

13 Mangrove: Changes and Conflicts in Claimed Ownership, Uses and Purposes

M.-C. Cormier-Salem

UR169-IRD/MNHN, Département Hommes, Natures, Sociétés, Paris, France, e-mail: cormier@mnhn.fr

Abstract

From its early discovery, mangrove has inspired ambivalent feelings among Westerners, ranging from delight to repulsion. It has been considered in turn as an unhealthy and hostile milieu, as a source of multiple resources or as a fragile, diversified and rich ecosystem. Management policies have also varied between extremes: from periods of degradation and conversion to periods of rehabilitation, restoration and protection. This contribution is centred on claims and conflicts over mangrove wetlands.

First, through the case study of West Africa, we will show the very early (at least, the 15th century) multiple-use system controlled by peasant-fishermen communities, then the disruption of this remarkable and sustainable system with the 'white' penetration and colonization, ending with the recent process of rehabilitation, restoration and protection or 'heritage construct', that leads to conflicts.

Second, this contribution will question the relevance of the concept of natural heritage, and set out the different interpretations and constructions that can be made from it: Which are the living objects designated as heritage? Who are the decision-makers, the stakeholders, the managers and/or the caretakers? Is mangrove a world heritage, a communal territory, a private capital or a public good?

Third, to answer these questions, multidisciplinary approaches and new tools of management, not only integrated but also concerted, have to be developed. The diverse relationships in mangrove societies call for a variety of legal and management policies. In addition, a diachronic approach is necessary, investigating several time intervals (from a few years to eras).

This contribution also discusses the implications of innovative tools such as the institutionalization of heritage and new ways of valuing nature, such as product labelling, eco-certification or ecotourism.

Introduction

When mangroves were designated as part of humankind's common heritage in Agenda 21 at the Rio Earth Summit (1992), the reversal of attitudes and policies regarding these sites was institutionalized. Long considered, at least in Western eyes, to be impenetrable swamps, mangroves are now considered as

rich ecosystems, fragile and threatened by human activity, to the extent that they must urgently be protected. Making mangroves part of our heritage, or patrimony, is justified by the desire to preserve this ecosystem, which is indispensable for maintaining both terrestrial and marine biodiversity.

Yet, the idea that mangroves are a unique heritage, collectively shared by all of

humankind, is, from our point of view, not only scientifically false but also socially unacceptable. This notion of a common heritage engenders a threefold question: Can mangrove marshes in their entirety constitute a heritage, and, if not, then which elements are worth conserving? This issue is connected to the question of stakeholders involved in these processes: from local users to international bodies, from managers to decision-makers. It is clear that mangroves lend themselves to a range of projects, expressing the multiple values and functions that are associated with them. What mangroves represent for some is not what they are for others; and this is why mangroves are a disputed heritage, the subject of many conflicts related to representations, uses and access. The third question is that of mangroves' legal status: To whom does this patrimony belong? Is it a public, private or community good? Who are the beneficiaries, the stakeholders and the guardians?

This chapter aims to show that treating mangroves as patrimony often does not meet ecological imperatives, nor does it satisfy the needs of the communities involved. Most protection policies, or 'heritage-building' processes, are failures, and exacerbate conflict between stakeholders, at the local as well as at the regional, national and international levels. We try to illustrate the major causes of these failures, show the multiple issues – ecological, economic, political and social – that are at stake in mangrove marshes, and analyse the dynamics and strategies at work.

In the first section, we analyse the change in attitude towards mangroves, and the prevailing conditions that led to them being considered as a heritage. In the second section, using three case studies, we analyse local strategies that have been elaborated to meet the challenges of biodiversity conservation and sustainable development. In the third section, we demonstrate the effects induced by heritage-designation processes, their limitations and contradictions, as well as the innovative changes they have brought about. In our conclusions, we emphasize the main questions and perspectives in terms of research and action to achieve integrated and

concerted management of mangrove areas.

Mangroves: from Depreciation to Heritage Building

Changing attitudes towards mangroves testify to the progression of knowledge, but above all they reveal the ideological and economic ramifications of policies aimed at managing nature in tropical areas. In this section, we show that ignorance of local know-how and the destruction of genuine mangrove civilizations are the corollaries of the expansionism of colonial powers, and that our way of perceiving and managing mangroves is deeply rooted in this colonial mindset (Haraprasad, 1999). The present-day tendency to preserve, even to monumentalize, them as sanctuaries is only one of the more recent examples of these politics of domination (Neumann, 1998; Zimmerer and Bassett, 2003).

