



# Nature & Faune

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## Conservation Beyond Boundaries

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[www.fao.org/world/regional/raf/workprog/forestry/magazine\\_en.htm](http://www.fao.org/world/regional/raf/workprog/forestry/magazine_en.htm)



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## Preface

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Sustainable development of wildlife, forestry and renewable natural resources in general calls for approaches that include a vision of our field of operation as stretching beyond individual countries' borders. On the other hand, formulating and implementing programmes on sustainable management of wildlife and protected areas straddling political boundaries are quite challenging, especially in Africa. One reason for the challenge is that traditionally the scope of conservation activities has always been within individual countries. There was not, therefore, a concrete field basis around which inter-country collaboration could be built.

This edition of *Nature & Faune* is devoted to exploring various aspects of Trans-Boundary Conservation. The editorial by Alan Rodgers points to the fact that although planning, implementation and monitoring of natural resource conservation is a national prerogative neighbouring countries need to collaborate in achieving wise development of shared resources. The Special Feature by Craig Beech on Peace Parks Foundation argues that the establishment of transfrontier conservation areas (TFCAs) is expected to enhance job creation, biodiversity conservation, peace and stability in the region. A number of articles on transboundary conservation activities are presented, embracing examples from west, central and southern Africa.

A news item on three Foundations collaborating to conserve the threatened biodiversity of the Sahara Desert shines the spotlight on commitments “in support of conservation efforts throughout North Africa and all peoples who share the Great Saharan Desert.”

Also included in this issue's menu is a dash of multinational cooperation towards management of marine fish stocks. Séraphin Dedi Nadjé and Jessica Hjerpe Olausson reported of the countries in the West Central Gulf of Guinea area are conscious of the need for cooperation in the management of their fisheries resources. The Fishery Committee for the West Central Gulf of Guinea (FCWC) was consequently established, to facilitate cooperation in fisheries management in the subregion.

The country under focus in this edition is Sudan. It is the largest country on the African continent and has the largest freshwater wetland in Africa. In order to better understand Sudan's rich rangelands and wildlife, as well as its experiences on conservation of wildlife across national territorial boundaries, Dr Salwa Mansour Abdel Hameed, Director, Wildlife Research Centre, Ministry of Science & Technology Sudan, relates her country's story in an interview.

Under the feature FAO activities, 5 initiatives are introduced: The Central African World Heritage Forest Initiative (CAWHFI); Fouta Djallon Highlands Integrated Natural Resources Management Project; the Collaborative Partnership on Forests (CPF); Emergency Prevention System (EMPRES) for Transboundary Animal and Plant Pests and Diseases; and Marine Protected Areas as a Tool for Fisheries Management (MPAs).

This edition of *Nature & Faune* illustrates the complexities of cross-border conservation and makes sensible suggestions about how these complexities could be managed. The approaches taken here by contributing authors are of great interest to those studying and working in this area.

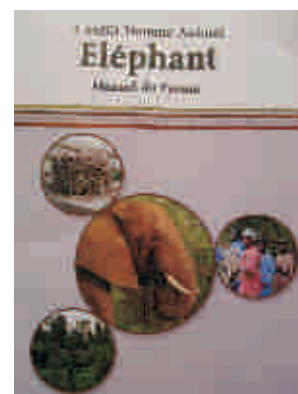
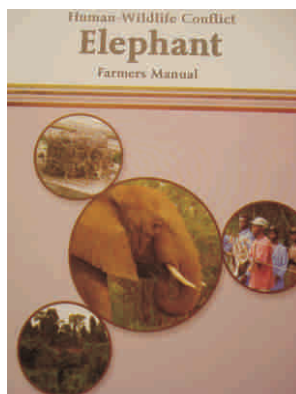
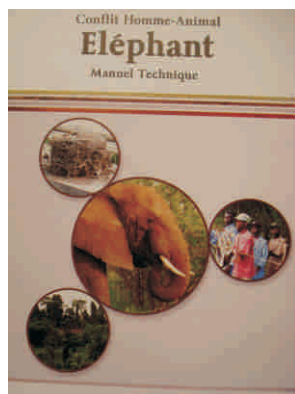
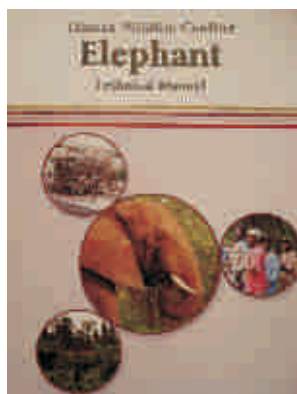
You will find this edition of *Nature & Faune* thought-provoking.

Happy reading!

## Announcements

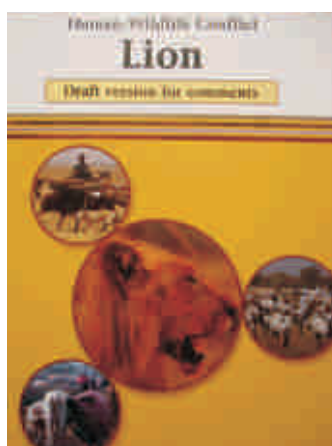
### Training package on Human-Elephant Conflict Management

FAO recently completed a training package on Human-Elephant Conflict Management, consisting of a Technical Manual, Farmers' manual and a video. Please send an email to [nature-faune@fao.org](mailto:nature-faune@fao.org) in order to receive a package (available in English and in French).



### Draft report on Human-Lion Conflict management is available; comments are welcome!

A draft report on Human-Lion Conflict management has been written up by FAO. If interested to receive a copy, contact Rene Czudek: [Rene.czudek@fao.org](mailto:Rene.czudek@fao.org). Your comments will be very much appreciated.



### Draft report on Human-Baboon Conflict Management is available at FAO.

A draft report on Human-Baboon Conflict Management is available for comments. For further inquiries or simply to receive a copy of this draft publication, contact Rene Czudek: [Rene.czudek@fao.org](mailto:Rene.czudek@fao.org)



## Conservation across and beyond boundaries

Alan W. Rodgers<sup>1</sup>

“The borders of African countries rarely coincide with eco-regions or cultural boundaries. National borders were established mostly by past colonial powers in the politicized “Scramble for Africa” of the late 1800s, with little consideration for the geographic distribution of African people, and even less for the ecological divisions of the landscape”. This is the opening sentence to a discussion on cross-border conservation in the detailed assessment of Africa's eco-regions (Burgess et al 2004). Their analysis shows that of 119 distinct African “ecological-regions”, 85 cover more than one country, mostly with direct continuity across borders. At a finer scale, national borders dissect many individual ecological processes, eco-systems and large mammal home ranges; (Burgess et al 2004).

Whilst the planning and implementation of natural resource conservation is the sovereign right (and responsibility!) of every country, as stressed by, for example, the Convention on Biological Diversity; there is a shared responsibility between adjacent countries to collaborate in managing shared resources. These can be freshwater resources; such as Lake Victoria (Kenya Tanzania, Uganda) or Lake Tanganyika (Burundi, DRC, Tanzania, Zambia), and Lake Tchad (shared by Cameroon, Niger, Nigeria, Tchad); with shared biodiversity and commercial fisheries<sup>2</sup>; or they can be terrestrial resources such as the annual wildebeest migration between Tanzania and Uganda. The scale of such trans-boundary resources across the Kenya Tanzania boundary is shown in Figure 1, with three aquatic and eight terrestrial significant resource flows.

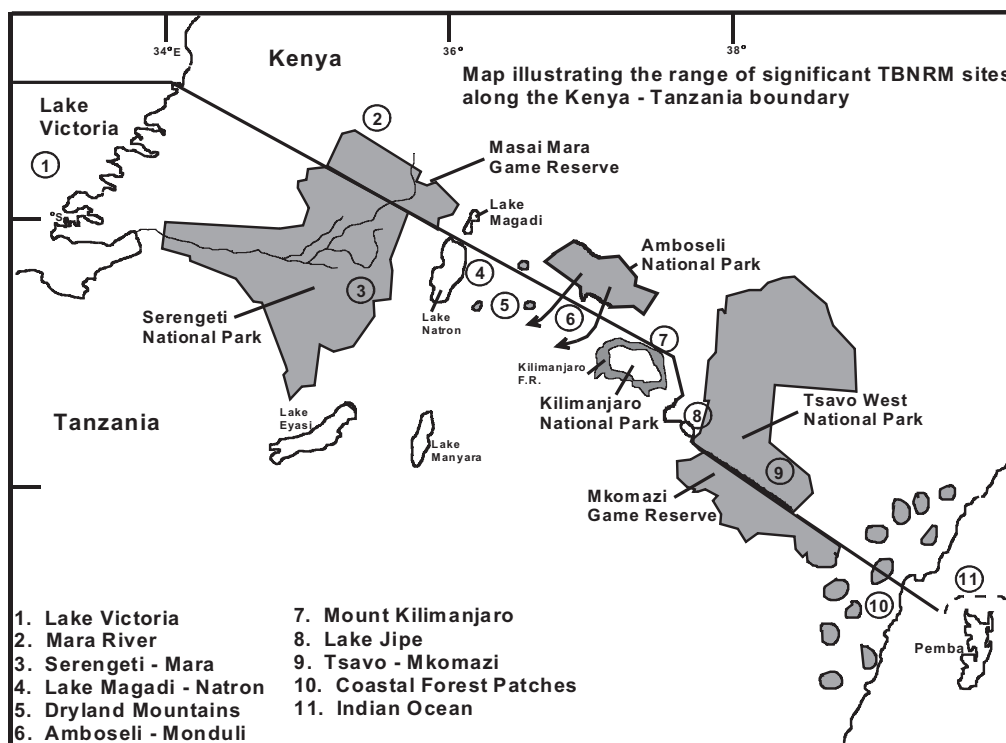


Figure 1. Trans-boundary Natural Resource Management (TBNRM) sites across the Tanzania-Kenya Border.

<sup>1</sup> C/O UNDP GEF, P O Box 30552 Nairobi, Kenya. alan.rodgers@undp.org

<sup>2</sup> Note that FAO has been involved in creating and supporting “Regional” Lake Authorities for both lakes in the past ten years

The past few years have seen many formal trans-boundary agreements on resource management in Africa. These vary from adjacent Protected Areas (such as Kgalagadi Trans-Frontier Park between Botswana and South Africa); to landscape management (such as the Greater Limpopo Landscape between Mozambique, South Africa and Zimbabwe); to regional process such as the Yaoundé agreement of Congo Basin Countries to manage the Congo Forests. Two of the oldest transboundary sites are 1) The **Kgalagadi Trans-frontier Park**, where informal collaboration existed since 1948 between Gemsbok National Park in Botswana and Kalahari Gemsbok National Park in South Africa, with the two areas functioning as one ecological unit with free movement of wildlife. This cooperative effort culminated in 1999 with the formal declaration of the Kgalagadi Trans-frontier Park, in which the respective governments have devolved authority to the collaborating conservation agencies to make joint management decisions on their behalf. The area is now recognised as a TFCA - an undivided ecosystem with coordinated management, shared revenues, and increased freedom of movement for visitors. Secondly is the **Fouta Djallon Highlands Regional Integrated Management Programme (FDH-MP)**, involving the eight countries that depend on waters from the Highlands (Gambia, Guinea, Guinea-Bissau, Mali, Mauritania, Niger, Senegal and Sierra Leone). It was established in the 1970s. The Fouta Djallon Highlands (FDH) are a series of high plateaus concentrated in the central part of the Republic of Guinea but whose area also extends into Guinea-Bissau, Mali, Senegal and Sierra Leone. This highland area is the point of origin of a number of international rivers, notably the Gambia, Niger and Senegal Rivers, as well as a number of small water courses contributing to the characterization of the area as the “water tower” of West Africa.

Many of the lessons from such Trans-Boundary Natural Resource Management (TBNRM) or Trans-Frontier Conservation Areas (TFCAs) were documented by the Washington DC based Biodiversity Support Programme. Their initial “Study of TBNRM in Southern Africa (Griffin et al 1999); was followed by a series of case studies across Africa, summarised by van der Linde (2001). This had detailed analyses from e.g., the Virunga Mountains (DRC, Rwanda and Uganda largely for mountain gorillas), and East Africa, focusing on the Minziro - Sango-Bay forests across the Uganda Tanzania border (Rodgers et al 2001).

This latter case, derived from a GEF funded project, supported by FAO, details the complexity of institutional cooperation in managing cross border resources. This must include the necessary enabling environment from central government policies, joint management plans, District Commissioner joint security discussions, cooperation between forest and customs officers in reducing illegal timber trade, etc.

“Enabling Environments” are important at all scales from the support of village governments along borders to statements on regional / international cooperation in relevant national policies. This broader level of cooperation stems from the Convention on Biological Diversity, which spells out the need for trans-frontier and even broader interaction. Recent developments in southern Africa show how market forces around possibilities of cross border tourism, are pushing this cooperation process, bringing on board immigration and customs officials into reducing red-tape. Globalisation in general supports such trans-frontier process. This can have both positive and negative consequences on local economies (see Munthali 2007), as the rich tend to benefit and, unless carefully planned, the poor may lose out.



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## Three Foundations collaborate to conserve the threatened biodiversity of the Sahara Desert

Source: Cheetah Conservation Fund Media

The World Deserts Foundation, the Sahara Conservation Fund (SCF) and the Cheetah Conservation Fund (CCF) met in Algiers, Algeria on 26 December 2007 to examine ways and means to jointly conserve the Sahara, with particular emphasis on its declining population of gazelles and cheetah. Also in attendance at the meeting were diverse Algerian state institutions and nongovernmental organisations.

One of the important outcomes of the conference was the signing of an accord between SCF and the World Deserts Foundation for further cooperation. The President of the World Deserts Foundation, Mr. Cherif Rahmani, who is also Algeria's Honourable Minister, of Planning, Environment and Tourism described the agreement as having great value “not just for Algeria but also in support of conservation efforts throughout North Africa and all peoples who share the Great Saharan Desert.” It is noted that Algeria is a major range state for quite a number of endangered species e.g. the slender-horned and Cuvier's gazelles, the cheetah and the houbara bustard.

For more information, please see:

- The Cheetah Conservation Fund (CCF) <http://www.cheetah.org> or write to: [cheeta@iafrica.com.na](mailto:cheeta@iafrica.com.na)
- The Sahara Conservation Fund [www.saharaconservation.org](http://www.saharaconservation.org) or write to [scf@bluewin.ch](mailto:scf@bluewin.ch).
- The World Deserts Foundation: [www.desertsdumonde.org](http://www.desertsdumonde.org) or write to [fondationdesertsdumonde@hotmail.com](mailto:fondationdesertsdumonde@hotmail.com)



The **cheetah** (*Acinonyx jubatus*) is unique for making up in speed and stealth what it lacks in climbing abilities. It is the fastest of all land animals and can reach speeds between 112 and 120 kilometers per hour.

Photo courtesy of Frederick van heerden, “the photo taker” [rich.fvh@intekom.co.za](mailto:rich.fvh@intekom.co.za)  
P. O. Box 41, George 6530 South Africa. Tel: (+27)44-874 6868

### Peace Parks Foundation: A decade of experiential knowledge on transboundary conservation in southern Africa

Craig Beech<sup>1</sup>,

The establishment of Peace Parks or transfrontier conservation areas (TFCAs) is becoming increasingly an important instrument in linking protected areas and ecosystems across international borders. Southern Africa has taken the lead in this direction, realizing that unless a separate body was set up to co-ordinate, facilitate and drive the process of TFCA establishment and funding, these peace parks would not receive the attention that they deserve, nor would they produce the expected results of job creation, biodiversity conservation and peace and stability in the sub-region. In response to this need, Peace Parks Foundation was established on 1 February 1997 by Dr Nelson Mandela, former president of South Africa, Dr Anton Rupert, former President of WWF in South Africa and HRH Prince Bernhard of the Netherlands. The principal role of the Foundation is to facilitate the establishment of peace parks or transfrontier conservation areas (TFCAs), in southern Africa. Moreover, the development of peace parks is an exemplary process of partnerships where donors and NGOs have assisted governments and their implementing agencies. The spectacular success achieved thus far is due mainly to the dedication of the region's political leaders, the devotion of the international coordinators and government officials and the tremendous support of the donor community.

Thus far, the Foundation actively supports governments in southern Africa in various TFCAs, all of which straddle the sub continent from the arid west to the tropical belts of the eastern shoreline (see Figure 1) These include eight (8) TFCAs namely: Kgalagadi Transfrontier Park (Botswana/South Africa); Lubombo Transfrontier Conservation and Resource Area (Mozambique/South Africa/ Swaziland); Maloti-Drakensberg Transfrontier Conservation and Development Area (Kingdom of Lesotho/South Africa); Great Limpopo Transfrontier Park (Mozambique/South Africa/Zimbabwe); |Ai-|Ais/Richtersveld Transfrontier Park (Namibia/South Africa); Malawi/Zambia TFCA (Malawi/Zambia); Limpopo/Shashe TFCA (Botswana/South Africa/Zimbabwe); and Kavango-Zambezi TFCA (Angola/ Botswana/ Namibia/ Zambia/ Zimbabwe).



**Figure 1:** Map showing the eight transfrontier conservation areas (TFCAs), straddling southern Africa from the arid west to the tropical belts of the eastern shoreline.

<sup>1</sup> GIS Manager. Peace Parks Foundation; Millennium Park, 16 Stellantia Ave, PO Box 12743, Die Boord; Stellenbosch 7613; Republic of South Africa. Tel: +27 (0)21 887 6188. Fax: +27 (0)21 887 6189. e-mail: [cbeech@ppf.org.za](mailto:cbeech@ppf.org.za) ; Web: <http://www.peaceparks.org> Maps: <http://maps.ppf.org.za>

**Kgalagadi Transfrontier Park** (Botswana/South Africa), is Africa's first transfrontier park, which was opened on 12 May 2000 by Presidents Festus Mogae of Botswana and Mbeki of South Africa. This has since become a popular destination to tourists and 4x4 trailists wishing to experience Kalahari's tranquillity and natural beauty. The development of a joint management and tourism plan, has paved the way for the regional cooperation of this peace park as has the opening of a tourist access facility at Mata-Mata between Namibia and South Africa and the approval of a joint entrance facility at Twee Rivieren.

**Lubombo Transfrontier Conservation and Resource Area** (Mozambique/South Africa/ Swaziland) On 22 June 2000, five protocols towards the Lubombo's establishment were signed. World Bank funds were used to develop the Mozambican component of the Usuthu-Tembe-Futi TFCA. This development included infrastructure and accommodation upgrades, in addition to the construction of headquarters and accommodation facilities. To supplement this, a co-financing agreement between Mozambique and the Foundation for the development of Maputo Special Reserve was signed and a project implementation unit appointed. The existing boundary fence of the Maputo Special Reserve was repaired and a unique and highly successful elephant restraining line erected along the Futi River to link up with Tembe Elephant Park in South Africa. The two electrified wires run two metres above ground and thus allow communities free movement whilst protecting crops from elephants (a successful step in the right direction of mitigating animal and human conflict). Joint management, tourism, project implementation and zoning plans for the various components of the Lubombo TFCA were completed through a detailed participatory process, making extensive use of GIS during workshop sessions to detail and visualise the various options. The plans are now in various stages of implementation. Additional projects initiated in the region are the derivation of Land Cover map products. The Foundation is working jointly with the FAO on these products making use of Land Cover Classification System. The Foundation has created ground-truthing databases and methodologies, to be implemented by local representatives, empowering them in the collection and collation of verification data. The Foundation is also assisting the Mozambique government in formulating a community strategic development plan for the Matutuine district.

