerative capacity, or both.

Nevertheless, the facts are of massive and completely unmanaged harvesting, in conditions of ever-increasing public access (often linked to logging and road building projects) and increasing demand for bush meat (especially for big city markets).

Doumenge et al. (2001) state that subsistence hunting itself in rural zones does not generally present serious risk for wildlife survival, except the zones with high density of people where the forests themselves disappear.

Commercial hunting-poaching for big city markets provision is on the contrary very destructive. Increasing demand, due to burgeoning human population, rising living standards, and conflicts, is driving the poachers to penetrate more the forests, following forest logging enterprises. The level of this commercial hunting is alarming above all in sub-region of Central Africa, where the anti-poaching control is not effective and where professional bush meat hunters are often sponsored by influential urban entrepreneurs with access to modern weapons. The market is enormous. As Table 1 shows, annual consumption by 25 million people has reached more than 1 million metric tons in the Congo Basin alone the equivalent of 4 million cattle, and wildlife is now the primary source of protein for increasing human population.

Unsustainable hunting and habitat fragmented by logging are blamed for the extinction of Miss Waldron's red colobus and for dramatic reduction in population of gorillas and chimpanzees. Big rodents, antelopes and primates are particularly threatened. Last IUCN quadrennial Red List survey of threatened wildlife concluded that "the global extinction crisis is

as bad or worse that believed with dramatic declines of many species". It found that the number of critically endangered primates increased from 13 to 19 in the past four years.

The empty-forest syndrome was the catalyst for recent formation of the Bushmeat Crisis Task Force to battle forest poaching. Alliances are being created not only within the conservation community but with the logging, energy, mining, and construction giants operating in unprotected regions. These extractive industries, regarded often as adversaries, are now being cultivated as potential allies and donors, since many have bigger budgets than the nations they work in. CIB, a large German timber company in Congo, for example, has agreed to confiscate guns from its workers who previously hunted their own food. The company will import meat to feed them and crack down on poachers.

Actions like this can help but cannot fundamentally change the deteriorating situation for wildlife in Africa. Wildlife exploitation for consumption is very high not only for economic reasons but is linked with traditional preferences for bush meat. In the city, bush meat represents a meat of prestige and the demand is very important. Illegal bush meat markets are well organized and involve a large number of sub-dealers and smugglers for supply to big city markets. Policy and control are ineffective and corruption is the reality.

Discussion on the internet *bushmeat* forum (bushmeat@AZA.org) give a consensus about factors contributing to intensification of bush meat market, especially in Central Africa :

- economic crisis causing a diminution of income for population and return to the villages with hunting as a rare source of immediate income for covering daily needs (scholarship of children, food, products...);
- introduction of guns and steel wires increasing productivity of hunting;
- weakened system of traditional control of access and ownership of the resources
- increasing penetration to the forests by growing network of roads for forests logging and communication, made by governments with help of different fundings;
- transfers of people caused by conflicts and political instability in general;
- devaluation of franc CFA that provoked:
 - doubled price of imported meat (few local farms existing in Central Africa) and as consequence an increasing demand for bush meat
 - reduction of forest exploitation costs and consequently a deeper penetration on the forests margins far and far from marine ports.

Increasing demand for bush meat will continue with population growth and unsustainable hunting will decline wildlife population in Africa, particularly in sub-region of Central Africa.

To slow down this trend, anti-poaching enforcement is needed. But creation of anti-poaching units of professionals free of corruption and their equipment is very expensive (estimated at \$200/km²). Without strong political support for implementation of a conservation strategy and development of new methods to increase other food resources for supply to city markets, wildlife will be lost in most of areas in Africa.

A monitoring of wildlife populations, management and planning, reasonable hunting quotas and development of wild animal species' ranching and farming to satisfy partly the demand for bush meat are some of the issues in wildlife management to improve the bush meat crisis in the future.

However, the problems of monitoring, planning and managing wildlife are in many ways akin to the problems of any form of management of common pool resources, the differences being primarily of degree rather than of kind (Box 2). In combination, they considerably lower the incentives for sustainable management.

Box 2 The distinctive features of wildlife as a common pool resource

- *Low ownership*
Most notable are low levels of local ownership. In most countries, wildlife is either without any owner or is state property and alienated from the local communities.
- *Mobility of the resource*
Low levels of ownership are related, inter alia, to the mobility of the resource. Mobility distinguishes animals fundamentally from most plants and has important implications for their management.
- *Non-recognition of user rights*
Recognising the rights of traditional users in relation to mobile resources like wildlife poses particular intellectual and managerial challenges. All too often, the discourse of biodiversity conservation equates low densities of sedentary human populations and 'true' owners with an absence of legitimate user rights, a confusion which can easily serve to justify transfers of rights away from the poor and marginal.
- *Criminalisation of use*
Along with low levels of ownership goes the fact that activities associated with its use tend to be criminalised; wildlife exploitation is often subject to numerous negative sanctions.
- *Difficulty of monitoring the resource*
Despite many years of effort, the quest for techniques to census forest animals accurately has so far eluded ecologists, even for large animals like elephants and the great apes.
- *Low barriers to entry in the exploitation of the resource*
Factors such as low levels of ownership and the low cost and wide availability of hunting technology lower the barriers to entry into hunting, and its frequent blanket criminalisation only discourages regulation. In many societies it is the preserve of young adult males, who are best able to accommodate the variable returns and other uncertainties of hunting.

All of these features imbue wildlife with the characteristics of common pool resources and may encourage free-rider behaviour. Those who exploit the resource have little ability or incentive to manage it sustainably.

Options for management

The distinctive features of wildlife and the complex political contexts within which its use occurs pose some significant management dilemmas. The problem appears to be less one of environmental education than of achieving effective management (Box 3).

What are the options for donor interventions to increase the livelihood security of peoples dependent on wildlife as a consumptive resource? Given the public goods aspects of wildlife in Equatorial Africa, land and resource privatisation (promoted as solutions to wildlife management elsewhere) may be insufficient in themselves. Devolving ownership of wildlife without effective institutional incentives to promote equity and sustainability could well marginalise large numbers of wildlife users. The common access and usufruct rights which they currently enjoy (even if only by default) may be threatened, rather than supported, by changes in the land tenure regime.

Equally, there is no guarantee that solutions based on reinstating traditional control systems will necessarily provide any easy institutional base for effective management of the resource. Global integration, monetisation of economies, growing land and labour transactions and social complexity, combined with increasing pressure on natural resources,

all challenge images of communities as cohesive entities. This casts doubt on the notion that leaders and followers share a basic commonality of purpose.

If wildlife conservation is to contribute to people's livelihoods, new forms of ownership must be found which do not rely on over-ambitious land reforms or the restitution of traditional controls. The development of rights-based management that supports people's entitlements may well be a more promising way.

Box 3 Problematic areas in the management of wildlife

- *Problems of institutional scale* Given both the nature of the resource and the threats to its survival, wildlife management regimes (particularly for the larger species) need to be imposed over large geographical areas. Wildlife tends to be most abundant in regions which are weakly controlled by the institutions of the state. In such areas, traditional institutions usually operate best on a small scale; high-level institutions tend to be notably weak and riven with conflicts. Scaling up local institutional arrangements for wildlife management is likely to be problematic.
- *Permeation of the industry by external élites* A complicating factor is that in many societies, hunting is not restricted only to local communities, but draws in professional bushmeat hunters often sponsored by urban entrepreneurs with access to modern weapons. Perversely, the attempt to increase the regulation of the industry may merely encourage such operators, who can easily subvert the intended controls.
- *Donor initiatives and the reluctance to relinquish control* Government and donor-supported wildlife management strategies have rarely proven willing to relinquish control over wildlife to rural dwellers, or let them decide whether or not to retain the resource. For many governments, this would set a dangerous precedent, given that wildlife is merely one part of a package of state-appropriated resources, the other components of which include high-value land, timber and minerals.
- *Problems with local participation* Even where outside agencies are willing in principle to pursue 'participatory strategies', this may prove difficult to achieve. Villagers are usually reluctant to admit to involvement in illegal practices, and unless governments are prepared to concede such rights in public, only the most peripheral players may be ready to participate openly in wildlife management strategies.
- *Decentralisation of the bushmeat trade* In many parts of Africa, the bushmeat trade is highly decentralised (this increases its attractiveness to the poor), and the primary markets are dispersed throughout the forest areas. The secondary markets may offer more potential for regulation, as these are usually in major urban and industrial centres.
- *Compensation measures* There are few agencies willing to compensate people for illegal practices foregone, and attempts to provide alternative income sources have not been proven very effective (Brown, 1998).
- *Discriminatory hunting strategies* Strategies of control which attempt to differentiate acceptable from unacceptable practices – for example, permitting the hunting of rodents and vermin (which are rarely threatened, and often thrive better on-farm than in the forest) while banning the hunting of endangered species, or permitting the taking of mature animals while protecting the young – has considerable appeal to the livelihoods lobby but is regarded with scepticism by preservationists. The arguments against the approach are quite strong. Under present management regimes hunters will be tempted to take even protected animals when they come within range, and some of the preferred hunting technologies (snares and traps) do not discriminate at all.

The ways forward

Wildlife has long been marginalised from the development debate, and to introduce the complex sanctions now needed to control its utilisation, trade and management will not be easy. Nevertheless, improvements can be made, without necessarily surrendering the twin goals of equity and conservation. The starting point must be recognition that local wildlife consumption and trade is something to be managed, not devalued and criminalised.

Wildlife resources on common land (such as is de facto the case in many parts of Equatorial Africa) present particular regulatory difficulties because of their distinctive characteristics (mobility, coverage of large areas, difficulty of monitoring) enumerated above. However, regulatory systems from other natural resource sectors, such as inshore fisheries, may provide useful models to enable the poor to define their rights to wildlife resources in communal management regimes. Individual Transferable Quotas (ITQs) are one such innovation which may have potential in the wildlife sector (see Box 4).

Box 4 Individual Transferable Quotas – An innovative model from the fisheries sector

Rights-based management systems, which enable people to negotiate access and assert their entitlement to resources on an on-going basis, are an important tool to broker better development opportunities. Individual Transferable Quotas (ITQs) are one class within the rights-based (or 'entitlements') approach. They were first introduced in New Zealand in 1986 but are now being used in Iceland, Australia, the USA and Canada. An ITQ is a percentage of the total allowable catch which is set annually on the basis of scientific advice. ITQs are allocated to individuals generally on the basis of catch history. They appear to work best if they are able to evolve into 'real' property rights with minimum interference from government. Their value increases over time, they can be freely traded and people can choose to form cooperatives or sell their shares and leave the fishing industry. In the best scenarios, the secure income offered by ITQs can be used as a basis on which to raise capital and encourage investment in the sustainable future of the fishery. Monitoring of harvests can be simplified dramatically as ITQs create an incentive for owners to catch free riders operating in the market (de Alessi, 1998).

ITQs have been criticised because they enable large commercial companies to buy up all of the rights to fish stocks, often resulting in marginalisation of small independent fisherfolk. Against this should be weighed the fact that people are compensated for their entitlement to their proportion of the catch – without the ITQ, the commercial operator could have simply pushed them aside.

There are many similarities between the fisheries and wildlife industries. The estimate of sustainable yield, for example, is based on catch data (the number of animals taken out of the environment) rather than count data (how many animals remain in the environment). The approach commends itself where there is uncertainty as to the level of the stock, for as long as it is subject to regular review the yield can be adjusted in line with productivity. ITQs have proven useful in managing artisanal fisheries though they have not yet been tested as a mechanism to regulate wildlife. There are two particular challenges in the latter reference. The first is ensuring that local and national governments respect the validity of the quota and do not interfere in how it is traded. The second is establishing the system that allows people to monitor and regulate offtake. This latter function will largely be determined by the size and extent of the local wildlife market.

There are other more modest measures, which can be taken to improve the management of wildlife:

Accepting trade-offs

It is interesting to contrast the approach taken by many governments and their international partners in relation to the management of resources, which offer immediate value to themselves against resources such as wildlife, where the benefits are primarily to local communities. In the management of timber, for example, trade-offs are routinely made between the interests of the industry and the long-term desire to conserve the resource. This contrasts starkly with the reluctance of many agencies to negotiate with local populations over wildlife, preferring to stick rigidly to impractical exclusion strategies.