Dense and long-standing occupation until the whites arrived

Shell debris and middens in Asia, Latin America and Africa attest to the long-standing occupation of coastal mangroves and their early exploitation for multiple purposes. Research by Higham (1988) in South-east Asia highlights the long tradition of coastal life in which rice growing is associated with the gathering of seafood (fish, crab, molluscs, turtles), as far back as 5000 years before our era. Several authors underscore the nutritional importance of food derived from mangroves and adjacent coastal zones in the ancient Americas (Bearez, 1996; Craighead, 1997; Musset, 1998; Kneip, 2001). In West Africa, excavation of kitchen middens in the region between the Saloum and present-day Guinea Bissau attests to the presence of human groups that lived in the mangroves and exploited their resources (oysters, shellfish, fish, salt and rice), and traded them (Cormier-Salem, 1999a).

From the 15th century onward, with the major discoveries and exploration of the

New World, written sources are more and more numerous and specific (Saenger and Bellan, 1995; Cormier-Salem, 1999a). The first descriptions of the West African coast testify to its settlement in ancient times, as well as to the density of the coastal population, to the importance of products drawn from the mangroves and to the highly elaborate implantation of rice-growing areas in the mangroves.

Mangrove, the 'white man's grave'

The arrival of the white man – navigators and explorers from the Old World – constituted a major break in the history of mangroves. With the great seafaring voyages, followed by colonial conquest, indigenous coastal populations were unable to resist foreign aggression, while at the same time the development of maritime trade profoundly and durably altered ancient relationships of exchange and multiple-use systems (Rodney, 1970; Brooks, 1993; Cormier-Salem, 1999a).

The predominant image of mangrove swamps, the one that emerges from the accounts of French voyagers and missionaries in the 17th century, echoed throughout the 18th and 19th centuries, is that of a repugnant, hostile, unhealthy and impenetrable environment. Two conceptions about mangroves are particularly tenacious. The first notion is of their wild and inhospitable nature: living conditions are so difficult that only primitive peoples who are forced to take refuge there can live in mangroves. In the writings of explorers, and of later colonial agents, it is easy to move from the idea of marginal status in space to marginal status in society, from the view of a malignant environment to the perception of a malignant population.

The second notion is that mangroves are unhealthy. The hot and humid coasts of 'Northern Rivers', in particular Sierra Leone, were commonly called the 'white man's grave' because of the various fevers that were rampant in these regions (Carlson, 1984). Mangroves were preferred terrain for malaria, a disease perceived as linked to humours emanating from swamps. The term *paludism* is derived from *palud*, meaning

swamp, and in Italian malaria means 'bad air'. It is true that Africa is a vast foyer for malaria. But, mangrove forests are not particularly pestilential, and might even be healthier than places inland. Entomologists have shown that the dominant *Anopheles* species (*Anopheles melas*) in the mud flats of African brackish waters is not a very efficient vector of malaria (Mouchet *et al.*, 1994). The most effective vectors are freshwater species (*A. gambiae*, *A. arabiensis*). The numbers of these species rise with increasing rainfall and the construction of freshwater ponds and lakes, and thus, paradoxically, with colonial hydraulic and agricultural works.

In practice, repugnance towards mangroves led to vast colonial operations intended to drain, cleanse and improve mangrove marshes for productive purposes. For a long time, mangrove soils, which are heavy, fluid and subject to acidification and salinization, were deemed unsuitable for agriculture, except at the cost of massive investment. Demographic pressure and technological progress in the first half of the 20th century lifted some of these constraints, leading to a change in thinking, and maritime mud flats were seen as immense reserves of arable land.

In Latin America, mangroves were converted to sugarcane and palm plantations, while West African mangroves were meant to become the rice bowl of French West Africa. Most of these conversions were spectacular failures, economically as well as ecologically and socially (Rue, 1998). Yields were low, and the civil works involved were not reappropriated by farmers because they were not adapted to agricultural and pedological conditions. The modification of natural outflows has caused lasting disturbances in ecosystem functioning. Vast expanses of mangrove forest, cleared and transformed into solid land, are now abandoned. Ultimately, the multiplication of freshwater collection points favours new outbreaks of malaria in these areas (Mouchet and Brengue, 1990).

The hygienist and productivist aims of the colonial period were followed in the 1950s by the newly independent countries' desire to acquire substantial industrial and port infra-

structure, and the need to expand the limits of urban areas. Drying and filling mangrove mud flats was a response to the demand for land that accompanied maritime development and urbanization of coastal regions.

With the boom in shrimp farming in the 1980s and 1990s, the productive function of mangroves was once again to the fore. Mangrove forests, but above all the mangrove backcountry, are now increasingly becoming preferred sites for shrimp farming. The commercial value of shrimp is on another scale altogether compared to other mangrove products. This activity constitutes a growing, if not a predominant, foreign-currency contribution to the GNP of many Southern countries. Today it is one of the major factors causing the disappearance of mangrove systems (Barbier and Satirathai, 2004).

Mangrove rehabilitation

While repugnance for mangroves is deeply rooted in our imagination and their utilitarian functions are given precedence in many Southern countries, new and radically different conceptions appeared in the course of the 20th century. These ideas converged towards rehabilitation of mangroves and have given rise to protection and restoration programmes (Williams, 1990; Dugan, 1992; Mitsch, 1995).