**Maloti-Drakensberg Transfrontier Conservation and Development Area** (Kingdom of Lesotho/South Africa)

The establishment of the Peace Park was initiated with the signing of a Memorandum of Understanding (MoU) on 11 June 2001 between the governments of the Kingdom of Lesotho and Republic of South Africa. Part of the Lesotho component of this TFCA is the Sehlabathebe National Park which was proclaimed on 2 November 2001. The Foundation is supporting the development of management and tourism plans, as well as infrastructural development in order to turn it into a major tourist attraction. The entrance gate and arrival centre have been completed. The upgrade of this National Park is key for the regional tourism aspect of the TFCA. A detailed GIS was derived for Sehlabathebe National Park, from which a land use plan was derived. This plan buttressed the development strategy and realignment of infrastructure within the park, ensuring that sensitive areas would not be disturbed. On 22 August 2003 the Maloti-Drakensberg Transfrontier Conservation and Development project was launched by the Ministers of the Environment of the Kingdom of Lesotho and of Republic of South Africa and the World Bank.

**Great Limpopo Transfrontier Park** (Mozambique/South Africa/Zimbabwe). The heads of state of the three countries signed a treaty establishing the Great Limpopo Transfrontier Park on 9 December 2002. The Giryondo Access Facility between Kruger and Limpopo national parks was opened on 16 August 2006, creating, within the Peace Park, a point of access between the countries of Mozambique and South Africa. Since its unofficial opening in December 2005, more than 17 000 visitors have entered Limpopo National Park (LNP) in Mozambique and this has earned LNP more than R1 million (approximately US \$150,000) in gate fees. The million ha LNP was proclaimed on 27 November 2001. The Mozambican government requested the Foundation's assistance in overseeing the park's development as a SADC approved project. The following key aspects have been achieved:

- Management and tourism development plans were completed and indicated that the park could accommodate 486 180 visitors per annum.
- The park was demined according to international standards;
- The boundary for the buffer zone was re-aligned through a participatory process to ensure that the communities living along the Limpopo River would have adequate space for their resource utilisation needs;
- 150 community members have been empowered with various skills and have subsequently been employed by LNP.
- Just over four thousand animals have been translocated from surrounding protected areas (most of which have come from the Kruger National Park) and that, combined with 50 km of fence being dropped, encouraged more animals, including some 500 elephants to traverse the international boundary at will;



- Detailed planning, together with the sourcing of the necessary funding has led to the Park headquarters and staff housing being built;
- The first tourism facilities were opened in September 2005 and these include Machampane tented camp, Machampane wilderness trail, Shingwedzi 4x4 eco-trail, Aguia Pesqueira campsite and the Massingir hiking trail; these offer visitors to the region a Mozambique experience.
- A resettlement working committee was established and seven communities living in remote areas inside the park have opted to relocate to areas with better living conditions.

The FAO is determined to work jointly with the Foundation in deriving land cover map products from 2008, according to the Land Cover Classification System (LCCS) standard. A methodology to assess biomass estimates and subsequently carbon sequestration potentials, will be implemented and tested.

**|Ai-|Ais/Richtersveld Transfrontier Park** (Namibia/South Africa) This transfrontier park was established by the two heads of state signing a treaty on 1 August 2003. The Foundation again assisted with the joint management, tourism and financial protocol plans. The upgrade of the tourism facilities included the building of an entrance gate to |Ai-|Ais Hot Springs Game Park, and the refurbishment of the pontoon at Sendelingsdrift. Furthermore the customs, immigration offices and staff housing on both sides of the Orange River were built to enable the opening of a tourism access facility in October 2007.

**Malawi/Zambia TFCA** (Malawi/Zambia). An MoU toward the TFCA's establishment was signed on 13 August 2004. A joint law enforcement project operating as a single unit across international borders to combat poaching was employed with resounding success in the Nyika TFCA. Thanks to this, a wildlife restocking programme of Nyika National Park and Vwaza Marsh Wildlife Reserve began this year. Again the detailed implementation of a GIS for the Malawi/Zambia TFCA, and its planning capabilities have successfully contributed to the regional planning.

**Limpopo/Shashe TFCA** (Botswana/South Africa/Zimbabwe) This TFCA includes the Mapungubwe Cultural Landscape, which was proclaimed a World Heritage Site in July 2003. Peace Parks Foundation, De Beers, National Parks Trust and WWF SA assisted SANParks by facilitating negotiations with landowners, and the purchase of farmland to consolidate the core area of South Africa's contribution to the proposed TFCA - the 30 000 ha Mapungubwe National Park, officially opened on 24 September 2004. An MoU toward the TFCA's establishment was signed on 22 June 2006 and an international coordinator appointed. During the course of 2007, three participatory meetings were held with representatives from the 3 countries to discuss the outline and content of drafting a joint management plan for the TFCA. The categories under discussions include, safety and security; tourism; community development; conservation issues and cultural heritage. Again a GIS is being derived to visually document these discussions drawing together disparate topics.

**Kavango-Zambezi TFCA** (Angola/ Botswana/ Namibia/ Zambia/ Zimbabwe) The KAZA TFCA, which is set to become the world's biggest conservation area, was incepted with the signing of an MoU on 7 December 2006. To guide its initial development the five governments commissioned a pre-feasibility study, which was facilitated by the Foundation. A secretariat to steer its development has been appointed. The foundation has been invited to assist with a spatial regional plan of the western Zambian component of the TFCA. During this phase of the project, a rapid assessment methodology of land cover mapping was tested. Land cover maps were derived from LandSat TM data of this region. An aerial game survey was scheduled for October 2007, and the Foundation was invited to test a database, derived on LCCS field verification indicators to observe and verify land cover classes from the aerial transects being flown. The database, running on a GPS integrated Tablet PC, allowed for the collection of land cover structure, physiognomy, tree height and cover abundance. The database is to be used, where possible, to verify land cover mapping, and to estimate biomass according to various classes. FAO and Peace Park Foundation (PPF) are to jointly refine this technique for implementation during 2008.

To help ensure the sustainability of peace parks, the Foundation supports the training of wildlife managers at the Southern African Wildlife College near Kruger National Park. Since inception in 1997, more than 2000 students have been trained. Linked to the college is the Hans Hoheisen Wildlife Research Station where wildlife disease research, training and certain veterinary projects are facilitated. The SA College for Tourism in Graaff-Reinet, officially opened by Mrs Mbeki in 2002, trains people in the necessary hospitality skills to work at lodges in and around the peace parks.

As a further contribution to the sustainability of the peace parks, the Foundation, in partnership with the conservation agencies of SADC countries, has identified payment for carbon offsets, generated through land rehabilitation and avoided deforestation initiatives, as a potential long-term sustainable source of income. Following a positive feasibility assessment, and again in partnership with the relevant conservation agencies and Ministries, the Foundation is developing a set of climate change mitigation projects within transfrontier conservation areas across southern Africa. It is hoped that the multiple biodiversity, financial, social and climate benefits of this win-win opportunity will be realised in the near term.

#### **Peace Parks Foundation - FAO Collaboration**

During this first decade, the Foundation set out to develop a Geographical Information System (GIS) for its facilitation role in southern Africa. It became apparent from the onset, that there was certainly a lack of standards in terms of data collection, data storage, the manner in which data is referenced and attributed. The foundation sought international standards to adopt, in order to ensure interoperability amongst systems and the sharing of datasets for regional analytical work. Through the various programmes of the United Nations Food and Agriculture Organization (FAO), much work had been done to establish and promote standards in data sharing and systems implementation. The Foundation approached the FAO to formally enter into a collaborative agreement. The Agreement entails the processing of remote sensed information and the drafting of land cover mapped products, using of the Land Cover Classification System (LCCS). Several additional FAO software packages and tools are being developed where the Foundation will ensure consistency in the collection, processing and harmonisation of these mapped products. Of the several Essential Climate Variables (ECVs),\* the Foundation and FAO are endeavouring to standardise methodologies in the collection, assessment and analysis of three of these, namely Land Cover, Biomass and Fire Disturbance. The employment of these techniques and tools by the Foundation ensure that decisions taken and at the policy level reach functional implementation as they are adopted in the various transfrontier conservation areas. Furthermore, building capacity in the various countries and employing local staff to assist with these analytical and field data collection tasks has the desired harmonisation and standardisation effect both regionally and globally.

*\*Other ECVs include river discharge; water use; global terrestrial network for groundwater; lake and reservoir levels and volumes; snow cover; glaciers and ice caps; permafrost; albedo and reflectance anisotropy; fraction of absorbed photosynthetic active radiation; and leaf area index.*

# Characterisation of wildlife movement corridors in the Zimbabwe, Mozambique, Zambia (ZiMoZa) trans-boundary area to guide mitigation of increasing human-wildlife conflicts in the Zambezi heartland

Patience Zisadza<sup>1</sup> and Jimmiel J. Mandima<sup>2</sup>

## Summary

This study identified and characterised nine (9) wildlife movement corridors and mapped a total of 26 Human Wildlife Conflict hotspots in the River Zambezi Heartland, a landscape that straddles Zimbabwe, Mozambique and Zambia in the Middle Zambezi Valley. A Garmin eTrex Legend Global Positioning System unit was used in the field for collecting location statistics for geo-referencing wildlife movement routes and human-wildlife conflict hotspots. Other ecological attributes of the wildlife movement corridors were recorded on standardized field data sheets. Maps showing the location and connectivity of the wildlife movement routes at local and landscape levels were produced. It is expected that recognising wildlife movement corridors in land use planning will help reduce human-wildlife conflicts, while at the same time safeguarding the elephant movement routes.

## 1. Introduction

The River Zambezi Heartland<sup>3</sup> has an estimated population of 600 000 people that reside in open Communal Lands and Game Management Areas, and largely depends on subsistence agriculture for livelihood. As the human population increases, more land is continuously cleared to create more fields, in the process expanding into traditional wildlife habitat. The population of elephants (*Loxodonta africana*) and other large herbivores has also been increasing at an average rate of 5% per annum (Dunham, 2004). As both humans and wildlife strive for more space in the landscape, there has been a gradual increase in human-wildlife contacts that have resulted in human-wildlife conflict (HWC) problems such as: loss of human life, crop damage, and destruction of granaries and other property by elephants. Efforts to mitigate this through problem animal control by wildlife authorities have not succeeded in resolving HWC. An added dimension is the trans-boundary movement of the elephant populations across national borders in the Zambezi Heartland. The elephants use the same traditional movement routes overtime to access the wildlife dispersal areas across the whole landscape.

Conservation and management of wildlife movement corridors from a landscape perspective is undoubtedly important because fragmentation of wildlife habitat results in reduced functional responses as exemplified by lack of refugia for animals due to land clearance for cultivation, and dispersal mechanisms compromised by infrastructure development. Wildlife movement corridors and dispersal patterns provide a special focus in situations where wildlife species move across borders. Anthropogenic activities in communal areas present serious threats to wildlife and rangeland management considering that rural people's livelihoods largely depend on natural resources as well as subsistence agriculture.

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<sup>3</sup> The term 'Heartlands' is uniquely used by African Wildlife Foundation to refer to large cohesive landscapes that are biologically important and have scope to maintain healthy populations of wild species and natural processes well into the future while serving livelihood needs.

Linking areas of important wildlife habitat or high biodiversity as dispersal areas has become a priority in the conservation of natural habitats for wildlife. Formally protected areas alone are not adequate to sustain healthy and viable populations of wildlife, particularly elephants, and the more sensitive ungulate species such as nyala (*Tragelaphus angasii*), sable (*Hippotragus niger*) and roan (*Hippotragus equinus*) antelopes. Connectivity between such areas is critical, and this can be achieved through the demarcation and maintenance of wildlife movement corridors. Fragmentation due to human activities in and around areas occupied by wildlife and in wildlife movement corridors, is at the present time a common cause for extinction of some key wildlife species in the ecosystem.

Wildlife that becomes stranded in a high quality habitat (protected areas) which is surrounded by a sea of human development will become increasingly endangered. Protecting “patches of habitat” simply will not be sufficient to guarantee the survival of key species. In order to avoid a “patchy” habitat we need to protect a system in which interconnected wildlife movement corridors are maintained and protected, as such corridors will weave a web or network of habitats that allows wildlife and natural processes to move freely across the (entire) landscape.

Human population growth and settlement expansion are likely to continue in some parts of the landscape and the real challenge is to make sure that they happen in a planned and well monitored manner. Clearly mapping and demarcating wildlife movement corridors will support the development of land use and management plans which are more acceptable to all parties concerned, and which are conducive for human-wildlife co-existence in the Zambezi Heartland.

Recognizing that the entire landscape provides habitats for elephants and that it is essential to allow connectivity across national borders, and at the same time promote co-existence of wildlife and human beings, this study sought to characterize wildlife movement corridors and recommend selected key routes which should be secured from anthropogenic activities.

The characterization was done using a standard field data sheet with a consistent checklist of characteristics that were documented across the whole landscape while geo-referencing all key features to allow interfacing in GIS. Conflicting land uses were documented and recommendations made for adaptive management that allows for co-existence of people and wildlife.

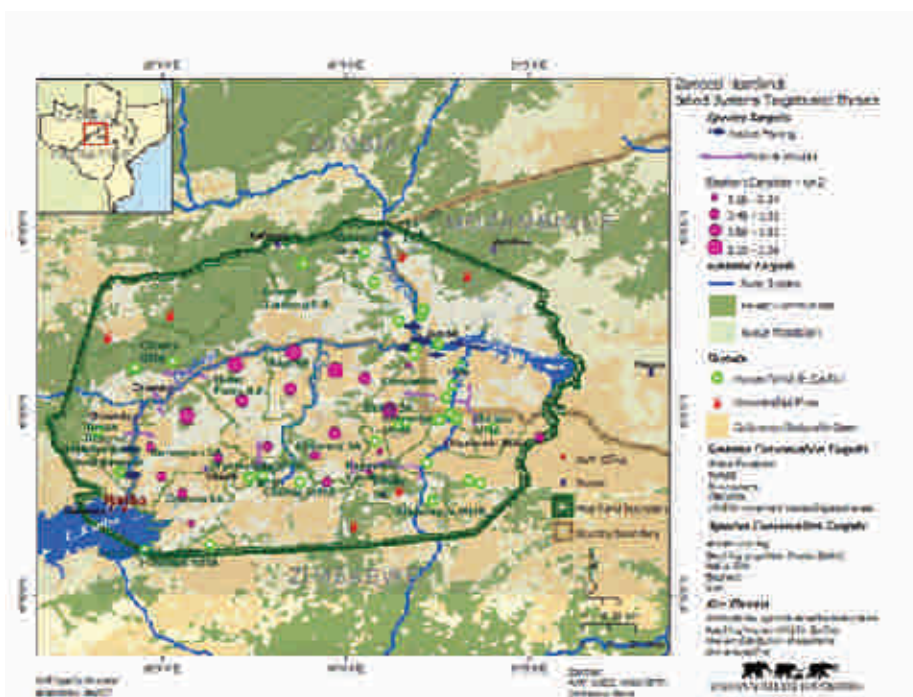


Figure 1: Map of the Zambezi Heartland, showing elephant densities, occurrence of HWC and land use.



## 2. Materials and Methods

The Zambezi Heartland is a three-country trans-boundary landscape that is rich in biological resources along the Zambezi River stretching from downstream of Kariba Dam to Cahora Bassa Dam (Figure 1). The trans-boundary area where Zimbabwe, Mozambique and Zambia share a common border (ZIMOZA) is shared by four districts - Luangwa District in Zambia, Zumbo and Magoé Districts in Western Tete Province of Mozambique and Mbire District in Zimbabwe (Figure 2). Appropriate authority over wildlife utilization was granted to local district authorities with viable wildlife populations and is implemented according to the philosophies embodied in Community Based Natural Resources Management (CBNRM) programs like the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in Zimbabwe and Tchuma Tchato in Mozambique.

The work was initiated in 2003 during which the African Wildlife Foundation worked with local communities and its partners to conduct preliminary wildlife movement corridor identification. This work was then scaled up and intensified in a structured, systematic manner over a 12-month period in January December 2005.



Figure 2: The Zimbabwe, Mozambique, Zambia (ZIMOZA) Trans-boundary Natural Resources Management Area

The process of wildlife movement corridor identification was participatory and consultative with field teams consulting local communities through group discussions, key informant interviews as well as guidance from local community and wildlife authority resource monitors. The movement routes and areas of significant human-wildlife conflict were geo-referenced using a Garmin etrex Legend Global Positioning System (GPS) handset during ground truthing field excursions when teams walked and drove long distances along corridor areas to document key attributes. The later included wildlife movement corridor size (dimensions), level and seasonality of use, ecological attributes (vegetation types, other key features, etc.) and extent of human uses which were recorded on standardized wildlife movement corridor description protocol field data sheets developed by the African Wildlife Foundation and its partners in the Zambezi Heartland (see sample of field data sheet in the Annex).

The average dimensions of wildlife movement corridor (width and length) were determined through walking transects in the corridor and these measures were used to calculate the estimated total area of the corridor which was subsequently corrected using 'Xtools' extensions in Arcview 3.2a to reflect the accurate total area per wildlife movement corridor.

The average area under settlement and cultivation in each wildlife movement corridor was calculated as a percentage of the total corridor area, a measure that provided an index of corridor viability and feasibility to secure.

For data analysis, all waypoints were downloaded from the GPS unit using OziExplorer to interface with Arcview 3.2a in GIS. The GPS waypoints for each wildlife movement corridor and human wildlife conflict hotspots were the saved in Arcview. Where direct downloading was not possible, waypoint files were created in Microsoft Excel and saved as database files (dbf) and later converted to shape files (shp) in Arcview 3.2a.

### 3. Results

Subsequent mapping involved superimposing wildlife movement corridor layers over relevant data layers e.g. hills, settlements, roads and water points to show the relationships between wildlife and other anthropogenic activities and ecological attributes as these are key to corridor viability and extent of human-wildlife conflicts (Figure 3).

