

NATURE & FAUNE

Volume 24, Issue 1

The relevance of mangrove forests to African fisheries, wildlife and water resources



FAO Regional Office for Africa



Nature & Faune is a peer-reviewed open access international bilingual (English and French) publication dedicated to the exchange of information and practical experience in the field of wildlife and protected areas management and conservation of natural resources on the African continent. *Nature & Faune* has been in wide circulation since 1985.

Nature & Faune is dependent upon your free and voluntary contribution in the form of articles and announcements in the field of wildlife, forestry and nature conservation in the Region.

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Front Cover Photos, From Left:

Mangrove – home of wildlife, Kenya, James Gitundu Kairo; Mangrove crab fishermen in Kenya, James Gitundu Kairo; Natural mangrove stand (*Rhizophora mucronata*) along the shore of a river, Kenya, James Gitundu Kairo; A boy and his Fish, Togo, anonymous.

Bottom background: Mangrove trees lining a body of water, Senegal, Lyes Ferouki.

Back Cover Photos, From Left:

Degraded mangrove area in Kenya, James Gitundu Kairo; Mangroves in Red sea area of Sudan, Michel Laverdière; Mangrove wood products, Kenya, James Gitundu Kairo; Stand of red mangroves (*Rhizophora racemosa*) showing typical arch-formed stilt roots and aerial roots descending from branches, Sierra Leone, Mette Loyche Wilkie

Bottom background: Mangrove trees lining a body of water, Senegal, Lyes Ferouki



Nature & Faune

Volume 24, Issue 1

The relevance of mangrove forests to African fisheries, wildlife and water resources

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<http://www.fao.org/africa/publications/nature-and-faune-magazine/>



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Accra, Ghana
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Message to Readers

*Maria Helena Semedo*¹

The world celebrates International Day for the Mangrove on the 26th of July every year! In line with the commemoration of this Day, the subject of this edition of *Nature & Faune* is a simple question: *What is the relevance of mangrove forests to African fisheries, wildlife and water resources?* It is under this banner that we tease-out elements of the mangrove ecosystem in Africa and glue them into a seamless tapestry to reveal the importance of proper management, conservation and use of mangroves.

The present edition offers a collection of 14 diverse articles highlighting different aspects of mangroves - from the lush natural stands, wildlings, nursery practices, enrichment planting, to the various uses of the mangrove ecosystems as paddy rice fields, along with fisheries and wildlife sanctuaries and salt exploitation areas. The *Special Feature* highlights an original work from Cameroon, which provides good insight into mangrove forest management from community to national level. It also provides perspectives at policy level and relevant structures through which the integrity of mangroves can be enhanced and degradation reduced. Another interesting feature of this volume is the 'Country Focus' which explains how Madagascar's wildlife, water resources and fisheries entwine with its mangrove ecosystems.

This edition of *Nature & Faune* is the most voluminous Issue published so far, occupying over a hundred knowledge-filled pages as it strives to capture the wide scope of issues relating to mangrove management in Africa. The contributions include writings on the value of mangroves from those who are working in this field. This Issue looks at innovative ideas and best practices that have been used around the region to address pressing challenges in conservation of mangroves.

Acknowledging that mangrove ecosystems play key roles in the interface between forests, water and fishery resources and agriculture; and indeed in the whole economy of coastal areas, *Nature & Faune* received articles from experts in diverse relevant disciplines. It is therefore not surprising that specialists in water resource utilization, watershed management, aquaculture, capture fisheries, agriculture, wildlife and forest management all contributed to this edition.

The variety of uses and interactions that are discussed in the articles is fascinating. These articles accompanied by regular features, review the multiple interconnections; asking who should care about these mangrove forests and how all the different users may achieve sustainable management.

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Let's get started in discovering what unique and individual aspects of mangroves are unfolding in this edition of *Nature & Faune*.

Finally, subscribers and readers have paid tribute to two members of the Board of Reviewers who passed away during their active tenure on the Board. Adieu comrades Jean Djigui Keita and Alan W. Rodgers!

Editorial

African mangroves: their importance for people and biodiversity

Ricardo Carrere¹

Africa is richly endowed with mangroves, which cover over 3.2 million hectares, extending from Mauritania to Angola on the Atlantic coast and from Somalia to South Africa along the Indian Ocean. Mangrove covered countries in West and Central Africa include Mauritania, Senegal, Gambia, Guinea Bissau, Guinea Conakry, Sierra Leone, Liberia, Ivory Coast, Ghana, Togo, Benin, Nigeria, Cameroon, Equatorial Guinea, Sao Tome & Principe, Gabon, Congo, Democratic Republic of Congo and Angola. Eastern African mangroves are found in Somalia, Kenya, Seychelles, Tanzania, Madagascar, Mozambique and South Africa (Ajonina et al 2008).

International discussions on forest conservation have dedicated insufficient attention to mangrove forests. Some of the reasons for concentrating on other types of forest ecosystems –particularly tall inland tropical rainforests- could be that these appear to have more economic value and to host higher levels of biodiversity than mangroves. Both assumptions could be challenged.

Mangroves and people's livelihoods

Mangrove forests have a huge value for coastal communities that derive their livelihoods from them. Although commonly defined as “poor” in official statistics, communities living in healthy mangrove areas have what many urban people lack: diverse and abundant food. Additionally, mangroves provide many of their needs, usually complemented with other productive activities such as farming, poultry, bee-farming and so on. Mangrove wood is a multi-purpose resource for fish stakes, fish traps, boat building, boat paddles, yam stakes, fencing, carvings, building timber, fuel and many other uses (World Rainforest Movement ². 2002).

The Rufiji River Delta mangroves provide a good example on the above. Located in southern Tanzania, it is the largest delta in Eastern Africa and contains the largest estuarine mangrove forest on the eastern seaboard of the African continent. The Delta region is home to over thirty thousand people who live, farm and fish in its fertile agricultural lands and rich fishing grounds. The latter produce over 80 per cent of Tanzania's prawn exports with the entire catch being wild prawns (Lawyers' Environmental Action Team).