Starting in the late 1960s, international organizations such as FAO and UNESCO began to pay close attention to the situation of mangroves, aware of their accelerating disappearance and concerned about the risks incurred for coastal environments, both locally and globally. This change in attitude can be attributed to the rising influence of environmental concerns and movements, as well as to greater knowledge of the multiple functions and values of humid coastal wetlands and the importance of their preservation in order to conserve land and marine biodiversity. As shown in these studies (Saenger *et al.*, 1983; UNESCO-UNDP, 1986;

Hook *et al.*, 1988), mangroves are stabilizing factors for the coastline, protecting beaches and river banks, retaining shorelines, acting as breaks against storms, hurricanes and waves,¹ etc. In addition to this physical role, they have a biological role in enriching coastal waters and soils. They provide ecological niches for micro flora and fauna; spawning and nursery grounds for fish, shrimp and shellfish; refuges for migratory birds; and natural habitats for various forms of animal life. Mangroves are henceforth presented as rich, complex and fragile ecosystems that must be protected from human impact.

In this rehabilitation of mangroves, although the scientific community played an essential part in raising consciousness, and international organizations such as UNESCO and FAO were quick to launch research and reforestation programmes, the pressure exerted by certain NGOs must be underscored. Groups such as the World Wide Fund for Nature (WWF) and the International Waterfowl and Wetlands Research Bureau (now Wetlands International), along with the World Conservation Union (IUCN), were the principal driving forces behind the International Convention on Wetlands signed in Ramsar (Iran) in 1971. The Ramsar Convention was a major milestone in the implementation of new policies for mangrove management, or heritage building.

Mangroves: from resource to heritage

Once merely zones for exploitation of resources, mangrove systems have become assets, project spaces and even a projection of our dreams. The notion of 'natural heritage', although scientifically ambiguous, is increasingly popular, corresponding to the desire to enact effective environmental protection policies (Cormier-Salem and Roussel, 2000). Originating in the Western world, this notion is now spreading around the world.² Red lists of endangered species

¹ The tsunami that occurred on 26 December 2004, in South-east Asia, dramatically testifies to the mangroves' buffer role.

² The term 'patrimony' is part of the vocabulary of Western civil and religious rights. From the Latin *patrimonium*, it designates collectively the goods and rights inherited from the father (Rey, 1992).

keep getting longer, and protected areas (national parks, Biosphere Reserves, etc.) are expanding. This process, which is relatively recent and remained limited in spatial terms and in its objectives up to the 1990s, is now experiencing an explosion concerning mangroves. According to Spalding *et al.* (1997), only 685 protected areas contain mangrove forest sections. The first patrimonial reserves to be constructed had purely ecological aims, sometimes related only to fauna. Mangroves were at first viewed as refuge habitats for animal species deemed to be of patrimonial value, either emblematic ones such as the Bengal royal tiger (Haraprasad, 1999) or those of international significance such as migratory species. Accordingly, the first West African coastal areas to be registered, starting in 1976, were migratory bird sites, initially recognized as Ramsar sites, then as UNESCO Biosphere Reserves (Saloum Delta with the Île aux Oiseaux in Senegal) or national parks (the Arguin Bank and the Barbary Point in Mauritania, Djoudj in the delta of the Senegal River and Île de la Madeleine off Dakar) (Fig. 13.1).

Alongside these official asset-building processes, for the most part exogenous in origin, our research highlights the existence of endogenous nature conservation processes (Cormier-Salem *et al.*, 2002). We observe characteristics habitually attributed to patrimonial objects, as described elsewhere (Babelon and Chastel, 1994; Cormier-Salem and Roussel, 2000). These characteristics are three in number. For a natural object to be given the status of a heritage, it must first of all be inherited from ancestors; second, it must be destined to be bequeathed to following generations (which assumes sustainable management); and third, it must embody a collective identity.

The objects officially designated as constituting a heritage and the dynamics that underpin these choices are rarely those of the local human community. Three case studies illustrate the divergences among ways of viewing and conceiving mangroves as a heritage.