Negotiating with the users

Wild animals are living resources subject to fluctuations from season to season and year to year, and thus need to be managed in a flexible way (Murphree, 1996). Establishing the rights of both users and those affected by the resource to negotiate over its condition is thus likely to be central to any management strategy.

Influencing the wider environment

Part of the pressure on the resource derives from the increased access that is provided to bushmeat hunters by the activities of the timber industry. While ultimately such activities need to be accommodated within a wider land and resource management system, there are short-term steps which can be taken to limit both the demand for bushmeat from itinerant timber workers, with no long-term interest in the sustainability of the local stock, and the potential which such industries offer to abuse the trade. These include contracts requiring the companies to provide alternative sources of protein (frozen sea fish and poultry), at affordable prices, to their workers, and controls on the use timber vehicles.

Conclusion

Significant progress has been made in recent years in advancing the case for people's involvement in wildlife management, though the success stories have been much greater in areas with tourist potential than where the resource is primarily of interest for local consumption. Workable models of sustainable management in the latter instance are few and far between. Populist models which link community participation, land tenure reform and the reinstatement of traditional control systems simplistically with poverty alleviation and resource conservation, are unlikely to suffice in an increasingly complex world. Even where such mechanisms are politically feasible, the transaction costs may well outweigh the benefits that accrue. We must look to other sectors for viable models, and search for innovative forms of ownership more compatible with the interests of the poor and with a greater chance of political acceptability. Rights-based management, grounded in equitable negotiation by user groups, offers a promising route for wildlife development.

Situation in the eastern and southern Africa

In the eastern and southern Africa region the situation differs considerably from Equatorial Africa. The wild meat is legally produced from well developed game ranching and farming, large-scale and community based cropping schemes, ecological culling programmes, resident and safari licenced hunting, and from problem animals measures. This is due to ecological conditions where wildlife ranching and cropping/culling have been promoted as a more suitable land use option. Within the semi-arid and unproductive areas of the region, wildlife offer a better opportunity to meat production than livestock. Many

ecological studies show that indigenous wild ungulates use rangeland resources more efficiently than introduced livestock species. Although a certain meat production, the formal game meat industry remains underdeveloped when compared to its potential. However, when combined with non-directed game meat production systems, overall supply in the eastern and southern Africa countries is still substantive. This legal production mechanisms can partly contribute to meeting the social objectives of poverty alleviation, and in increasing food security and the nutritional status of many of the region's people. In addition, game meat plays a critical role in community-based wildlife management. Throughout the region, wildlife management decision and policy makers have recognized that without the support and participation of rural communities who live with wildlife resources, little progress will be made towards attaining the balance between sustainable use and conservation. To this end, policy has been increasingly directed at the devolution of more wildlife benefits to rural inhabitants with the aim of changing current negative attitudes toward wildlife. Game meat in many cases represents one of the most direct and tangible benefits that many communities receive from wildlife, and as such has contributed extensively to promoting wildlife as a valued resource. In practice, however, it seems that harnessing the theoretical advantages of wildlife meat production is not as straightforward as previously thought. Policy and legislative restrictions were in part responsible for only partial results or even failures.

Parallely with formal wild meal industry and market, there are the illegal utilization and trade of bush meat within the east and southern Africa region. The extend and importance of bush meat utilization is primary based on economic factors, but also social and cultural considerations. The resulting quantities of bush meat utilized by the majority of inhabitants are substantial and represent one of the most important natural resources available to households that contributes significantly to community development in most cases. The situation concerning buch meat crisis in the eastern and southern Africa is less critical than in Equatorial Africa region, however, illegal bush meat utilization, and increasing subsistence and trade-accrued values, are leading to unsustainable harvesting techniques, which have an increasingly negative impact on wildlife population in the region. The conservation and community development implications are dire, and unless immediate action is taken, will likely result in the loss of many valued resources.

6. Increasingly there are efforts to involve local communities in park management (e.g. CAMPFIRE in Zimbabwe) What is the overall impact of such initiatives in protecting wildlife but still meeting the development aspirations of the local communities? What are the necessary and sufficient conditions for such initiatives? What is the potential to replicate such “success stories”?

Community-based conservation programs have been developed over last 20 years to link better wildlife conservation with local development. Currently, much of the funding by major bilateral and multilateral donors to protected areas in Africa is in the form of CBC programs, but most of them have had only limited success in achieving both conservation and development objectives.

For CBC to succeed it needs to be flexible enough to cope with a countryside inhabited by growing number of extremely poor people who depend on a subsistence existence and whose greatest goal is to gain economic security. The dilemma is that even the most enlightened programs, if wildlife conservation is to be a priority, must reduce people's land-use option, because of natural habitat preservation. And the local people do not favor the land being used for wildlife protection because they believe it is wrong to place the needs of wildlife above those of people, a common African viewpoint. This reality makes the widespread implementation of CBC programs problematic.

Although project leaders want local people to benefit from the park and the wildlife living in buffer zones as much as possible, it is clear that the park itself can provide only minimal revenue, even with an increase in ecotourism. The amount of revenues received by the community from conservation program is often considered too low to cover the disadvantages related to wildlife protection (impacts on agriculture, restriction of land-use, etc.). This fact presents what is likely to be a common problem for CBC programs. Conservationists see the problem and act to involve local people as a means to build a constituency. Long-term success is problematic, however, because local people are reacting to an outside initiative: the program considers the needs of local people primary as a strategy to win their favor for the park, and enough money must be generated from tourism for local people to receive significant financial gain indefinitely.

Tourism is viewed as the critical ingredient, but it requires on-going promotion, facilities, and management flexibility if it is to succeed. The question is, however, whether sufficient jobs and money can be really generated for local people to refrain from exploiting the park's resources. At present, there may be a growing over-reliance on tourism as the primary means to produce revenue for CBC programs.

One of the most often-cited “successful” examples of a CBC program is Zimbabwe's Communal Area Management Programme for Indigenous Resources (CAMPFIRE). This utilitarian wildlife program has been developed to appeal to local people. It gives them a voice in natural resource management decisions and a financial stake in the preservation of wildlife. Large mammals are the key resource because most of the money generated comes from safari hunting fees. It is hoped that the program will eventually come to include as income generators such resources as forestry and livestock production.

CAMPFIRE has been developed by Zimbabwe's Department of National Parks and Wildlife Management. Fortunately, it fits with President Mugabe's desire to decentralize the management of rural resources. The program has been implemented over other competing options, including settlement and intensive agriculture. Thus, although there is broad support for the program, it is far from universal and not without problems. Recent fieldwork in some CAMPFIRE districts indicates that many villagers show little knowledge about CAMPFIRE or view the program as an extension of the RDC (Rural District Councils—the lowest level of government) or “government”. Even where councilors do represent their communities in the

RDC, they may have little bargaining power over benefits derived from CAMPFIRE, because counselors from wards without wildlife schemes are often in the majority.

Villagers living with wildlife bear the cost of wildlife impacts on agriculture), whereas benefits from safari hunting may be spread beyond the community that bears the cost or may be concentrated in the RDC. Campbell et al. (2000) found that 50 to 90% of revenues from hunting were retained by the RDC, whereas in one district, household dividends were \$1 to \$3 per household per year. If antelope were poached and sold for meat, they would bring \$7 to \$20 each.

Scholarship is needed to establish under what conditions CBC programs work. There are successful CAMPFIRE schemes, but each district is different, providing rich data for scholars. An emerging hypothesis is that devolution must go lower than the RDC if CBC program is to be successful (Wily, 1998). The successes of CAMPFIRE must be built on by developing genuine local participation and ownership. There is, however, a risk. What would happen to the program if support for it declined because arguments for intensified agricultural or increased settlement began to resonate with local people? It would be difficult for CAMPFIRE to remain a viable wildlife conservation program, which would be a predicament for conservationists because CAMPFIRE has as its foundation "the assumed right of communities' group proprietorship over 'their' resources" (Metcalf, 1994:190). Could conservationists then lobby for a more protectionist wildlife policy, despite their previous commitments to local control of resources? The social and economic reality in Africa make very difficult to produce a program that successfully wed wildlife conservation and people's economic needs. As CAMPFIRE illustrates, even when the foundation for CBC is solid and well thought out, success is hard-won (Metcalf, 1994).

Community-based conservation programs are a more realistic policy in areas that have big game animals (Zimbabwe's CAMPFIRE, Zambia's Administrative Management Design for Game Management, and Kenya's Amboseli National Park). The ability to draw hunters or tourist in sufficient numbers is the key element. Each of these programs has an operational history of several years, and each has succeeded to some degree in working cooperatively with local people. It is not likely, however, that such programs can be applied generally in rural Africa for the following reasons :

- Areas without big game animals will not have the revenue-generating potential required for conservation based projects that rely on revenue sharing because there will be insufficient financial reward.
- Even in those areas where there is big game, there is the danger that communities will eventually reject the project. The amount of revenue received by the community may eventually be considered too low. For example, in Kenya there is presently an incentive for the Masai living in the Mara area to convert their land to agriculture and ranching because of the difference between their current and potential revenue. Norton-Griffiths (1995) estimates that the ratio between what the masai now receive from traditional livestock management, tourism, and agriculture to what they could receive if the land was used to its full agricultural potential is between 1:3 and 1:23, depending on land quality. Consequently, he questions a policy for rangelands that is based on a mix of traditional livestock management and tourism. It would not produce enough revenue to halt development. Clearly, the economic link between rural communities and CBC programs poses both a serious practical and a conceptual problem. First, it will be difficult to produce enough revenue; second, CBC programs put a price on wildlife that can be compared to revenue that might be received from other activities. If the rural community accepts a CBC program based on its economic benefits, they might also reject it if a better economic alternative comes along. And if rural people cannot pursue economic options that would bring them greater income, then they are in fact still subsidizing wildlife

conservation. In economic terms, this is an opportunity cost, which is defined as the cost of lost economic opportunities (Owen&Chiras, 1995). Rural people may eventually perceive that they have an opportunity cost because they are forgoing the possibility of greater economic gain to maintain wildlife and they may become feel that the restrictions that they must bear to save wildlife are costing them too much.

- The widespread application of CBC programs requires significant changes in the relationship between central governments and rural areas. Western (1994) believes the CBC approach calls for great reforms in land-use policy. He believes that if the conservation focus is to switch to the community, the focus must change from a top-down to a bottom-up approach: he states that this “is where community-based conservation becomes more revolutionary than evolutionary: Such changes call for nothing less than a turnaround in entrenched political norms”(Western, 1994:553). As Callaghy and Ravenhill (1993) point out, it is not likely that such profound changes will occur in Africa any time soon. Little (1994) discusses the realities that could work against CBC in the foreseeable future, including:

- 1) central governments that maintain policy-making power and allow only administrative authority to devolve to rural areas;
- 2) local participation that is difficult and time-consuming to administer;
- 3) difficulty in recognizing the most appropriate community members for program participation;
- 4) participatory community-based conservation that is ineffective in combating the environmental problems that produce wildlife conservation problems;
- 5) constant monitoring and evaluation needed to see if the program’s objectives are being met;
- 6) local conservation efforts that cannot escape national or global politics.

Thus, the requirement for a “revolutionary” change in the relationship between rural areas and the outside world, coupled with the already ambitious goal of linking conservation and development, makes it problematic that CBC can be widely applied as a wildlife conservation model in Africa’s rural areas.

Newmark and Hough (2000) describe the multiple factors that hinder integrated conservation and development projects in Africa from achieving their objectives, and the need for promoting alternative conservation approaches. They analysed a number of assessments of the effectiveness of ICDPs that have been conducted in Africa. Two things are striking about these reviews: the consensus among workers that nearly all ICDPs have either not achieved their objectives or that progress has been modest, at best, and the multiple explanations given for the limited success of ICDPs. These explanations fall into three broad categories:

- assessment problems;
- internal constraints, and
- external forces.

Assessment problems

Project evaluators have identified two important constraints that have hindered the objective assessment and demonstration of success of many ICDPs.

One is that many projects were at an early stage of implementation when they were assessed. The early evaluations (Kiss 1990, Hannah 1992, Wells et al. 1992) of ICDPs in Africa concluded that success was limited in meeting both conservation and development objectives, but also that most of these projects had not been under way long enough to be

fairly evaluated. Reviewers noted that the normal 3-5 year project cycle may be inappropriate for ICDPs, as it was found to be during the 1970s for rural development projects, which required considerably longer project cycles to achieve project objectives. Given that a number of ICDPs in Africa have now been in operation for more than a decade, this issue should be less of a constraint; however, there is as yet little substantive evidence of improvement in success.

