



PRCM

REGIONAL PARTNERSHIP
FOR COASTAL AND MARINE CONSERVATION
IN WEST AFRICA

MARINE PROTECTED AREAS IN WEST AFRICA

Laboratories

FOR SUSTAINABLE DEVELOPMENT





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Introduction

In response to the already visible signs of environmental degradation, and like many other States on the planet, the countries of West Africa perceived the need for protected areas geared toward preserving the most sensitive natural areas and those richest in biodiversity. Aside from a few initiatives dating back to the colonial period, the process of designating protected areas began to develop in earnest in the 1970s, with approaches and speeds differing from country to country. It was accompanied by the establishment of appropriate institutions, staff recruitment and training, procurement of equipment and specific cooperation mechanisms.

Initially, the introduction of these new spatial planning tools was a response to the entreaties of the international community, and due consideration was not given to the circumstances and needs of the human communities who had been living in these protected areas since time immemorial. Similarly, little attention was paid to ancestral systems of protection like sacred sites, systems of access rights or traditional calendars governing open and closed seasons for resource use.

West African countries are in the process of developing a model for protected areas which is more specifically adapted to their ecological, social, cultural and economic circumstances.

In the half century since the beginnings of "modern" conservation, major changes have been observed. National actors have taken control of operations, directing these processes according to their own vision. West African countries are now developing a specific model for protected areas that is better suited to the ecological, social, cultural and economic context.

In the countries considered herein*, this move toward greater ownership was especially salient in the coastal and marine portions of their territory, which are strategically important in economic and environmental terms. Under the leadership of the Partnership for Coastal and Marine Conservation in West Africa – PRCM, conservation took on a subregional dimension and a clear determination to respond to development concerns. A number of solutions to these concerns have been found in marine protected areas (MPAs), solutions that today are informing development processes beyond their boundaries and that subject the subject of this booklet.

* Mauritania, Senegal, Gambia, Cabo Verde, Guinea-Bissau, Guinea, Sierra Leone

Current status of the Network of MPAs in West Africa (RAMPAO)

Today there are 33 officially established marine protected areas in the subregion, covering a total surface area of 2,923,674 ha. Officially recognised by States, the Network of MPAs in West Africa, or RAMPAO, now includes 27 of these, which together account for 93% of the total area under protection (see map below and table in Appendix). The regional approach and the provision of funding to support the establishment and development of many of these MPAs were decisive factors in prompting countries to follow this example, especially Cabo Verde, Guinea and Sierra Leone where progress was slower than in other countries in the Programme.

These MPAs protect an extremely broad diversity of coastal and marine habitats. Most of them are also home to human populations, traditional occupants whose utilisation of the area's natural resources follows strict rules. There are different categories of protected areas, from strict nature reserves, where most human activities are prohibited, to nature parks, whose key aim is to ensure that natural resources are used sustainably with some activities such as tourism or sport fishing being permitted. It is a model which has shown itself to be well-suited to the socioeconomic realities of the region.



➤ Localisation of MPAs forming part of RAMPAO Network in 2013

Compared to other regions in the world, West Africa's MPAs stand out due to the presence of human populations inside their boundaries. This feature, which could initially have been perceived as an impediment to achieving conservation goals, has turned out to be a positive one.

The communities living in these protected areas have a very close relationship with their environment which often extends over many centuries. They have developed empirical knowledge about their natural environment and the resources it produces. They know when and how to tap these resources, not only to feed themselves but also for medicinal purposes, for materials for crafts and shelter as well as for their spiritual needs. All of this knowledge proves extremely useful when the time comes to draw up an inventory of natural habitats, to measure their degree of vulnerability and to derive rules for resource use within the protected area. This is especially true when large amounts of funding are not available or scientific expertise for conducting these studies is scarce.

These communities have devised traditional management models that specify the periods during which they have access to natural resources, the areas where exploitation can take place, and which people or groups of people are authorised to harvest resources. They have internal mechanisms for regulation, surveillance and conflict resolution which give precedence to the knowledge and wisdom of the elders. The most recent MPA establishment processes in West Africa have succeeded in drawing on these advantages by combining traditional and modern management rules. The added advantage is that this system produces rules that the resident communities can more readily understand, thereby making their application easier.