The importance of mangroves for local communities becomes even clearer when they are degraded or disappear. In the case of Senegal, oysters, shrimp, tilapia, barracuda and

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² *The World Rainforest Movement is an international network of citizens' groups of South and North involved in efforts to defend the world's rainforests. It works to secure the lands and livelihoods of forest peoples and supports their efforts to defend their forests from commercial logging, dams, mining, oil exploitation, plantations, shrimp farms, colonization and settlement and other projects that threaten them.*

catfish are among the many fish species that live in Casamance's mangrove forests, but now, as a result of mangrove degradation "you can only find big fish, as well as shrimps and oysters, but you can no longer find catfish or other varieties, while there used to be plenty." (See Box1).

Box 1

The importance of mangroves for local communities: the case of Senegal

The depletion of fish stocks has particularly affected women who sell fish in bulk: "*Women are closely involved in the fishing economy in this region. We sell fish, shrimp and oysters in the market and can earn up to US\$20 a day from this, which greatly benefits our families. Now it is difficult for fish-sellers in Ziguinchor markets to earn even US\$4 a day because there is so little fish left to sell.*" The disappearance of mangroves harms other crops as well. Fewer mangroves means increased salt content of the water, which impedes the growth of paddy rice. "*When we plant the rice now, it doesn't grow because there is so much salt in the water.*"

Source: (IRIN- Senegal 2008)

The importance of mangroves in biodiversity conservation

Regarding biodiversity, mangrove forests have few tree species to show (6 to 10), which may lead people to think that they are biodiversity-poor. In fact, they are exactly the opposite: mangroves are an irreplaceable and unique ecosystem, hosting incredible biodiversity and ranking among the most productive ecosystems in the world. They house a wide variety of life: migratory birds, marine creatures and reptiles in addition to associated species of flora.

The aerial roots of their trees form a complex web, hosting a multitude of animal species (fish, molluscs, crustaceans) and they operate as zones for mating, refuges and nursery areas for a large number of other species. The enormous quantities of fish and invertebrates that live in these coastal waters, provide an abundance of food for monkeys, turtles, and aquatic birds and they serve as an important migratory point for many birds. (National Geographic. - Central African mangroves <http://www.nationalgeographic.com/wildworld/profiles/terrestrial/at/at1401.html>) (World Rainforest Movement 2002).

The Baly Bay, located to the West coast of Madagascar serves to illustrate the important biodiversity value of mangroves. Many species of animals use the bay's 7200 hectares of mangroves as nesting, roosting and feeding areas. Among the nine threatened and endemic Madagascar waterbird species, five are recorded inside the mangrove (*Ardea humbloti*, *Anas bernieri*, *Threskiornis bernieri*, *Haliaeetus vociferoides* and *Charadrius thoracicus*). For mammals, two species are recorded inside the bay, namely, the Madagascar bat *Pteropus rufus*, roosting on mangrove trees and *Delphinus sp.* In addition, mangroves constitute an important habitat for invertebrates. The most

economically important is the crab *Scylla serrata* and two shrimp species: *Penaeus indicus* and *P. monodon*. (World Rainforest Movement 2002).

The economic and environmental importance of this ecosystem extends to very distant areas, as shown by the Nigerian area of mangrove swamps that stretches through the coastal states, with 504,800 hectares in the Niger Delta and 95,000 hectares in Cross River State. The mangrove forests of Nigeria rank as the largest in Africa and as the third largest in the world. By some estimates, over 60% of fishes caught between the Gulf of Guinea and Angola breed in the mangrove belt of the Niger Delta (World Rainforest Movement 2002). Mangroves have been sustainably managed by the many generations of communities living there. Sustainable use has been possible because of their profound knowledge about this ecosystem, passed on from generation to generation.

Causes of mangrove loss and degradation

However, a number of changes have taken place over the last few decades that have resulted in mangrove destruction or degradation in many countries. The direct and underlying causes that have led to the current situation have yet to be adequately assessed in each country. What follows is only a broad overview of what we consider to be the main direct causes of mangrove loss and degradation. It is important to stress that two different processes (frequently related) affecting mangroves can be observed: total destruction or degradation.

In some cases their total destruction may be due to urbanization, large-scale tourism undertakings, rice production or their eradication to give way to commercial shrimp farming. In other cases, partial deforestation is further aggravated by mangrove degradation – where most trees may remain standing – due to activities such as oil exploitation or mining. That is to say, the installation of pipelines, seismic exploration and open cast mines cause deforestation; while oil-spills, gas flaring and waste dumping pollute the water and the air and seriously degrade the ecosystem as a whole. Another important cause of “invisible” degradation is the use of agro-toxics in nearby agricultural production, where toxic chemicals end up in this ecosystem, thus resulting in severe impacts on mangrove biodiversity and peoples’ livelihoods.

In terms of degradation, major oil spills have occurred that have devastated rivers, killed mangroves and coastal life and affected the health and livelihoods of millions of inhabitants. Although this has happened in several countries in both Eastern and Western Africa, the case of the Niger Delta is probably the worst. As denounced by Amnesty International, the local communities living there rely on “the land and natural waterways for their livelihood and sustenance. Now, they have to drink, cook with and wash in polluted water and eat fish contaminated with toxins. They have lost farming land and their incomes from oil spills and breathe air that reeks of oil, gas and other pollutants.” (Amnesty International Australia 2009)

A further form of mangrove degradation results from overexploitation of its resources – both the trees themselves or the fish and other aquatic live forms that live there. In Africa, excessive mangrove wood extraction has been linked to fish smoking, building materials, fuelwood and charcoal production.

The shrinking African mangroves

During the last decades, African mangroves have been increasingly affected by deforestation. In West Africa, mangrove areas have diminished from 20,500 km² in 1980 to their current 15,800 km², while in Central Africa they have been reduced from 6,500 km² in 1980 to 4,300 km² at present (Ajonina et al 2008). Estimates of existing mangrove areas in Eastern Africa range from 2,555 km² to 7,211 km² (The Encyclopedia of Earth. 2007) and no data appears to be available as respects to the rate of mangrove loss –which has in fact occurred- during the past decades. According to the FAO, Africa has lost about 500,000 hectares of mangroves over the last 25 years. (FAO. 2007)

However, those figures cannot show the extent of mangrove ecosystem degradation, which is probably much more important than mangrove loss and is impacting heavily on both local communities' livelihoods and mangrove biodiversity. Within that context, efforts should be made to ensure sustainable use of existing mangroves, to restore degraded areas and to replant mangrove forests whenever possible and viable.