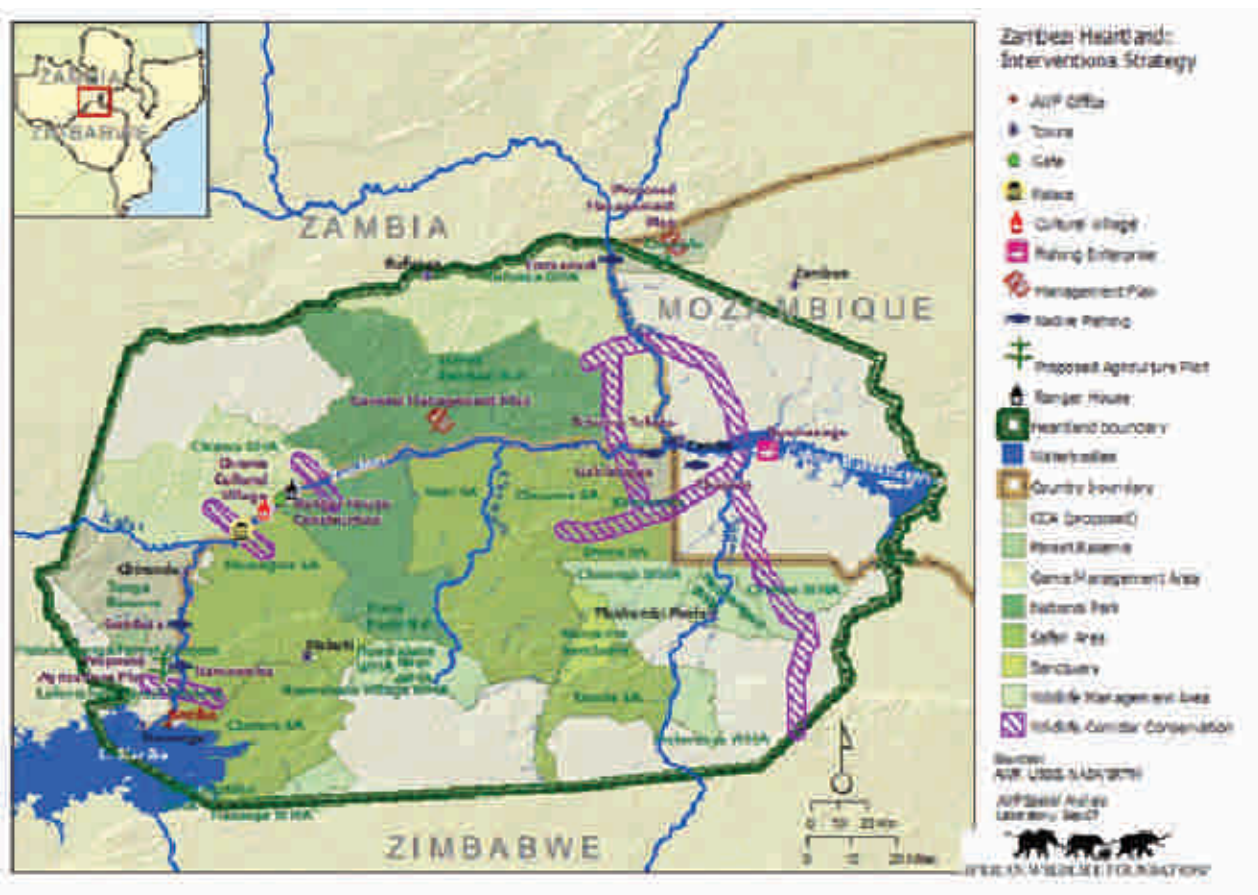


Figure 3: Relationship between wildlife movement corridors, anthropogenic activities and key biodiversity attributes in the Zambezi Heartland

Wildlife movement corridor maps and human-wildlife conflict hotspots data layers in GIS were further superimposed over land use data i.e. The cultivated region in year 1996 and year 2000 in order to demonstrate expansion into wildlife movement corridors (Figures 4a and b).

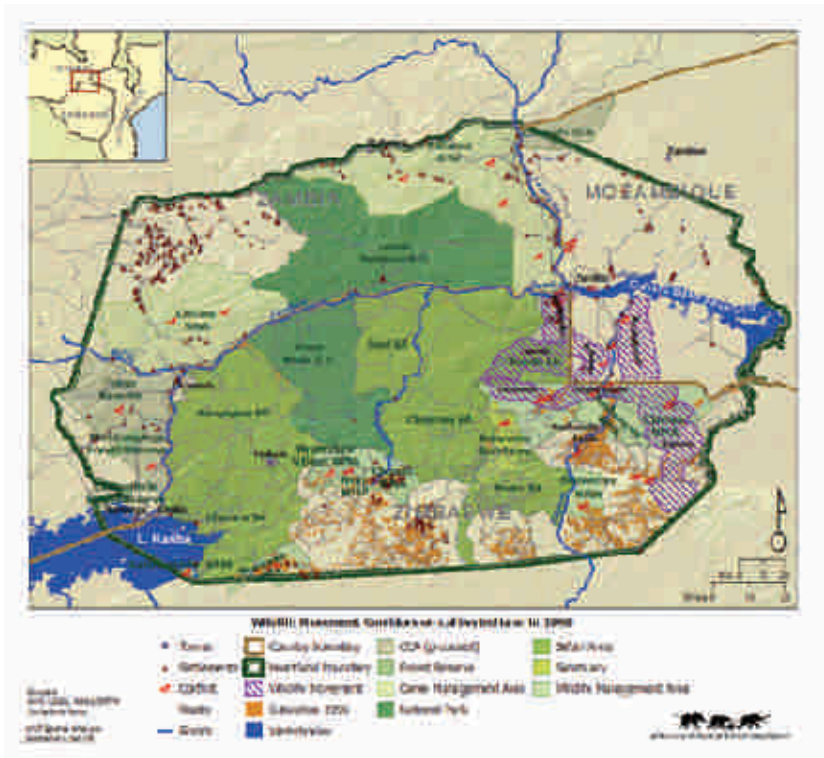


Figure (4a) Year 1996

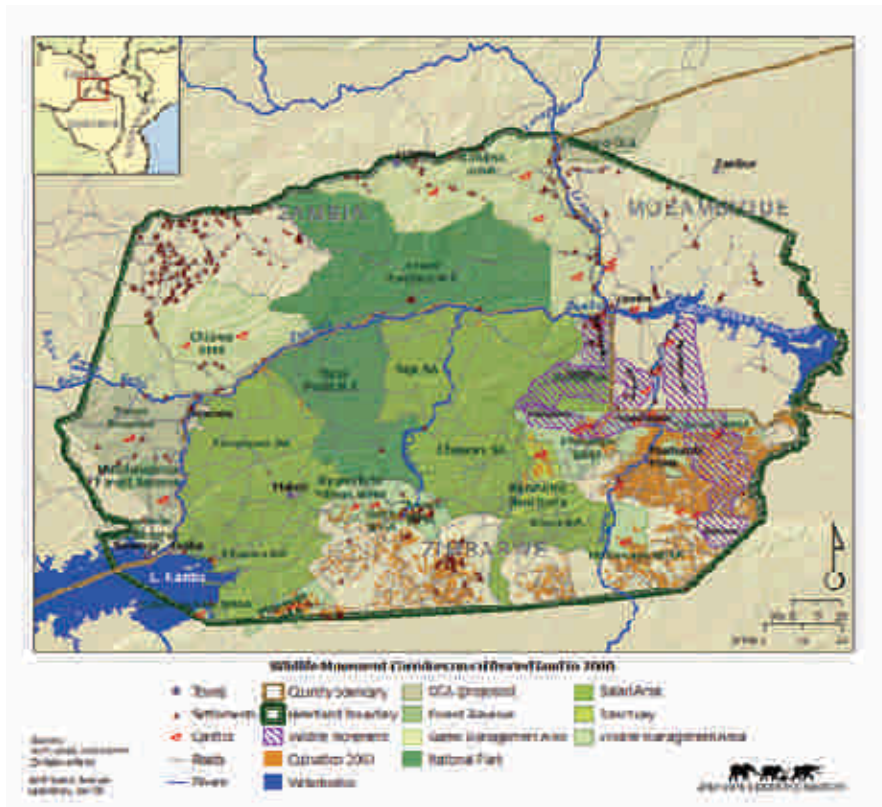


Figure (4b) Year 2000

Figures 4a and b: Wildlife Movement Corridors overlaid on cultivated land in 1996 and 2000 respectively to demonstrate encroachment and increased human-wildlife conflict.



Nine wildlife movement corridors were identified for which preliminary mapping was done based on field data collected and the attributes of the corridors are shown in Tables 1, 2 and 3.

Corridor name	Attributes of the Corridor		
	Average Width (km)	Estimated Length (km)	Estimated Total Area (km <sup>2</sup> )
1. Manyemu	6	49	294
2. Mupedzapasi	7	18	126
3. Dande Safari Area (DSA)	5	23	115
4. Kanyemba 1	8	26	208
5. Kanyemba 2	2	7	14
6. Kafunsa	6	53	318
7. Nyakatondo	8	82	656
8. Paramunyu	6	23	138
9. Mulenzva	5	14	70
Total			1939

Table 1: Area of the identified wildlife movement corridors in the ZIMOZA area

Corridor name	Integrity <sup>4</sup>	Degree of Use <sup>5</sup>	Seasonality and diurnal pattern of use
1. Manyemu	Very good	Very high	wet summer, early morning, evening/night
2. Mupedzapasi	Good	High	wet summer, early morning, evening/night
3. DSA	Very good	Very high	all year round, anytime
4. Kanyemba 1	Very good	Medium	wet summer, early morning, evening/night
5. Kanyemba 2	Good	Medium	wet summer, early morning, evening/night
6. Kafunsa	Good	Medium	wet summer, early morning, evening/night
7. Nyakatondo	Very good	High	all year round, anytime
8. Paramunyu	Good	Medium	all year round, anytime
9. Mulenzva	Fair	Low	wet summer, early morning, evening/night

Table 2: Wildlife movement corridor integrity, degree of use by wildlife, seasonality and diurnal pattern of use attributes.

<sup>4</sup> Corridor integrity is a composite measure given a rank of Poor, Fair, Good or Very Good, based on measures of other conflicting uses, vegetation damage, fire incidences and any other disturbance features.

<sup>5</sup> The degree of use is classified as Low, Medium, High or Very High, based on measures of spoor counts, droppings and actual numbers of animals observed using the corridor.

Corridor Name	Dominant Vegetation	Estimated percentage area under Settlement & Crop Cultivation	Ecological functions and Economic Uses by Humans
1. Manyemu	<i>Colophospermum mopane</i> and Miombo complex ( <i>Julbernardia spp</i> and <i>Brachystegia spp</i> ), <i>Terminalia sericea</i> , Jesse bush ( <i>Combretum spp</i> )	12%	-links Manyemu and Angwa rivers - building material, firewood and medicinal herbs for the local people
2. Mupedzapasi	Jesse bush and <i>C. mopane</i> , <i>Terminalia spp</i> , <i>Zizyphus spp</i> , <i>D. mespiliformis</i>	20%	-links Manyame and Angwa river - building material, fire wood, medicinal herbs
3. DSA	<i>Terminalia sericea</i> , Miombo complex ( <i>Julbernardia spp</i> and <i>Brachystegia spp</i> ) <i>C. Mopane</i> , <i>Combretum spp</i> , <i>A. digitata</i> , <i>Acacia spp</i> , Jesse bush.	0%	-sports hunting
4. Kanyemba 1	<i>Terminalia sericea</i> , <i>C. mopane</i> , Miombo complex ( <i>Julbernardia spp</i> and <i>Brachystegia spp</i> ), <i>Combretum spp</i>	10%	-links small streams to Mwanzamatanda movement of wildlife from DSA, Kanyemba, transboundary movement of wildlife from Magoé -firewood, building material, game meat for the Doma people
5. Kanyemba 2	Mixed (mopane & miombo), <i>Terminalia sericea</i> , <i>Acacia spp</i>	12%	-links to Zambezi river perennial source of water -facilitates movement of wildlife from Kanyemba communal area. -transboundary movement between Magoé and Kanyemba.
7. Nyakatondo	<i>C. mopane</i> & <i>T. Sericea</i> , <i>Combretum spp</i> , <i>Zizyphus spp</i> , <i>Sterculia spp</i>	4%	-links to Zambezi river -facilitates transboundary movement of wildlife between Guruve and Magoé -access to resources in the corridor is not restricted.
8. Paramunyu	<i>C. mopane</i> & <i>Combretum spp</i> , Riparian woodland ( <i>Kigelia (Kigelia africana</i> & <i>Trichilia emetica)</i> , <i>Faidherbia albida</i> , <i>A. nigrescens</i> , <i>T. sericea</i> <i>Zizyphus spp</i>	3%	-links to Zambezi river -facilitates movement of wildlife between Zumbo and Magoé. -fire wood, building material
9. Mulenzva	<i>T. sericea</i> , <i>C. Mopane</i> , Riparian woodland ( <i>Kigelia africana</i> & <i>Trichilia emetica)</i> , <i>Combretum spp</i> , <i>Zizyphus spp</i> , <i>F. albida</i>	5%	-links to Luangwa and Luwaladzi rivers -facilitates transboundary movement of wildlife between Zumbo and Rufunsa Game Management Area.

Table 3: Use characteristics in identified wildlife movement corridors (i.e. habitat composition, area under human settlement and crop cultivation, ecological functions and economic uses).

#### 4. Discussion and Conclusions

The research findings reaffirm the role of wildlife movement corridors as elements that serve as linkages between historically and functionally connected wildlife areas as suggested by McEuen (1993). Identification and description of the corridors offer a viable landscape level basis for reconciling conflicting requirements for agricultural development and wildlife conservation (Cox, 1988). The degree of development in the open areas of the Zambezi Heartland is very low as livelihoods are supported by subsistence farming, but significant habitat shrinkage is noticeable as drought resistant sorghum and cotton crops are introduced. Parts of the Manyemu and Mupedzapasi wildlife movement corridors are under threat due to expansion of human settlement and cultivation.

The wildlife species identified in all wildlife movement corridors relate to the different habitat niches existing in the corridors that exhibit habitat diversity to harbour various species, both large and small. *Colophospermum mopane* and *Terminalia sericea* are plant species present in all corridors; they are preferred habitat for elephants (Stuart and Chris, 2000).

Presence of a variety of wildlife species in wildlife movement corridors illustrates that corridors are not only used for passage of large wildlife species but that they also provide other ecological services, such as micro-habitats and food for other life forms. For example, wildlife movement corridors are usually extensive enough to constitute home ranges and dispersal areas for smaller mammalian species, reptiles and even birds. Conservation and management of such corridors therefore brings benefits not only to large mammals such as elephants but enhances biodiversity in the ecosystem, hence justifying the need to accord wildlife movement corridors high protection status as wildlife sanctuaries.

Despite human settlement and crop cultivation estimated at 20% of the total area of the Mupedzapasi wildlife movement corridor which links to Manyemu, Gonono and Kafunsa, there is significant use of the route by wildlife to reach other dispersal areas and home ranges. Drought resistant crop varieties like cotton and sorghum have exacerbated expansion into the corridor in recent years.

In Kanyemba, conflict problems are faced as a result of different needs of people and wildlife in the area, especially elephants and hippos during the wet summer season. Local community outreach is very important to describe the behaviour of wildlife and the use by wildlife of the corridors, and to make recommendations on possible long-term strategies aimed to minimise human-wildlife conflicts.

The Manyemu and Kafunsa wildlife movement corridors are settled and cultivated, about 12% for Manyemu and 8% for Kafunsa. The percentage values are fairly low in relation to total area for each corridor. Successful abatement of further human activities into the corridors will make them remain viable for conservation and human wildlife conflicts can be minimised.

The Kanyemba 1 and Kanyemba 2 wildlife movement corridors have an estimated 10% and 12% of their area under human settlement and crop cultivation, respectively. The percentages are low enough to warrant conservation of both corridors with future prospects of reducing human-wildlife conflicts in the area. Human-wildlife conflict cases are mainly reported from people settled along the Mwanzanutanda and Zambezi rivers. The Doma people settled in the Kanyemba 1 corridor present serious threats to the wildlife and habitat in the corridor. Their livelihoods are based on shifting cultivation and hunting. Considering normal human population growth and considering also the need to safeguard the viability of the wildlife movement corridors in the future, more effort should be put into sensitization, education and provision of alternatives for livelihood strategies for people living in these areas.

The fact that wildlife movement corridors link to form interconnected movement routes locally or at a transboundary level illustrates the need to conserve and manage the corridors in a broader context: the landscape approach. Harmonisation of land use plans and land tenure along trans-frontier sites may also ease the processes, reducing the dilemma of wildlife movement corridor fragmentation and, ultimately, human-wildlife conflicts.

This study concludes that conservation and management of viable wildlife movement corridors and habitats is critical if species are to survive. The ability of wildlife to thrive is directly related to the quality and quantity of the habitat and corridors on which they are dependent. It is clear that there are situations where human access or land uses come into conflict with the needs of wildlife and it is only through careful planning and management that people and wildlife can successfully coexist or the level of conflicts may be mitigated. A careful review of development and other land use in the Zambezi Heartland is therefore needed to ensure the presence of high quality and contiguous wildlife habitats and viable wildlife movement corridors, while at the same time reducing human-wildlife conflicts.

Understanding of local community perspectives and support from policy makers is key to ensuring that wildlife movement corridors are successfully conserved and managed to minimize human-wildlife conflicts.

## **5. Recommendations and Suggestions for further work**

In order to successfully mitigate the increasing human-wildlife conflicts in the Zambezi Heartland there is need to prioritize conservation and management of wildlife movement corridors. This can be achieved by the formulation of practical land use plans that take into consideration wildlife corridors. Policy implementation will help restrict further expansion of human settlement and crop cultivation in wildlife movement corridors. This will include development of specific by-laws that will bind planning efforts in all the three countries as part of an inter-state Master Plan.

There is need to promote the cultivation of alternative cash crops, for example chili pepper, to replace a drought resistant cotton variety which is raided every farming season by elephants, buffaloes and other wildlife species. Promotion of chili pepper growing in wildlife hotspot areas, may give high returns to the community and reduce losses, as was proven in some areas.

Public education on wildlife movement corridors, sensitisation and advocating wildlife friendly developments that keep human settlement away from the corridors and dispersal areas will also help reduce human-wildlife conflicts in the long run.

It is suggested that district planning units in the respective ZIMOZA districts lead on the respective planning needed to zone areas for different uses that take cognisance of wildlife movement routes. These 'national planning units' at district level, should then build to what could be called a 'Master Plan Combination Authority': this being an inter-state planning authority recognized under a relevant Southern Africa Development Community (SADC) Protocol or the African Union Border Region Program, that will seek for harmonized planning efforts that officially recognize space for wildlife movement. This institutional set up can build on existing Trans-boundary Local Area Committees that were established to coordinate local community participation and input to the process of formalizing the ZIMOZA Trans-Frontier Conservation Area. Given the transboundary nature of the site, neutral international not-for-profit organizations like African Wildlife Foundation, WWF and IUCN among many others could play the inter-state brokering role to coordinate such a process.



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**ANNEX**

**Sample of "ZAMBEZI HEARTLAND ZIMOZA AREA WILDLIFE MOVEMENT CORRIDOR DESCRIPTION DATA SHEET"**

**Recorder's name:**..... **Corridor Name:**.....

**Site ID:**..... **Year:**..... **Month:**..... **Date:**...../...../..... (dd/mm/yy)

**GPS reading:** East:..... South:..... Altitude:.....(m)

**General corridor description:**

.....  
 .....

Corridor attributes	Length (km)	Width (km)	Area (km <sup>2</sup> )	Integrity <sup>6</sup>	Degree of use <sup>7</sup>	Other (Specify)

**Habitat type:** Mopane woodland  Riparian woodland  Escarpment woodland   
 Miombo woodland  Mixed woodland (mopane/miombo)  Jesse bush   
 F. *albida* woodland  Other (Specify).....

Undergrowth  If present describe briefly .....

**Land uses:** Human settlements  Crop cultivation  If yes, record % Area.....  
 Tourism infrastructure  Give detail.....  
 Other uses (specify).....

**Other relevant characteristics:** Human-wildlife conflict  If yes, what are the main problem animals? .....

**Seasonality of corridor use:** Dry winter  Wet summer  All year round

**Diurnal pattern of use:** Early morning  Late morning  Early afternoon   
 Late afternoon  Evening/Night  Anytime

**Other ecological functions of corridor:** .....

**Economic use(s) of resources in the corridor:** .....

**Checked by:**..... **Date:**.....

<sup>6</sup> This will be a composite measure given a rank of Poor, Fair, Good, Very Good based on measures of other conflicting uses, vegetation damage, fire incidences, etc.

<sup>7</sup> This will be classified as Low, Medium, High, Very High based on measures of spoor counts, droppings and actual numbers of animals observed using the corridor.

# Cross-border trade and conservation in the Sangha River Region (Cameroon, Central African Republic and Republic of Congo)

*Ruben de Koning<sup>1</sup>, Julius Chupezi Tieguhong<sup>2</sup> and Victor Amougou<sup>3</sup>*

## Summary

In Africa conservation areas are increasingly established along national borders where human activity seems low. In reality border areas are often vibrant places of economic interaction. This article looks at conservation opportunities and challenges posed by cross border natural resource trade in the Sangha River Region, which straddles the borders of Cameroon, the Central African Republic and the Republic of Congo. It argues that conservation projects and forestry administrations can and should contribute to trade liberalisation, thereby unlocking the economic potential in poor and remote forest areas. If accompanied with strict law enforcement in cases of major disruptive and illegal practices, policies in this direction can help to integrate development and conservation objectives.