Diversity of Local Strategies for Confronting Conservation Issues

The Kaw estuary: a sanctuary

The Kaw estuary in French Guiana is the largest French wetlands zone and constitutes a remarkable natural sanctuary in terms of the diversity of its vegetation, richness of fauna and minimal human impact. The dense forest is made up of mangrove trees, and also pinot palm, epiphytes and vines. It is home to rare animals such as the black cayman (*Melanosuchus niger*) and the mata-mata turtle (*Chelus jimbratus*); endemic species, including a legless aquatic frog (*Typhlonectes compressicaudus*); and remarkable birds such as the crested hoatzin (*Opisthocomus hoazin*) and the red ibis (*Eudocimus ruber*). Kaw shows very little trace of human presence. Excepting the village of Kaw itself, built at the end of the 19th century by Noir-Marron, descendants of slaves, and numbering about ten houses, there are no permanent dwellings. Woody mangrove stands are not particularly exploited; grassland is somewhat more exploited, as seasonal pasture land for grazing herds. Mangroves are also a strategic location for the reproduction of fish species such as atipa (*Hoplosternum littorale*) that build their nests there. Exploitation of coastal and marine resources is very limited, except for shrimp fishing. Fishing in the estuary and the river is more common: certain native American communities (Wayapi) specialize in fishing, and small groups of itinerant fishers travel along the rivers. Fishing, hunting and grazing animals are the main uses of the mangrove swamps; these are all itinerant and extractive activities.

In spite of recent and limited human settlement, the creation of the Kaw-Roura Swamplands Natural Reserve (by government decree in March 1998 and registered as a Ramsar site in November 1993) on some 98,500 ha and its ecotourism operations have generated much tension. The inhabitants of Kaw are afraid that their hunting and fishing practices may be threatened by restrictive measures for the protection of wild fauna and by competition from 'metro' (mainland

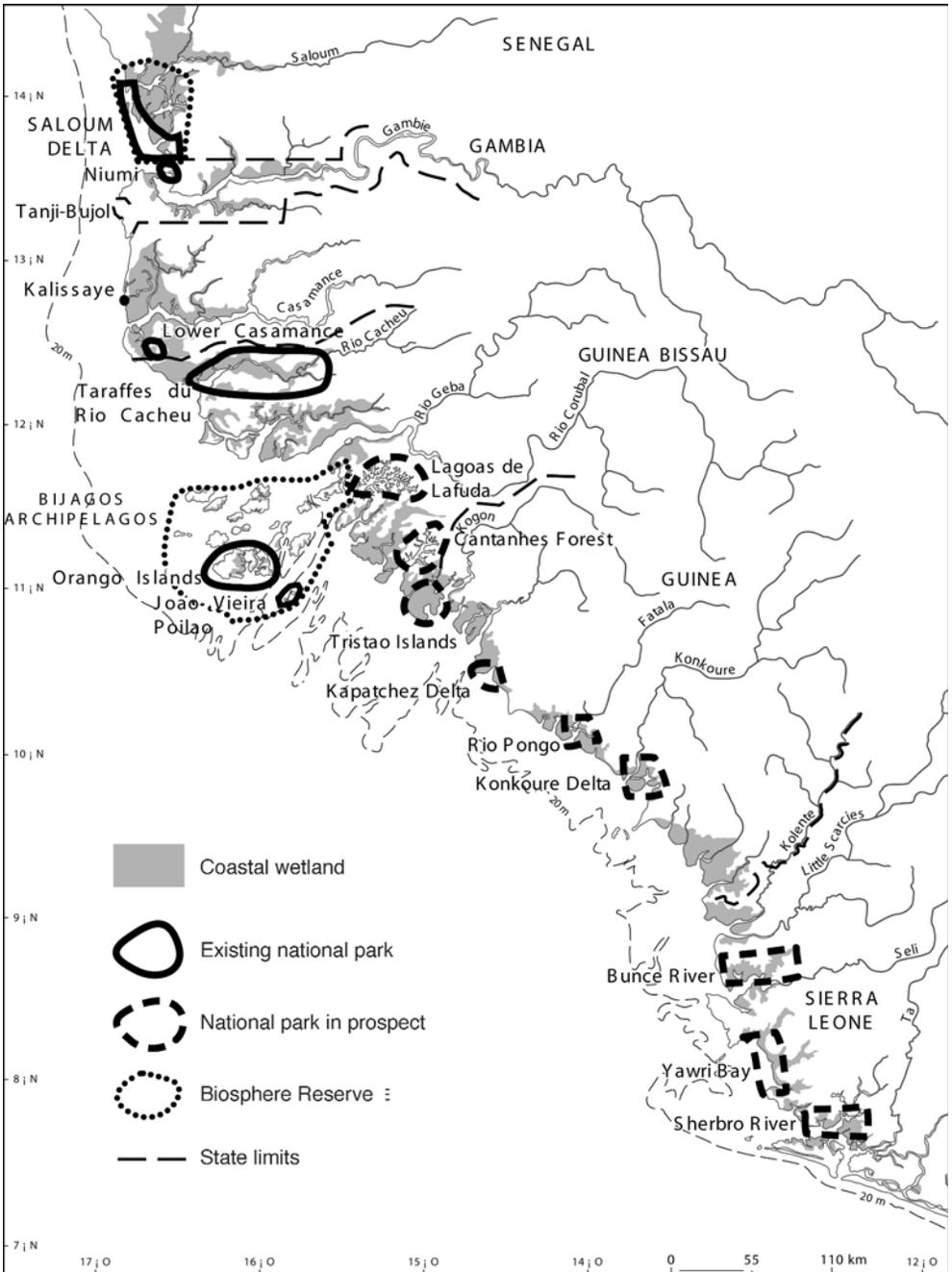


Fig. 13.1. West African coastal and marine protected areas.