Another advantage that comes with keeping human populations inside protected areas is precisely their constant presence. If we visualise a protected area devoid of inhabitants but overflowing with natural resources at levels that often exceed those in surrounding areas, it is easy to see that the protected area is like an empty house, attracting would-be resource users from the outside and making it vulnerable to the pillaging of its resources. Conversely, a population living inside a protected area acts as a deterrent by participating in guarding *their* home territory, as long as they enjoy exclusive or priority rights over its resources. Having usufruct rights over the resources engenders a sense of responsibility for an environment that they know they will be able to pass on to their children. In practical terms, it also means that the authorities in charge of guarding the protected area can count on the help of the resident communities.

Therefore, accepting that these populations continue to live inside protected areas has made it possible to capitalise on the empirical knowledge of the natural world that they have accumulated over generations, knowledge that can be used to develop management rules inspired by traditional models, *ipso facto* facilitating their acceptance and enforcement. Protected areas also benefit from human communities' presence and contribution to surveillance of the territory to which they are attached. This results in tremendous savings for national and local institutions in charge of protected areas and also means that they do not have to relocate entire villages, thus avoiding future conflicts which are impossible to resolve. The special features of the model developed in West Africa are not without disadvantages, however. One such disadvantage is that resident communities that may be experiencing poverty and struggling to cope with a monetarised economy and the drive for progress are often tempted to overexploit resources, grow mainly cash crops or make deals with resource users from outside the protected area. These were the central issues that had to be tackled with regard to sustainable development in MPAs. And the experiences and solutions which emerged can serve as inspiration to other sites outside the boundaries of protected areas.



MPAs, home
to traditional inhabitants

West African MPAs, testing grounds for sustainable development

Protected areas are governed by special regulations which place a certain number of restrictions on development. They are, by their very nature, areas which must be sheltered from abrupt changes that may upset the functioning of natural systems. However, the human communities that occupy them have the same right to development as all other humans. The question is therefore: How can these communities' needs for development and social progress be satisfied without generating adverse effects on nature? This seemingly insoluble equation is what has prompted protected areas managers to seek sustainable solutions which safeguard the natural and cultural integrity of these sites to the greatest extent possible. The quest for a solution to the protection/development equation has gradually made West African MPAs into testing grounds for sustainable development. For nearly 40 years, experience has been accumulated with this outlook in mind. The time has now come to capitalise on these experiences and to disseminate them with the aim of promoting sustainable development in outlying areas. The following chapters present, in condensed form, the key learnings taken from these experiences.

The quest for a solution to the protection/development equation has gradually led West African MPAs to become testing grounds for sustainable development.

➤ Banc d'Arguin National Park (Mauritania)

Natural resources have always been exploited by human communities for their own subsistence within clearly defined geographical boundaries and respected traditional rules. In recent decades, the drive for development and the introduction of a market economy have upset this balance. Since then, natural resources have been sought for commercial gain by large numbers of users, some of whom come from outside the protected areas. This new situation led to conflicts which have been exacerbated by the gradual decline in resources – not only conflicts between residents and non-residents, but also within communities sharing the area, between those who adhere to the ancestral rules and those who want to put their shared heritage up for sale.

When these situations arose, it became necessary to convince the different groups of resource users sharing the same area to come to an agreement on a new set of rules that would protect the legitimate interests of all involved without jeopardising the sustainability of the resources. This approach based on consultation and negotiation between stakeholders and the management system which stems from it are known as "shared governance".



1 > Saloum Delta Biosphere Reserve (Senegal)

The shared governance approach was a pioneering concept when it was developed by protected areas managers but it can be replicated in any other area.