A second constraint on assessment is the absence of ecological monitoring. Kremen et al. (1994) examined 36 projects worldwide, 23 of them from Africa, and found that over half of the projects had no ecological monitoring and only two contained a comprehensive ecological monitoring component. The lack of ecological monitoring in most projects has prevented a rigorous evaluation of the impacts of development activities, particularly resource exploitation, on biological diversity. The lack of ecological monitoring has also meant that feedback useful for guiding the future course of project activities is frequently absent (Kremen et al. 1994). Wells et al. (1992) noted that few of the 18 ICDPs they studied in Africa, Asia, and Latin America were able to demonstrate--largely because of the absence of ecological monitoring--that the development activities occurring outside of the protected areas enhanced the conservation of biological diversity within the protected areas.

Internal constraints.

Project evaluations have also identified four internal constraints common to many ICDPs.

First, public goods may not alter the behavior of individuals, as Gibson and Marks (1995) have suggested; they maintain that many ICDPs in Africa will fail in their goal of conservation because the incentives presented to communities are public goods and are insufficient to alter individual behavior. Furthermore, these incentives may have differential effects on different groups within the communities (Noss 1997). Gibson and Marks (1995) also argue that the economic incentives that many ICDPs offer are often ineffective because project designers frequently overlook the social importance of many activities, such as hunting. Metcalfe (1994) also highlights the difficulty of distributing public benefits to individuals as one of the key challenges facing the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in Zimbabwe.

A second internal constraint is that the organizational structure of many ICDPs often mimics earlier ineffective colonial structures. Gibson and Marks (1995) suggest that many local people remain disenfranchised from most ICDPs in Africa because the ultimate authority for wildlife continues to reside with the state. They maintain that although a number of ICDPs have devolved authority over wildlife to local communities, that authority is limited and local communities should have greater control over the use of wildlife. Most wildlife departments accept the rhetoric of such a change in approach, but they can find it difficult to effect that change because doing so demands new sets of skills, a shift from competitive to collaborative relationships with other agencies and institutions, and changes in the internal institutional culture (Hough 1994a). These difficulties have been problematic for ICDPs in Madagascar; government and donor efforts to overcome them have resulted in a number of changes in institutional mandates and structure (Hough 1994a, McCoy and Razafindrainibe 1997).

A third internal constraint is that the offtake associated with many harvesting schemes may be unsustainable over the long term. Barrett and Arcese (1995) and Hofer et al. (1996), for example, have argued that the large mammal harvesting schemes associated with many ICDPs in savanna ecosystems in Africa may be unsustainable because wildlife populations in these ecosystems are inherently variable. They suggest that because managers are frequently under considerable political pressure to maintain a constant flow of benefits (in this case,

meat, skins, or revenues) to local communities, they may find it extremely difficult to reduce the offtake when wildlife populations are declining. They also suggest that if wildlife managers do reduce offtake, the project could lose community support. Less work has been done on the sustainability of plant and animal harvesting in nonsavanna biomes in Africa, but some research on woodlands in southern Africa (Shackleton 1993) and forests in East and West Africa (Fa et al. 1995, FitzGibbon et al. 1995, Slade et al. 1998, Wilkie et al. 1998) indicates that the current offtake for many species in those areas is likewise unsustainable.

A fourth internal constraint is that development activities frequently conflict with conservation objectives. In many projects, such conflicts are a result of the inability of managers to effectively control resource exploitation by communities or individuals (Stocking and Perkin 1992), the unsustainable use of resources, or the ecologically disruptive nature of the development activities.

External forces

Finally, project evaluations have identified three external forces that adversely affect many ICDPs in Africa.

First, sources of potential revenues for communities are usually unreliable and insufficient. Because exchange rate fluctuations and political turmoil often make tourist revenues unreliable, basing cash inducements to communities on tourism is unwise (Barrett and Arcese 1995). The dramatic decline in tourism in recent years in Uganda, Kenya, Comoro Islands, and Zimbabwe highlights the high vulnerability of this industry to political unrest and economic downturns. Additionally, as Barrett and Arcese (1995) noted, there are few protected areas in Africa where the revenues from gate receipts exceed the cost of management; thus, it is unlikely that many communities will ultimately benefit from such revenue-sharing practices. Furthermore, as Norton-Griffiths and Southey (1995) have pointed out, if opportunity costs are taken into account, protected areas and their buffer zones may impose economic penalties on their surrounding communities that far outweigh any potential financial advantages from revenue-sharing arrangements.

Second, external market forces are increasingly manipulating resource use patterns in Africa. The urbanization that is taking place in Africa has created a growing demand in many cities and towns for resources such as meat, timber, and firewood (Barrett and Arcese 1995). These urban markets will produce increasingly strong market incentives to exploit rural natural resources, which could circumvent or undermine ICDP activities. For example, regional urban market forces have encouraged the commercial poaching of large mammals in and around Serengeti National Park for meat (Hofer et al. 1996). Similarly, Hannah et al. (1998) found that distant market forces have had significant negative impacts on the success of ICDPs in Madagascar.

Third, ICDP development activities may induce migration into the project area (Wells et al. 1992, Barrett and Arcese 1995, Noss 1997). Evidence for such in-migration comes from other rural development projects in Africa. For example, a United Nations-supported irrigation project that was initiated in the early 1980s near Lake Manyara in Tanzania was largely responsible for the 40% growth in population in the area between 1978 and 1988 (Yanda and Mohamed 1990).

Based on bibliographic analysis and their own field observations Newmark and Hough (2000) also described why ICDPs' success has been limited

They stated that there are several overarching factors responsible for the limited success of ICDPs in Africa. These include :

- erroneous assumptions;
- unintended social relationships, and
- inadequate knowledge about the project environment.

Erroneous assumptions

That local communities are hostile to protected areas, that raising living standards will inevitably result in conservation, and that buffer zones are panaceas have proved to be erroneous assumptions that are detrimental to the success of ICDPs.

Because protected areas in Africa have historically excluded local people and have a colonial legacy (Anderson and Grove 1987, Neumann 1998), it is generally assumed that these areas are surrounded by hostile communities and enjoy little, if any, support among local people (Lusigi 1981, Wells 1996). The attitudinal research that has been conducted in Africa indicates that this assumption is overly simplistic.

Surveys in South Africa (Infield 1988), Rwanda (Harcourt et al. 1986), Tanzania (Newmark and Leonard 1991, Newmark et al. 1993), and Nigeria (Ite 1996) have found that an overwhelming majority of people living adjacent to protected areas in these countries agreed on the need for the protected area or were opposed to abolishing the parks or making them available for agriculture. On the other hand, surveys showed that most people living adjacent to protected areas in South Africa (Infield 1988), Botswana (Parry and Campbell 1992), and Tanzania (Newmark et al. 1993) held negative or neutral attitudes toward managers of protected areas. Furthermore, surveys in South Africa, Botswana, and Tanzania found that local people's support or opposition to protected areas, managers of protected areas, and wildlife is based on utilitarian values (Infield 1988, Mordi 1991, Parry and Campbell 1992, Newmark et al. 1993). In these countries, local people expressed support for protected areas because national parks and related reserves protect important watersheds, generate foreign exchange, or maintain critical hydrological functions. Similarly, local people expressed support for wildlife primarily because wildlife is viewed as a source of food. However, those who held negative or neutral attitudes toward managers of protected areas did so because they felt that managers provided few services or benefits for their communities. Thus, the documented instances of the unpopularity of ICDPs with local people (e.g., the Cross River National Park project in Nigeria; Ite 1996) and the overall lack of success of many ICDPs do not result from local people's opposition to conservation or protected areas per se. Rather, they are a result, in part, of the inherent limited capacity of ICDPs and--in the eyes of many local people--managers of protected areas to provide sufficient tangible incentives to alter the attitudes and behavior of local people toward the ICDPs (see, e.g., Ferraro and Kramer 1997, McCoy and Razafindrainibe 1997).

A second erroneous assumption of the ICDP model is that improving the living standards of people living adjacent to protected areas will necessarily enhance conservation within the protected area (Wells et al. 1992, Wells 1996). Studies of conservation attitudes of people in South Africa (Infield 1988) and Tanzania (Newmark and Leonard 1991, Newmark et al. 1993) have found a positive correlation between affluence and conservation attitudes, but it is unlikely that an improvement in the living standards of communities near protected areas will inevitably lead to enhanced long-term viability of many species within the protected areas. For example, Ferraro and Kramer (1997) found that the hiring of poachers at Ranomafana National Park in Madagascar actually increased levels of poaching because these new employees used their earnings to hire more people to expand their poaching operations. It is also unclear whether species in protected areas that are threatened indirectly by habitat loss outside of these reserves, perhaps by agricultural intensification, would be helped by an improvement in the living standards of local communities. Thus, encouraging landscape-wide compatible land use adjacent to protected areas may be more important for conserving species in protected areas than simply stimulating local economic development.

A third erroneous assumption is that buffer zones are panaceas. These management zones are promoted frequently in many ICDPs as peripheral areas where living conditions of local communities are to be enhanced through selective resource use and where habitat

degradation will be reduced through habitat restoration. However, it is unclear how those goals are to be achieved: None of the ICDPS that promote the use of buffer zones have explained how an already overexploited area can be used to increase productivity and provide additional habitat for wildlife (Little 1994).

Unintended social relationships

Aside from the problems caused by problematic assumptions underlying the ICDP approach are those that stem from ICDPs' creation of unintended social relationships with local communities. In the effort to win the support of local communities for conservation, ICDPs frequently share park revenues, provide employment, or permit access to plant and animal resources. However, most provide only nominal opportunities for community-wide participation and often fail to link development benefits directly to community conservation obligations. The result is that many ICDPs may unintentionally promote dependency rather than reciprocity and have often treated local communities as recipients of aid rather than partners in development.

Inadequate knowledge about the project environment

Finally, many ICDPs have had limited success because the social and ecological environment surrounding the project is often poorly understood and dynamic. This inadequate understanding of the project environment has contributed greatly to the difficulty in transferring seemingly successful components of ICDPs from one region to another. In most ICDPs, scientific input is normally limited to a "rapid" preproject ecological and social appraisal of the project area. However, these appraisals, by their very nature, have a limited capacity to capture the complex ecological and social (Gezon 1997) relationships that surround most projects. Moreover, they provide a tenuous baseline for subsequent project monitoring, assessment, and adaptation.

ICDP designers are often reluctant to incorporate a significant research component into these projects. Part of this reticence stems from the crisis nature of most conservation initiatives: Research is often viewed as a hindrance to action and an expensive luxury. Yet incorporating a significant research component into ICDPs is essential if the ecological and social dynamics encompassing each project are to be accurately defined and if conservation and development are to be truly integrated.

Lessons learned

Several lessons can be drawn from existing observations. One is that multiple ecological, social, political, economic, and institutional problems confront ICDPs. Not only are ICDPs themselves complex, but so is the environment in which they operate. However, ICDPs seem to rarely build in mechanisms for analyzing and adapting to these changes. Furthermore, project designers and scientists' understanding of the mechanisms governing this environment is generally inadequate. For example, little is known about the long-term primary and secondary impacts of resource harvesting on the structure and function of most tropical ecological communities. Similarly, many social scientists counsel that it is unwise to devolve total authority to local communities (West and Brechin 1991), but little is known about how much authority over the use of natural resources should be transferred to local communities or how to ensure that project benefits are equitably distributed and not captured by local elites (Lutz and Caldecott 1996).

A second lesson, related to the first one, is that more thorough, and ongoing, ecological and social assessment and analysis is required, both during the design phase of ICDPs and during their implementation.

A third lesson is that project planners need to examine in more detail the effects of external factors such as markets, land tenure, and population growth on proposed project activities. ICDPs may need to include project components or explicit linkages to other initiatives, which address external constraints well beyond the limited geographic focus of the ICDP. For example, efforts to control commercial meat poaching in protected areas may require not only upgraded law enforcement within protected areas and improved grazing management in the buffer zones but also favorable pricing and marketing systems for domestic livestock in distant urban areas.