## 1. Introduction

Because movements and distributions of animal, plant and human populations are not restricted by national boundaries, conservation planners around the world have realised the need to undertake their efforts in a trans-boundary fashion. In Central Africa, Trans-Boundary Protected Areas (TBPAs) today comprise more than half of the total area under protection. The number of TBPA's in Central Africa is only likely to grow in the future as areas worthwhile to protect are increasingly concentrated along borders where population densities and economic activities are usually low compared to coastal and central regions.

While border areas increasingly attract conservation initiatives, they also represent spaces where inequalities surface and conflicts erupt (Katere et al., 2001). In Sub-Saharan Africa border areas seem particularly vulnerable to conflict due to a lack of governance, arbitrary borders and economic marginalization. In many countries these conditions have resulted in ambiguities about citizenship, disenfranchisement of local populations from the state, and informal/criminal trading networks across borders.

This article will focus on security and conservation challenges posed by trans-boundary economic interactions in the Sangha River region a biodiversity hotspot that straddles the borders of Cameroon, the Central African Republic (CAR) and the Republic of Congo (Congo). This area forms an important transit point of goods from remote regions in CAR and Congo to Douala, Brazzaville and Kinshasa. Trans-boundary trade is of vital importance to uplift local communities' economies and to create centres of growth in interior Africa, enabling social and political stability. At the same time, some trade in natural resources risks damaging the environment and generating social conflicts.

Recognising the above linkage between trade, environment and security, we undertook two field studies in the area in 2005. These were part of a three year project by the Center for International Forestry Research (CIFOR) on the issue of forest related conflict in Cameroon. The objectives of these studies were to describe the nature of and identify the challenges to cross border natural resource trade, and

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analyse formal institutional responses to these challenges, with special reference to trans-boundary natural resource management. The main body of research consisted of individual questionnaires addressed to merchants and in-depth interviews with local administrators and representatives of development and conservation NGO's active on the Cameroonian side of the Sangha River area. Financial resources did not allow greater geographical coverage. In addition we used relevant materials and data produced by a variety of conservation and development agencies operating in the region.

## 2. The regional context

The Sangha River is created by a confluence of the Ngoko and Kadeï Rivers. Flowing from East to West and draining in the Sangha at Ouesso, the Ngoko forms the boundary between Congo and Cameroon. Coming from inside the Central African Republic, the Kadeï is called Sangha after congregating with smaller streams from Cameroon at Libongo.



Figure 1: Sangha River Region (From Curran, 1993)

The Sangha River Region is covered with dense semi deciduous tropical rainforest, with patches of swamps along rivers and forest clearings, locally referred to as *bais* (Steel and Curran, 2001). The forest is home to rich flora and fauna. Botanical studies in the adjoining protected areas suggest a combined total of between 1600 and 1800 vascular plant species. Large mammals include forest elephants, lowland gorillas, chimpanzees and buffaloes. Following the Sangha River up north, dense forests turn into savanna grasslands.

Forming a link between savanna and forest ecosystems, the Sangha River region has historically been an important point of human interaction in Central Africa. Long before colonial powers arrived at the scene in the late 19<sup>th</sup> century, peoples of various Central African Regions were drawn to the Region by its fertile lands, iron mining and river trading opportunities. Mobile groups of Pygmy, Bantu and Oubangian were engaged in cross-cultural interactions that were substantiated by inter-marriages, the trade in agricultural products, and the exchange of cultural expressions (Giles-Vernick, 1999).

Drastic 'foreign' induced changes started to take place during the latter half of the 19<sup>th</sup> century. The rise of the Ngaoundere's Fulbe state brought slave raids far down south, generating refugees and conflicts between tribal groups. Not much later French and German administrations began to attract people to live and pay taxes on either side of the Sangha River (Kalck, 1974). Concessionary companies competed for and forced new inhabitants into the Sangha forest as wage labourers. Colonial rubber and ivory trading companies of the Sangha River region are known to have used physical force upon local populations (Coquery-Vidrovitch, 1998).

After independence the extractive economy of the Sangha River region increasingly relied on timber and diamond exploitation. Logging towns like Bayanga, Libongo, Kika, Pokola and Kabo attracted skilled workers from outside the region who were followed by other opportunity seekers. Rather than being directly employed, most of these new migrants – some of them coming from as far as Senegal, Mali and Mauritania – made their living as traders: hunters, tailors, fishermen or mechanics. Despite its apparent remoteness to national economic and political centres, the Sangha River region still draws many people from far away, reflecting an inverse trend of urban-rural migration common in Cameroon today.

Conservation projects in the Sangha River region started in the 1990s. The three adjoining protected areas and their peripheral zones presently form one complex under the name of *Tri-National de La Sangha* (TNS)<sup>4</sup>. The creation of the park complex was the joint result of informal exchanges between scientists and conservation professionals during the late 1990s and the Yaoundé Declaration of 1999 by which Central African governments committed themselves to accelerating the process of creating trans-boundary protected areas. Soon after the Yaoundé Declaration, a cooperative agreement for the TNS was drafted and it was subsequently endorsed in 2000<sup>5</sup>. It provided for the establishment of four committees: the supervisory and arbitration committee, operating at national ministerial level; the scientific committee; the monitoring committee at local administrative levels and projects; and the planning and execution committee, including wardens and project staff.<sup>6</sup>

### 3. Cross border trade in natural resources

The Sangha River Region is an important source and area of transit for natural resource products, notably timber and bush meat but also palm oil, cocoa, gold, diamonds and raffia. Goods used to travel by water through the Sangha, Ubangi and Congo Rivers to Brazzaville, and then by rail to the seaport of Pointe Noire. As a result of civil war and related acts of robbery, corruption and infrastructure destruction in the southern part of the Republic of Congo, almost all long distance trade nowadays passes through Cameroon by road. Timber exploitation and trade is the dominant commercial industry in the Sangha Region. In Cameroon several national and international companies are active. In the other two countries logging is dominated by one international company (CIB in Congo and SESAM in Central African Republic). In remote areas smaller national operators like the Central African *Societe de Bois de Bayanga* are simply unable to be cost effective considering the high transportation costs, frequent road accidents and bribery on the route leading to Douala seaport in Cameroon – transportation costs are together estimated at over 40% of factory revenue (Personnel Manager SBB, Pers. com.).

Rather than timber, small scale entrepreneurs engage in bush meat trade. Logging roads have over the years opened up large tracts of forests rich in fauna. This, in combination with an ever growing demand for bushmeat in urban centres, has created a professionally organised business. Foreign hunters often collaborate with local pygmy populations to track down and kill big game. Bushmeat is known to be transported on logging trucks from Northern Congo through CAR just north of Dzanga-Sangha Project, and into Cameroon (Steel and Curran, 2001).

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<sup>4</sup> The TNS includes four reserved areas: National Park in Cameroon; Nouabalé-Ndoki National Park in the Republic of Congo; and Dzanga-Ndoki National Park and Dzanga-Sangha Dense Forest Special Reserve in the Central African Republic.

<sup>5</sup> *Accord de Coopération entre les Gouvernements de la République de Cameroun, la République Centrafricain et la République du Congo, Relatif a la Mise en Place du Tri-national de la Sangha*, COMIFAC 2000.

<sup>6</sup> The planning and execution committee is the primary organising body of the TNS. It is composed of representatives from four conservation projects. It meets approximately every six months to develop and implement a joint action plan.

Mineral extraction includes artisan diamonds and gold mining. Diamond extraction predominantly takes place in the northern sections of the Dzangha Sanga Reserve but recently sites have been opened north of Lobéké National Park in Cameroon. Most of the diamonds leave the region through the National Purchase Office in Bangui where diamonds are delivered by intermediary investors who organise and invest in the actual digging. Investors supply diamond camps with food, alcohol, tools, fuel and motorised pumps to drain water out of the diamond pits. The investor circuit is internationalised and is dominated by West Africans. Diamond diggers are usually local youths and youths drawn to the region from medium size towns in Central Africa's savanna regions and Batouri, Bertoua and Yokadouma in Cameroon. Wages for diamond digging youths in Cameroon add up to 80 USD per person per month.<sup>7</sup>

Gold is dug in the Congolese district of Souanké and is principally an individual enterprise, as it needs little investment. Gold diggers sell their gold in Cameroon in places like Kika and Moloundou, from where buyers transport it further to Yaoundé and Douala. The selling price is about 10 USD per gram, which is just below international market prices, indicating a reasonable bargaining position on the side of the diggers. The amount which individual diggers bring to the market varies between 15-30 grammes. Full time diggers may take their gold four times a month to the 'market'. Others, partly engaged in the business, manage to come four times a year.

On-farm products form yet another category of natural resources that are traded across borders. Food crops like plantains, cassava, cocoyam and sugar cane, grown in Cameroonian villages along the main axis to the south, are transported mainly to the growing towns of Ouessou (now counting about 76 395 inhabitants) and Pokola in Congo. From Congolese communities in the Sangha Region palm oil is sold in Cameroonian communities and towns at significant profits, 50-80% over the purchase price. In Cameroonian border villages with the CAR, like Mboy, Central African farmers market their foodstuffs freely without paying custom duties, but this kind of trade is very small scale.

Cocoa farming has recently become commercially interesting again after a long period of decline during the 1990's. The fact that in Northern Congo the trade has reached its production levels of the early 1980's is indicative for the sector's gradual recovery (Senga, 2005).

Duties and taxes for cross-border traders in the Sangha Region differ greatly, depending on the quantity and value of goods, and the border crossing used. At the southern border crossings with Congo, traders of fresh products of small value dispense most of their transaction cost at the border on their personal entry. The *entrée régulière* is set at the equivalent of 14 USD in local currency and is paid to customs officers of the country of entry. In absence of a passport, traders may pay a *laissez-passer* of 20 USD.

Once the value of products transported surpasses 500 USD, usually on a combination of manufactured, processed and fresh goods, traders pay at three offices in the country of entry; customs, forestry and *phytosanitaire*. Border transaction costs amount to an average of about 10 % of the value of merchandise. This percentage remains below the legally prescribed VAT of 18.7%, standardised for Central African countries within the CEMAC<sup>8</sup> free-trade zone. However, one must realise that many more police, forestry and local government controls have to be passed on the way, and taxes are to be paid at markets. The total amount of taxes paid at the end of a trader's journey easily reaches and exceeds 18.7%.

Despite heavy legal and illegal taxes and payments, individual traders' prognoses for the future are remarkably positive. While 48 % of the traders perceive that cross border trading has become harder over the past five years, only 20% does not believe in the growth of their cross-border trading activities. Irrespectively of the border crossings used, the perceived easiness of trade or the quantity and value of merchandise, cross-border traders express a need for lowering taxes, for clearly defined customs duties,

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<sup>7</sup> The *Communauté Financière Africaine* (CFA) franc is used in all three countries. Amounts of money in the text are directly converted to US dollars.

<sup>8</sup> The Central African Economic and Monetary Community comprises six countries: Cameroon, Central African Republic, Republic of Congo, Chad, Gabon and Equatorial Guinea



and for better roads. Most (57%) people are familiar with the CEMAC organisation and some know about TNS (16 %) collaboration. Those aware of these regional organisations believe that they have the responsibility to contribute towards trade liberalisation.

#### **4. The downside of cross-border trade**

Cross-border trade offers economic opportunities to remote forest populations of the area. However there are certain downsides to cross-border trade and the present rush on forest resources that have to be identified and managed. These relate to players and practices in and around the various types of concession areas in the Sangha region, *i.e.* those used for the extraction of diamonds and timber, and for conservation and hunting. Exploitation and management of these areas does not always (equally) favour human populations in the region, and may damage its natural resource base.

Diamond prospecting and extraction activities in the CAR are underwritten by foreign capital coming from large industrial companies. These companies work through intermediaries, from the whole of Central and West Africa, to invest in and extract the produce from diamond shanties that are established by a combination of immigrant and local youths. In Cameroon, large international companies have so far not set foot on the ground, but this should not be ruled out in the future. Chinese and Israelian prospectors are already active along the Central African Border.

Alluvial diamond exploitation by individual diamond diggers is by its nature a highly conflict sensitive business. Impoverished local and immigrant youths need outside investment to be employed. "You cannot make the investment, do not have the necessary connections and don't know the quality and prices", according to an informant in Mboya. But loyalty to the investors is fragile once the diamond digger proves lucky and quick richness is close at hand. Diamond theft, locally referred to as 'Tic Tac', has led to a tight system of control and punishment by the investors, creating structural tension between diggers and intermediaries. Control is exercised through hidden but generous rewards to those that betray their fellow diggers, and the latter's consequent harsh punishment or expulsion from the business. As a result of unequal power relations, young diamond diggers and local villagers feel abused both by international capital and their national agents that are given a free hand in the Sangha River region, mounting frustration in diamond shanties has the dangerous potential to lead to violent revolt and interpersonal confrontations.

Conflicts over hunting rights are manifold in the Sangha River region. They include both conflicts between communities and individuals who stand in direct competition with each other and between hunters on the one side and the state and conservation agencies on the other. In regard to people-versus-people conflicts, local Baka and non-Baka communities are confronted with an increasing number of professional hunters that easily cross over the border to each of the countries to hunt big game for meat and ivory. Villagers around the Lobéké National Park in Cameroon complain that as a result of good marketing opportunities in Cameroon, logging roads and relatively weak law enforcement, Central African ivory and big game hunters cross over to deplete their forest. Baka pygmies, who are predominantly subsistence hunters, are hit hardest by a growing number of commercial hunters and the subsequent decline in densities of bushmeat. However, it should be noted that local villagers may benefit as well from large scale commercial hunting and therefore may not necessarily oppose the penetration of foreign hunters in their forests. As noted above, pygmies are often employed as trackers and hunters, benefit from the meat left over and supply hunters and merchants with food and other necessities (Zouya-Mimbang, 1998).

More fundamental hunting conflicts tend to arise in relation to law enforcement and action by conservation agencies. Many of the local and immigrant populations do not abide to the laws and rules governing hunting practices. They illegally possess weapons<sup>9</sup>, do not respect protected species and hunt

<sup>9</sup> During inter-militia confrontations and general chaos in Northern Congo in 1997, a number of arms depots were looted. A GTZ study shows that 76 % of all illegal weapons of war used by poachers in South-East Cameroon are smuggled in from the Republic of Congo, and that smugglers use the ferry crossing to Cameroon operated by the biggest logging company in Northern Congo as the major point of entry.



with methods forbidden by law, such as steel snares. Attempts to force back illegal hunting practices have in the whole region created a backlash of fear and hostility among people thereby ruining any further collaboration perspective in conservation activities, which continues to date (Mogba and Freudenberger, 1997).

Finally, commercial logging has generated numerous conflicts in the region. One type of logging conflict is the one arising between logging and local people's livelihoods. Disruption of local livelihood results from physical destruction of the environment in concession areas, as well as an influx of migrant workers in the logging camps who compete for bushmeat. However, most public complaints and opposition are related to the perceived unequal employment opportunities and benefit sharing. In the Republic of Congo violent demonstrations against logging companies' employment policies took place in the beginning of the 1990's, coinciding with civil war. The *Front National de la Sangha* was the main vehicle for expressing this discontent (Forest-Monitor, 2001). In the Cameroonian subdivisions of Yokadouma, Mouloundou and Gari-Gombo in Cameroun, villagers' outcries, roadblocks and other forms of sabotage lead to state intervention in 2004. Documentation of the forest department shows that the major complaints centred on forest revenues that were claimed not to be paid or not to be invested in village development.

In addition to creating people-*versus*-companies conflicts, logging operations sometimes clash with conservation interests. Such conflict has been most evident in Bayanga, CAR, where during the mid 1990's intense rivalries developed between logging companies and conservationists over management rights in forest concessions. The two sides were represented by the French firm Sylvico and the German Development cooperation GTZ, the first propagating a modernist development perspective based on extractive industries, while the second insisted on strict conservation, tourism and alternative development for the region. Both parties engaged in local patronage relations, lodged legal charges and lobbied with politicians to garner support for 'their' development agenda in the Bayanga region (Hardin 2002).

## 5. Conclusions and policy recommendations

Integrated Conservation and Development Projects are widely put forward as the solution to sustainable development in developing countries. Also in the TNS region, policy makers and environmental planners have frequently voiced the desire to work towards a type of park management that reconciles social and economic needs of local populations. This should lead to increased support for protected area management and reduce rampant poaching and other illegal and unsustainable practices.

This article argues that economic needs of local populations should be addressed through trade liberalisation and infrastructural improvement. Concerning trade liberalisation, it was observed that although tariffs have officially been eliminated within the CEMAC region, a number of customs duties and taxes are still levied, both officially and non-officially. As a consequence, traders are confronted with highly variable and at times exorbitant transaction costs. In addition no adequate system of VAT collection has been systematically implemented.

As much of the trade concerns natural resource products, the inter-ministerial Commission on Central African Forest (COMIFAC) and Tri-national conservation partners have a role to play in implementing free trade. Indeed COMIFAC's *plan de convergence* does prioritise support to marketing of non-timber forest products (Activity C, point f.: 3), but is silent on any other small scale trade in agricultural and mineral products. The authors of this article stress that the *plan the convergence* should allude to a responsibility to assist in achieving trade liberalisation according to CEMAC agreements. COMIFAC's particular responsibility should be to target illegitimate taxation of non-timber goods at the level of forestry checkpoints inland and at border crossings.

At the level of Tri-national cooperation, the committee comprised of local administrators during a 2005 meeting specifically recognised the need and its responsibility to stop unofficial and non-authorized controls in order to render citizens less vulnerable to abuse when they move across the border<sup>10</sup>. These good intentions should materialise in concrete action, for example in the form of training custom officials and setting up accounting mechanisms for border and roadside control posts of different administrations. TNS funds could support such initiative that must be executed by, and involve of administrators and law enforcers operating at the most local level.

Infrastructure improvement is another critical element in improving regional economic integration. If Cameroon wants to maintain its strategic position as a country of transit of natural resource products derived from Northern Congo and Western CAR, public investment is badly needed. Recently the Congolese and Cameroonian governments agreed on the construction of a road, *la route de l'integration Économique*, to connect Sangmelima and Ouesso (Senga, 2005). There is a need to investigate whether and how the remote southwest corner of the CAR could be connected to this planned road.

Opening up biodiversity rich areas for commerce and trade, as suggested above, is often feared by conservation planners, and for good reasons. Improved access to the region may unleash a rush for natural resources that runs the risk of spiralling out of control and become unsustainable. To prevent this from happening new and innovative ways should be explored to bring legal and illegal exploitation areas within responsive and shared management.

In regard to hunting and logging in the area, already some positive results have been achieved in the recent past. In Cameroon communal hunting zones, *Zone d'Intérêt Cynégétique à Gestion Communautaire*, are managed by newly created local authorities that collect and reinvest slaughter taxes and lease fees, paid by professional hunting guides that accompany tourists. In Northern Congo one promising model is PROGREPP, by which WCS, CIB and the Congolese government are jointly responsible for the creation and implementation of an ecologically and socially sound management plan for the CIB concession areas adjoining the Nouable Ndoki National Park. Notwithstanding different social and political contexts in the three countries, positive experiences gained in some areas could very well be replicated in other parts of the TNS region. Tri-national meetings form an excellent platform to facilitate communication among project managers and concerned authorities and companies.