Shared governance

1 > Community Marine Protected Area of Urok Island, Bijagos Archipelago (Guinea-Bissau)

The approach, developed by protected areas managers, was a pioneering one, but it can be reproduced in any other part of the territory. It comprises several phases:

- **Understanding the context** through a participatory process which includes all stakeholders and places an emphasis on local knowledge. It entails doing a situation assessment which covers both the social and environmental dimensions;
- **Defining stakeholders**, which entails identifying the interests at stake, power relations, stakeholders' perceptions of space and resource use, and the respective roles of men, women and young people. Stakeholder definition leads to the designation of the representatives who will take part in the governance process;
- At this stage **consultation and dialogue** can begin, paving the way to a shared vision for the future while seeking to balance points of view, cultural values and levels of power;
- **The negotiation phase** is the time for compromise, through consensus whenever possible and in a climate of trust between stakeholders. At times trade-offs must be made and these may dilute certain conservation goals. Nonetheless, a system achieved through negotiation and with the support of all stakeholders is better than one that is ideal from an ecological standpoint but has not been arrived at through negotiation and garners no support from stakeholders;
- The negotiation phase should result in a **co-management agreement** based on mutually-agreed upon goals and clearly defined responsibilities and rights for all parties. It should contain zoning proposals, rules governing use, a surveillance and enforcement system, a conflict resolution mechanism and participatory monitoring and evaluation arrangements;
- Implementation of the management plan calls for **the creation of governance bodies** whose structure reflects the sharing of the powers and mutual responsibilities defined in the preceding phases. Indeed, the structure of these bodies depends on the already agreed upon roles given to each stakeholder: what role will the State play and what will be the relative weight of community representatives, advisory bodies, etc.?

While nearly 80% of the region's MPAs now have management plans in place, not all have fully operational governance bodies. The most advanced among them from this point of view are the Indigenous and Community Conserved Areas (ICCAs) and community-managed MPAs, although in the last few years others including National Parks have been trying to establish systems which involve users and communities to a greater extent in their governance mechanisms.

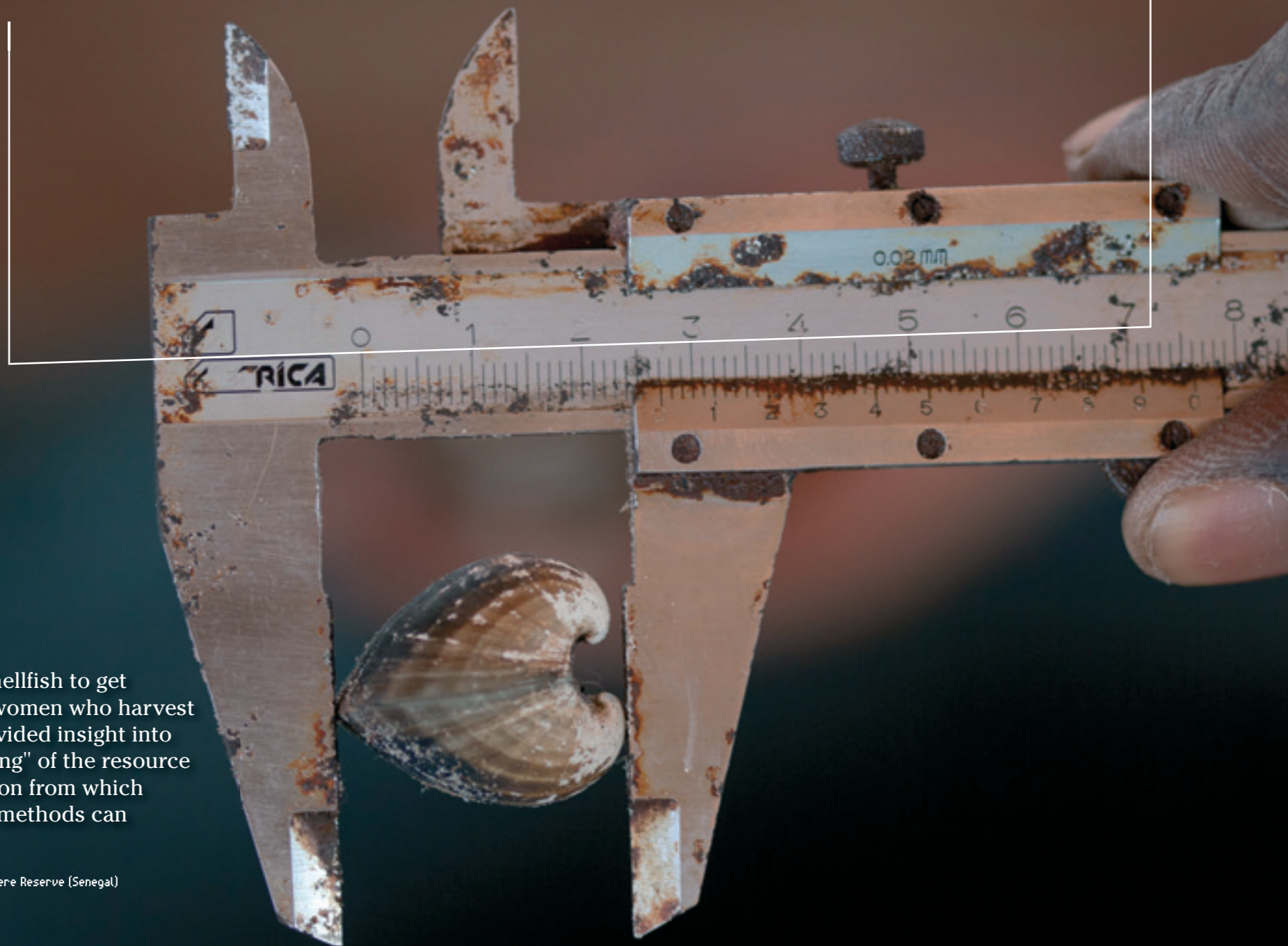
The PRCM has developed a regional training programme on shared governance which has been used to train the managers who will be guiding the processes underway in their respective countries. They act as neutral facilitators whose role can be crucial, especially in situations where there are serious conflicts. This regional expertise has been set up as a *task force* within RAMPAC, putting its skills at the disposal of the members of the network.