Addressing existing causes and preventing new ones

For the above to be possible, the necessary starting point is to identify and address all the direct and underlying causes of mangrove loss and degradation. In this respect, it is important to note that while most of the former have already been identified, the underlying causes are still a matter of debate that needs to be studied much further. Such analysis is fundamental in order to avoid the easy solution of putting the blame on “poverty” or “population growth”, while obscuring the role of governments, international institutions and corporations in mangrove loss and degradation.

While existing problems are addressed, it would be wise to prevent the development of new ones. In this respect, policies should be adopted and implemented to stop the expansion of unsustainable industrial shrimp farming, which is now looking at Africa's mangrove areas as a new business opportunity to be exploited with little regard to the ecosystem. The negative social and environmental impacts of this activity are already well documented in all the countries where it has established itself, particularly in Latin America and Asia. The result, in country after country, is that industrial shrimp farming destroys mangroves, biodiversity and local peoples' livelihoods. The impacts of the few existing cases of industrial shrimp farming in Africa should also serve as a basis for convincing governments on this issue.

African mangroves should be allowed to continue to play the role they have traditionally played: to ensure local peoples' livelihoods through the conservation and wise use of their rich biodiversity.

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ANNOUNCEMENTS

THE GREAT MANDINGO WARRIOR IS GONE *(Tribute to Jean Djigui Kéïta: 1936-2009)*



Jean Djigui Kéïta: 1936-2009

At first sight, he was viewed as an Old Wise African,
However, never has anyone had a younger spirit;
His mixed blood made people think he was a Westerner,
But he was an African from within;
And most of all, he possessed an absolutely fantastic African and Mandingo culture.

This is not a riddle, but rather an attempt to sum up the personality of a man I met in the Spring of 1979, as he had just been recruited as Senior forestry officer of the FAO Regional Office for Africa and was supervising the study tour of a group of young

African forestry officers in China. During this trip, we all came to learn to love and appreciate the numerous qualities of Jean Djigui Kéita.

He wanted to be called Djigui, but forestry officers in Mali respectfully and affectionately called him 'le Colonel'. He possessed the natural charisma needed to be a leader. His mere presence was enough to ensure the success of our regional seminars and workshops as he knew how to put everybody at ease and arouse attention and admiration through his vast knowledge of African cultures. They all wanted to be around him and searched for his company.

The name Djigui has been associated with the 'Nature et Faune' magazine that he created and of which he wrote several of the editorials. This magazine facilitated the emergence of numerous African authors in the field of wildlife and protected areas. To this day, 'Nature et Faune' continues to thrive and represents a tangible result of the wonderful work done through the African Task Force on Wildlife and national parks that Djigui masterfully and with dedication animated for almost 20 years. Until his fateful demise, Djigui was an active member of the writing committee of 'Nature & Faune'.

Beyond his role as FAO Regional Officer, Djigui also invested himself, together with other colleagues, in creating the Sahelian Forestry Officers Association of which the statutes have been formally registered in Dakar, Senegal.

I will remember with fondness a young retired officer who honored me during one of my missions in Bamako by giving me a tour of his beautiful house on the hilltop and who was so proud to walk me through the small teak and eucalyptus forest he planted years ago. He had a hard time bringing himself to cutting down trees in his forest even though they were ripe for exploitation. We spent that morning discussing silvicultural treatments and exploitation conditions of artificial woodlots in the Sahelian zone.

My last memory of Djigui goes back to early 2006 during the FAO Regional Conference for Africa held in Bamako. This vibrant FAO retiree never wanted to miss one session, taking notes as if he was still part of the Secretariat, chatting in the corridors as if he was part of the official delegations. I will never forget the dried meat he offered us on the day we departed, knowing very well how much we enjoyed it as he was the one who introduced us to it during the 10 o'clock coffee breaks he used to organize with so much friendliness in his office in Accra.

Djigui, I personally owe you this discreet and sincere friendship, this brotherly affection I had the opportunity to appreciate several times and this fruitful collaboration from the time I joined this organization, and beyond your retirement.

Rest in peace, Mandingo warrior, and may the land you revered so much welcome you.
By Pape Djiby Koné

TRIBUTE TO ALAN W. RODGERS

(Ecologist, Botanist, Zoologist and Conservationist)



Alan W. Rodgers: 1944 - 2009

The purpose of this tribute is to provide readers of *Nature & Faune* with a concise overview of the amazing life and works of Alan Rodgers, a member of its Board of Reviewers.

He was an extraordinary man who left an indelible mark on the world.

He was born in Liverpool in 1944. As a child he moved with his family to Nairobi where his father took up a lectureship he had been offered. Alan's high school education and undergraduate studies in botany and zoology were in Nairobi. At graduate level, he completed a Master's degree in conservation in Aberdeen and a doctorate in ecology at the University of Nairobi.

In the course of his working life Alan Rodgers contributed to conservation and science in diverse ways.

In 1965 he was appointed as an ecologist for the Game Department in the vast and remote Selous Game Reserve in Tanzania, which must have been a marvellous experience for a young man of his abilities and interests. He worked in the Selous for 11 years. He took part in anti-poaching patrols and conducted wildlife census counts in the aircraft that he piloted. He set up the Miombo Research Centre and produced a many scientific papers on the ecology of Africa's largest wilderness reserve, on topics ranging from lions, elephants and the ivory trade to the effects of fire on vegetation.

By 1976 Rodgers was recognised as a world expert on Miombo woodland ecology and was given a position as a lecturer at the Zoology Department of the University of Dar es Salaam. Here he eagerly shared his knowledge and inspired a generation of students, many of whom were later to join his informal army of conservationists in the common cause of protecting East Africa's natural heritage.

During this time Rodgers's many initiatives included a permanent research station on the edge of the Ngorongoro Crater to discourage corrupt officials from getting involved in rhinoceros poaching. He further co-founded the Tanzania Forest Conservation Group in 1982 and led students on field trips to spearhead research into the remaining fragments of Coastal Forest, another overlooked ecosystem with large numbers of rare animals and plants. Rodgers oversaw the activities of the Tanzania Forest Conservation Group for the

rest of his life, and it is today Tanzania's foremost forest conservation organisation, with 45 staff supporting the management of more than 100,000 hectares of forest.