Despite the conflict sensitivity and destructiveness of diamond mining in the region, the issue is not well attended to in regional conservation planning. Mining and trading mainly take place around uncontrolled border areas and thus fall outside active management areas for conservation and logging. For the CAR, sensitization of Central African authorities has been placed on the agenda of the Tri-national Planning and Execution committee, but little progress has been made in really changing methods, legal frameworks and market structures. In Cameroon no action has been taken by any authority or organisation. The challenge in diamond mining areas in both of these countries is to bring the business within the rule of law in a way similar to timber exploitation, *i.e.* delimiting and allocating legal concessions, drawing up socially and environmentally responsible management plans, formally employing workers etc.

The ambivalent impact of cross-border economic interactions on people and their environment requires well-defined management strategies in each branch of economic activity. While many activities presently are informal or illegal, not all are harmful. On the contrary, petty trade, regional labour migration and some artisan mining are vital livelihood strategies for people that find themselves remote from economic centres of power, and can potentially be practiced in sustainable ways. Rather than limiting these activities, development and conservation planners have to develop strategies to support these and transform them into law abiding activities. On the other hand illegal practices, like commercial elephant poaching and the criminal practices surrounding diamond mining should be targeted and stemmed in a resolute manner. In such ways natural resource trade can help in compromising conservation and development.

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<sup>10</sup> *Communiqué conjoint sanctionnant les travaux du comité technique de suivi de la Tri-nationale*, Yokadouma, 20-21 May, 2005.

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# Survey of elephant movement and corridor issues in western Ghana and eastern Cote D' Ivoire.

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## Summary

The forests of western Ghana and eastern Cote d' Ivoire host a number of elephants and other important wildlife species. Forest elephants of West Africa have suffered a drastic decline in numbers. Their habitats have dwindled in size and have been fragmented, with subsequent isolation of populations, presenting a threat to the long term survival of the species in this part of Africa. The diminishing numbers of elephants has led to the adoption of a sub-regional and country specific elephant conservation strategy. The present study sought to determine the distribution and movement pattern of elephants, assess local attitude towards elephant conservation and corridor creation, and identify potential corridor areas in western Ghana and eastern Cote d'Ivoire. Two isolated populations of elephant exist in western Ghana; the Goaso and Bia population and there is no evidence of elephant movement between Ghana and Cote d' Ivoire, possibly because of the increased clearance of the forested areas for cash crop cultivation on the fringe of reserves inhabited by elephants in both countries. The vegetation along the Bia River through to the Songan Forestry Concession offers hope of an international corridor to link the Ghanaian and Ivorian population. In the planning and establishment of this corridor, however, there is a need to safeguard the livelihoods of human fringe communities who may feel that they are at the losing end of the bargain due to crop raiding incidences by elephants. Furthermore, there is a need to incorporate conservation plans into the regional development agenda and individual country national development plans to ensure their sustainability over time.

## Introduction

Western Ghana has several important forest reserves and wildlife conservation areas, for example Mpameso, Bia, Asukese, Bia Tano, Goa Shelterbelt, Bia North, Bia National Park and Bia Resource Reserve. These extend towards the borders of Cote d'Ivoire with three reserves, Songan, Diamakrou and Bossematie, abutting the border at the Ivorian side. Surrounded by a dense farming population, it is increasingly susceptible to encroachment. As habitats dwindle in size, the species of plants and animals which they support become increasingly vulnerable to extinction. Land cultivation for food crops encroaches into forested areas, with forests shrinking in size and wildlife migration routes becoming blocked. As a consequence, species such as elephants are forced into smaller areas. The increasing conversion of forest areas into farmlands impacts negatively on the population of many species, in particular the forest elephant, which has a very extensive home range. The long-term viability of the elephant populations in Western Ghana and in Eastern Cote d'Ivoire will depend on the ability to broaden the genetic base that will foster exchange of genetic material among neighbouring populations

The urgency of conserving the rapidly diminishing habitats of forest elephants set in motion a series of dialogues between conservation authorities in Ghana and Cote d'Ivoire in an effort to review the possibility of establishing and protecting adequate corridors to ensure migration of elephants between western Ghana and eastern Cote d'Ivoire. National level elephant conservation strategies developed by both countries all stressed the need to synchronise regional efforts for the conservation of elephants.

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Major objectives recognised that small populations have a higher risk of extinction and so it is essential to maintain and where possible, increase large elephant populations. In addition, a need to invest in habitat management, rehabilitation and protection of parks and reserves in order to improve habitats for elephants was identified.

Several proposals have been made with regard to the feasibility of elephant movement corridors between western Ghana and eastern Cote D'Ivoire. Notable among these proposals are the works by De Leede (1994) in Ghana; Versteegen (1993) in Cote D'Ivoire and subsequently work by Parren *et al*, (1999) in both countries.

De Leede (1994) recommended the habitat between the Bia Conservation Area and Classified Forest Songan (Cote d'Ivoire) along the Bia River as the only viable option for corridor development. At the time of this study, the human population pressure was less and there were small patches of forest left along the riverside (especially in Cote d'Ivoire). A possible connection with Dadieso Forest Reserve and Boin River Forest Reserve, where a small elephant population is believed to live (about 3 individuals) was also proposed. De Leede (1994) also observed that the cost of the creation of a corridor will be very high and a lot of effort will be needed. Versteegen, (1993), observed that the elephant population situation encountered in Cote d'Ivoire was worse than expected; only in three out of eight reserves forest elephants were found. Their numbers proved to be much lower than was to be expected from previous estimates. Instead of more than 200 elephants divided over seven different Classified Forests, the number estimated was less than 100 individuals. Apart from the elephants in the Classified Forest Bossematie, which represent about half of the remaining population, elephants are found in the remnants of degraded forest areas, such as Classified Forest Beki and Classified Forest Songan. The lands between the remaining forest reserves where potential corridors are proposed have 50% coverage by cocoa and coffee plantations. Based on population size, condition of the remaining forest, local people's attitude and the distances, the most suitable elephant populations to be connected according to Parren *et al*, (1999) are: A. The populations of the Bia area with the Bettie area along the Bia River, including the Boin River Forest Reserve populations. B. The populations of the Bia area with the Bettie area via Classified Forest Diambarakrou. C. The populations in Classified Forest Songan of the Bettie area with suitable habitat in Classified Forest Mabi.

The current study which was sponsored by British Petroleum Conservation Program in 2003 in partnership with Wildlife Conservation Society (WCS), Fauna and Flora International (FFI) and Conservation International (CI), describes the current status of forest elephants in Western Ghana and Eastern Cote d'Ivoire, based on field surveys and interviews with members of fringe communities in the proposed area. Based upon the results, potential corridor areas in terms of ecological and social suitability were identified. The overall aim was the assessment of feasible Transfrontier Corridors, which will expand current elephant range and lead to the protection of viable populations of this vanishing West African heritage.

## **Study Area**

The study was conducted in the Western Region of Ghana, specifically in Bia Conservation Area (BCA) and the Goaso complex of forest reserves namely; Mpameso, Bia shelterbelt, Bia Tano, Ayum, Subim, Bonsam Bepo, and Bonkoni (Fig 1). In eastern Cote d'Ivoire, efforts were concentrated in Classified Forest Songan and along the 25km long Bia River which flows into the Songan River in Songan.



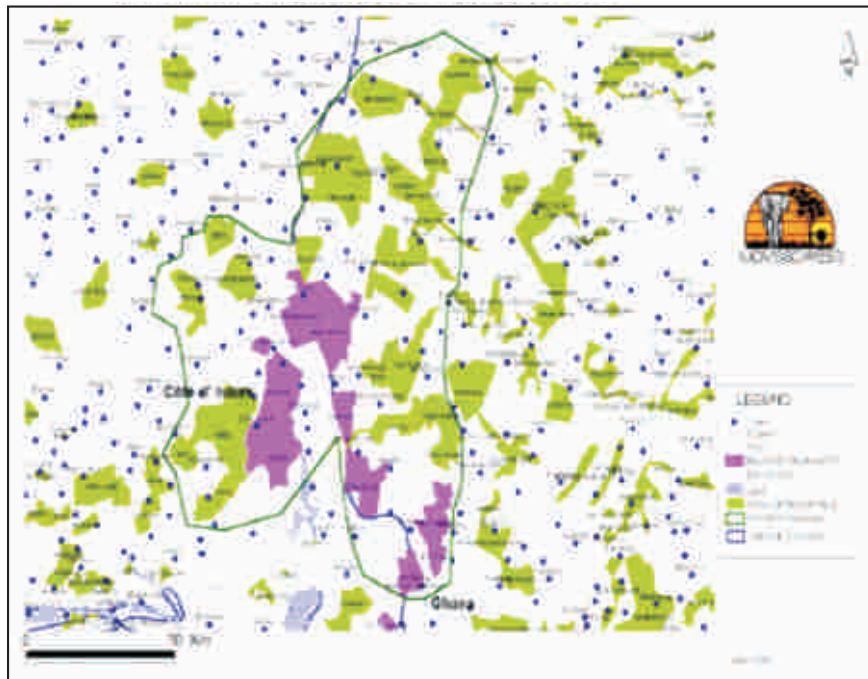


Fig 1 .Study areas in Ghana and Cote D' Ivoire. Green (lighter shade) for Ghana and Mauve (darker shade)for Cote D'Ivoire.  
Source: IUCN/SSC/AFESG. Action Plan for Transnational Corridor Report (2003).

## Climate

The mean annual temperature ranges between 24° 28°C, with the hottest period in March- April and August and December being the coolest months. The average annual rainfall ranges between 1400mm/annum in the northernmost forest reserves like Mpameso, Bia Shelterbelt and Asukese, and up to 1700mm/annum in the Bia Conservation Area (BCA) (Short, 1981). The maximum rainfall occurs from March to July and from October to November, separated by arid periods.

## Vegetation

The forests in South-Western Ghana are remnants of the Guinea-Congolian forest vegetation which covered the whole south-western region in former days. The reserves in the research area belong to the Moist Semi-deciduous, North-West vegetation zone (MSNW). More south-west wards, the vegetation changes to the Moist Evergreen (ME) and Wet Evergreen (WE) vegetation type. Bia Conservation Area falls in the Moist Evergreen vegetation zone (Hall and Swaine, 1981). The whole research area corresponds with Taylor's (1960) Celtis-Triplochiton Association. The upper canopy is discontinuous and consists of a mixture of deciduous and evergreen species, whilst the under storey is composed of evergreen, often gregarious, species (Hall and Swaine, 1981). Most characteristic commercial species of these forests are *Triplochiton scleroxylon*; *Entandophragma spp*; *Pericopsis elata*, *Khaya sp*, and *Chlorophora excelsa*.

## Methods

### Field Survey

Line transects techniques were used employing the dung-count method (Barnes, 1993). Dung-pile densities were considered a good measure of the occupancy of an area by elephants (Sam, 2000). Jachmann (1991) indicated that the elephant dung-piles seen on the ground reflects the accumulated occupancy over the preceding one or two months, while elephant counts are an instantaneous measure of occupancy. A reconnaissance survey which included trail walks and farmer interviews was carried out to have a fair idea of the distribution of elephants in the range. The communities were selected based on their proximity to the forest (2km radius), pre-existing information about elephant distribution, and probable elephant presence based upon information given by the Biodiversity Monitoring Unit (BMU) in Goaso and trail survey. After the reconnaissance, each reserve was stratified into blocks with low,

medium and high densities of elephants. Depending on the size of the reserve between 40-50 transects were systematically distributed (Buckland *et al.* 2001) in grids in the various proportional blocks.

### **Social Survey**

A standard questionnaire with open and close-ended questions was designed to:

- uncover the history of elephant occupation in the study sites: trend in numbers, movement patterns for pre and post independence times (1957-1981-2000),
- ascertain whether elephants were permanently resident or seasonal migrants, and if migrants: the seasons they appeared, and issues on human-elephant conflict;
- whether elephants damaged crops, which crops, how human-elephant conflict was controlled, as well as utilisation of elephants by humans.

Interviewing the communities also provided an opportunity to inform and educate local people about the concept of corridors for elephants. Interviewees in each fringe community were selected based on proximity of their farms to the study area and the incidence of crop raiding activities.

### **Land Use Assessment**

LandSat 7 TM images for 1990 and 2000 for the elephant range in Ghana were acquired and intensively analysed to identify landscape modifications and to assess critical areas for feasible wildlife corridors and areas of human encroachment or disturbances. During the field survey, GPS co-ordinates of some land-use forms were taken and these served as Ground Control Points (GCPs) during the processing of the images. Changes in forest cover over the 10 year period (1990-2000) for the individual forest reserves as well as 5km buffer of each reserve were determined. The team could not acquire similar images of study areas in neighbouring Cote D'Ivoire, hence field survey in these areas were very comprehensive and extensive. The survey trail extended from an area around the confluence of Bia and the Songan River, approximately 5km from Bianouanon, right up to the border on the Ghanaian side.

## **Results and Discussions**

### **Elephant Distribution and Movement Pattern**

Elephants in the region were found to live in fragmented habitats; three separate elephant populations were identified: the Goaso, Bia and the Ivorian population. In the Goaso cluster of forests, elephants were found to be confined to the south western part of the Mpameso forest reserve (see Fig. 2). Elephant activity was traced from the Bia Shelterbelt to the Bia Tano forest, an indication of occasional movement of elephants in these areas. Scientists have suggested a large elephant population for the Goaso complex (Dickson 1991; Parren *et al.*, 1999, Sam 2000; African Elephant Database 2000). The current study observed that elephant numbers are far less than suggested. An attempt to determine the numbers of elephants using dung counts in the Goaso Cluster of forests proved unsuccessful as the team could only come up with less than forty (40) dung counts, far below the minimum needed to give an estimate of numbers. In all the other forest reserves in the range surveyed, there was no sign of elephant presence except for old elephant bones in Ayum forest reserve, believed to be a relic of the Wildlife Elephant Control Programme in the range, some years back. In the Bia range, elephants were found to be confined to the southern part of the conservation area. A relatively high density of elephant indices were found in the BCA, compared to that found in the Goaso range of forest reserves, On the Ivorian side of the study area, elephants were found to be distributed in the north eastern portion of the Classified Forest Songan, the Classified Forest Bossematie and the eastern part of Classified Forest Beki.

The team did not find evidence of elephants in Bonkoni Forest Reserve, Ayum Forest Reserve, and Subin Forest Reserve as reported by Parren (2002). However, some local people in Asumura reported seeing an elephant about 4 years ago. At the time of the survey, heavy felling activity was ongoing in the Ayum Forest Reserve. Surveys conducted in Krokosua Forest Reserve showed that elephants had not been seen in the area for more than 10 years. On the Ivorian side, the elephant population was not as promising, agreeing with the observations expressed by Versteegen (1994). Reports from a 10 years monitoring programme implemented by SODEFOR, recorded only two groups of elephants in the Songan Classified Forest; one group had 10 individuals and the other just two elephants. The team



observed evidence of elephants at the confluence where the Bia River joins the Songan river close to Bianouanon, a fringe community of Songan Classified Forest. Following the 25km long river from the confluence right up to the point where it enters into Ghanaian territory (Fig. 2), the team did not find any signs of elephants which might have used this riparian area for migration. Ground surveys and interviews with farmers and households close to the reserves on the Ivorian side, showed that, elephants had never used the proposed 25km long riparian vegetation from the confluence of the Songan river as passage into Ghana, at least not over the past decade.

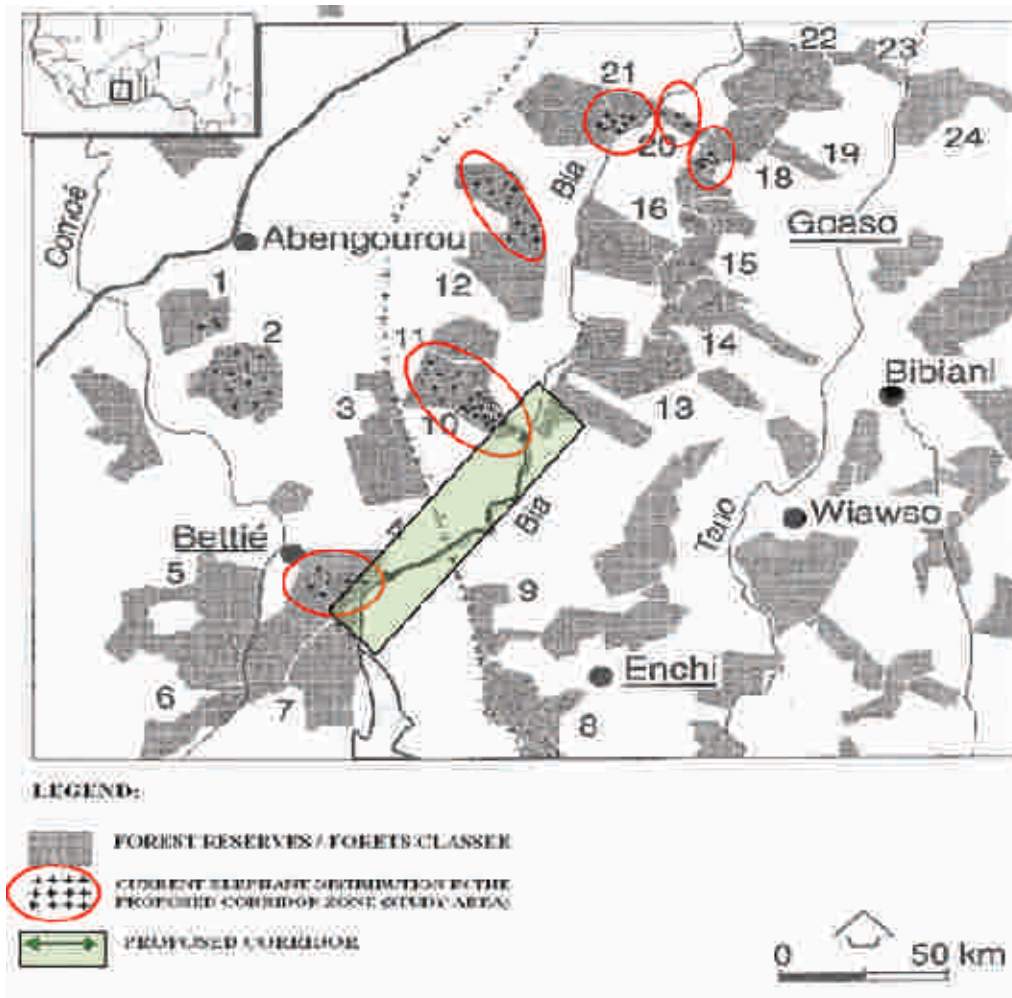


Fig 2. Current elephant distribution and potential international corridor

From the interviews with local community members it became apparent that there has been a decrease in the extent of the forest cover, especially during the past few decades (80% of respondents). About 87.5% of respondents were farmers, giving an indication that farming is the major land use activity in the area. Most respondents (93.9%) were not aware of what an elephant movement corridor is. A large proportion of respondents (84%) of people living in the fringes of forest reserves in Goaso as well as fringe communities of BCA, complained about problems living in close contact with the elephants, with crop raiding being the most prevalent complaint; 79.2% of interviewees complained of elephants raiding their farms more than once. Although local community members unanimously (95.6%) declared experiencing difficulties living in these areas, because of the absence of basic social amenities, a majority of them (61.2%) said they would not relocate, even if compensated.

#### Assessment of Vegetation Cover Over a Decade (1990- 2000)

For the Goaso complex, between 1990 and 2000, the forest cover within the forest blocks had decreased by 4.53%. Forest loss was estimated to be 326.23 ha per annum. The size of degraded or open areas saw an increase of 18.95% (Fig 3 & 4).