A fourth lesson is that although linking conservation with development may be desirable, the simultaneous achievement of these two objectives may be impossible because of inherent contradictions. In these cases, success may be enhanced by addressing each of these objectives separately but in parallel, tightly linked interventions, rather than within the same project. Decoupling these two objectives does not negate the importance of development to conservation and conservation to development; rather, it implies that protected-area organizations, which have been responsible for implementing most ICDP rural development activities so far, should delegate these activities to organizations with the appropriate mandate, expertise, and experience. The implications are that protected-area institutions should serve more as facilitators than as implementers of rural development activities, although they must work closely with local communities to attract assistance that addresses the needs of local communities without adversely affecting the protected areas. Some protected-area institutions, such as the Kenya Wildlife Service and Tanzania's Division of Wildlife, appear to have already adopted this approach for revenue-sharing schemes between protected areas and local communities, but it needs to be extended to cover the full range of development activities. Another implication of decoupling conservation and development objectives is that an ongoing mechanism is needed within ICDPs for negotiating the compromises and seeking out the win-win solutions that meet both conservation and development needs.

Future direction?

Several immediate challenges need to be addressed in designing future conservation initiatives in Africa.

One is the need to develop mechanisms for ensuring that ICDPs respond to the real complexity of their ecological and social environments and that they effectively monitor, analyze, and adapt to this environment as it changes.

A second challenge is the need to assess, implement, and evaluate alternative and complementary approaches to ICDPs that address the external forces affecting ICDPs through actions such as economic and land-tenure policy reform, landscape-wide conservation planning, conflict resolution, community-based natural resources management, and enhanced management capacity of protected-- area institutions. Although project experience with and evaluation of these approaches is insufficient for a rigorous assessment of their overall effectiveness in comparison to (or as complements of) ICDPs, some preliminary observations can be considered.

- **Economic and land tenure policy reform.** Such reforms can greatly assist in reducing external environmental pressures on protected areas, particularly external market forces and in-migration. For example, the international ban on ivory trading has significantly reduced elephant poaching throughout Africa.
- **Landscape-wide conservation planning.** Given that most protected areas in Africa are small and that many are becoming ecologically isolated, it is important that land-use activities that are compatible with wildlife conservation be encouraged on a landscape-wide scale adjacent to protected areas, and activities that are incompatible must be

actively discouraged. It is particularly important that land use be controlled within wildlife corridors linking existing protected areas as well as within wildlife dispersal zones. In most savanna ecosystems in Africa, pastoralism is considerably more compatible with wildlife conservation than agriculture; thus, efforts should be made to maintain existing pastoral systems adjacent to protected areas. Similarly, for use adjacent to protected areas in tropical forest ecosystems, native hardwood plantations and multilayer perennial agroforestry are better choices than agricultural monocultures and pastoralism (Thiollay 1995, Perfecto et al. 1996, Greenberg et al. 1997).

- **Conflict resolution.** Promoting dialogue between managers of protected areas and local communities, involving affected stakeholders in protected-area project planning and implementation, identifying areas of common interest between protected areas and local communities, and including community representatives on advisory management boards for protected areas can greatly assist in reducing conflicts between parks and Local people (Hough 1988, Lewis 1996). Such programs are attractive not only because they are relatively easy to implement but also because they are fairly inexpensive. Recent conflict resolution initiatives in areas adjacent to the Bwindi Impenetrable and Mgahinga Gorilla National Parks in Uganda indicate that such activities can greatly reduce tensions between local communities and park authorities (Wild and Mutebi 1996).
- **Community-Based Natural Resources Management (CBNRM).** Considerable success in generating compatible land-use regimes around protected areas has been claimed in Zambia, Zimbabwe, and Namibia through the use of CBNRM approaches, the most notable of which is the CAMPFIRE program (Murphree 1993, Metcalfe 1994). CBNRM differs from the normal ICDP approach in that, instead of offering development services in exchange for conservation, it devolves management responsibility for natural resources--wildlife--to local communities. Its success depends on communities seeing more value in managing their wildlife on a longterm sustainable basis than in pursuing short-term exploitation or alternative land uses. Yet a number of scientists associated with these projects believe that local communities will eventually be forced to forsake wildlife conservation for more intensive agriculture development because of demographic and social pressures (Hackel 1999). Therefore, complete devolution of authority to local communities may be unwise (West and Brechin 1991).
- **Enhancing the management capacity of protected area institutions.** The capacity of most African protected-area institutions to address complex interactions between protected areas and local communities is limited (Hough 1994a, 1994b). The development of scholarships, courses, exchange programs, training manuals, and technical assistance that focus on ecological and social monitoring, conflict resolution, park planning, and modern law enforcement techniques would greatly enhance the capacity of protected-area institutions to address many of the protected-area-local community conflicts.

Although ICDPs in Africa have had only limited success, it seems that a refined ICDP approach may be appropriate in some circumstances, especially when protected areas and local communities are highly codependent; that is, when local communities control the habitat abutting protected areas - habitat that is vital to the long-term viability of protected-area species and ecological processes - and protected areas control resources used historically by local communities, the use of which could be managed to be both sustainable and ecologically nondisruptive. An argument for an ICDP is compelling in this case because, unlike most of the alternative approaches discussed above, an ICDP can simultaneously address issues of conservation and development on the ground.

However, the ICDP approach needs to be both refined and enhanced. Improvements to the ICDP model include increasing flexibility and enhancing the use of adaptive management, which is a process by which management activities in a complex biophysical and social environment are monitored, evaluated, and reformulated in an iterative fashion so as to evaluate alternative hypotheses, accumulate knowledge about the system, and reassess long-term objectives. Central to this approach is the formulation of well-articulated objectives and the rigorous testing of management activities, which typically entails incorporating adequate samples, replicates, and controls.

Additional refinements of the ICDP model should include:

- the incorporation of a comprehensive ecological and social monitoring component;
- a more rigorous assessment of resource-harvesting schemes;
- more use of ecological and social research as a basis for identifying and addressing the ecological, social, and economic links that affect ICDPs; and
- the recognition that protected-area institutions need to act as facilitators of development assistance.

Obviously, effective conservation of wildlife in Africa and elsewhere will depend on the willingness and capacity of both national institutions and donors to embrace a broad package of interventions. These interventions might well be applied in conjunction with improved ICDPs on a landscape-wide scale.

7. Wildlife in Africa is regarded as a unique asset, which no other region possesses. What are the options available for African countries to maintain its comparative advantage in this and reap substantial economic benefits? What are the threats and constraints?

The wildlife in Africa is, and will be, more and more threatened. Without an important support of international community and a political volonte of african governments to reverse the trend, wildlife will disappear from most of African territory.

New community-based conservation programs (CBC), that presently have been developed as a hope for better conservation, do not have a long operational history to evaluate them rigorously, but seem already to have some limits. Nevertheless, CBC represents an advance over past practices that ignored rural people. Community-based conservation programs have as their goal the transformation of the relationship between rural people and the environment, and they draw upon natural resources to produce revenue for local communities (Western, 1994). Yet the widespread application of CBC programs in Africa is questionable because of rapid human population growth and widespread poverty. It is doubtful that the economic return to rural people from CBC programs can be high enough that people will not eventually look for economic alternatives. In his conception, CBC is both a wildlife conservation and economic development program, with all the complexity inherent in such an effort. In Africa's conditions, the programs are exceedingly difficult to administer, and the simultaneous achievements of social, economic, and conservation goals is problematic.

The main constraints to wildlife conservation in Africa are :

- a) population growth and land-use pressures
- b) poverty

Population growth and land-use pressures

Africa's human population has been growing at an important rate during the last 50 years and this growth has been accompanied by expansion of agricultural land and increased livestock number, resulting in increasing isolation of conservation areas and decreasing wildlife. Although Africa's human population growth rate has moderated somewhat in recent years, it remains uniformly high over much of the continent (average 2,8%). Because Africans are mostly rural, pressure to convert new areas to cropland and pasture remains high and will likely remain so for the foreseeable future (Pagiola et al. 1998).

Cropland expansion has been a primary method by which Africa's agricultural production has increased and has been a major contributing factor in the loss of biodiversity. Moreover, FAO expects the general trend to continue, although abated to some degree, and predicts that agricultural expansion will account for approximately 30% of Africa's increased crop production by 2010 (FAO 1995).

Livestock populations are at 600 million head and increased by approximately 12% between 1981 and 1993 (World Resources Institute, 1996). This can have significant effects on wildlife populations. In many countries, as the number of pastoralists and their livestock has increased, there has been a loss of habitat for wildlife.

Consequently, wildlife conservationists are concerned about the conversion of rangeland, which can be shared with wildlife, to commercial ranches or agriculture. The trend has led to the isolation of protected lands as the land around them is transformed by human use. This trend will continue.

Some of the conservation problems associated with people settling or using new areas are :

1. disruption of ecological processes essential to maintain long-term biodiversity (for example, dispersal and colonization might become more difficult as habitat is transformed to human use)
2. increased hunting for home or market
3. increased pressure from local people to open protected lands for community use.

Moreover, if land shortage increases as a social and economic problem, there is the likelihood that human conflicts will also increase (Scoones, 1995), a situation that is never good for wildlife conservation efforts.

Thus, it is likely that people will continue to settle and cultivate new areas as one of their primary responses to population growth and the need for land (Norton-Griffits, 1995). The solution is an economic reinvigoration of rural economies, but how this can happen is a big question. That rejuvenation will occur cannot be taken for granted (FAO, 1995), especially in light of the dismal rural development record in sub-Saharan Africa in the last 50 years.

The urbanization of Africa is an other problem. Because of the relationships between urban Africans and rural areas, the pressure on rural areas is intensified in order to satisfied city's increasing demand for rural resources.

Poverty

For rural Africans, poverty is an inescapable fact of life. Africa has experienced a protracted economic decline since the mid-70s, with per capita income levels now similar to those of 30 years ago. For sub-Saharan Africa from 1980 to 1992, the per capita GNP growth rate was -1.83% per year, with only five countries achieving the rate (4.7%) needed to reduce the number of people living below the poverty level (Hope, 1997). Different factors have led to poverty in Africa, like lack of employment opportunities, low productivity of land and labor, low levels of health, education, and training, limited opportunities to own land, low levels of government support to the most needy and high population growth that puts pressure on the physical environment and social services. Political corruption, bureaucratic bloat, and governmental policies that have stifled rural development is to be added to the list.

Whatever their specific situation, rural Africans have been forced to maneuver within the often narrow confines of their social and economic environment. The priorities they set and the economic choices they are forced to make often lead to actions that are not compatible with wildlife conservation (Mortimer&Tiffen, 1995).

Democratization and conservation

Since the mid-80s, African governments have been under internal and external pressure to implement democratic reforms, with the majority of African countries having done so to some degree. Now, the question is, whether increased democracy will help or hinder community conservation projects.

Some specialists believe that democratization aids the development of CBC programs. They argue that democratization has led to a loosening of governmental authority in rural areas, which in turn has enhanced rural people's control over their own resources. Hence, they see the spread of democracy as an opportunity for conservationist to build not only a better relationship between rural people and protected areas but also between rural people and the land in general.

If democratic reforms empower rural people, however, the consequences for CBC programs and wildlife conservation may not be positive, especially in light of Africa's persistent economic problems (Swatuk, 1995) and the weak support for wildlife conservation efforts among rural Africans. Risk are inherent because CBC programs have to restrict people's economic choices and it is possible that people will resist the narrowing of their options through democratic means.

Democracy can be a two-edged sword. Although democratization holds promise for rural empowerment, which theoretically could favor CBC, there is also the possibility that rural democracy will promote, through democratic means, the loss of land for wildlife as rural people gain a greater say in land-use decisions. Although it is too early to know what the outcome of the interaction between the democratic movement and CBC programs will be, conservationists must not assume that increased democracy, with its presumed attendant decentralisation, will be beneficial to conservation efforts.

Rural Africans face formidable economic pressure. Economic stagnation has produced widespread poverty and little incentive to change to a more intensified rural agriculture. Land remains people's primary asset and social security. Hence, with the growing population and continued economic uncertainty, the only solid prediction is that rural people will be trying to better themselves and that CBC programs will be working within an increasingly unpredictable social and economic environment. Although CBC can produce a better relationship between people and wildlife, the future of Africa's wildlife relies heavily on an improvement in the lives of rural Africans. As mentioned in precedent theme about CBC and ICDPs, effective conservation of wildlife in Africa will depend on the willingness and capacity of both national institutions and donors to embrace a broad package of interventions. These interventions might well be applied in conjunction with improved ICDPs on a landscape-wide scale.