From 1984 until 1991 Rodgers worked at the Wildlife Institute of India. He produced many more scientific papers on subjects ranging from snow leopards to sacred groves, together with his monumental work *A Biogeographical Classification of India*, which is now one of the most cited and used documents in the field of wildlife conservation in India. Rodgers was the key architect in developing "wildlife science" in India, and through his contribution the institute has subsequently produced a vast array of competent biologists who are now contributing to the cause of conservation across the globe. With HS Panwar, he also put together the voluminous *Action Plan for Protected Areas Networks* in a country with a far greater human population pressure than in East Africa. This experience was to emphasise to Rodgers the urgent need to formally protect as much habitat as possible before it was too late.

Rodgers returned to East Africa in 1992, on the eve of the Earth Summit in Rio and the UN Convention on Biodiversity, to set up a project financed by the Global Environment Facility to support the management of East African Biodiversity. As chief technical adviser for this initiative, Rodgers skillfully used his prominent position to increase the protection afforded to the most important remaining patches of forest. His two great causes, the Eastern Arc Forests and the Eastern African Coastal Forests, which were hardly known at the start of the 1980s, were included in the internationally recognised list of the world's 34 biodiversity hotspots by the end of the millennium. After years of dormancy, many new forest reserves and nature reserves were gazetted through his efforts, as well as the Jozani National Park on Zanzibar Island.

Rodgers later served as the regional technical adviser to the UN Development Programme and Global Environment Facility initiatives in East Africa, where he sought to ensure that biodiversity conservation was advanced as part and parcel of the larger development agenda. He led an initiative to put together a manifesto for the environment to the Government of Tanzania in 1994, overcoming resistance from a number of government officials. His infectious enthusiasm held strong, despite his inevitable engagement with bureaucracy. He sought every opportunity to get people out into the field and do practical conservation. He was a mentor to many, who sought him out for his wisdom and encouragement, and who risked his ruthless editing of any documents that crossed his desk — wielding his red pen with pleasure to eliminate redundant prose and unsubstantiated claims. This quality found much expression in his functional role as a member of board of reviewers for *Nature & Faune* journal.

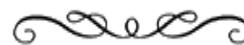
As a person, Rodgers had more interest promoting and encouraging the right people to achieve action and results than personal recognition. It is therefore largely to his credit that a coherent and effective conservation movement exists in East Africa today, and that so much of the Eastern Arc and Coastal Forests are now protected. They still face enormous challenges and pressures from a growing population hungry for natural resources, but their situation would be far bleaker were it not for him.

Rodgers's energy was not limited to conservation; he was also a fine rugby player, an enthusiastic actor, a keen fisherman and a generous and jolly host, who with a scratch of his grizzled beard would captivate his audiences with many a mischievous anecdote about

his wild youthful years. He is survived by his first wife Bobbi Jacob and their daughter; his second wife Nicky Tortike and their two sons; and his partner Mercy Njoroge. His three children are now following his passion for East Africa and conservation.

Although he will be sorely missed his influence will continue to be felt through the many different people with whom he interacted in his diverse roles as a scientist, a teacher, a manager, a mentor, a critic, an advisor, a colleague, a friend.

By the Editor, Nature & Faune



CLIM-FO-L: Newsletter on Forests and Climate Change

CLIM-FO-L is an electronic newsletter compiled by FAO monthly as a source of information on forests and climate change. The newsletter provides information on developments in UNFCCC negotiations, publications, websites, events and job opportunities and project information. For more information, to request a subscription or to request FAO to include news in CLIM-FO, please visit:

<http://www.fao.org/forestry/54538/en> or contact CLIM-FO-Owner@fao.org.

News

Commemorating 2009 International Day for the Mangroves

Every July 26th has become an annual global commemorative day for the mangroves. The International Day of Mangroves was observed on Sunday 26 July 2009 and this year's theme calls for global action against the shrimp farming industry and demands the conservation of precious mangrove areas. This worldwide move may mark the beginning of a stronger international network of small-scale fishermen. Fishermen activists advocating for the rights of marine communities around the globe have been concerned about the loss of mangroves that serve as home for a diverse range of plant and animal life. Mangroves are also a source of income for local communities, and prevent soil erosion and protect the coast from storms.

*By Jan Khaskheli, Pakistan Fisherfolk Forum (PFF) Karachi
For the whole article, visit - <http://www.pff.org.pk/node/200>*

UNESCO requests reinstatement of moratorium on mangrove cutting in Belize

The UNESCO World Heritage Committee has placed the largest barrier reef in the northern hemisphere on UNESCO's List of World Heritage in Danger to help raise international support for their preservation. Belize Barrier Reef Reserve System was placed on the Danger List mainly because of the problem of mangrove cutting and excessive development in the site. This reef system was inscribed on the World Heritage List in 1996 as the largest barrier reef in the northern hemisphere, with offshore atolls, several hundred sand cays, mangrove forests, coastal lagoons and estuaries. This series of coral reefs straddles the coast of Belize, roughly 300 meters (0.2 mile) offshore in the north and 40 kilometers (25 miles) in the south. It extends for about 300 km (185 miles), making it the second largest coral reef system in the world after the Great Barrier Reef in Australia. Mangroves are being cleared for vacation and retirement homes, hotels, roads, ports, casinos, golf courses, rice fields and shrimp farms. Their destruction erodes fragile coastal lands, eliminates fish and shellfish nurseries, and natural wind and storm-surge breaks. While requesting stricter control of development on the Belize Barrier Reef Reserve System, the World Heritage Committee also requested the reinstatement of the moratorium on mangrove cutting on the site which expired in 2008.

News item culled from: UNESCO Expands List of World Heritage in Danger

Website: <http://www.ens-newswire.com/ens/jul2009/2009-07-04-02.asp>

Source: Environment News Service <http://www.ens-newswire.com/ens/jul2009/2009-07-04-02.asp>

South Africa and Mozambique Create Africa's Largest Marine Protected Area

South Africa and its neighbour to the north, Mozambique, have joined forces to create Africa's largest marine protected area. Mozambique has declared its first Marine Protected Area at Ponta do Ouro that now links with the South Africa's iSimangaliso Wetland Park to create the continent's first transfrontier marine conservation area along 300 kilometers (200 miles) of pristine beaches.

News item culled from: South Africa, Mozambique Create Africa's Largest Marine Protected Area.