Finally, the shared governance approach can be used not only for a geographical area but also for an economic activity, as in fisheries co-management. It can also be applied on any scale. The PRCM Forum, at which representatives of all marine and coastal zone stakeholder groups meet every 18 months, is by extension an example of shared governance at work on a regional scale.

Scientific monitoring of fisheries (and other) resources

Monitoring shellfish to get her with the women who harvest them has provided insight into the "functioning" of the resource and information from which management methods can be derived.

➤ Saloum Delta Biosphere Reserve (Senegal)



Monitoring natural resources provides enhanced knowledge about existing resources and their trends, and data for defining sustainable levels of exploitation and gauging the suitability of the management methods being used. Some MPAs in the region have quite unique systems for monitoring fisheries resources which could usefully be replicated throughout the entire coastal zone. Among the most noteworthy of these are the Banc d'Arguin National Park (Mauritania), the Bamboung Bolon MPA and the Mangagoulak ICCA (Senegal). Shellfish monitoring initiatives have been implemented in the Saloum Delta Biosphere Reserve (Senegal and Gambia) and the Bijagos Archipelago Biosphere Reserve (Guinea-Bissau), and the Joal-Fadiouth MPA has initiated community monitoring of seagrass beds.

Fish resource monitoring is conducted as part of scientific fishing programmes by researchers at national oceanographic institutes, in some cases with the participation of local artisanal fishermen. These operations gather information about the environment as well as about fish populations. Data is collected using different types of fishing gear in different habitats and seasons. This data provides insight as to which species are present, which habitats they occur in, at what time of the year and why: migration, breeding or juvenile development.

Management measures that take into account species behaviour in specific habitats and seasons can be extrapolated from this data. These include recommendations regarding biological recovery periods during which all fishing activity is suspended, as well as the designation of areas where fishing is prohibited during the breeding season in breeding grounds. The use of appropriate fishing gear is also covered, with a recommendation favouring the most selective types such as longlines or hook and line.