Trends and scenarios for wildlife and protected areas conservation in Africa

In Africa the overwhelming trend is that core protected areas (e.g., national parks) are becoming ecologically isolated as people populate the countryside.

If this trend continues unabated, one can expect the worst-case scenario: the core areas deteriorate as the land around them is transformed to a human-dominated landscape. Over time wildlife is lost from the countryside and the core areas themselves are lost.

If the present trend is modified, one can also envision a more optimistic scenario: a new environmental relationship is forged between rural people and the land, largely based on principles of community-based conservation. The result is sustainable development in the countryside and the maintenance of biodiversity not only in the core areas but also in the countryside as a whole.

The most realistic scenario is one that lies between these two but nearer the pessimistic side. This raises the issue of where protection fits in the CBC model. In other words it will depend on ability of each implemented CBC program to assure the level of habitat protection needed to save a remnant of Africa's wildlife.

Advocates of community-based conservation seem to assume that rural people, because they receive benefit, will accept and promote whatever level of protection is needed as a by-product of the program or that the level of benefits can be increased to meet the community satisfaction. These include, besides monetary gain, access to renewable resources, recreation opportunities (as of yet not major factor in Africa), and ecological benefit (Munro, 1995).

Community-based conservation should be taken as a set of tools that serve to promote greater acceptance of conservation efforts by rural people. Instead of conservationists trying

to implement unrealistically complex programs, they should use the most appropriate CBC tools to build better relations with rural people. Such tools include, among many others, environmental education, local people's involvement in management, regulated access to protected lands, compensation for protecting biodiversity, and compensation from such activities as hunting and tourism.

Community-based conservation programs cannot fundamentally change the deteriorating situation for wildlife in Africa when people's economic needs are so great.

The social and economic reality in Africa will test the skills of conservationists because each conservation strategy must be site-specific, with conservationists required to mix protectionism with any CBC tools that might work in a particular situation. Finding a successful mix will require much flexibility. What will work will not likely be predictable at the outset, and success will have to be measured in small increments.

The trend toward an increasingly human-dominated landscape will continue in Africa, with larger mammals increasingly restricted to parks and reserves. In those areas where people and wildlife coexist, the coexistence will continue to be uneasy. To succeed, wildlife conservation policy will have to be a mix of protectionism, community involvement, public relations, conservation education, and revenue sharing. Hence, it is the creative application of the inclusive philosophy of community-based conservation rather than the CBC programs themselves that will likely be of the greatest practical value in Africa.

The big challenge is to design strategies that not only will ensure the long-term viability of species and ecosystems but also will be politically and economically acceptable to local communities and governments.

8. A number of countries are making effort to develop transboundary parks to ensure contiguity of ecosystems and to coordinate protection measures. What are the main issues in the management of transboundary parks?

Transboundary conservation areas (TBCAs) provide a mechanism to promote sound ecological management of transborder ecosystems, and, at the same, promote opportunities for regional political, economic, and cultural cooperation (Singh, 1999).

Singh (1999) states that the ecological advantages of TBCAs are generally no different than those that occur with an increase in land area under ecologically sustainable management. The specific advantage of TBCAs is that, where international boundaries have divided ecosystems, river basins, and wildlife migratory routes, formation of TBCAs can re-establish key ecological functions previously disrupted by artificial limitations imposed by political borders. TBCAs can also:

- Improve the protection of internationally shared resources, such as watersheds;
- Increase the area available for wildlife and plant populations, thereby reducing the extinction risk due to stochastic events; and
- Re-establish seasonal migration routes.

Politically, the reasons driving TBCA formation vary considerably; they include a desire to improve regional ecological management, increase economic opportunities, decrease cultural isolation, and foster peace in a bilateral and regional framework. TBCAs may provide a mechanism for developing capacity for bilateral cooperation, thereby creating opportunities for further collaboration in other, more politically charged areas.

Culturally, TBCAs assist in the economic livelihood of indigenous groups whose traditional land areas have been divided by international borders. TBCAs assist in developing policies for the resumption (or at least legalisation) of cross-border movement of indigenous groups divided by political international boundaries.

Economic incentives exist along the gradient of players involved in TBCA formation. Increased tourism potential will benefit overall revenues throughout the tourism sector. Care needs to be taken so that economic opportunities are shared among member countries. More formalised TBCA agreements will increase efficiency in monitoring and managing natural resources, including water flow, water quality, wildlife density and abundance, livestock stocking rates, and disease detection and protection. Duplication of monitoring activities can be eliminated, thereby creating an economy of scale that may be shared by the cooperating nations.

One of the greatest benefits from establishing TBCAs is increasing capacity-building opportunities among respective national partner institutions to manage natural resources. Capacity-building in less-developed partner nations is also an area where donor organisations need to focus in order to create a long-term option for sustainable management. This will enable equitable participation in regional meetings among nations. Stronger regional capacity enables better decision-making with regard to common ecological problems, such as climate change, pollution, and desertification.

For all the benefits possible, the formation of TBCAs is neither easy nor rapid. Long-term commitments from both partner nations and donors are necessary to re-evaluate historical perceptions of international boundaries. Some of the factors affecting TBCA formation are outlined below.

Factors That Increase the Likelihood of Successful TBCA Formation

Broad political support. Since establishing TBCAs is inherently a political process, there needs to be a strong political commitment to establish TBCAs.

Local communities and public participation. The success of a TBCA lies in being accepted by local communities. Without the communities' active participation in the decision-making process, the TBCA will not be able to achieve its goals.

Presence of highly visible "target" species, scenic areas, or key wildlife processes, such as migration routes. Whenever possible, individual TBCAs should have highly visible target species' or scenic areas that would benefit from transboundary cooperation. "Target" species focus has proved successful in many conservation and reintroduction projects. Designation as World Heritage Sites also enhances national pride and international interest in area conservation, and may also bring concomitant donor funding.

Informal relationships between land management officials in adjacent countries. Informal relationships have been key in creating opportunities for formally establishing TBCAs.

Involvement of nongovernmental organisations (NGOs). NGOs play pivotal roles in establishing TBCAs. These organisations provide technical expertise and funding, as well as act to place the establishment of the TBCA on the regional agenda.

Regional agreements and organisations. Regional agreements and organisations provide opportunities to achieve regional goals as they are largely driven by local consensus rather than external parties.

Factors That Slow or Impede TBCA Formation

Lack of funding and political instability. Lack of funding, combined with high political transaction costs and political instability, is a major impediment to establishing TBCAs. TBCA development is slow and may be impractical when funding (both external and domestic) and governmental support are lacking. Where three or more countries are involved, TBCA development may occur between a subset of countries at the beginning. Peer pressure may be effective in developing third-party interest as the benefits of the TBCA are realised.

Time involved in establishing a TBCA. Establishing TBCAs is time intensive and requires enormous amount of political capital over a long period.

Unequal protected status on either side of the international border. Unequal status of protected areas may lead to conflicts between resource use and conservation, thereby slowing the TBCA process.

Unequal management capacity among neighbouring states. While this does not prevent TBCA formation, it should be clear to donor agencies and the partner nation(s) that a considerable period of information-sharing and capacity-building may be needed to enable equitable representation among neighbouring states.

Lack of support from local communities. TBCA formation is difficult where the attitudes and perceptions of local communities are not supportive of conservation

efforts. TBCAs must have the support of the local communities as the benefits and costs are usually borne by them first.

Vastly differing languages and cultures. Where language and culture differ, extensive capacity-building and awareness education need to be carried out for both the official and key members of local communities.

In conclusion, TBCA formation is still a new concept in which the potential benefits are yet to be realised. Hence, it is difficult to make any definitive statements as to its long-term success. However, the potential does exist, through TBCAs, to foster political cooperation and sustainable cross-border ecosystem management.

Benefits from TBCAs

The many benefits of establishing TBCAs can be grouped into the following categories: ecological, cultural, socioeconomic, economic, political, and institutional (Singh, 1999).

Ecological benefits of TBCAs

Ecological benefits of TBCAs are mainly associated with protecting larger areas. They are especially important where an important ecological function is disrupted by political borders or dispute. Specifically, TBCAs:

- Improve the protection of internationally shared resources, such as watersheds, that provide important ecological and economic services. TBCAs may encompass critical portions of watersheds for multiple purposes, such as pollution control, clean water supply, wetland management, and carbon sinks.
- Increase the size of areas available to maintain large populations of species, thereby reducing the chance of extinction due to stochastic disturbances. Moreover, increasing habitat size may significantly reduce conflicts between wildlife and the people who live near or within TBCAs, thereby reducing predation and competition between wild ungulate and livestock. Reduced contact would reduce disease transmissions from wildlife to livestock (and vice versa) and reduce crop damage and threat to human lives. Note that levels of ecological benefit depends on the amount of livestock grazing and agricultural farming that is contiguous to the protected areas.
- Re-establish seasonal migration routes, as well as protect sufficient land for species with long-range habitat requirements, such as elephants, large ungulates, and carnivores. This is especially important in areas where animals migrate long distances in response to seasonal changes in rainfall.
- Increase range of habitat types within conservation areas to better meet the requirements of a sustainable ecosystem.
- Increase available habitat, which could reduce the threat of inbreeding depression by permitting larger population sizes of both rare species and those that require large home ranges.
- Create better opportunities for endemic flora to be conserved and provide better chances for reproduction of the vegetative base in traditional ranges.
- Protect at least part of an ecosystem or wildlife population during civil unrest on one side of an international border. Facilitate the re-establishment or reintroduction of the species once peace has been restored.
- Create biological corridors between isolated protected areas to facilitate movement of organisms.
- Aid in efforts to understand climate change at both regional and global levels by protecting key areas within an ecoregion that straddles an international border. For

example, in the Miombo Project in southern Africa, the effects of land use and the resulting effects on climate change are being analysed.

Cultural benefits from TBCAs

TBCAs can help rejoin traditional heritage territories and assist in the preservation of indigenous knowledge. These activities have great potential, not only in re-establishing ethnic customs and building confidence among border communities, but also in building confidence and trust between national governments.

The Masai people along the border of Kenya and Tanzania can be taken as example of potential cultural benefits from TBCAs. The Masai traditionally migrated between Kenya and Tanzania. The three border parks (Serengeti National Park and Maswa Game Reserve in Tanzania and Masai Mara in Kenya) are key components of the Greater Serengeti Ecosystem. "The whole of the eastern half of the park (in Tanzania) was part of the Masai pastoralist system, whose rangeland resources were used by both wildlife and livestock. The Masai are the largest pastoral ethnic group in East Africa..." (WCMC 1997; Leader-Williams et al. 1996). Unfortunately, political differences between the two countries have hampered joint monitoring and other natural resource programmes between these protected areas. Sustained cooperation between the two countries would allow the Masai to return to their heritage territories, leading to a better understanding of their traditional patterns, preservation of their traditional knowledge, and more effective designs of culturally-related TBCAs. Meanwhile this would also afford scientists and visitors an exciting opportunity to experience one of the "greatest wildlife spectacles on Earth," as well as encounter one of the oldest cultures in its traditional settings while contributing to the local economy through ecotourism (Thorsell and Harrison 1990).

The success of a cultural TBCA is enhanced when the respective national governments do not perceive a threat to national security in the restoration of the rights of indigenous groups to travel freely across international borders. As many authors point out, most African governments have inherited an administrative structure from colonial times that inhibits effective governance of indigenous groups split across borders. Certain African governments may be wary of cross-border collaboration due to incursions by rebel insurgents that may be aided by transboundary communities with a sense of dual nationalism. To overcome this fear, it is imperative to build the trust of border groups. One way is to include border indigenous groups in the planning and management of TBCAs.

Economic and socioeconomic benefits from TBCAs

There are important economic and socioeconomic incentives to establish a TBCA. Following are examples of the types of benefits that may ensue.

Non-consumptive economic benefits

- **Tourism:** According to World Bank figures, tourism is second only to oil in generating the world's largest income. In 1994, global tourism generated an estimated U.S. \$3,400 billion of gross output, or 10% of global GDP (World Bank 1996). TBCAs can improve opportunities for expanded ecotourism and help diffuse tourist concentrations to achieve high-quality "experiences." This will allow a greater number of tourists to go through multinational destinations and circuits. In addition, TBCA ecotourism would offer tour operators an economy of scale.
- **Watershed and catchment maintenance:** TBCAs may protect critical parts of a watershed for maintaining water supply and quality (e.g., watersheds and wetlands act as natural filtration systems and reduce the need for expensive water filtration systems).