Source: Environment News Service <http://www.ens-newswire.com/ens/oct2009/2009-10-29-01.asp>

The world's three major tropical forest regions agree on collaboration

The intergovernmental regional organizations representing the world's three largest tropical forest regions (the Association of South-East Asian Nations – ASEAN, the Amazon Cooperation Treaty Organization – ACTO, and the Central Africa Forests Commission – COMIFAC) agreed to work more closely to enhance south-south cooperation in conserving and sustainably managing their tropical forests and biodiversity. The three regions - primarily Amazon, Congo and Borneo - collectively contain more than 80 per cent of the world's tropical forests, and an estimated two thirds of all terrestrial species. More: <http://www.cbd.int/doc/press/2009/pr-2009-07-16-forest-en.pdf> and <http://www.cbd.int/doc/meetings/ssc/bmssc-02/official/bmssc-02-02-en.doc>

News item culled from: Tim Christophersen. Programme Officer for forest biodiversity, Secretariat of the Convention on Biological Diversity, United Nations Environment Programme, 413 St-Jacques O., Suite 800 Montreal, QC., H2Y 1N9, Canada Tel. main: +1-514-288-2220. Fax: +1-514-288-6588. Email: Tim.Christophersen@cbd.int

Alternative source: the ASEAN July 2009 Bulletin "World's Three Largest Tropical Forest Regions to Forge Alliance": <http://www.asean.org/Bulletin-Jul-09.htm>

The world's seabirds are on the decline

The world's seabirds are disappearing more quickly than any other group of bird species, and they are harder to conserve than birds based on land, where habitat can more easily be set aside for their protection. To conserve seabirds despite these issues, BirdLife International and some of its partner organizations have developed guidelines for identifying Marine Important Bird Areas for seabirds that can be applied anywhere around the world.

News item culled from: Conservation Guidelines Define Important Bird Areas at Sea

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Lion population in Kenya on the decline

Kenya could lose all its lions in the next 20 years if the current rate of decline continues unless urgent and decisive measures are taken, the Kenya Wildlife Service warned today. World famous for its wildlife, Kenya now has 2,000 lions in seven national parks and conservation areas, but the lion population has been declining by an average of 100 animals per year for the past seven years.

News item culled from: Kenya's Lions Could Disappear in 20 Years

Source: <http://www.ens-newswire.com/ens/aug2009/2009-08-17-02.asp>

Spices such as thyme proving effective as pesticides for fruits and vegetables

Common kitchen spices such as rosemary, thyme, clove, and mint, nick-named "killer spices," are proving effective as pesticides in organic agriculture's battle against insects as the industry tries to meet the growing demand for fruits and vegetables that are free of toxic chemicals. In a study presented Sunday at the opening day of the American Chemical Society's national meeting in Washington, scientists from the University of British Columbia presented new research into what they are calling "essential oil pesticides."

News item culled from: 'Killer Spices' Fatal to Insect Pests

Source: <http://www.ens-newswire.com/ens/aug2009/2009-08-17-01.asp>

Lake Nakuru National Park in Kenya recognized as an Important Bird Area

Lake Nakuru National Park in central Kenya, internationally known for its concentration of bright pink flamingos, has been designated as an international bird sanctuary. It becomes the first national park in Africa to be recognized as an Important Bird Area

(IBA) under the international IBA program established by the UK-based global organization BirdLife International and its worldwide network of partners.

News item culled from: Kenya's Lake Nakuru National Park Named Important Bird Area

Source: <http://www.ens-newswire.com/ens/sep2009/2009-09-24-02.asp>

About one-third of known species of plants and animals threatened with extinction

About one-third of all known species of plants and animals are threatened with extinction, finds the International Union for the Conservation of Nature in the most recent update of its authoritative Red List of Threatened Species™ issued today. "The scientific evidence of a serious extinction crisis is mounting," warns Jane Smart, director of IUCN's Biodiversity Conservation Group.

News item culled from: Rapid Pace of Species Extinctions Mounts to a 'Crisis'

Source: <http://www.ens-newswire.com/ens/nov2009/2009-11-03-01.asp>

Kew Gardens celebrate collection & banking of 10% of world's wild plant species

The Royal Botanic Gardens, Kew celebrated a milestone in plant conservation, the collection and banking of 10 percent of the world's wild plant species. On 15 October 2009, Kew banked its 24,200th plant species, a pink wild forest banana from China which is an important staple for wild Asian elephants. Between 60,000 and 100,000 species of plants are threatened with extinction, roughly one quarter of all plant species.

News item culled from: Kew's Millennium Seed Bank Saves 10% of World's Wild Plants

Source: <http://www.ens-newswire.com/ens/oct2009/2009-10-15-02.asp>

Special Feature

The challenges and prospects of developing a community based generalizable method to assess mangrove ecosystems vulnerability and adaptation to climate change impacts: Experience from Cameroon

Gordon Ajonina¹, Bertin Tchikangwa,² George Chuyong³ and Martin Tchamba⁴

Summary

Mangroves provide a wide range of resources and ecosystem services for human livelihood, including fisheries production, timber production, coastal protection, pollution abatement and carbon sequestration. However, human-induced stresses ranging from: diversion of freshwater, poor land-use in and around mangrove forests, over-harvesting of resources, and pollution disrupt the natural equilibrium of mangroves. Mangroves are also predicted to suffer from the impact of climate change as the frequency and significance of environmental observations related to Climate Change (CC) increase across the entire planet's ecosystems especially in the low-lying coastal areas, especially regions such as tropical Africa, Southeast Asia and the South Pacific. However, even in the light of such warnings, there have been no clear approaches identified through which the direct environmental effects of CC can be ameliorated in the short term especially development of comparable methods that assess the vulnerability of coastal ecosystems and services. In WWF-US, Global Environment Facility Project Development Facility – Climate Change (GEF PDF B) supported initiative to develop a generalizable method to assess the vulnerability and adaptation of mangroves and associated ecosystems to climate change impacts in three project countries including Fiji, Tanzania and Cameroon. The approach intended to build and strengthen local and national capacity of targeted countries as well as on-the-ground projects demonstrating practical approaches to vulnerability assessment and adaptation by involving multiple stakeholder groups throughout the planning and execution stages of project to promote effective vulnerability assessment and climate change adaptation projects and policies. In this paper the authors assess the status of achievements of such initiatives in Cameroon. The paper also examines challenges and future perspectives for such an expanded programme in the rest of mangrove-covered countries in Africa.