France) hunters out of Cayenne. Hunting, a sporting activity for foreigners, is of prime importance to local nutrition and social structure. Competition between fishing and animal husbandry is also a source of conflict. Kaw is attached to Regina Township, where the mayor possesses large herds of cattle that graze throughout the swamplands in the dry season. These herds are entrusted to the care of Brazilian herders, who are underpaid immigrants. They are seen as responsible for the trampling of atipa nests, necessary for the reproduction of this fish. Sale of atipa in Cayenne is the main source of income for the people of Kaw. These competing uses are mirrored by power struggles within the village: some support and some oppose the mayor of Regina. Lastly, the Noir-Marron population is not indigenous. The people have neither property rights nor recognized rights of usage for mangrove resources. Unlike Native Americans, they can make no claim to traditional naturalist knowledge or mythical ancestors. And yet they are just as fully entitled as French citizens.

The Menabe mangrove wetland in Madagascar: a pioneer frontier

Madagascar is one of the places where the contradictions between discourse and action plans are the most glaring, where the conflicts of interest among economic development, preservation of traditions and protection of biodiversity are the most blatant. A 'natural paradise' endowed with exceptional biodiversity, ranking fifth among the 17 Global Diversity Hotspots according to the United States Agency for International Development, the Grande Île (Madagascar) is one of the poorest and most heavily indebted states in the world. International pressure (World Bank, UNDP, etc., and major NGOs) and new policies of openness to the outside world, economic renewal and social development, followed since 1992, have led to the implementation of the National Environmental Action Plans. These plans are intended to preserve the remarkable Malagasy biodiversity, while at the same time fighting poverty. Among all the mea-

asures for protection and coordinated management of biodiversity, one cannot help but underscore the meagre attention paid to mangroves. There are only two protected coastal or marine areas, both located on the eastern coast, where there are no mangroves. Only one protected zone on the west coast, Kirindy near Belo-sur-Mer, includes a small section of mangrove.

This relative lack of interest contrasts with the high stakes attached to the degradation of continental biodiversity: forest loss (68–85%), migratory dynamics and territorial pressure are all related to the dominant mode of agricultural production: itinerant slash-and-burn cultivation (Razanaka *et al.*, 2001). Deforestation is also due to the creation of economic value from the heritage of the remarkable landscapes and unique sites of the Merina kingdom in the High Plateau region, and from emblematic species such as orchids and lemurs, which embody ecological and aesthetic value far greater than that of mangrove trees or crabs. The lack of interest in mangrove conservation is also explained by the economic importance of coastal resources and the prime goal of turning them into sources of foreign currency. When shrimp are declared to be strategic national resources (Goedefroit *et al.*, 2002), mangroves become frontiers to be conquered and converted into shrimp farms and salt-works.

The coastal wetlands of this region were long used essentially as grazing lands for herds of zebu raised by seasonal Sakalava herders. Human settlements were limited to small fishing or wood-gathering camps. From the mid-19th century to the 1960s, several waves of migration contributed to the settlement and improvement of the marshes. Starting in the 1970s, shrimp fishing, then farming, engendered an influx of population.

The increasingly sedentary population and the development of agriculture since the end of the colonial period, the search for land and water with the arrival of migrants, and the increasingly rapid clearing of fields and diminution of fallow lands have profoundly disturbed the organization of the Sakalava territories. Since the 1970s, a worsening of the climate and modification of

river drainage hastened the decline of animal raising and the abandonment of rice growing. This crisis in ancient agrarian systems has elicited strategies for the diversification of activities, reconversion and migration, leading to doubts as to the survival of the Sakalava identity.

In seashore villages such as Bosity, fishing is now the sole activity, along with maritime trade. Fishing techniques have become more diversified. In particular, we must take note of the use of large-mesh dragnets for catching swordfish, tuna and, above all, shark. Another alarming trend is the conversion of Vezo fishers into mere intermediaries who recover the by-catch from trawling vessels and sell it on Malagasy markets. While sea fishing from Bosity is diminishing, migration to fishing camps farther north has increased, and the extraction of mangrove resources during the rainy season is increasing (particularly for shrimp, fishing and woodcutting for the making of poles).

In mangrove backwater villages such as Ampataka, commercial exploitation of mangrove crab is becoming a major activity (Montibert, 2001). This specialization is linked to the collection system established by the Société de Pêche de Morondava (SOPÉMO) that transports the crab to its factory in Morondava, the Menabe regional capital. The crab is then exported to Asian markets.