Consumptive economic benefits

- **Consumptive use of flora:** Transborder communities often rely on the native wild flora and fauna for subsistence. Allowing these communities larger areas for collecting and harvesting could improve quality of life, as well as reduce reliance on food imports. Moreover, there is a possibility of creating and promoting markets to sell locally harvested food and herbal medicinal plants, thereby creating a source of income and promoting sustainable use of these resources (Reid 1994). These products may aid in preserving indigenous knowledge of native plants and their medicinal and food qualities. This knowledge has important implications for the biotechnology industry and agro-based industries in the host countries, as well as global markets.
- **Agriculture:** Most of the major crops grown in the U.S. originated in other countries, and they depend on infusion of new genes from those countries. According to WRI, the genetic diversity used in plant breeding accounted for about half of the gains in agricultural yields in the U.S. from 1930 to 1980, amounting to some \$1 billion in annual additions to the value of U.S. agricultural output. Conversely, loss of genetic diversity places agricultural productivity at risk. Establishing TBCAs would facilitate protection of gene-pool diversity.
- **Forestry and fisheries:** Healthy and biologically diverse ecosystems are the foundation of strong forest and fisheries industries (Reid 1994). For instance, sustainable management of salmon in the Pacific Northwest of North America relies on transboundary cooperation between the U.S. and Canada to maintain rivers important to the successful propagation of the various salmon species, as well as healthy ecosystems along the northern Pacific coastline.
- **Pharmaceuticals and biotechnology:** Nearly 25% of all U.S. drugs are derived from plants. More than 3,000 antibiotics are derived from microorganisms. Most of these life-saving drugs were discovered while bio-prospecting in the wild. Advances in biotechnology have enhanced pharmaceutical companies' interest in natural products. Biotechnology, a growing sector in the U.S. (and the rest of the world), relies on a stable gene pool and biological diversity from all over the world. Moreover, growth in biotechnology leads to growth in other fields such as pharmaceuticals and agriculture. Today, growth in the biotechnology sector remains substantial. Total product sales for this sector in U.S. totalled \$4 billion in 1991 and were projected to top \$50 billion by the year 2000 (Reid 1994). Thus, establishing TBCAs along biologically rich borders has significant revenue-sharing potential between border communities and countries.
- **Hunting:** According to World Bank (1996) figures, the market for hunting in southern Africa is "large, price inelastic, and far from being saturated." This market may be further enhanced with the creation of TBCAs, which will foster cooperation between adjoining hunting blocks. Cooperation will depend upon the concessions on each side of the border. Hunting has the potential of generating revenues in areas where farming or any other economic venture may not be feasible.
- **Game ranching:** Several communities in east and southern Africa have benefited from game ranching activities. Transboundary communities may benefit on both sides of the border through similar game-ranching programmes by increasing the amount of land available for wildlife.

Socioeconomic benefits

Aside from the direct economic benefits mentioned above, TBCAs would reunite indigenous groups divided by international borders and possibly assist in preserving indigenous knowledge and cultures. (See above discussion on cultural benefits). TBCAs can also act as a conduit for transborder movement of trade both within and between indigenous groups.

Institutional opportunities and benefits from TBCAs

Establishing TBCAs creates a number of important management opportunities, as follows:

- Cross-border institutional capacity can be increased, especially where one country's institutions are stronger than its neighbours.
- Highly visible, joint activities, such as research and monitoring, technical meetings, and training workshops promote staff morale, transfer of technology and expertise, and information-sharing between neighbouring countries. These activities may lead to compatible management plans, as well as offer positive and non-threatening activities upon which to base other collaborative efforts (Hamilton 1997).
- Better opportunities for controlled experimentation are created. More importantly, TBCAs would facilitate research on wildlife that regularly cross international borders. This research would have extensive management implications for conservation, sustainable game ranching, and tourism.
- TBCAs could provide a forum for cooperative efforts to limit or eliminate alien species and control disease.

Political benefits of TBCAs

According to McNeil (1990), TBCAs may be established to build confidence and goodwill between border nations, as well as to stimulate transboundary cooperation in resource management. Other important political benefits include a regional approach to foreign aid to developing countries that may increase economic, socioeconomic, and cultural impacts of the aid along with peace dividends. The major implications for multilateral lending institutions; such as the World Bank and such national agencies as USAID, CIDA, GTZ and NORAD; are clear. These agencies may be able to appropriate foreign aid regionally rather than bilaterally, thus contributing to shared regional economic growth and cooperative natural resource management.

TBCAs and the concept of environmental security

TBCAs are increasingly being considered in the academic community as case studies in which to test alternative hypotheses about how to manage natural resources and boundary disputes. In matters of environmental security, TBCAs may play an important role by reducing or eliminating the impacts of violence on and over natural resources. As a fledgling academic field, environmental security relates to re-conceptualising national security interests by incorporating the significance of natural resources in the economic, cultural, and social development of a nation. Mathews (1989) and Kaplan (1994) show how the effects of environmental degradation on human and wildlife populations can lead to conflict over resources and political chaos. Hanks (1997) also points out the effect of military violence on natural resources and its related effects on regional economies. Establishing TBCAs may be considered a first-line of defence to protect regional commons and to cooperatively promote sustainable economic development and peace. As these nations attempt to meet the challenges of regional coordination, they are talking and exchanging information on various levels with positive impacts.

Factors That Contribute to or Inhibit the Establishment and Sustainability of TFCAs: Lessons Learned

Besides the political climate, which will be discussed in the following section, a number of important factors contribute to or inhibit the establishment of TBCAs.

Contributory Factors

In most cases, the three major factors that influence the establishment of a TBCA are as follows:

- Political will,
- Sustained funding, and
- Involvement of international agencies (nongovernmental organisations [NGOs] and international governmental organisations [IGOs]).

The following factors also contribute to the successful establishment of TBCAs:

Local communities and broad public participation. According to Milich and Varady (1998), who recently published a lessons-learned report on international river-basin accords, most accords tend to be "top down" and lack public participation in the decision-making process. These observations were key reasons for the failure of the accords. Thus, it is imperative that the process of establishing TBCAs include local and public participation.

Informal relationships. Informal exchanges at all levels have often led to more formal arrangements. Also, many TBCAs exist as informal entities driven by relationships formed through exchanges over time at all levels of management, as well as between neighbouring communities.

Regional agreements and organisations. Regional organisations are more effective if driven by local consensus rather than externally by donors and third parties. This affords an opportunity for regional goals to be effectively tackled, using local expertise and knowledge.

Existing successful experiences provide a number of key lessons (de Fontaubert and Agardy 1998), including the following:

- It adopts a two-tiered approach, whereby the general and common objectives are agreed upon, but implementation is left to each state. Implementation by each state is based on the level of economic development, resource capabilities, and the dependence on the resources.
- Rather than imposing strong obligations, it aims to facilitate technical and scientific research and mutual assistance.
- Its underlying foundation is based on the ecology of the region and the necessary criteria for the longevity of the ecosystem.

Established protected areas on both sides. Designation of protected areas on both sides of an international border facilitates the process by 1) demonstrating the importance of the natural resources to each state and 2) encouraging a commitment by the states toward conservation. Protected areas on both sides of an international border may be able to facilitate efforts to conduct joint research and solve common management problems under the auspices of a TBCA.

International recognition as World Heritage Sites or Biosphere Reserves. Weed (1994) shows that designating the protected areas comprising the TBCAs in Central America as World Heritage Sites or Biosphere Reserves demonstrates to the local communities the global importance of the resources

and instils a sense of pride that has tended to speed up the process. In addition, these designations are usually accompanied by donor funding.

Highly visible "target" species driving cooperative efforts. Protection of the endangered mountain gorilla habitat may be a strong factor that could join the Virunga National Park and Rutshuru Hunting Zone in the Democratic Republic of Congo, Mgahinga Gorilla National Park and Bwindi Impenetrable Forest National Park in Uganda, and Volcans National Park in Rwanda to form a TBCA.

High-level demand to establish a political symbol of cooperation (regardless of ecological or cultural factors). This demand has facilitated the establishment of many TBCAs in post-Second World War Europe.

High level of cooperation between bordering communities, local management authorities, and central government agencies. Such cooperation has been the case for TBCAs between Nepal and Tibet, where the process has included community participation and other significant stakeholders.

Barriers to the Establishment and Sustainability of TBCAs

Most TBCAs fail to materialise due to lack of sustained funding from the relevant national governments and from donors. Lack of necessary funding is one of the major obstacles in completing the La Amistad TBCA in Central America, primarily because of donor difficulties in appropriating funds regionally. One way to overcome this hurdle, according to Lusigi (in Singh, 1999), is through Trust Funds. They may be one of the only truly viable options, as they can be managed for specific TBCA communities. However, trust funds also can suffer the consequences of failing global markets and political corruption.

Other important constraints include:

High political and economic transaction costs. States that have had strained relations for a number of years may not have the capacity or the sustained political will to undertake the lengthy negotiations required for establishing TBCAs. Assistance from NGOs, IGOs, and international conventions can significantly reduce these transaction costs by offering a forum for negotiation and funding. In areas where high opportunity costs favour present land-tenure patterns, it may be difficult for nations to alter consumption of natural resources patterns, especially if a state may not benefit as much from the TBCA as the neighbouring state would.

Unequal capacity and support, as well as conflicts of interest, among competing NGOs and IGOs. As Castro-Chamberlain (1997) pointed out, although the Si-A-Paz initiative achieved healthy levels of binational coordination, the fact that donors viewed Nicaragua more favourably than Costa Rica and gave that country more help dampened Costa Rica's interests to an extent that inhibited success.

Time involved in establishing a TBCA. A constraint that was pointed out by most people interviewed during this study was the time involved in establishing a TBCA. Establishing a TBCA is a lengthy and complex process that cannot and should not be forced, due to the large numbers of stakeholders involved. Many TBCAs may never get established because sustaining a political will over a number of years is required. Differing interests and priorities of succeeding governments may inhibit this process.

Unequal protected status on either side of the border. Protected areas on both sides of an international border may be of unequal status; for example, one side could be an area where hunting is allowed and the other a strict wildlife preserve. This unequal status raises many important issues related to resource conservation and utilisation that may not be easily solved.

Unequal capacity of wildlife departments and other management authorities. This constraint may be an opportunity in disguise. As to overcoming unequal management capacity, joint training programmes and exchange of personnel may facilitate the sharing of knowledge and creating strong ties between the relevant management departments. These activities and bonds will assist in successfully establishing TBCAs.

In addition to the above constraints, several others should be noted, including:

- Unequal benefit-sharing between countries and between stakeholders,
- Incompatible or warring bordering communities,
- Attitudes and perception of local people toward wildlife issues that are inconsistent with TBCA goals, and
- Language barriers (both local and national languages).

Conclusion

TBCA formation is still a new concept in which the potential benefits of TBCAs are yet to be realised to make any definitive statements. However, the potential does exist, through TBCAs, to foster political cooperation and sustainable cross-border ecosystem management. In developing plans for TBCAs, three distinct questions need to be addressed (Miller 1996):

1. How do you create national and regional capacity to manage complex and integrated programmes?
2. How do you enhance and/or link current institutions, as well as identify new ones? and
3. How do you establish a meaningful dialogue with and include interests of all stakeholders involved?

Based on the literature reviewed, the following principles are critical in order to address the above questions:

- ***Focus on the ecoregional biodiversity:*** Since an ultimate goal is to conserve biodiversity, the plan must be ecologically sound.
- ***Focus on sustainable use:*** Based on sound ecological principles, TBCA management must recognise the interests of communities dependent on the resources. Thus, plans must include channels for multiple stakeholder participation and mechanisms to deal with competing resource use.
- ***Seek long-term political commitment and involve public participation:*** States involved must be committed to a long-term action plan that involves multiple layers of bureaucracy. Moreover, in many cases, national governments may find it necessary to involve NGOs and local communities in partnerships to build capacity and manage these resources.
- ***Adopt adaptive management:*** Since TBCA management is a learning process, institutions need to be flexible enough to make rapid and effective decisions.

Establishing TBCAs is a complex and lengthy process. The better the confidence, trust, and informal relationships developed, the more sustainable the TBCA will be. Thus, in addition to the above points, long-term funding and political commitments are needed to establish frameworks for success. Moreover, before any gains may be realised, it is important that efforts to establish TBCAs be harmonised with the economic and development policies of these nations.