Introduction

Mangroves are among the most productive terrestrial ecosystems and are a natural, renewable resource. Mangroves provide a wide range of resources and ecosystem services for human livelihood, including fisheries production, timber production, coastal

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protection, pollution abatement and carbon sequestration. However, human-induced stresses ranging from: diversion of freshwater, poor land-use in and around mangrove forests, over-harvesting of resources, and pollution disrupts the natural equilibrium of mangroves. Being composed of three important ecosystems, the terrestrial, fresh water and marine ecosystems, the degradation of the mangrove forests not only depletes the resources within their boundaries, but also affects the productivity of the adjacent coastal and marine ecosystems and is a cause of serious environmental and economic concern to many developing countries. This stems from the fact that at the interface between the sea and the land, mangroves play a pivotal role in moderating monsoonal tidal floods and in coastal protection. At the same time their primary production supports numerous forms of wildlife and avifauna as well as estuarine and near-shore fisheries. Consequently, the continuing degradation and depletion of this vital resource will reduce not only terrestrial and aquatic production and wildlife habitats, but more importantly, the environmental stability of coastal forests that afford protection to inland agricultural crops and villages will become seriously impaired (Duke *et al*, 2007).

Mangroves are also predicted to suffer from the impact of climate change as the frequency and significance of environmental observations related to Climate Change (CC) increase across the entire planet's ecosystems especially in the low-lying coastal areas, especially regions such as tropical Africa, Southeast Asia and the South Pacific. There have been no clear approaches identified through which the direct environmental effects (altered temperature regimes, precipitation patterns, extreme weather events, etc.) of CC can be ameliorated in the short term. Scientific findings are showing that marked changes are already taking place and are impacting these coastal ecosystems, and will have increasingly adverse effects even after atmospheric CO₂ emissions may be stabilized or decreased. Recent synthesis has even cautioned that society may already be faced with irreversible biophysical changes based on recent measurements and observation (Adger *et al*, 2005). Consequently, conserving and sustaining ecosystems and biological resources for the future may require a larger focus on developing adaptive resource management strategies, or coastal communities will be faced with hardships associated with the loss of many natural systems and services as a result of climate change. However, even in the light of such warnings, there has been little development of comparable methods that assess the vulnerability of coastal ecosystems and services. Most vulnerability assessments appear to have focused more on particular sectors or individual ecosystem types isolated from others. But standard methods are important in measuring, making meaningful comparisons and in planning for adaptation across ecosystem type and between sites with common habitats. For such methods to be useful to resource managers, they need to be reasonable to execute and economically feasible.

In 2003, the World Wide Fund for Nature WWF and its partners benefited from a GEF-PDF-A (A = Biodiversity) to develop a project proposal for building coastal resilience to climate change through the development of a generalizable method for assessing vulnerability and adaptation of mangroves and associated ecosystems for Africa (Cameroon and Tanzania) and the South Pacific (Fiji). By examining similar systems in three multiple locations, this project intended to develop a method that can be generalized and replicable between mangrove, sea-grass, and coral reef ecosystems by leveraging focussed activities within target countries. The approach also intends to build and strengthen the local and national capacity of targeted countries as well as on-the-ground

projects demonstrating practical approaches to vulnerability assessment and adaptation by involving multiple stakeholder groups throughout the planning and execution stages of project to promote effective vulnerability assessment and climate change adaptation projects and policies. This was intended to support development of regional scale planning, as well as potentially promoting management concepts such as networks of protected areas and the links between threatened ecosystems (including upland areas). As a result, this project tries to demonstrate how policies and plans can help countries adapt to climate change. The effectiveness of this approach and adaptation strategies for the ecosystems and communities involved is being tested through pilot initiatives in each of these countries.

This paper assesses the status of achievements of such initiatives in Cameroon, challenges and future perspectives for such an expanded programme in the rest of African mangrove covered countries.

Development of vulnerability assessment methodology

In Cameroon, the project development phase kicked off with a workshop in the coastal zone of Limbe in March 2004. The workshop provided an opportunity for regional stakeholders engaged in the management of mangroves in Cameroon to devise strategies to reduce the negative impacts of climate change on these ecosystems and strengthen the livelihood security of human communities within mangrove areas. It served as a scoping exercise to further the development of proposed project goals, objectives, and activities.

Stakeholders agreed on working definitions of vulnerability as exposure, sensitivity and/or adaptive capacity of an ecosystem to change impact also often used interchangeably with resilience to mean the ability of the ecosystem to maintain system function, services and processes in the face of change (bounce back to its original pre-disturbed state after a disturbance which may be a climate change impact or anthropogenic impact); resistance as its ability to absorb change (withstand); and adaptation as actions or measures put in place to increase resistance of the ecosystems to anthropogenic or climate change impacts. Three pillars of adaptation planning identified were: Impacts-based: Identify impacts, then assess vulnerability to those impacts, then identify adaptations. Risk-based: Develop scenarios of risks, identify possible vulnerabilities to those risks and then identify possible adaptations. Vulnerability-based: Assess the causes of social vulnerability then develop adaptations that will reduce overall vulnerability to any change.

Three mangrove key sites were selected during the workshop for the testing of the methodology with the involvement of many institutions in the execution of the project including community based organisations within the Cameroon Mangrove Network, consultants from research institutes, universities and university students with CWCS playing the lead role in collaboration with WWF Central African Regional Programme Office (WWF-CARPO). These sites included Ndongoré (Rio Del Rey Estuary), Douala-Edea (Cameroon Estuary) and Ntem Estuary (Ndongoré) representing the mangrove covered areas in Cameroon with the present country surface area of about 200 000 ha (Ajonina *et al*, 2008; UNEP, 2007). Ongoing activities within these sites have been capacity building of local NGOs to appropriate the project through workshops and on-field training activities on the monitoring of four key aspects of vulnerability assessments:

climate (temperature and rainfall regimes); ecological (baseline assessment of mangrove species zones, condition, productivity, biomass, phenology, stand dynamics, sedimentation rates under mangroves, tidal and sea level amplitudes, elevations relative to sea level); socioeconomic (human population census and resource use interactions and perceptions); and policy aspects which include policy actions at local, national and international levels.