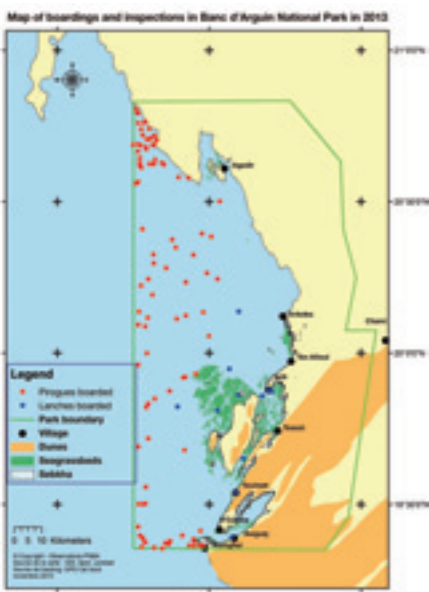
Monitoring conducted in the Bamboung MPA has highlighted the positive impact of designating a reserve encompassing a section of mangrove forest in the Saloum: the number of species present has risen, as has the number of large and small individuals. The number of average-sized individuals has however declined. This is probably related to increases in predator species (threadfin, barracuda). The breeding period occurs mainly during the dry season. Comparable findings were obtained in the Mangagoulak ICCA through participatory monitoring performed by the fishermen themselves over a five-year period.

Shellfish population monitoring carried out with women harvesters also provided a clearer picture of the "functioning" of this resource from which management methods could be extrapolated. Several measures were established to repopulate depleted areas, among them setting aside areas on a cyclical basis and reseeded with adult oysters. In the initial stages, technical staff provide support for these monitoring operations, but they are designed to be carried out over the long term and by the women harvesters on their own. A practical handbook based on this experience has been produced for the managers of protected areas and the populations involved.

1 > Banc d'Arguin National Park (Mauritania)

This is an activity which is both among the most crucial and the most complex in the range of management measures for any maritime area. Surveillance is indispensable because most fishing grounds are free access areas and those who fish there are more concerned with their own short-term profits than with the sustainability of the resource. The situation is even more critical when there are migrant fishermen who have no close ties with the area where they come to set their nets. Once the resource has been completely depleted, they move on to another area.

Maritime surveillance is complex in that, unlike on land, there is no "port of entry" or passage that potential offenders are forced to take in order to get to the fishing grounds. They can arrive from and depart in any direction, creating significant difficulties for those tasked with the surveillance of the area. Furthermore, it is a dangerous undertaking, not only because of the inherent dangers of navigating on the ocean (often at night), but also because the fishermen are sometimes armed. Accidents can occur all too quickly on the open sea, at night and with no witnesses. Finally, surveillance can be a source of corruption, especially when the illegal catches have high commercial value and the inspectors' salaries are modest.



Several West African MPAs have developed relatively effective surveillance systems. Mobile means at sea have been provided, chiefly through the PRCM and the RAMPAO Network. Some fifteen aluminium patrol boats with 4-stroke engines were purchased. In some MPAs, the patrol boats continuously record navigational and boarding parameters using GPS (*cat track*), thus making temporal and spatial statistical monitoring possible as well as measuring the effectiveness of surveillance.

A special training programme comprising a series of progressive modules, including boarding and inspection techniques, navigation, safety and maintenance, has been used to train surveillance officers, including first officers, some of whom have themselves become trainers qualified to teach the full series of modules. A special maritime surveillance "task force" has been established by RAMPAO and organises training and exchanges in the seven countries involved. A training handbook has been produced in three languages. Surveillance strategies have been developed to improve the effectiveness of operations, increase the deterrent effect and control costs. All of these strategies advocate the participation of the communities because they are the most directly affected by the impacts of surveillance, but also in order to benefit from their knowledge of the area and to lower the risk of corruption.