9. What is the current state of wildlife research, education and training in Africa? Has there been an increase in this capacity or as in the case of forestry research, is the capacity declined?

Project of new statute for wildlife school of Garoua (Cameroon). Project aims to create a new cycle at ingeneer level on wildlife management.

References

- African Resources Trust, Fact Sheet Number 6 (Cambridge, UK, 1997).
- Alpert P 1996. Integrated conservation and development projects. *BioScience* 46: 845-855.
- Anderson D, Grove R, eds. 1987. *Conservation in Africa: People, Policies and Practice*. Cambridge (UK): Cambridge University Press.
- Barrett CB, Arcese P 1995. Are integrated conservation-development projects (ICDPs) sustainable? On the conservation of large mammals in sub-Saharan Africa. *World Development* 23: 1073-1084.
- Brown, D., 1998 : Participatory biodiversity conservation: Rethinking the strategy in the low tourist potential areas of Tropical Africa. *ODI Natural Resource Perspectives* No.33. London: Overseas Development Institute.
- Campbell K, Sithole B., Frost P. 2000. CAMPFIRE Experiences in Zimbabwe. *Science*. Vol. 287, p. 42-43.
- Campbell K, Borner M. 1995. Population trends and distribution of Serengeti herbivores: Implications for management. Pages 117-145 in Sinclair ARE, Arcese P, eds. *Serengeti II: Dynamics, Management, and Conservation of an Ecosystem*. Chicago: University of Chicago Press.
- Callaghy, T., and Ravenhill, J. 1993. Vision, Politics, and structure: Afro-optimism, Afro-pessimism or realism? Pages 1-17 in Callaghy, T., and Ravenhill, J. (ed.). *Hemmed in: responses to Africa's economic decline*. Columbia University Press, New York.
- Castro-Chamberlain, J. (1997) *Peace Parks in Central America, Successes and Failures in Implementing Management Cooperation*. In the Conference Proceedings of the Parks for Peace: International Conference on Transboundary Protected Areas as a Vehicle for International Co-operation (Draft of 30 January, 1998). Gland, Switzerland: IUCN.
- Colchester, M., 1994: *Slave and enclave: The political economy of Equatorial Africa*. Penang, Malaysia: World Rainforest Movement.
- Daily G. et al., *Science* 281, 1291 (1998)
- de Alessi, M. (1998). *Fishing for solutions*. *IEA Studies on the Environment* No.11. London: Institute of Economic Affairs.
- de Fonatubert, A. C. and Agardy, T. (1998) "Critical Analysis of the SPAW Protocol: The Dilemma of Regional Cooperation." In press. Washington, DC: IUCN-US.
- de Graaf H.J., Musters C. J. M., ter Keurs W. J., *Regional Opportunities for Sustainable Development: Theory, Methods and Applications* (Kluwer Academic Publishers, Dordrecht, Boston, 1999).
- Diouf J. *Curr. Sci.* 77,652 (1999).

Doumenge Ch., Garcia Yuste J.-E., Garlan S., Lagrand O., Ndinga A.: Conservation de la biodiversité forestière en Afrique Centrale atlantique : le réseau d'aires protégées est-il adéquat? Bois et Forêts des Tropiques, No 268 (2), p. 5-27, 2001.

Duncan, A.: Land matters. The World Today [H.W. Wilson - SSA]; Aug/Sep 2000; Vol. 56, Iss. 8; pg. 42

Food and Agriculture Organization of the United Nations, The State of Food and Agriculture 1997 (FAO, Rome, 1997).

Fa JE, Juste J, Perez del Val J, Castroviejo J. 1995. Impact of market hunting on mammal species in Equatorial Guinea. Conservation Biology 9: 1107-1115.

Ferraro P Kramer R. 1997. Pages 42-49 in Ferraro PJ, Tshombe R, Mwinyihali R, Hart JA, eds. 1997. Projets Integres de Conservation et de Developpement. New York Wildlife Conservation Society. Working Paper no. 6.

FitzGibbon CD, Mogaka H, Fanshawe JH. 1995. Subsistence hunting in Arabuko-Sokoke forest, Kenya, and its effects on mammal populations. Conservation Biology 9: 1116-1126.

Ford W. R., speech at the Second International Cultural Conference on Africa and the African Diaspora, Washington, DC, 8 October 1999, available at <http://linux.adf.gov/udc.html>.

Gezon L. 1997. Institutional structure and the effectiveness of integrated conservation and development projects: Case study from Madagascar. Human Organization 56: 462-470.

Gibson CC, Marks SA. 1995. Transforming rural hunters into conservationists: An assessment of community-based wildlife management programs in Africa. World Development 23: 941-957.

Goklany I. M., BioScience 48, 941 (1998).

Greenberg R, Bichier P, Sterling J. 1997. Bird populations in rustic and planted shade coffee plantations of eastern Chiapas, Mexico. Biotropica 29: 501-504.

Hackel, JD. 1999. Community conservation and the future of Africa's wildlife. Conservation Biology 13: 726-734.

Hamilton, L. (1997) Guidelines for Effective Transboundary Cooperation: Philosophy and Best Practices. In the Conference Proceedings of the Parks for Peace: International Conference on Transboundary Protected Areas as a Vehicle for International Co-operation (Draft of 30 January, 1998). Gland, Switzerland: IUCN.

Hanks, John. (1997) Protected Areas During and After Conflict: The Objectives and Activities of The Peace Parks Foundation. In the Conference Proceedings of the Parks for Peace: International Conference on Transboundary Protected Areas as a Vehicle for International Co-operation (Draft of 30 January, 1998). Gland, Switzerland: IUCN.

Hannah L. 1992. African People, African Parks: An Evaluation of Development Initiatives as

a Means of Improving Protected Area Conservation in Africa. Washington (DC): Biodiversity Support Program.

Hannah L, et al.1998. Participatory planning, scientific priorities and landscape conservation in Madagascar. *Environmental Conservation* 25: 30-36.

Harcourt AH, Pennington H, Weber AW 1986. Public attitudes to wildlife and conservation in the Third World. *Oryx* 20: 152-154.

Helmuth J., *Science* 286, 1283 (1999).

Hofer H, Campbell KLI, East ML, Huish SA. 1996. The impact of game meat hunting on target and non-target species in Serengeti. Pages 117-146 in Taylor VJ, Dunstone N, eds. *The Exploitation of Mammal Populations*. London: Chapman & Hall.

Hope K.R. 1997. Development solutions for Africa: the need for policy reform and good governance. *Issues XXV*, p. 35-38.

Hough JL. 1988. Obstacles to effective management of conflicts between national parks and surrounding human communities in developing countries. *Environmental Conservation* 5: 129-136.

Hough JL. 1994a. Institutional constraints to the integration of conservation and development: A case study from Madagascar. *Society and Natural Resources* 7: 119-124.

Hough JL. 1994b. Improving the effectiveness of conservation area personnel: Lessons from social research in northern Benin, West Africa. *Environmental Conservation* 21: 231-235

Inamdar A., de Me H., Lindsay K., Cobb S., *Science* 283,1856 (1999).

Inamdar, A.; Brown, D. and Cobb, S., 1999: What's special about wildlife management in forests? Concepts and models of right-based management, with recent evidence from West-Central Africa. *ODI Natural Resource Perspectives* No.33. London: Overseas Development Institute.

Infield M. 1988. Attitudes of a rural community towards conservation and a local conservation area in Natal, South Africa. *Biological Conservation* 45: 21-46.

Ite UE. 1996. Community perceptions of the Cross River National Park, Nigeria. *Environmental Conservation* 23: 351-357.

[IUCN) IUCN-The World Conservation Union. 1980. *World Conservation Strategy: Living Resource Conservation for Sustainable Development*. Gland (Switzerland): IUCN-The World Conservation Union, United Nations Environmental Programme, World Wildlife Fund.

James A. N., Gaston K. J., Balmford A., *Nature* 401, 323 (1999).

Kaplan, R. D. (1994) *The Coming Anarchy*. *The Atlantic Monthly*, vol. 273, pp. 44-76.

- Kiss A, ed.1990. Living with Wildlife: Wildlife Resource Management with Local Participation in Africa. Washington (DC): World Bank. Technical Paper no. 130.
- Klein, M. and van der Wal, M., 1998: About tropical hardwood, hunters and gorillas: Conservation of forest fauna in south Cameroon. In *The Congo Basin*. The Netherlands: IUCN.
- Kramer R., van Schaik C., Johnson J., Eds.,1997. *1st Stand: Protected Areas and the Defense of Tropical Biodiversity*, Oxford Univ. Press, New York.
- Kremen C, Merenlender AM, Murphy DD. 1994. Ecological monitoring: A vital need for integrated conservation and development programs in the tropics. *Conservation Biology* 8: 38-397.
- Leader-Williams, N., Kayera, J.A. and Overton, G.L., Eds. (1996) *Community-based conservation in Tanzania*. Gland, Switzerland and Cambridge, UK: IUCN.
- Leader-Williams N, Albon SD. 1988. Allocation of resources for conservation. *Nature* 336: 533-535.
- Lewis C. 1996. *Managing Conflicts in Protected Areas*. Gland (Switzerland): IUCN-The World Conservation Union.
- Lewis D, Kawech GB, Mwenya A. 1990. Wildlife conservation outside protected areas-lessons from an experiment in Zambia. *Conservation Biology* 4: 171-180.
- Little E 1994. The link between local participation and improved conservation: A review of issues and experiences. Pages 347-372 in Western D, Wright P, eds. *Natural Connections: Perspectives in CommunityBased Conservation*. Washington (DC): Island Press.
- Lusigi WJ. 1981. New approaches to wildlife conservation in Kenya. *Ambio* 10: 87-92.
- Lutz E, Caldecott J, eds. 1996. *Decentralization and Biodiversity Conservation*. Washington (DC): World Bank.
- Luyten J. C., "Sustainable world food production and environment" (Research Institute for Agrobiological and Soil Fertility, Agricultural Research Department, report 37, Wageningen, Netherlands, 1995).
- Machado, A., 1998. Borrador de anteproyecto de ley de areas protegidas de Guinea Ecuatorial. Documento técnico 14. Bata, Guinea Ecuatorial, Informe Curef, 50 p. 13 mapas fuera del texto.
- Mathews, J. (1989) *Redefining Security*. *Foreign Affairs*, vol. 68, pp. 162-177.
- McNeil, R. J. (1990) *International Parks for Peace*. In J. Thorsell (ed.), *Parks on the Borderline: Experience in Transfrontier Conservation* (pp. 39-49). Gland, Switzerland: IUCN.
- McCoy K, Razafindrainibe. H. 1997. *Madagascar's Integrated Conservation and Development*

Projects: Lessons Learned by Participants. Antanarivo (Madagascar): Sustainable Approaches to Viable Environmental Management, United States Agency for International Development.

Metcalf, S. 1994. The Zimbabwe Communal Areas Management Programme for Indigenous Resources (CAMPFIRE). Pages 270-279 in McNeely J, ed. Expanding Partnerships in Conservation. Washington (DC): Island Press.

Mordi AR 1991. Attitudes toward Wildlife in Botswana. New York: Garland Publishing.

Mortimer M. and Tiffen M. 1995. Population and environment in time perspective: the Machacos story. Pages 69-89 in T. Binn, editor. People and environment in Africa. Wiley, New York.

Munro D. 1995. New partners in conservation: how to expand public support for protected areas. Pages 13-18 in J. McNeely, editor. Expanding partnerships in conservation. Island Press, Washington, D.C.

Murphree M. 1993. Decentralizing the proprietorship of wildlife resources in Zimbabwe's communal areas. Pages 133-145 in Lewis D, Carter N, eds. Voices from Africa: Local Perspectives on Conservation. Washington. (DC): World Wildlife Fund.

Murphree, M. (1996) *Approaches to community participation*. ODA Wildlife Policy Consultation.

Musters, C.J.M., de Graaf, H.J., ter Keurs, W.J., 2000. Can Protected Areas Be Expanded in Africa? *Science*, Vol. 287, p. 1759-1760.

Neumann RP 1998. Imposing Wilderness: Struggles over Livelihood and Nature Preservation in Africa. Berkeley (CA): University of California Press.