Field Testing

Community based vulnerability assessment monitoring efforts

- Monitoring stations and infrastructure that will regularly provide scientific data for field testing of *Vulnerability Assessments* (VA) have been completed in three mangrove sites of Ntem, Douala-Edea and Rio Del Rey estuaries with the involvement and project appropriation of a network of over 12 local NGOs and CBOs in field monitoring efforts spread over the Cameroon coastal area (Figure 1). These community group members regularly feed project management with vital data.
- Continued awareness raising and capacity development of local population on mangroves and climate change impacts
- Training carried out on the climatic, ecological and socio-economic aspects of the methodology for over ten local organization members of Cameroon Mangrove Network (CMN) through several on-field training workshops by CWCS and group of consultants from University of Buea. Members of six local organizations voluntarily collect basic ecological data by regularly monitoring the established ecological structures set in the three sites consisting of four (04) 0.1 ha Permanent Sample Plots (PSP) in Ntem and Rio Del Rey sites to complement eleven (11) PSP already set in Douala-Edea which can contribute to the evaluation of mangrove forest dynamics and ten (10) stations for monitoring of tidal dynamics, mangrove including micro-topographical influence on mangrove distribution and river sedimentation for monitoring catchment dynamic processes, and periodic assessments of water quality and biodiversity assessments, climatic data collection, socioeconomic surveys on resource use patterns and interactions, etc. In Douala-Edea emphasis was on the strengthening of existing VA monitoring structures, especially the monthly waterfowl counts and river sedimentary monitoring in the lower Sanaga reduced to biannual monitoring for waterfowl to coincide with migratory patterns from experience from ten years monthly monitoring efforts with local organisations.



Figure 1: Monitoring tidal/sedimentation station by representatives of local community based organisations in the Rey Del Rey Project site in Cameroon. Note the prominent aerial roots of the mangrove trees. (Photo Ajonina)

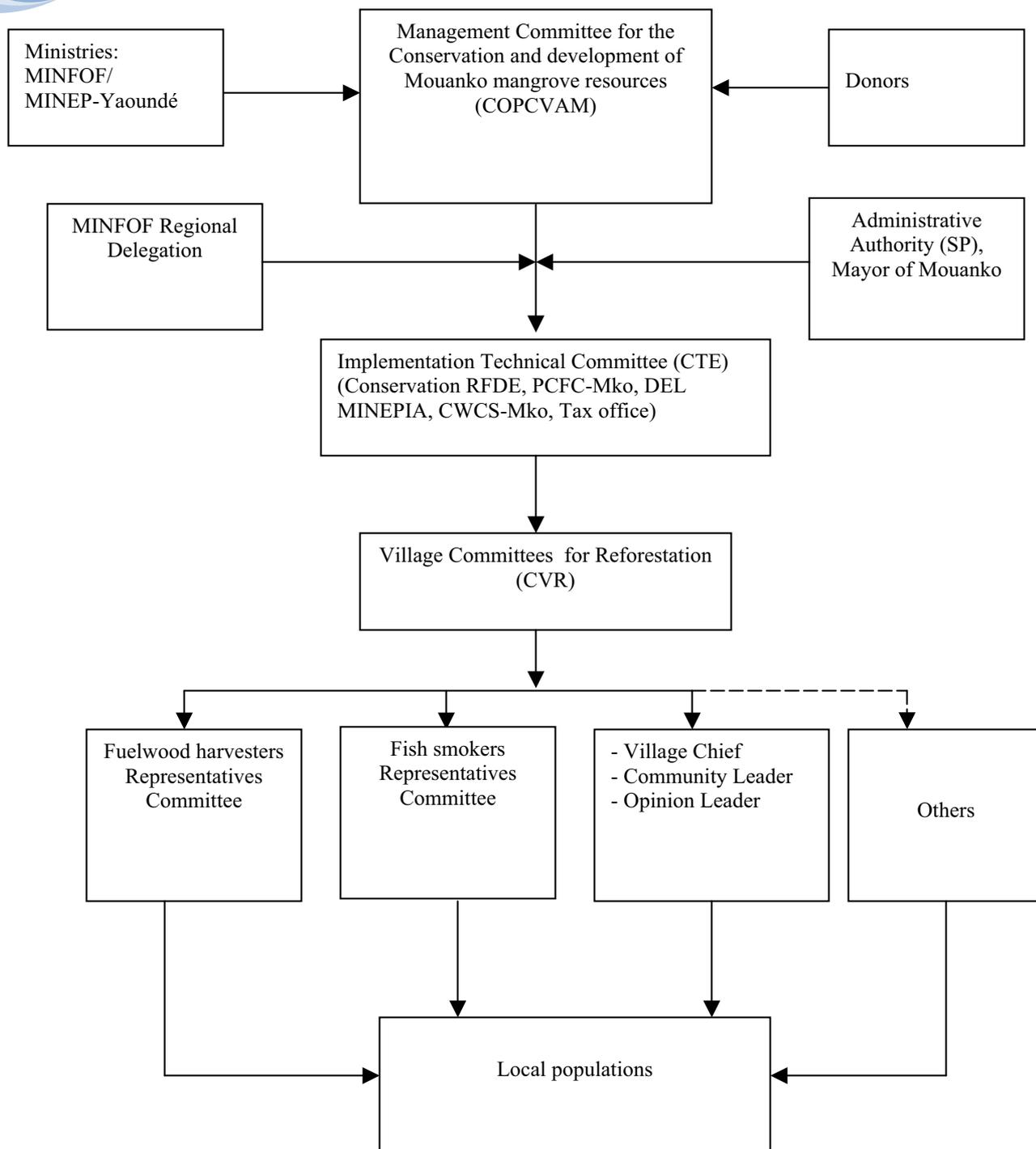
Activities to rehabilitate mangrove forests

Though the original intention of the project was for interventions (*adaptation*) to flow from the analysis (*VA*), however adaptation initiatives have taken place concurrently with the VA, largely due to time constraints. As a result some interventions have been focused on building resilience in mangrove systems rather than direct adaptation to demonstrated impacts or vulnerabilities.

- Policy change.

Like in other African countries, specific policies to protect mangroves do not yet exist in Cameroon. A National Mangrove Plan is awaiting endorsement from the government, but also needs to be mainstreamed into broader policy including the new Poverty Reduction Strategy Papers (PRSP). Mangroves would be currently considered by the government as a separate forest ecosystem with specific needs in the ongoing review of the 1994 national forestry law. This project is further highlighting their importance including the ongoing lobbying for the official endorsement of the national policy and strategies for the sustainable management of mangroves and wetlands. Gazettement of the project sites as Ramsar Sites of international importance for protection of wetlands is underway with the completion of information sheet for some.