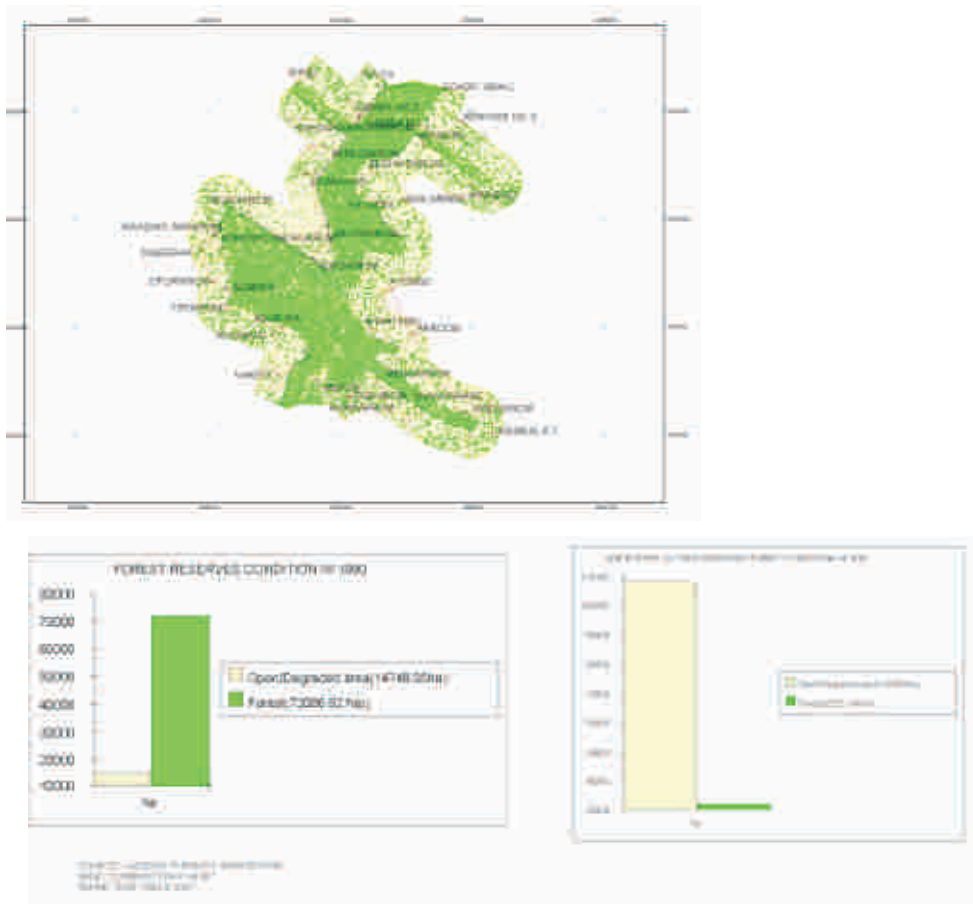


Fig 3. Condition of Goaso range of Forest Reserves analysed for 1990

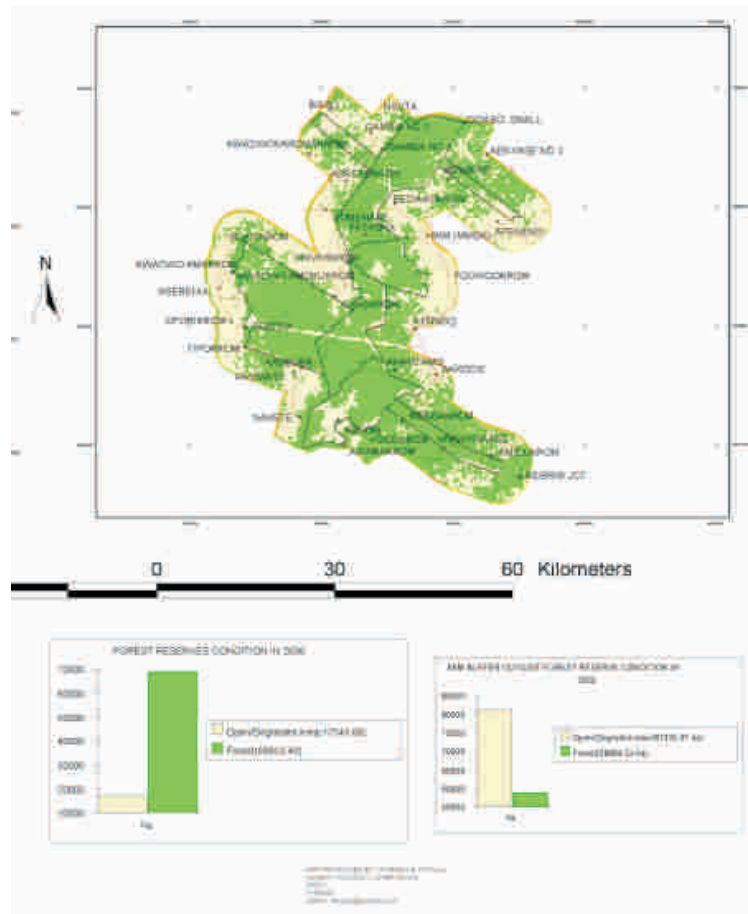


Fig 4. Condition of Goaso range of forest reserves analysed for 2000

The increase in open area in the reserve is due to small scale (illegal) logging and encroachment by farmers in the forest reserve. In a 5 km radius of the forest reserves, there was an 82.96% increase in the non-forest vegetation cover, mainly large scale cocoa and coffee plantations, and mainly in the southern parts of the Goaso forest complex. The situation for the Bia Conservation Area was no different from that in the Goaso Cluster of Forests (Fig 5). Although only data for vegetation cover within the forest reserve was available for analysis, what was observed was not different from the condition described by Sam (2000): an ecological island surrounded by a sea of cocoa farms. It was observed that between 1990 and 2000, the forest area decreased by 15.11% with annual loss of forests estimated at 275 ha per annum. Large scale logging in the southern portion of the BCA, which was then a Resource Reserve, saw the area of closed forest converted to open forest increase from 14008 ha in 1990 to 17286 ha in 2000, an increment of by 23.41%.

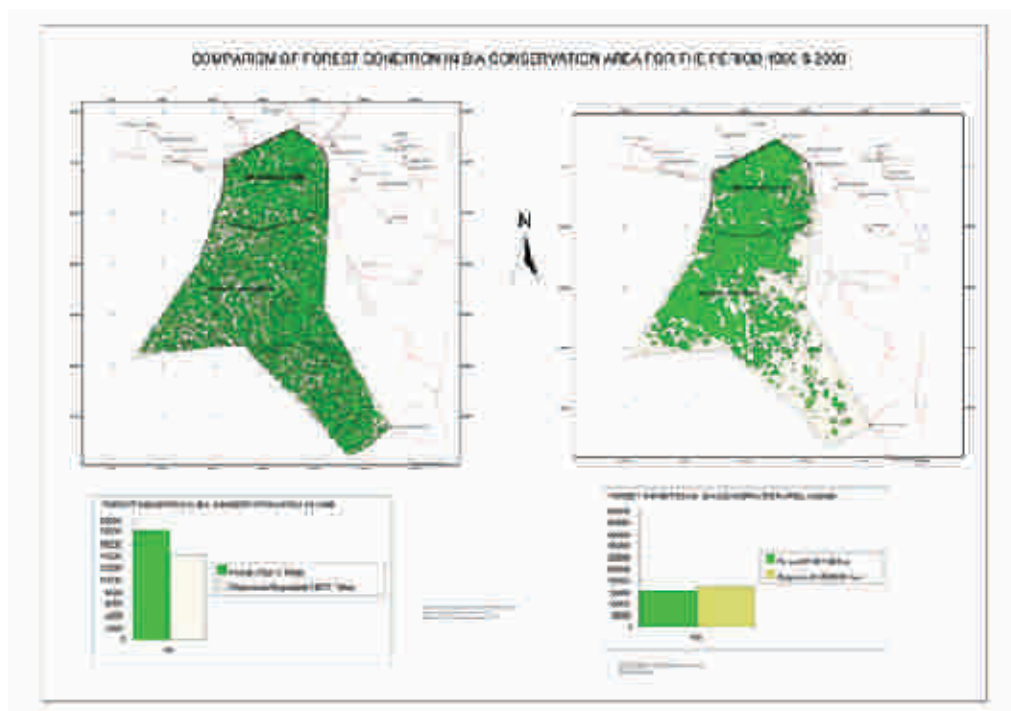


Figure 5: Condition of Bia Conservation Area analysed for 1990 and 2000

### Feasibility of Proposed Transboundary Corridors

In line with the findings of the present study, the only corridor that would be viable, having a large impact on elephant populations and little negative impacts on human fringe communities, is the Bia River Corridor (Fig 2). Present estimates of settlements along the Bia River on both sides of the border shows an increase in human population, with increased developmental activities. Bianouanon (in Côte d'Ivoire), which lies approximately 10 km from the Bia Songan Confluence, will pose a challenge to the whole corridor project. Several development projects along the proposed corridor path, such as bridges and access roads, show that although plans were far advanced for the establishment of an elephant corridor, neither of the two governments took the proposed corridor into account in regional infrastructure planning. According to information gathered in the two countries, the corridor project will be unsuccessful and technical and donor financial support wasted, if governments of both countries do not incorporate the intended plans for the corridor into their regional planning policies. With regard to the Diambarakrou Corridor, the present declassified status and drastic degradation of the Forest Reserve and surrounding lands does not provide a good opportunity for corridor establishment between Classified Forest Songan and Bia GPR.

## Conclusions

Continuous land conversion from forest to cocoa and coffee plantations and illegal logging and hunting activities in elephant ranges in both Ghana and Cote D'Ivoire have led to a drastic decline in the number of elephants. The decline in numbers, destruction of the habitat and the consequent isolation of elephant populations, does not provide a promising scenario for the survival of the species in these countries. Local community members clearly acknowledge the decline in elephant numbers in the area and embrace the idea of elephant conservation. To most settlers, land is a precious legacy which would be difficult to sacrifice for the sake of conservation. People further expressed fears that they might not be compensated after they have been evicted from the land if a reserve is established, as has occurred in other areas. Although there has been an increase in human and development activities in the area between Western Ghana and eastern Cote D'Ivoire, the present study indicates that the area around the BCA still offers a possibility for the establishment of an international corridor to facilitate the movement of elephants.

## Recommendations

There is an urgent need for intensification of elephant conservation activities in Western Ghana and Eastern Cote D'Ivoire. However, the option of resettlement and compensation need to be critically looked all, with a comprehensive environmental impact assessment does not seem an agreeable option to the local populations in the proposed corridor zone. Establishing the corridor would give rise to socio-economic problems which could impact negatively on the lives of people in the area. Any effort to resettle the people should involve a comprehensive negotiation program and collaborative strategy so as to ensure its success. There is a need for Ghana and Cote D'Ivoire to harmonise new infrastructure development and land use plans in order to avoid a situation where one or both of the countries undertake activities that disrupt plans to create an elephant migratory corridor. The lack of awareness about the corridor project, suggests that a sensitization program should be the first line of action to ensure collaboration from local populations. Success of the program can only be assured if local people understand its importance and are convinced that they will be compensated for loss of access to the areas concerned and possible damage from elephant populations to their crops. As the area presents high agrarian economies, both governments need to be prepared for the negative impact, the loss of agricultural areas, may pose. Clearly, these areas are major cocoa and coffee production areas, important cash crops to the economies of both countries.

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# Fisheries cooperation in the West Central Gulf of Guinea (Liberia, Cote D'Ivoire, Ghana, Togo, Benin and Nigeria)

*Séraphin Dedi Nadje<sup>1</sup>, and Jessica Hjerpe Olausson<sup>2</sup>*

## Summary

Marine fish stocks are transboundary by nature and their management requires multinational cooperation. The countries in the West Central Gulf of Guinea area are conscious of the need for cooperation in the management of their fisheries resources and recently established a committee; Fishery Committee for the West Central Gulf of Guinea (FCWC), to facilitate cooperation in fisheries management. The FCWC is the third committee within the zone covered by the Fishery Committee for the Eastern Central Atlantic (CECAF), after the Regional Fishery Committee for the Gulf of Guinea (COREP) in the south and the Subregional Fisheries Commission (SRFC) in the north. The Committee collaborates with FAO through CECAF, which provides technical as well as financial support. The World Bank initially provided financial support to the Committee and the Swedish International Development cooperation Agency (SIDA) intends to offer additional financial assistance for the Committee's effort in managing fisheries resources in its zone. The Committee aims at contributing to the improvement of governance through increased cooperation between the member countries. This includes, among others, improving sub-regional cooperation and ensuring sustainable fisheries management. Some of the expected synergistic benefits are exchange of knowledge and information, capacity building, collaboration in monitoring, control and surveillance (MCS) and combating illegal, unregulated and unreported (IUU) fishing.

## 1. Introduction

Marine fish stocks are transboundary by nature and their management requires multinational cooperation. Multilateral fisheries management bodies are in place in many parts of the world to facilitate management of shared fish stocks and this is also true for West Africa. The Food and Agriculture Organization of the United Nations (FAO) established the Fishery Committee for the Eastern Central Atlantic (CECAF)<sup>3</sup> in 1967 for the African coastal countries from Morocco to Congo. Three sub-regional bodies were subsequently established in the region: Sub-regional Fisheries Commission (SRFC)<sup>4</sup>; Fishery Committee for the West Central Gulf of Guinea (FCWC)<sup>5</sup> (see figure 1); Regional Fishery Committee for the Gulf of Guinea (COREP)<sup>6</sup>.

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<sup>3</sup> Morocco, Mauritania, Senegal, Gambia, Cap Verde, Guinea, Guinea Bissau and Sierra Leone, Liberia, Côte d'Ivoire, Ghana, Togo, Benin, Nigeria, Cameroon, Congo (Democratic Republic of), Congo (Republic of) Equatorial Guinea, Gabon, Sao Tome and Principe, Japan, Cuba, European Community, France, Korea, Netherlands, Norway, Poland, Romania, Spain and the USA.

<sup>4</sup> Mauritania, Senegal, Gambia, Cap Verde, Guinea, Guinea Bissau and Sierra Leone.

<sup>5</sup> Liberia, Ivory Coast, Ghana, Togo, Benin and Nigeria.

<sup>6</sup> Cameroon, Congo (Democratic Republic of), Congo (Republic of) Gabon, Sao Tome and Principe.

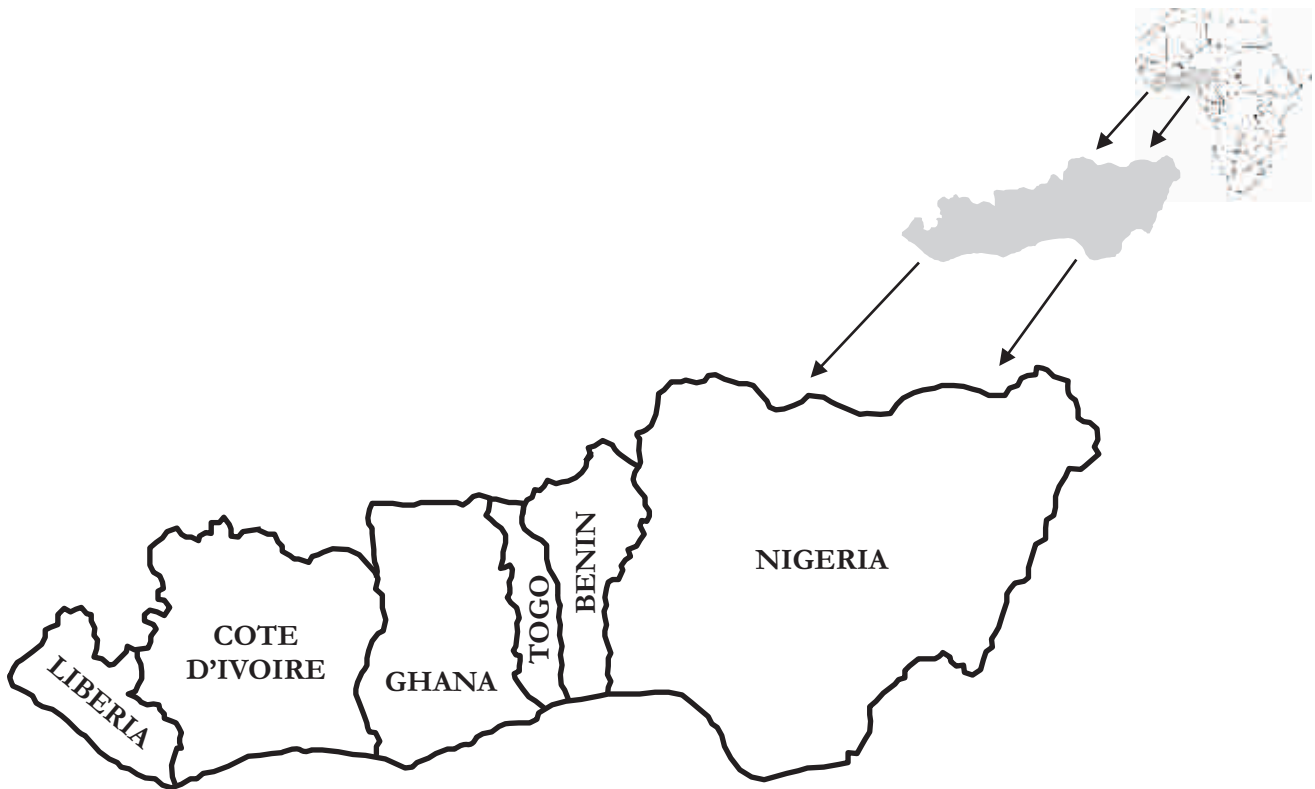


Figure 1: Map of Africa showing member countries of the Fishery Committee for the West Central Gulf of Guinea (FCWC).

The over-exploitation of fisheries resources and lack of national administrative capacity to manage the resources in a sustainable way are major problems in the Central Gulf of Guinea sub-region. The shared fisheries resources and catches are influenced by insufficiently harmonized national policies. Sub-regional cooperation is therefore a precondition for sound fisheries management and essential to avoid conflicts stemming from limited and migrating fish resources as well as from illegal, unregulated and unreported (IUU) fishing.

## 2. The state of the natural resource

The waters of the Eastern Central Atlantic, in particular the northern shelf areas from Morocco to Guinea are among the richest in the world with very high annual catches. Apart from substantial local fisheries, these resources have attracted large fleets of fishing vessels from Europe and Asia, often fishing for tuna species. The waters of the West Central Gulf of Guinea are not as productive as its neighbouring waters but in contrast these countries have the highest human population densities in the region. Hence these countries are net importers of fish and fish products and rely on catches from their neighbours.

The fisheries resources mainly exploited are large pelagic species as tuna, small pelagics such as sardinellas, anchovy, chub mackerel and bonga and demersals as for example *Pagellus spp.*, snapper, seabream, grouper, cassava fish, sole, shrimp and cuttlefish. Several of the species (for example sardinella, anchovy, seabream and shrimp) are fully- or overexploited, which makes the sustainability of livelihoods critical in the sub-region. Many of the important stocks, especially those of the highly productive pelagic species migrate up and down the coast, and therefore are shared by several countries in the region. Over the last decade, however, fish resources have been declining due to direct or underlying factors such as fishing by foreign fleets, domestic overcapacity, weak management of the fish stocks, lack of technical and scientific capacity, poor stakeholder participation and IUU fishing. In addition, there is a degradation of habitats and water quality in some areas. The socio-economic consequences of reduced fish catches due to these factors are severe and include increased poverty, food insecurity, health problems, less government revenue and increased conflicts within the fisheries sector.