Today, the Menabe mangrove marshes are subject to multiple pressure from local users, migrants and foreigners (*valiny*). The GSM saltworks, located some 15 km from Ampataka, and the Aquamen shrimp farm farther north at Tsangajoly, are steadily expanding their occupation of land and intensifying their production, leading to sharp tension in the local communities. The force of local claims based on heritage and territory can be read in the phenomena of trances, the resurgence of ancient taboos in reaction to the Ampataka saltworks and sabotage of shrimp ponds.

Northern Rivers: endangered amphibious territories

In the Northern Rivers region, the communal territories carved out in the mangrove

marshes are today threatened because ancient social and technical systems of managing these spaces are in jeopardy, and because of environmental changes. Hard labour in the rice fields, the burden of familial constraints, and isolation and difficult living conditions in mangrove villages without fresh water or electricity are all factors that drive people away. Migrations that were initially seasonal now tend to become permanent. In the zones affected by rural population flight, the hydraulic and agricultural infrastructure is no longer maintained. Because of the lack of labour, many rice fields have been abandoned. This retreat, visible as early as the 1950s, has accelerated because of the worsening climate and salinization of soil and water. In Ziguinchor (Casamance, Senegal), average rainfall that was over 1500 mm per year before the 1960s fell below 1000 mm in the 1970s and dropped as low as 690 mm in 1983. The consequent rapid increase in salinity level has led to a simplification of ecosystems and depletion of the surrounding environment. In Guinea, Sierra Leone and the south of Guinea Bissau, the impact of drought is less severe, but, in contrast, political instability has caused massive emigration and the collapse of local and national economies (Cormier-Salem, 1999a).

To confront this many-faceted crisis and compensate for the deficit in rice production, the people in Northern Rivers have developed strategies to diversify crops and broaden the range of rural activities. Growing rice in the highlands, tree cultivation and vegetable farming have made considerable progress. The old activities of gathering, often done by women, have been rehabilitated and integrated into merchant networks. Mangrove resources (mangle wood, salt, oysters) as well as the products of highland forests (cashew, palm) are exploited for small-scale commercial production and sent to rural and urban, even international, markets. In just a few years, Guinea Bissau has become one of the top-ranking producers of cashew nuts.

The development of estuary and sea fishing within local communities of rice growers, herders and fisher-farmers is without a

doubt one of the major phenomena of the last 20 years. For some socio-cultural groups, rice growing, once their main identity, has been superseded by fishing.

Overall in Northern Rivers, family strategies have become diversified, leading to a redistribution of tasks among sexes and age groups. The centre of gravity of rice growing has, by and large, shifted from the flood plains to the highlands. But rice, whether imported or produced locally, remains the basis of the local diet, and, all in all, the people are still culturally rice farmers.

Against this background, several local heritages can be identified: clearly, rice fields can be considered as a heritage by lineage, and a first definition of this patrimony can be proposed: 'the set of rice cultivation techniques, practices and institutions transmitted by ancestors that shape the community space and from which the community draws its identity, and which are to be kept fruitful and enriched'. Other components of biodiversity are valued as a heritage: animals (monkeys, manatees, turtles, flamingoes, etc.), plants (baobab, fromager – *Ceiba pentadra* – stands of mangrove and palm), products (palm wine, honey and mead) and landscapes (dyked sea marshes). The amphibious mangrove lands and the multiple-use and traditional management systems that maintain them are identified as both a bio-ecological and cultural heritage, in which the people of Northern Rivers find their identity (Cormier-Salem, 2002).

With the creation of protected areas, such as the Saloum National Park, most uses of mangrove resources have become illegal, with hardly any compensation or employment in return. Many animal species (e.g. turtles) are henceforth fully protected. Taking mangrove resources is allowed only for household use and a permit is required. Conflict with national park guards was frequent in the early years (1976–1979) but has now fallen off: schools and dispensaries have been built, wells dug and water towers and electric generators installed. The islands that once were isolated, proud of their unique features and keenly opposed to outside influence, are opening up, at the price of a profound questioning of ancient ways,

notably the social control exercised by the elders.

Learning from the case studies

These case studies highlight that mangroves are far from being homogeneous and stable entities. First of all, they are a patchwork of ecosystems, of widely varying size, composition and structure, depending on their own geographical and historical context. Second, mangroves lend themselves to differing socio-spatial units. These differences stem from the history of these regions, and from the conditions of settlement to their integration into colonial or postcolonial economic systems. They are also linked to the techniques, practices, knowledge and rules elaborated by the surrounding communities that leave their mark on the landscape. Lastly, mangroves depend on the capacity of these same communities to adapt to change in their environment (climate, policy, economy, etc.).

Moreover, the aspects of mangrove areas that are considered to be worth preserving, in other words the heritage, are very different depending on the stakeholders, from local to international levels, and the criteria change over time. Most local heritages (by lineage, community, etc.) are in disagreement with those defined by outside bodies and enshrined in international conventions. Furthermore, these heritages appear to be increasingly threatened by two major trends. One is the privatization of resources and spaces, the expropriation of the property of traditional holders in favour of public or private enterprises, and the search for value in a monoculture perspective. The second is the tendency towards individualism and the abandoning of 'traditional' systems.