At the local level, policy development through institutionalisation of mangrove management in a participatory manner through local mangrove steering committees and consultative platforms with key stakeholders involving local administration was undertaken (see the governance structure Figure 2).



Other Abbreviations:

MINFOF : Ministry of Forestry and Wildlife
 MINEP : Ministry of Environment and Protection of Nature
 MINEPIA : Ministry of Livestock and Animal Industry
 RFDE : Douala-Edea Wildlife Reserve
 PCFC : Hunting and Wildlife Checkpoint
 SP : Sub-Prefect

Fig. 2: Governance structure of local mangrove management committee Douala-Edea region, Cameroon
 • Mangrove restoration

a) Nurseries for community mangrove green-shield establishment

Mangrove nurseries have been established in Ntem estuary by the population of Campo Beach with over 4000 mangrove seedlings raised and established as green shield to protect Campo Beach from coastal erosion and wind. This is a community initiated project based on negative experience from collapsing engineering construction of concrete walls along the beach (an example of social vulnerability assessment). Several of such village green-shields exist in Douala-Edea area. Selected members of local organisation in the Campo village monitor nursery seedling development and record in conceived data sheets.

b) Restoration of degraded mangrove forests

Similar activities have been realised in the Douala site with up to 15 ha of mangrove forests being replanted from established nurseries and wildings obtained from mother trees during the community mangrove wood demarcation activities implemented by the COPCVAM. This was also through the initial support of the French NGO Planète Urgence volunteers, Oxfam NOVIB and GEF Small Grants Programme funding.

- Efficient mangrove management through demarcation and control of community mangrove wood gathering zones enforced by the local mangrove management committee (COPCVAM) to curb further mangrove deforestation from illicit and uncontrolled wood harvest. COPCVAM initiated field programmes coordinated by CWCS and Conservation service of the Douala-Edea Reserve to demarcate and control future wood gathering zones. Criteria for demarcation of zones included mangrove stands further away from permanent plots, exclusion of seaward mangrove zones and creek margins.
- Mangrove wood energy efficiency management
This involves the implantation of energy efficient fish smoke houses designed and being tested by CWCS within fishing camps in the Douala-Edea (Figure 3B). They formed the bases of the In the Hands of Fishers (IHOF) Workshop of community based approaches to mangrove and fisheries management organised by CWCS supported by the Mangrove Action Project (Los Angeles) in collaboration with the then Cameroon Ministry of Environment and Forestry in May 2003 at Edea. Twenty fishing camps have so far either benefited on the implantation of smoke houses with assistance of SNV (Netherlands Development Organisation) and Oxfam NOVIB or had sites in their various zones surveyed for such implantations. A new energy efficient smoke house (Figure 3) project has been selected among the two country projects to benefit from avoided deforestation initiatives under the CDM process with technical project development assistance from the French based Carbon Initiative (CASCADe).

Δ



B



Fig.3 :(Top: A) Traditional fish smoke house and (Below: B) Improved smoke house in the Douala-Edea Project site (Photos by Bertin Tchikangwa)

Preliminary results

Earliest results of actions implemented so far include completing of field monitoring stations and infrastructure in the three mangrove sites (Ntem, Douala-Edea and Rio Del Rey estuaries). Through regular monitoring by the community groups, these should provide scientific data for field testing of the generalisable methodology. Initial result is thus limited to the high level of community participation and appropriation of the methodology, which translated in their massive participation and involvement in the monitoring exercise. It is envisaged that they would continue to regularly feed project management with data that will be analysed to test the methodology. As part of the project, a symposium to bring together stakeholders from within and without Cameroon (i.e. seven other mangrove countries in Africa) is scheduled to hold in April 2010. By this

date, it is hoped that the project would have generated enough data to present concrete results of the field testing.

Challenges and future perspectives

The major challenge lies in the ability to establish strong and informed links or relationship between vulnerability assessments and climate change adaptation efforts and the expansion of the endeavours in other African mangrove covered countries.

Challenges

Specific challenges are:

- Ability to sustain voluntary local community data collection work
- Ability to analyse data to inform climate sensitive decision making processes
- Collecting vital meteorological data given the poor state of meteorological infrastructure in Cameroon and analyse climate change data
- Up-scaling from pilot activities
- Private sector involvement especially extractive industries that have a greater impact on the mangrove ecosystems
- Sustainable financing mechanisms to sustain the endeavour.

Future perspectives

Vulnerability assessments based perspectives include:

- Production of a consolidated VA manual based on consolidation and analysis of existing VA data to show important patterns and trends (mangroves species zones and condition, stresses, past sea level history and projection and their impacts.
- Exploration of mechanisms to sustain local community data collection/monitoring processes especially covering basic subsistence and transport costs for members of the local organizations involved in the data collection process. The possibilities of integration into ongoing conservation and development projects, collaboration with private sector actors especially extractive industries are also being explored
- Continued local capacity building by training of local organisation in basic data processing techniques (general training workshops, etc.) in order to appropriate the methodology and make informed decisions.
- Enhance VA information sharing mechanisms to make informed decisions making processes (forestry code, coordination of mining, oil & gas and forestry sector, etc)

Perspectives to enhance mangrove ecosystem adaptation to climate change impacts would include:

- Continued mangrove restoration work in degraded mangrove zones within the project sites and support of establishment or maintenance of green shields to protect the coast from erosion.
- Energy efficiency management to enhance avoided mangrove deforestation through the establishment of modern mangrove wood energy efficiency ovens for fish processing within project sites
- Continue local institutional strengthening such as COPCVAM initiative to implement concrete adaptation activities including control of community wood gathering activities
- Continued policy mainstreaming work (mangroves and wetlands...) using the Cameroon Mangrove Network to organise integrated coastal area management forums

- Promote the gazettement process for marine national parks especially by seaward extension of existing coastal national parks especially Douala-Edea National park to protect local fisheries resources and promote sustainable fisheries.

Acknowledgements

The authors wish to thank NGO and CBO members of the Cameroon Mangrove Network for contributing to the success of the project and the facilitating role of the officials of the Ministry of Forests and Wildlife, Ministry of Environment and Nature Protection and Ministry of Fisheries and Animal Industries at the national and local levels including local councils. We are also grateful to the members of the Global Advisory Group especially Drs Joanna Ellison, Jonathan Cook, Esther Mwangi, Jason Rubens and Grey Wagner for fruitful exchange during the last meeting in Douala-Cameroon.

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