### 3. Socio-economic aspects

Marine and freshwater fisheries are the primary sources of livelihoods for more than 5 million people in West- and Central Africa and provide for between 30 and 60% of the protein intake in the region. Various national studies carried out within the FAO executed Sustainable Fisheries Livelihoods Programme (SFLP), show that the fisheries sector typically contributes between 3 and 5% of the national GDP, and up to 23% of the primary sector GDP in some countries (SFLP.2007). The large scale or industrial sector is a significant contributor to national revenue in some countries. It is, however, not the most important employer or the most important supplier of fish to national and regional markets. Instead it is the artisanal (traditional & small-scale, often with wooden canoes) fisheries which fulfils these needs. However, investments in fishing equipment are expensive and at a high risk, often leaving many people in debt.

Fish products are an important source of affordable animal protein and micronutrients. The seasonality of the fisheries in this region makes different types of preservation very important, such as drying and smoking, which are conducted by women (figure 2). Women often play a key part in industries and economies and that is also the case in fisheries. Despite this role, women are the poorest group in the region alongside children.



Photo: Courtesy of Jessica Hjerpe Olausson

Figure 2: Woman salting fish

The major problem for marine small scale fishermen, traders, processors and fishery dependant communities in the region is the over-exploitation of fisheries resources and the lack of national administrative capacity to manage the resources in a sustainable way. In addition, fisher communities constitute one of the highest risk groups for HIV/AIDS due to their high degree of mobility. This is a severe threat to the communities, the profession and thus to food security.

#### 4. The management situation today

The fisheries administrations in the countries of the West Central Gulf of Guinea lack adequate financial, material and human resources to undertake their fisheries resources management task efficiently and effectively. Shortage of staff and regulatory structures weaken law enforcement in some of the countries, especially those coming out of conflict as for example the situation in Liberia with the civil war.

In all the FCWC member countries, except Ghana where there is a Ministry of Fisheries, fisheries administration is within the Ministry of Agriculture. The legislation and fisheries management situation is similar in these countries, but many of them are yet to establish regulatory frameworks to enforce fisheries laws and implement the principles of the FAO Code of Conduct for Responsible Fisheries (FAO1995).

The fisheries in the sub-region are characterized by open access. Management is limited to mesh size regulations (which are not always complied with), licensing of industrial vessels only, zonation of fishing grounds for industrial and artisanal units (often violated) and surveillance, the latter generally limited to port inspection due to lack of suitable vessels to carry out inspections at sea. Thus, in practice, there is no limitation to the quantity of fish caught or landed. In addition, there is no licensing system in place for the artisanal fisheries. The adverse effects are further compounded by IUU fishing activities in the sub-region.

Governance of fisheries includes several aspects such as socio-economic, natural and human (Table 1). Many of the problems are common to all the member countries, so solving them requires a joint effort in exchanging knowledge and information, improving management tools, improving MCS and combating IUU fishing. The results of the recently initiated subregional cooperation will hopefully improve the state of the fisheries resources in all the six countries.

Assets	Definition	Example of problems
Financial	The capital base; cash, credit/debt, savings, access to micro credit.	Debts, no access to micro credit.
Natural	Natural resources, e.g. fish stocks, oceans/beaches and freshwater.	Dwindling fish stocks, pollution.
Social	Networks, social claims, relations, affiliations, associations.	Absent parents (migration), no formal cooperation between fisher folks.
Human	Skills, knowledge, labour, good health, physical capability.	HIV/AIDS and other health related issues, illiteracy, etc.
Physical	Access to landing sites, cold rooms and other infrastructure.	No access to infrastructure such as cold storage, transport, market, etc.

Table 1: Table showing the assets of a fishing community in the sub-region (according to a livelihoods approach), a short definition of these assets and some examples of problems encountered. (Krantz, Lasse 2001)

#### 5. Establishing a Fishery Committee

At the sixth meeting of The Ministerial Conference on Fisheries Cooperation among African States bordering the Atlantic Ocean (ATLAFCO) in 2005, a request was made to FAO for an assessment of the possibilities to establish a sub-regional fisheries committee in the West Central Gulf of Guinea. Pursuant to this request, FAO conducted a feasibility study in March 2006. The result was reviewed in April 2006



by Directors of Fisheries of the six countries concerned and they agreed to establish a sub-regional fisheries committee, which is known as the Fishery Committee for the West Central Gulf of Guinea (FCWC).

In July 2006, a Ministerial Meeting held in Abidjan, Côte d'Ivoire issued a declaration to endorse the establishment of the Committee and approve the hosting of the Secretariat in Tema, Ghana. It was agreed that the FCWC will be a fisheries management advisory body to the countries with no regulatory powers. The Committee will apply the principles of the FAO Code of Conduct for Responsible Fisheries.

A first Ministerial Conference held in Cotonou, Benin in November 2007 approved the Convention for the Establishment of the Fishery Committee and the Rules of Procedure. The 2007/2008 Work plan and budget was also adopted at the Conference. The budget includes expected contributions from the member countries, FAO, more specifically from the FishCode STF-project (Status and Trends of Capture Fisheries) as well as from the Swedish International Development co-operation Agency, SIDA.

## **6. Contribution of the FCWC in the conservation and management of fisheries resources**

Initially, the FCWC will focus on the natural assets and on governance issues. The Committee would like to contribute to improved governance through increased cooperation between the member states in managing fisheries resources within national jurisdiction. This includes improving sub-regional cooperation and ensuring sustainable fisheries management. The close links with FAO through CECAF and funding from the FAO FishCode STF-project provide an opportunity to work on harmonizing fisheries data collection (CECAF report 2006). Assessments of sub-regional stocks will be useful in improving data quality and information required for resource management recommendations. The Committee, in collaboration with the Fish Code STF-project, consulted fisheries technicians in the sub-region and recommended the creation of a working group on improving fisheries information collection systems. This activity will be supported in the respective member countries by the FAO FishCode STF-project.

The Committee intends to work on harmonizing fisheries legislation in the sub-region and strengthening monitoring, control and surveillance (MCS). The latter will entail an agreement on minimum terms and conditions, establishing and exchanging a list of registered and authorized vessels in each country, establishing a sub-regional register for good standing vessels (i.e. vessels that are following laws and regulations), initiating studies on a sub-regional Vessel Monitoring System (VMS), and sharing knowledge through publicising reports on common issues.

Furthermore, the Committee will encourage exchange of experiences amongst the Fisheries Administrations in the sub-region and create a forum for scientists and managers to address fisheries management problems. Best practices will be catalogued as a basis for reviewing fisheries management policies and methods and proposing appropriate adjustments.

## **7. Linkages**

To be able to obtain the objectives mentioned above and to have a sustainable, long term impact, it is imperative that the FCWC works closely with other organisations and projects in the area. Synergies are expected to be reached through complementary activities undertaken by FAO's TrainFish and FishCode projects, the UNIDO/GEF Guinea Current Large Marine Ecosystem Project in the region and other relevant programmes/projects. FAO has also recently started the implementation of the Ecosystems Approach to Management (EAF) in the region of West Africa, and this is something that should also be part of the Committee's work.



The World Bank was involved in the setting up of the legal basis for the establishment of the FCWC and the FCWC is hoping to benefit from the support of the World Bank (Profish program) also in the future. The New Partnership for Africa's Development (NEPAD), the Economic Community of West African States (ECOWAS) and the West African Economic and Monetary Union (UEMOA) have fisheries development programmes that would require FCWC collaboration and the Committee will work closely with them in implementing their fisheries programmes.

The Committee is open to developing partnerships with other sub-regional or regional organizations and will encourage universities and NGOs to participate in and contribute to its activities when appropriate.

## **8. Discussion and conclusion**

After a long dialogue on fisheries cooperation framework in the West Central Gulf of Guinea, the establishment of the FCWC was warmly welcomed. The success of the Committee will, however, depend on the determination and willingness of the member countries to collaborate and the availability of financial and human resources. Working with other programmes and organizations in the sub-region, as well as in the West Africa region, will further enhance synergy and sustainability of efforts. Effective conservation and management of fisheries resources will require activities that are sustainable in the long term.

The Committee will have to avoid the common error of existing organizations which often offer one off and “last minute” support to fisheries administrations on improving governance, at the expense of socio-economic issues and knowledge of fisheries stocks. When such governance approaches give unsatisfactory results, the fisheries resources dwindle and poverty increases among the fisheries sector stakeholders.

In addition to avoiding such “last minute governance”, the challenge for the FCWC will be to integrate old and new initiatives at the level of the individual (researchers), specialized structures (universities and research institutes), and development programmes and organizations to its activities in the sub-region, all to ensure comprehensive and sustainable solutions for the fisheries sector.

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## COUNTRY FOCUS: Sudan

*Salwa Mansour Abdel Hameed gives an interview to Nature & Faune*

Sudan is the largest country on the African continent with a land area of about 2,376,001 sq km and a total area of 2,505,810 sq km. This enormous country has the largest freshwater wetland in Africa, located in the south. The Red Sea also washes about 800 km of its eastern coast. The country is crossed from north to south by the Nile, with all its huge tributaries partly or completely within its boundaries. These attributes are a great foundation for a teeming wildlife. Nature and wildlife seem to have met in Sudan.

In order to better understand this country's rich rangelands and wildlife, Nature & Faune interviewed Dr Salwa Mansour Abdel Hameed, Associate Professor, Director, Wildlife Research Centre, Ministry of Science & Technology, Omdurman, Sudan.



*Salwa Mansour Abdel Hameed, PhD*

**Nature & Faune:** The world greeted with much joy the fantastic news from Wildlife Conservation Society (WCS) in their June 12, 2007 press conference on the animal migrations in Sudan. Dr. J. Michael Fay of WCS expressed his feelings as “I have never seen wildlife in such numbers...” and “This could represent the biggest migration of large mammals on Earth.” Tell us more about this rather striking phenomenon! Is it the result of a deliberate national policy or a random occurrence?

**Salwa Mansour Abdel Hameed:** We in Sudan think that the huge animal migration observed by WCS officials is a return back home movement from safe havens where these animals took refuge from mines and fire arms during the 21 years of armed conflict experienced by the country.

Southern Sudan is home to a teeming number and variety of plants and animals, including endemic ungulates, birds and reptiles, distributed in its seven ecological zones (bush land, woodland, shrub land, bush grass land, wooded grass

land, dwarf shrubs grass land and swamps)(Hillman 1985). Moreover, Southern Sudan has an extensive system of National Parks and Game Reserves dating back to the 1930s.

During the long period of the armed conflict in the country, wildlife disappeared and it was impossible to keep track of them in the country as the civil war raged on in Southern Sudan. The huge return of the animals to their natural habitat is a happy phenomenon which gives us great joy!

However, the current poor state of the region after the armed conflict poses a real challenge for future progress in wildlife management. Protected Areas are unguarded, a great number of unlawful people are still carrying fire arms around in the region, and administrative and national parks infrastructure have collapsed, creating an unfavourable situation for sustainable wildlife management (Wani, 2007)..

**Nature & Faune:** What is the importance of wildlife resources in the economy of Sudan?

**Salwa Mansour Abdel Hameed:** In assessing the economic value of Wildlife in Sudan, we deal only with money directly collected from the Administration's activities, such as selling of hunting licenses, sale of wild animals, export fees of live wild animals and wild animal products, fees for raising wildlife in captivity and income from entry fees to Natural Parks. There are about 31 Game Farms and investment in these attractions started in 1992. It is, however, an unsuccessful practice.

Such monetary values fail to account for benefits derived from tribal hunting and tourist expenditures are not also accounted for. For many centuries, ivory, ostrich feather and reptilian skins (pythons, snakes, crocodiles, monitor lizards, turtles, wild cats) have been the most important items in Sudan exports. Also the trade activities on live animals such as dorcas gazelles (*Gazella dorcas*), monkeys, ostrich, parrot, love birds, tufted guinea fowl, eagles and other birds had increased during the 1980s and 1990s. Trade is almost attributed to dorcas gazelle, it contributes 50% of the wild animals export.

A total of 36 countries in three continents (Europe, Asia and North America) imported wild animals and their products from Sudan. The percentage of the economy that is derived directly from wildlife is very minimal, but revenue accruing indirectly from ecotourism and sport hunting is around 14% (Ministry of Tourism and Wildlife).

Eco-tourism as economic investment is not of great economic benefit, e.g. the number of tourists in 2001 was 5000, and it increased to 117,743 in 2005. The revenue increased from USD 60,400,000 in 2001 to USD 146, 234, 200 in 2005. The revenue from tourists that visited Dinder National Park in 2006 increased from previous years to US.D 472, 450 (excluding secondary economic returns from hotels, food, equipment and transportation, meat, trophies etc). Many tourists from Europe and Asia came for Hunting Sports; they hunt in particular dorcas gazelles, ducks, goose and bustards. The number of licences had increased throughout the years since 1995 and the revenue increased from US.D 76,456 in 1995 to US.D 124,343 in 1998. Organized hunting is flourishing once more, after the 3 year (1995-1998) ban on hunting was lifted.

**Nature & Faune:** What are the current Wildlife initiatives in the country? Is Sudan planning any groundbreaking programme?

**Salwa Mansour Abdel Hameed:** After the establishment of the Ministry of Wildlife and Tourism, there has been many initiatives for investment in the area of eco-tourism. There is also an IFAD Project, initiated in 2007, for Land Use Planning and Development of Natural Resources, which is assessing wildlife and other natural resources in Kordofan State/ Western Sudan

The policy and legal framework within which the Wildlife Administration is currently operating are: The Wild Animal Ordinance and Regulations (1935) and the National Parks, Sanctuaries and Reserves Regulation (1939). These were great legal instruments at the time, but have become ineffective in recent times.. Although they were amended in 1982, they are still not very relevant to present wildlife issues in Sudan.

A new wildlife law is being drafted and decision makers and wildlife practitioners alike are hopeful that it will be innovative and pragmatic in addressing current and emerging issues in the sector. The drafting of this prospective law under the auspices of the Federal Government began after the Peace Agreement, the adoption of which is the first priority in wildlife conservation efforts in Sudan. Furthermore, the "Strategies for Management of Natural Resources and the Environment" is undergoing review for imminent adoption. This is certainly a novelty in the Wildlife sector and it is generating much fervour in the sector.

It is pertinent to mention that the overarching National Environmental Management Policy provides the framework that guides environmental and natural resource management and reflects the country's commitment to social and economic development that are environmentally sustainable, bringing longterm benefits to all Sudanese citizens.

**Nature & Faune:** What are Sudan's experiences on Conservation of wildlife across national territorial boundaries? Does Sudan have Cross-Border Parks? What is Sudan planning in this sector?

**Salwa Mansour Abdel Hameed:** Sudan has bilateral wildlife protection agreement with Ethiopia, Republic of Central Africa, Chad, Kenya and Uganda. Specifically, Nimule National Park shares boundary with Uganda, while the proposed Imatong Mountain National Park is at the Sudan/Kenya border. Several initiatives are being developed, such as Wadi Allalagi Protected Area along Sudan/Egypt frontier, which is a proposed Biosphere Reserve. The UNESCO Man and Biosphere programme is starting preliminary surveys under the auspices of its Cairo Office.

**Nature & Faune:** Your country will be hosting the African Forestry and Wildlife Commission (AFWC) and the Near East Forestry Commission (NEFC) simultaneously in February 2008. This joint meeting is the very first in the history of the two statutory bodies of the Food and Agriculture Organisation of the United Nations! Why is Sudan the right choice for this unique gathering of forestry and wildlife practitioners from Africa and the Near East?

**Salwa Mansour Abdel Hameed:** You may recall that Sudan is widely regarded as a bridge between the African and Near East civilizations. Moreover, Sudan had once successfully hosted a meeting of the Near East Forestry Commission, even though this is the first time it is hosting the African Forestry and Wildlife Commission. Sudan has a unique status of being a member of both Commissions and that qualifies it as the appropriate venue for the maiden joint meeting. We are cognizant of the social and economic dividends the joint meeting will yield to our nation. Besides, it is desirable and laudable that the two Commissions have the rare opportunity of coming together to share knowledge and experiences and jointly seek the way forward in enhancing the sustainable management of their respective region's renewable natural resources.

**Nature & Faune:** It is our understanding that the Working Party on Wildlife and Protected Areas will be in session at the same period and venue. What is the mandate of the Working Party on Wildlife and Protected Areas? What do you think are the key wildlife issues in Africa that should merit the attention of this meeting?

**Salwa Mansour Abdel Hameed:** The Working Party on Wildlife and Protected Areas (WPWPA) is one of those 'subsidiary bodies', which evolved out of the ad hoc Working Party on Wildlife Management established in early 1960s and subsequent Working Party on Wildlife Management and National Parks. Initially the Working Party was established to draft the African Convention on Wildlife Conservation, nowadays its mandate is to address emerging issues and respond to the continuous internal reflection, monitoring and strategic evaluation of its role in wildlife management in Africa.

As developing nations, Sudan and many other countries in Africa with fragile economies face the challenge of balancing the desire to invest funds and efforts directly in wildlife resources management and the need to spend our funds in food security, livelihood improvement and poverty alleviation for our citizens. Fortunately, the objective of conservation of wildlife and that of achieving food security are not an either/or situation - we do not have to choose between developing protected areas and feeding our citizens. Both are linked! For example food security is linked to key wildlife issues such as bushmeat, Human-Wildlife Conflicts, wildlife rearing and ranching/farming, valuation through sustainable use and proper distribution of benefits from wildlife industries such as ecotourism, trophy hunting, etc.

**Nature & Faune:** As the Head of the Wildlife Research Centre within the Ministry of Science & Technology, what aspect of Sudan's forest ecosystem and wildlife resources would you want to particularly highlight in this edition of Nature & Faune? What in particular would you want to show-case to your guests during the joint AFWC/NEFC meeting in February 2008?



**Salwa Mansour Abdel Hameed:** Sudan's National Comprehensive Strategy devotes considerable attention to biodiversity conservation and encourages the private sector to invest in the conservation of natural resources. Under the strategy additional protected areas have been established, efforts are being made to increase level of local community awareness in conservation matters, as well as strengthening cooperation with neighboring countries in the field of wildlife conservation. Sudan takes pride in the fact that we have at present 10 national parks, 14 games reserves and 3 sanctuaries representing the major habitat types. I will also want to draw attention to the current strategy for management of Dinder National Park (DNP). The implementation of the strategy in the running of DNP effective 2002 has resulted into significant accomplishment.

Generally speaking management of most African Protected Areas, whether Biosphere Reserves or not, need to address the issue of involving the local communities in development of natural resources. Moreover it must encourage the use of research findings in augmenting the development of overall strategy for sustainable use of natural resources, biodiversity conservation and land use, depending on the situation of the specific Protected Area.



**Wildbeest Migration**

**Photo:** Wolfgang Braustein. Courtesy of Bushbuck Adventures, Website: [www.bushbuckadventures.com](http://www.bushbuckadventures.com)



### Central African World Heritage Forest Initiative (CAWHFI)

The Central African World Heritage Forest Initiative (CAWHFI) offers an innovative alliance between national authorities of Cameroon, Central African Republic, Congo and Gabon and a group of partners including the World Heritage Center of the United Nations Educational, Scientific and Cultural Organization (WHC-UNESCO), Food and Agriculture Organization of the United Nations (FAO), the World Wide Fund for Nature (WWF), the Wildlife Conservation Society (WCS), Conservation International (CI), Fonds Français pour l'Environnement Mondial (FFEM-French Global Environmental Fund), the United Nations Foundation (UNF) and the United Nations Fund for International Partnerships (UNFIP), CyberTracker Conservation and Réseau des Aires Protégées d'Afrique Centrale.