Ambivalent Policies for Mangrove Heritage

In the last 20 years, multiple initiatives have been launched to fight the accelerating disappearance of mangrove forests and overexploitation of coastal resources. An initial

phase, marked by the desire to protect the habitats of migrating waterfowl, led to the creation of integral reserves and mangroves being designated as Ramsar sites. This was followed by a mangrove rehabilitation phase with replanting of mangle trees, and then a landscape preservation phase characterized by the creation of Biosphere Reserves. These reserves (under the UNESCO *Man and Biosphere* programme) do not preclude a human presence and uses, at least in their peripheral and buffer zones. This policy evolution, from the creation of sanctuaries against human presence to conservation with and for humankind, and from protection of a biodiversity compartment to integrated sustainable management of coastal areas, echoes the larger international debate on environmental issues and new approaches that seek to be more ecosystemic (including humans and their knowledge) and ecoregional (Cormier-Salem *et al.*, 2002).

Another notable change on the international scene is the legal status granted to heritage. The status of 'the common good' of humanity was officially adopted in 1982 at the Montego Bay Convention on the rights of the sea (Humbert and Lefeuvre, 1992). This status was granted to mangrove forests in Agenda 21, the set of resolutions submitted for approval by the countries attending the Rio Earth Summit in 1992. But, the Convention on Biological Diversity, drawn up at this same summit meeting, retreated from this stance on international environmental law. While the convention affirms in its preamble that 'conservation of biological diversity is a common concern of mankind', it none the less reiterates the sovereign control of states over their biological resources. At the same time, on the question of *in situ* conservation, this same convention recommends taking into account 'knowledge, innovations and practices of indigenous and local communities' (article 8, §J). Since 1996, reference to Traditional Ecological Knowledge (TEK) has been a constant feature of all biodiversity talks (Posey, 1999; Chouvin *et al.*, 2004). Henceforth, 'indigenous and local communities' are considered to be the prime beneficiaries of benefit sharing (Cormier-Salem and Roussel, 2002). The

way is now open for the recognition of local heritages. The proliferation of patrimonial constructions, varying widely in nature and status, leads to questions about their effects.

Instruments that remain defective

Research is increasingly questioning the ecological legitimacy and the economic and social acceptability of regulatory instruments, such as the red-listing of endangered species or the designation of protected areas. In addition to questionable selection criteria for species and spaces to be designated as heritage, such designations can lead to imbalances and ultimately to a loss of biodiversity. Coastal biodiversity in its entirety cannot realistically be conserved as heritage. The choices made translate into a compartmentalization or parcelling out, disturbing fluxes and exchange between ecosystems. Many ecologists have denounced this conception of a two-tiered protection system, with exceptional natural objects on the one hand and 'ordinary' nature on the other, the latter with a precarious status or even seen as a 'waste dump' that is strongly at risk of being neglected, if not destroyed (Génot, 1998). Another risk is that these processes may stall at a certain point, obstructing the remarkable dynamics of mangrove marshes, and perpetuating inadequate regulatory measures that fail to take environmental changes into account. Lastly, field studies reveal the incoherence of these policies and the difficulty encountered in respecting principles of equity – inter- and trans-generational – due in particular to the multiplicity of partners and lack of coordination.

Mangroves, an ecotone between sea and land, are particularly vulnerable to the harmful effects of the compartmentalization of government agencies and administrations, dispersed among different ministries. The administrative jigsaw puzzle observed at the national level is even more evident on a regional scale. Taking the example of the Saloum delta on the Senegalese seashore, the various territorial authorities do not have the same boundaries, and stakeholders are legion. In addition to Water and Forest Department employees and those from the

Fishery Department, there are personnel from the National Parks Division (for the Saloum Delta National Park), the World Conservation Union and UNESCO (for the Saloum Delta Biosphere Reserve), representatives of village associations and federations, producer groups, and international cooperation missions (Japanese, German, Belgian, Swiss, French, etc.), not to mention private investors increasingly attracted by the potential for tourism in the Saloum delta (Cormier-Salem, 1999a).

In addition to this jumble of conservation territories, management plans keep piling up: the same section of mangrove is alternatively designated for reforestation, conversion to shrimp farm ponds, rehabilitation as a recreation site, etc.

To comply with the Convention on Biological Diversity, management projects must reconcile environmental protection with the well-being of the local population. While these projects are in practice implemented at the local level, quite often they are still drawn up by centralized institutions that are too far removed from reality in the field. Local actors find themselves invested with a new 'manager' status that they are not always ready to assume, especially since the transfer of responsibility rarely comes with the corresponding financial means. Furthermore, recognition of indigenous people's priority in terms of access and usage, if not of their exclusive rights, quite often leads to the exclusion of other users, notably migrants, for whom mangroves and their resources have a fundamental role.