Newmark WD. 1985. Legal and biotic boundaries of western North American national parks: A problem of congruence. *Biological Conservation* 33: 197-208.

Newmark WD. 1996. Insularization of Tanzanian parks and the local extinction of large mammals. *Conservation Biology* 10: 1549-1556.

Newmark WD, Leonard NL. 1991. The attitudes of local people toward Kilimanjaro National Park and Forest Reserve. Pages 87-96 in Newmark WD, ed. The Conservation of Mount Kilimanjaro. Gland (Switzerland): IUCN-The World Conservation Union.

Newmark WD, Leonard NL, Sariko HI, Gamassa DM. 1993. Conservation attitudes of local people living adjacent to five protected areas in Tanzania. *Biological Conservation* 63: 177-183.

Newmark WD, Hough JL. 2000. Conserving Wildlife in Africa: Integrated Conservation and Development Projects and Beyond. *BioScience* Vol. 50, No. 7: 585-592.

Norton-Griffiths M. 1995. Economic incentives to develop the rangelands of the Serengeti: implications for wildlife conservation. Pages 588-604 in A.R.E. Sinclair and P. Arcese, editors. Serengeti II: dynamics, management, and conservation of an ecosystem. University of Chicago Press, Chicago.

Norton-Griffiths M, Southey C. 1995. The opportunity costs of biodiversity conservation in Kenya. *Ecological Economics* 12: 125-139.

Noss AJ. 1997. Challenges to nature conservation with community development in central African forests. *Oryx* 31: 180-188.

Gates JF 1995. The dangers of conservation by rural development-a casestudy from the forests of Nigeria. *Oryx* 29: 115-122.

Owen, O., and Chiras, D., 1995. *Natural resource conservation: Management for a sustainable future*. Prentice Hall, New Jersey.

Owen-Smith G. 1993. Wildlife conservation in Africa: There is another way. Pages 57-69 in Lewis D, Carter N, eds. *Voices from Africa: Local Perspectives on Conservation*. Washington (DC): World Wildlife Fund.

Pagiola S, Kellenberg J, Vidaeus L and Sritastava J. 1998. Mainstreaming biodiversity in agricultural development. *Finance and Development*, 35, p. 38-41.

Parry D, Campbell B. 1992. Attitudes of rural communities to animal wildlife and its utilization in Chobe Enclave and Mababe Depression, Botswana. *Environmental Conservation* 19: 245-252.

PD-DESA-UN, Population Division of the Department of Economic and Social Affairs of the U.N. Secretariat, Long-Range World Population Projections. Based on the 1998 Revision (United Nations, New York, 1999).

Perfecto I, Rice RA, Greenberg R, Van der Voort ME. 1996. Shade coffee: A disappearing refuge for biodiversity. *BioScience* 46: 598-608.

Reid, W. (1994). "Testimony in Support of Senate Ratification of the Convention on Biological Diversity given to the Senate Foreign Relations Committee." Washington, DC.

SARDC - South African Research and Documentation Centre, The World Conservation Union (IUCN) and Southern African Development Community, *State of the Environment in Southern Africa* (SARDC, Harare, 1994).

Sayer J., Harcourt C., and Collins M. 1992. *The Conservation Atlas of Tropical Forests: Africa*, IUCN.

Scoones I. 1995. *Policies for pastoralists: new direction for pastoral development in Africa*. Wiley, New York.

Shackleton CM. 1993. Fuelwood harvesting and sustainable utilisation in a communal grazing land and protected area of the eastern Transvaal lowveld. *Biological Conservation* 63: 247-254.

Singh J. 1999. Study on the development of Transboundary Natural Resources Management Areas in Southern Africa. *Global Review: Lessons Learned*. Biodiversity Support Program, Washington, D.C.

Slade NA, Gomulkiewicz R, Alexander, HM, 1998. Alternatives to Robinson and Redford's method of assessing overharvest from incomplete demographic data. *Conservation Biology* 12: 148-155.

Soule M. E. and Sanjayan M. A., *Science* 279, 2060 (1998).

Stocking M, Perkin S. 1992. Conservation-with-development: An application of the concept in the Usambara Mountains, Tanzania. *Transactions of the Institute of British Geographers* 17: 337-349.

Swatuk L. 1995. Review essay: dead-end to development? Post-cold war Africa in the new international division of labor. *African Studies Review*, 38, p. 103-117.

Thiollay JM. 1995. The role of traditional agroforests in the conservation of rain forest bird diversity in Sumatra. *Conservation Biology* 9: 335-353.

Thorsell, J. (1990a). Through Hot and Cold Wars, Parks Endure. *Natural History*, vol. 6/90, pp. 59-60.

Thorsell, J. and Harrison, J. (1990) Parks that Promote Peace: A Global Inventory of Transfrontier Nature Reserves. In J. Thorsell (ed./), *Parks on the Borderline: Experience in Transfrontier Conservation* (pp. 3-21) Gland, Switzerland: IUCN.

UNEP - United Nations Environmental Program, Status of Desertification and Implementation of the United Nations Plan of Action to Combat Desertification (U.N. Environmental Program, Nairobi, 1991).

WCMC. (1997). Natural Datasheet on the Serengeti National Park. Cambridge, UK: WCMC. (<http://www.UNesco.org/whc/nwhc/pages/sites/main.htm>).

Wells MP 1996. The social role of protected areas in the new South Africa. *Environmental Conservation* 23: 322-331.

Wells M, Brandon K, Hannah L. 1992. *People and Parks: Linking Protected Area Management with Local Communities*. Washington (DC): World Bank.

West PC, Brechin SR, eds. 1991. *Resident Peoples and National Parks: Social Dilemmas and Strategies in International Conservation*. Tucson (AZ): University of Arizona Press.

Western D. and Wright R. M., Eds., *Natural Connections: Perspectives in Community-Based Conservation* (Island Press, Washington, DC, 1994).

Western, D. 1994. Vision of the future: the new focus of conservation. Pages 548-556 in Western D, Wright RM, Strum SC. 1994. *Natural Connections: Perspectives in Community-based Conservation*. Washington (DC): Island Press.

Western D, Wright RM, Strum SC. 1994. *Natural Connections: Perspectives in Community-based Conservation*. Washington (DC): Island Press.

Wild RG, Mutebi J. 1996. *Conservation through Community Use of Plant Resources: Establishing Collaborative Management at Bwindi Impenetrable and Mgahinga Gorilla National Parks, Uganda*. Paris (France): United Nations Educational, Scientific and Cultural Organization. People and Plants Working Paper S.

Wilkie DS, Curran B, Tshombe R, Morelli GA. 1998. Modeling the sustainability of subsistence farming and hunting in the Ituri Forest of Zaire. *Conservation Biology* 12: 137-147.

Wily, L., 1998. *Soc. Nat. Resour.* 12, 46

Woodroffe R, Ginsberg JR. 1998. Edge effects and the extinction of populations inside protected areas. *Science* 280: 2126-2128.

World Bank. (1996). *Mozambique. Transfrontier Conservation Areas Pilot and Institutional Strengthening Project*. Report No.15534-MOZ. Washington, DC: World Bank.

World Resource Institute. 1994. *World Resources 1994-95*. Oxford Univ. Press, New York.

World Resource Institute. 1996. *World resources, 1996-97*. Oxford Univ. Press, UK.

World Resource Institute. 1996. *World resources: A Guide to the Global Environment 1998-99*, Oxford Univ. Press.

Yanda PZ, Mohamed, SA. 1990. *The environmental impact of irrigation schemes: The case of Mto wa Mbu, a reconnaissance survey*. Dar es Salaam (Tanzania): Institute of Resource Assessment, University of Dar es Salaam. Research Paper no. 24.

ANNEX 1. Number and extent of protected areas in different African sub-regions.

The information about extending and increasing the protected areas during the last 10 years is based on WCMC data. The data for 1990 was taken from the 1993 United Nations List of National Parks and Protected Areas. The data for 2000 was provided by WCMC as a contribution to FAO's Forest Resources Assessment 2000 (FRA 2000). However, the latest updated data is based on information taken from maps of protected areas and may not be effectively comparable with the numeric data from 1990. For the 2000 data, it is not specified whether, for example, marine protected areas are included. This fact could explain the large extent of PAs in some countries. Given the above, the table should be considered reservedly. It is only an approximate situation about the protected areas in Africa.

Country	Land Area	Total	Total	Total	% of Land	% of Land
		Forest Area	Protected Area	Protected Area	Area	Area
		000 ha	000 ha	000 ha	1990	2000
Benin	11,162	5,970	777	2,991	7.0	26.8
Burkina Faso	27,360	16,398	2,662	3,120	9.7	11.4
Cape Verde	403					
Côte d'Ivoire	31,800	15,050	1,992	2,884	6.3	9.1
Gambia	1,000	648	23	42	2.3	4.2
Ghana	22,754	9,248	1,103	1,628	4.8	7.2
Guinea	24,572	11,412	164	1,182	0.7	4.8
Guinea-Bissau	3,612	2,157		30		0.8
Liberia	11,137	8,011	129	117	1.2	1.1
Mali	122,019	22,314	4,011	4,215	3.3	3.5
Niger	126,670	462	8,416	13,352	6.6	10.5
Nigeria	91,077	31,215	2,971	3,552	3.3	3.9
Senegal	19,253	9,488	2,181	2,590	11.3	13.5
Sierra Leone	7,162	3,463	82	350	1.1	4.9
Togo	5,439	2,135	647	492	11.9	9.0
Total West Africa	505,420	137,971	25,158	36,547	5.0	7.2
				145%		
Burundi	2,568	10	88	131	3.4	5.1
Cameroon	46,540	21,844	2,050	4,409	4.4	9.5
Central African Republic	62,298	31,907	6,106	9,594	9.8	15.4
Chad	125,920	7,689	11,494	11,344	9.1	9.0
Congo	34,150	23,321	1,177	4,069	3.4	11.9
Dem. Rep. of the Congo	226,705	142,278	9,917	19,043	4.4	8.4
Equatorial Guinea	2,805	2,039		441		15.7
Gabon	25,767	21,809	1,045	4,324	4.1	16.8
Rwanda	2,467	20	327	445	13.3	18.0
Sao Tome and Principe	95					
Total Central Africa	529,315	250,917	32,204	53,800	6.1	10.2
				167%		
Algeria	238,174	3,506	11,919	17,632	5.0	7.4
Egypt	99,545		793	2,552	0.8	2.6
Libyan Arab Jamahiriya	175,954	91	173	572	0.1	0.3
Mauritania	102,522	29	1,746	645	1.7	0.6
Morocco	44,630	2,777	362	2,523	0.8	5.7
Sudan	237,600	7,233	9,382	10,701	3.9	4.5

Tunisia	16,361	494	45	76	0.3	0.5
Total North Africa	914,786	14,129	24,420	34,700	2.7	3.8
				142%		
Comoros	186	89		2		
Djibouti	2,318	15	11	11	0.5	0.5
Eritrea	11,760	59		621		5.3
Ethiopia	110,430	16,724	6,022	19,883	5.5	18.0
Kenya	56,914	2,516	3,504	6,841	6.2	12.0
Madagascar	58,154	14,243	1,115	1,283	1.9	2.2
Mauritius	203					
Seychelles	45		38	32	84.4	70.9
Somalia	62,734	3,186	180	1,132	0.3	1.8
United Republic of Tanzania	88,359	26,234	13,890	14,875	15.7	16.8
Uganda	19,965	725	1,909	5,086	9.6	25.5
Total East Africa	411,068	63,791	26,669	49,765	6.5	12.1
				186%		
Angola	236,501	43,321	2,641	8,260	1.1	3.5
Botswana	56,672	2,362	10,663	16,301	18.8	28.8
Lesotho	3,035	10	7	633	0.2	20.9
Malawi	9,408	1,441	1,058	1,827	11.2	19.4
Mozambique	78,409	39,237	2	5,368	0.0	6.8
Namibia	82,329	2,115	10,218	10,888	12.4	13.2
South Africa	121,760	8,622	6,928	6,054	5.7	5.0
Swaziland	1,720	626	46	50	2.7	2.9
Zambia	74,339	29,213	6,364	22,165	8.6	29.8
Zimbabwe	38,685	14,039	3,068	4,963	7.9	12.8
Total Southern Africa	702,858	140,986	40,995	76,508	5.8	10.9
				186%		
Total Africa	3,090,228		149,446	251,341	4.8	8.1
				168%		