The initiative aims to improve the management of protected areas of the Congo Basin that could be recognized as of "outstanding universal value" and to improve their integration in the ecological landscape encompassing them. Its general objective is to "promote and support the building of management regimes for Central Africa forest protected areas that will satisfy standards befitting World Heritage status and effectively combat the principal threats of illegal hunting and unregulated bushmeat trade".

National Parks benefit from the UNF-cofinanced component of CAWHFI and in areas surrounding National Parks, the FFEM component of CAWHFI is being implemented. The initiative operates in tree transboundary landscapes including various sites :

- ⌘ The Tri-national Sangha Landscape
  - Lobeke National Park (S.-E. Cameroon)
  - Dzanga-Sangha National Park (Central Africa Republic)
  - Nouabale-Ndoki National Park (Congo)
  - Kabo and Loundougou forest concessions surrounding the Nouabale Ndoki NP (Congo)
  - Sangha river banks between Pikounda (Congo)
  - Salo (Central Africa Republic)
- ⌘ The Tri-National Dja-Odzala-Minkebe Landscape (TriDOM)
  - Minkebe National Park (Gabon)
  - Odzala-Kokoua National Park (Congo)
  - Dja, Boumba Bek and Nki National Parks in South-East Cameroon
  - Forest concessions surrounding Boumba Bek and Nki National Park
  - Forest Corridor connecting Minkebe NP with Ivindo NP
  - Ngombe forest concession and surroundings of the Odzala-Kokoua NP
- ⌘ The Gamba-Conkouati Landscape
  - Gamba complex of protected areas (Gabon)
  - Mayumba National Park (Gabon)
  - Conkouati-Douli National Park (Congo)
  - Mandji forest concession surrounding the Gamba Complex of PA
  - Surroundings of the Conkouati-Douli NP and adjacent oil concessions.

The first component of the initiative, cofinanced by UNF, was launched in 2004, with a specific objective to improve the protection of the 9 most important national parks of these 3 landscapes by combating illegal hunting and regulating bushmeat trade, strengthening law enforcement and using the World Heritage image to improve protected area management and long-term financing. Its main activities include capacity building of staff members of the national protected areas and wildlife services, providing technical and logistical support, and raising awareness, both at governmental and local level, on the outstanding value of these ecosystems.

The second component, cofinanced by FFEM, joined the initiative in late 2006 focusing on national park peripheral zones (e.g. logging & oil concessions). Seven pilot projects are carried out, characterized by an innovative approach. For example, the establishment of discussion platforms that gather all local stakeholders involved in forest exploitation and management to elaborate and implement sustainable wildlife management schemes. The component specifically aims to (1) build capacity in the surroundings of protected areas to allow community-based wildlife resource management; (2) elaborate wildlife management plans for these areas with all local stakeholders (including the private sector operating concessions located around protected areas); (3) implement and monitor wildlife management plans.

So far, CAWHFI has significantly contributed, through its capacity building and law enforcement efforts, to the conservation of critical populations of flagship species such as elephants, gorillas, hippos, etc. Strong working relations have been developed with local stakeholders, including private sector operators and local administrations to promote the sustainable management of natural resources at landscape level. CAWHFI partners also contributed to the creation of the Tri-National Sangha Trust Fund. This Fund is the first initiative of Central Africa that aims to provide sustainable financing for conservation activities. Joint efforts from Gabonese authorities and CAWHFI partners succeeded in obtaining the inscription of Lopé-Okanda, a mixed natural and cultural site, on the World Heritage List on 28 June 2007, during the World Heritage Committee meeting held in Christchurch (New Zealand).

For more information, please see: <http://whc.unesco.org/en/cawhfi>

## **Fouta Djallon Highlands Integrated Natural Resources Management Project**

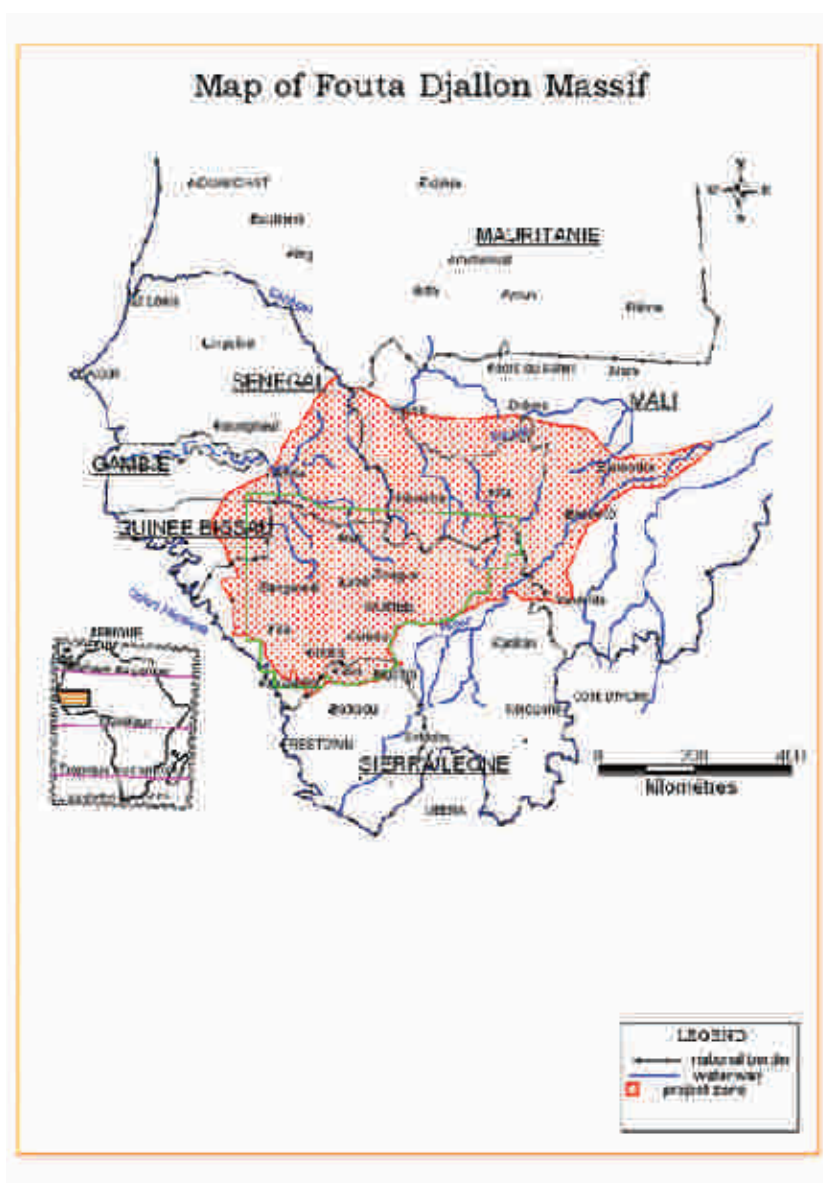
The Fouta Djallon Highlands (FDH) are a series of high plateaus concentrated in the central part of the Republic of Guinea but whose areal extent continues into Guinea-Bissau, Mali, Senegal and Sierra Leone. This highland area is the point of origin of a number of international rivers, notably the Gambia, Niger and Senegal Rivers, as well as a number of small water courses contributing to the characterization of the area as the “water tower” of West Africa. Due to their geographic and climatic diversity the Highlands and surrounding foothills also support a rich diversity of ecosystems that include savanna, dry forest, high forest, lentic, lotic, as well as agro-ecosystems.

Already in the 1970's the Fouta Djallon Highlands Regional Integrated Management Programme (FDH-MP), involving the eight countries that depend on waters from the Highlands (Gambia, Guinea, Guinea-Bissau, Mali, Mauritania, Niger, Senegal and Sierra Leone) was established. Despite these efforts, a number of growing threats over the last four decades have combined to take their toll on the Highlands' natural resources and contributed to a decline in their value as a source of water, endemic biodiversity and bio-productive potential. While the underlying causes are numerous and diverse, the main sources are: population pressure, poor or ineffective policies, and weak institutions.

A GEF-funded project was developed, where UNEP will be responsible for overall project supervision, the International Bureau of Coordination of the African Union will host the Regional Project Coordination Unit and the FAO will provide the overall co-ordination and technical backstopping. The development objective of the ten-year Fouta Djallon Project is to ensure the sustainable management of the natural resources of the Fouta Djallon Highlands over the medium to long-term (2025) in order to improve livelihoods of the rural population who are directly or indirectly dependent on the FDH. The environmental objective of the Project is to mitigate the causes and negative impacts of land degradation on the structural and functional integrity of the ecosystems of the Highlands through the establishment of a regional legal and institutional framework and institutional capacity designed to: (i) facilitate collaboration in the management of the FDH; (ii) assess the status of natural resources in the FDH; and (iii) develop replicable, community-based sustainable land management models.

Expected project outcomes include:

- Enhanced Regional Collaboration in integrated natural resources management in the FDH
- Improved Natural Resources Management and Livelihoods in the FDH
- Increased Stakeholder Capacity in integrated natural resources management in the FDH
- Project Management, Monitoring and Evaluation, and Information Dissemination.



## Collaborative Partnership on Forests (CPF)

The Collaborative Partnership on Forests (CPF), established in April 2001, is an innovative partnership of 14 major forest-related international organizations, institutions and convention secretariats. The CPF is currently comprised of 14 member organizations: Center for International Forestry Research (CIFOR), Food and Agriculture Organization of the United Nations (FAO), International Tropical Timber Organization (ITTO), International Union of Forest Research Organizations (IUFRO), Secretariat of the Convention on Biological Diversity (CBD), Secretariat of the Global Environmental Facility (GEF), Secretariat of the United Nations Convention to Combat Desertification (UNCCD), Secretariat of the United Nations Forum on Forests (UNFF), Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC), United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), World Agroforestry Centre (ICRAF), World Bank (WB) and the World Conservation Union (IUCN). The CPF is chaired by Mr. Jan Heino, Assistant Director-General of the Forestry Department of FAO, and is serviced by the UNFF Secretariat.

The objectives of the Collaborative Partnership on Forests are to support the work of the United Nations Forum on Forests (UNFF) and member countries and enhance cooperation and coordination on forest issues, for the promotion of sustainable management of all types of forests.

Joint initiatives developed by the CPF are:

- CPF Sourcebook on Funding for Sustainable Forest Management : to make forestry funding information accessible through an online searchable database;
- CPF Task Force on Streamlining Forest-Related Reporting : to reduce the reporting burden on countries;
- CPF initiative on forest-related definitions : to foster a common understanding of terms and definitions;
- GFIS: an initiative which aims to provide easy access to forest information world-wide for all types of stakeholders;
- CPF Web site: to provide information on the partnership and its activities

For more information, please see: [www.fao.org/forestry/cpf](http://www.fao.org/forestry/cpf)

### **Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases**

In 1994 FAO established an Emergency Prevention System (EMPRES) for Transboundary Animal and Plant Pests and Diseases in order to minimize the risk of agricultural pests and diseases migrating or spreading across borders, and causing major losses. Initial priority was given to two transboundary pest and diseases problems: animal disease component and desert locust component.

FAO's EMPRES-Livestock programme mission is to promote the effective containment and control of the most serious epidemic livestock diseases/Transboundary Animal Diseases (TAD) as well as newly emerging diseases by progressive elimination on a regional and global basis through international co-operation involving Early Warning, Early Reaction, Enabling research and Coordination. The programme continues to play a major role in the fight against persisting and/or spreading transboundary animal diseases at a global level, with emphasis however on developing countries. Salient under EMPRES is the Global Rinderpest Eradication Programme (GREP) which has advanced to a stage that large tracts of Asia and Africa have now been free from Rinderpest (RP) for an extended period of time. In addition to Rinderpest, EMPRES runs normative and operational activities on the containment and progressive control of various other serious transboundary diseases.

EMPRES works specifically on the following Transboundary Animal Diseases:

- African Swine Fever (ASF)
- Avian Influenza
- Contagious bovine pleuropneumonia (CBPP)
- Foot-and-Mouth Disease (FMD)
- Haemorrhagic Septicaemia
- Rift Valley Fever (RVF)
- Rinderpest

For more information, please see: [www.fao.org/ag/againfo/programmes/en/empres/home.asp](http://www.fao.org/ag/againfo/programmes/en/empres/home.asp)

### **Marine Protected Areas as a Tool for Fisheries Management (MPAs)**

Under the project 'Promotion of sustainable fisheries: support for the Plan of Implementation of the World Summit on Sustainable Development (WSSD)', FAO implements a programme on Marine Protected Areas (MPA's) for a better understanding of the contribution of MPAs to fisheries

management, and the identification and promotion of best practices and integrated approaches to MPAs. MPAs are recognised for their contribution to the conservation of marine resources and surrounding habitat, as well as for their potential contribution to fisheries management goals. Knowledge about the biological benefits outside the boundaries of MPAs is limited and is often a point of controversy.

An initial outline of guidelines for MPAs in the context of fisheries management was reviewed by the FAO workshop on MPAs and Fisheries Management (Rome, 2006). Currently, these guidelines are being developed, with the collaboration of international experts, and the support of a peer-review process.

For more information, please see:

[www.fao.org/fi/website/FIRetrieveAction.do?dom=org&xml=mpas.xml&xp\\_nav=1](http://www.fao.org/fi/website/FIRetrieveAction.do?dom=org&xml=mpas.xml&xp_nav=1)



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## Links

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### **FAO GeoNetwork**

GeoNetwork open source is a standardized and decentralized spatial information management environment, designed to enable access to geo-referenced databases, cartographic products and related metadata from a variety of sources, enhancing the spatial information exchange and sharing between organizations and their audience, using the capacities of the internet.

<http://www.fao.org/geonetwork/srv/en/main.home>

### **FAO Global Forest Resources Assessment 2005**

The Global Forest Resources Assessment 2005 (FRA 2005) is the latest and most comprehensive assessment of forests and forestry to date. It includes information on current status and recent trends for about 40 variables covering the extent, condition, uses and values of forests and other wooded land. The results are presented according to six thematic elements of sustainable forest management.

<http://www.fao.org/forestry/site/fra/en/>

### **FAO Global Terrestrial Observing System**

GTOS is a programme for observations, modelling, and analysis of terrestrial ecosystems to support sustainable development. GTOS facilitates access to information on terrestrial ecosystems so that researchers and policy makers can detect and manage global and regional environmental change.

<http://www.fao.org/gtos/>

### **FAO Terrestrial Ecosystem Monitoring Sites database**

Terrestrial Ecosystem Monitoring Sites database, is an international directory of sites (named T.Sites) and networks that carry out long-term, terrestrial *in-situ* monitoring and research activities. The system provides information on the "who, what and where" that can be useful to both the scientific community and policy-makers.

<http://www.fao.org/gtos/tems/>

### **FAO Globally Important Agricultural Heritage systems**

In 2002 FAO initiated a wide programme on conservation and adaptive management of Globally Important Agricultural Heritage systems (GIAHS) aiming to establish the basis for the global recognition, conservation and sustainable management of such systems and their associated landscapes, biodiversity, knowledge systems and cultures.

<http://www.fao.org/sd/giahs/>

### **Elephants in turmoil, Central African Republic**

P. Chardonnet, H. Boulet

Bois et Forêts des Tropiques, 2008, No. 295 (1<sup>er</sup> trimestre)

<http://bft.cirad.fr/pdf/som295.pdf>

### **IUCN Conservation Commons**

The **Conservation Commons** is the expression of a cooperative effort of non-governmental organizations, international and multi-lateral organizations, governments, academia, and the private sector, to improve open access to and unrestricted use of, data, information and knowledge related to the conservation of biodiversity with the belief that this will contribute to improving conservation outcomes.

<http://www.biodiversity.org/>

### **EcoPort**

EcoPort is a public access portal where natural resources managers and ecologists share their information in an open-source service devoted to biodiversity. EcoPort is seen as a single, contiguous, communal, *wiki* and database on the Internet that enables individuals and institutions to pool their information and apply their separate expertise in a collective manner to give any one of us free access and permission to use the sum of what all of us know. The name "EcoPort" is a composite acronym derived from the words 'Ecology and Portal'

<http://ecoport.org/index.html>

## **WRI EarthTrends**

EarthTrends is a comprehensive online database, maintained by the World Resources Institute, that focuses on the environmental, social, and economic trends that shape our world.

<http://earthtrends.wri.org/index.php>

## **European Commission - Assessing protected areas in Africa**

This website is part of a first attempt at a large scale assessment of protected areas using objective continent-wide data sets and methodologies as opposed to case studies on individual parks or global assessments. The website contains information on 741 protected areas, across 50 countries, and includes information on 280 mammals, 381 bird species and 930 amphibian species, and a wide range of climatic, environmental and socioeconomic information.

<http://www-tem.jrc.it/PA/index.html>

## **UNEP WCMC**

An internationally recognised Centre of Excellence for the synthesis, analysis and dissemination of global biodiversity knowledge, providing authoritative, strategic and timely information for conventions, countries, organizations and companies to use in the development and implementation of their policies and decisions.

<http://www.unep-wcmc.org/>

## **World Database on Protected Areas**

The World Database on Protected Areas (WDPA) is compiled from multiple sources and is the most comprehensive global dataset on marine and terrestrial protected areas available. It is a joint venture of UNEP and IUCN, produced by UNEP-WCMC and the IUCN World Commission on Protected Areas (IUCN-WCPA) working with governments and collaborating NGOs.

<http://sea.unep-wcmc.org/wdbpa/>

## **WWF - Terrestrial Ecoregions of the World**

A biogeographic regionalization of the Earth's terrestrial biodiversity; ecoregions. They are relatively large units of land or water containing a distinct assemblage of natural communities sharing a large majority of species, dynamics, and environmental conditions. Ecoregions represent the original distribution of distinct assemblages of species and communities.

<http://www.worldwildlife.org/science/ecoregions/terrestrial.cfm>

## **WCS - Cameroon-Nigeria Transboundary Conservation Program**

<http://www.wcs.org/international/Africa/cameroonnigeriatransboundary>

## **AWF - Transboundary Strategic Plan in the Virunga Heartland**

<http://www.awf.org/content/solution/detail/3590>

## **CMS - Memorandum of Understanding concerning Conservation Measures for the West African Populations of the African Elephant**

<http://www.cms.int/species/elephants/index.htm>

## **IUCN - Central African Elephant Conservation Strategy**

[Http://www.iucn.org/themes/ssc/sgs/afesg/tools/pdfs/str\\_afc0512\\_en.pdf](Http://www.iucn.org/themes/ssc/sgs/afesg/tools/pdfs/str_afc0512_en.pdf)

## **SADC Regional Biodiversity Strategy**

<Http://www.sabsp.org/strategy/SADC%20REGIONAL%20BIODIVERSITY%20STRATEGY.pdf>

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## Theme and deadlines for Next Issue

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The theme for the next issue of Nature & Faune is “Forest Management in Africa: Is wildlife taken into account?” This theme embraces the role of wildlife in forest management and expands to include topics such as: collaborative efforts between wildlife and forestry practitioners; reviews on who is doing what in Wildlife and Protected Areas management in Africa and how this relates to forest management; as well as appraisal of the extent of involvement of rural people in conservation. In addition, aspects of regional and sub-regional environmental policies relative to wildlife in forest management would be covered. Articles related to concerns for financing the multipurpose management of natural resources are also welcome.

Deadline for submission of articles, announcements and other contributions is 30<sup>th</sup> June 2008.

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## Guidelines for authors, Subscription and Correspondence

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In order to facilitate contributions from potential authors, we have created guidelines for the preparation of manuscripts for Nature & Faune. Please visit our website or send us an email to receive a copy of the 'Guidelines for Authors'.

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