Seeking sustainable alternatives

In the wake of the frequent failures of public policy on mangrove conservation, new alternative and sustainable pathways are being explored. The development of non-merchant economic value in mangroves, such as nature-based tourism, or commercial value via labelling of local products, is emerging as a way of reconciling environment and development, maintaining biodiversity and sharing benefits equitably (Dugan 1992; Perrings, 2002).

The aesthetic and visual features of mangroves make them attractive sites. This natural spectacle draws an ever-greater audience, often from Northern countries. Tourism at developed sites is a much-appreciated source of foreign currency for developing countries, and can be seen as an alternative to the depletion of resources, overexploitation of ecosystems and rural population flight. Ecotourism has many harmful side effects, however, in terms of local development and the conservational management of biodiversity. Experience in various mangrove marshes gives rise to questions about the carrying capacity at these sites, the most appropriate types of infrastructure and the outcomes that can be expected, particularly for local users (Blangy, 1999; Young, 2003).

The reputation of mangrove products (honey, rice, salt, crab, oysters, wood, etc.) is well established, and long-distance trade in these products is attested to as early as the first centuries of our era. These products relied on ancient know-how, rooted in a *terroir* (communal territory). Creating economic value and legal protection for these products is at the core of Geographical Indications. This approach, inspired most notably by French *Appellations d'Origine Contrôlées* (AOCs), is meeting with growing success. Creating a heritage is now a goal, in addition to the initial objectives of protection for product names and commercial promotion. Labelling is seen as an instrument for conserving the complexity of the living world, at all levels (biological and cultural), and for upgrading and enriching the status of the lands involved. But, for geographical indicators to perform well, there must be quality and hygiene (Bérard and Marchenay, 2004). In practice, some operators will not be able to afford the cost (economic, but also social and cultural) of complying with standards. Some consumers may no longer have access to these products, at a revalued price. In parallel, standardization of production may lead to a crystallization of practices, and ultimately to a loss of capacity for adaptation and innovation in local knowledge (Chouvin *et al.*, 2004).

Although they have not met with the

anticipated success, the alternatives that are proposed – ecotourism, labelling, eco-certification – are innovative and dynamic, opening up a vast vista for investigation.

By Way of Conclusion: for Integrated and Concerted Mangrove Management

With increasing pressure on coastal areas, mangrove ecosystems have become the stage for a number of claims and confrontations. The new institutional status of natural heritage and new forms of value derived from coastal biodiversity have exacerbated tension among stakeholders. The divergence of views, knowledge, practices and issues at stake is particularly evident between local communities and those who come in from the outside. Yet, even at the local level, strong conflicts of interest have arisen between indigenous users (fisher-farmers) and migrants (woodcutters, nomadic herders, sea fishers), as well as between the older and younger generations, and between men and women. Regionally, local social groups that want to see mangroves recognized as their territory are opposing public and private enterprises. Nationally, public institutions share management responsibilities in these areas: among others, water and forestry, fisheries, tourism, environment ministries, etc., and they often hesitate between exploitation and sanctuary establishment. Finally, at the international level, while environmental activists lobby for protection of species, groups in favour of indigenous peoples' rights are fighting for recognition of their unique cultural traits and for preservation of their knowledge.

In mangrove marshes as in other coastal wetlands, cohabitation is difficult between certain specific, and sometimes antagonistic,

economic practices of farmers, herders, hunters, oyster farmers, etc. Coupled with the incoherence of public environmental policies, the complexity of accumulated and overlapping legal and regulatory provisions, and local users' identity crises, the future of coastal wetlands is in question.

The dynamics and complexity of interaction among all the stakeholders in mangrove ecosystems are an incentive to develop integrated and concerted management of coastal zones. The global or integrated approach aims to take into account the full range of stakeholders and factors on diverse spatial and temporal scales. Comparative study of mangroves must also be encouraged in order to highlight the specific features of local contexts, draw up appropriate management scenarios and better guide public policy, both national and international (Cormier-Salem, 1999b).

At the same time, to better understand the motives underlying claims (patrimonial, territorial, identity-driven) to mangroves, more in-depth research should be devoted to the history of these coastal regions. Shell middens have not yet been sufficiently excavated and inventoried. Toponymy, founding myths and other oral traditions also deserve closer linguistic analysis to establish the unique nature of mangrove peoples and possibly to unearth forgotten civilizations.

This three-pronged approach – integrated, comparative and historical – is intended to foster mangrove projects (planning, zoning schemes, etc.) that are adapted to local socio-spatial contexts and negotiated among all stakeholders. Elaboration of these projects is thus a 'theatre' of concertation, where researchers in social sciences can act as mediators, or relays, to establish standards.

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