Despite the high cost and complexity of surveillance, several community-managed protected areas or ICCAs like Mangagoulak in Casamance have succeeded in establishing a surveillance system that is fully operated by the community's fishermen. The income from a monthly day of collective fishing is sufficient to cover the cost of surveillance for their maritime area. This approach opens interesting avenues in terms of making surveillance sustainable and deserves to be disseminated throughout the region.



Maritime surveillance

In some MPAs, patrol boats continuously record data on navigation, boarding and inspection of vessels using a GPS system, thus making it possible to statistically monitor these operations temporally and spatially while at the same time measuring their effectiveness.



1 > Marine National Park of João Vieira-Poilão, Bijagos Archipelago (Guinea-Bissau)

Tools for territorial management

Some of the management tools adopted by MPAs in West Africa could be beneficially used in other territories. For the most part, these are tools that can be mastered by members of the communities and do not necessarily require any investment. During the consultation and negotiation phases leading to the establishment of rules for use in a given territory, a map of the area is traced out on the ground for stakeholders to refer to. A facilitator can assist in drawing the lines of the map so that it is sufficiently precise to enable participants to recognise the physiognomy of their area and large enough to allow a collective approach. During ensuing discussions, it is the stakeholders who fill in the map with elements from their own perception, such as: the lines delimiting private and community areas, natural areas and farming lands, potential conflict zones, etc. This form of communication is effective because it facilitates broad participation by building on a physical image of the territory and its components.

Kite aerial photography offers a more sophisticated yet simple-to-use approach to territorial management. The principle entails flying a kite equipped with a camera connected to a monitor. The camera's movements and direction can be viewed and directed from the ground to obtain the desired images.

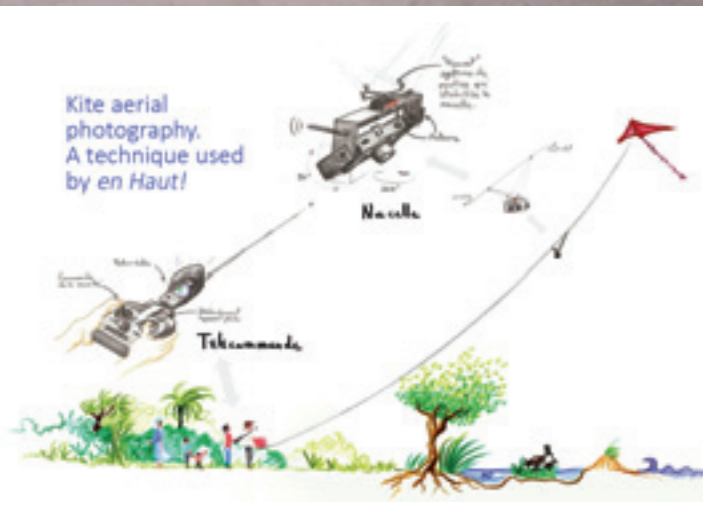
Kite aerial photography can be used for a variety of applications: studying landscape change, monitoring natural phenomena like coastal erosion and floods, conducting wildlife censuses, etc. Several MPAs in the region have used this technique with support from the En Haut! collective. Image capture can be performed with a group of people interested in a given subject; it begins with them seeing what the camera "sees" via the monitor. In the second stage, the photos are printed and used as a basis for group discussion. When they see their home territory from an aerial perspective, their perception is different from what they see day to day: it is a more sweeping view that encompasses all of their area's many components. Seeing the bigger picture in this way enabled communities in Rio Cacheu Mangrove Nature Park (Bissau-Guinea) to understand how the surface area of their rice fields had changed compared to that of mangroves, and allowed the inhabitants of the Palmarin MPA in Senegal to measure the impact of sea level rise. This technique has been used subsequently outside protected areas, most notably in the city of Nouakchott to measure the magnitude of the 2013 floods. Kite aerial photography has the additional advantages of being affordable and environmentally-friendly compared to other means of obtaining aerial images; it can also be easily mastered at the local level.

Zoning is another effective territorial management instrument. It consists of considering the specific features and functions of the different spaces that make up a territory and giving each of them an appropriate status and set of rules. This is an approach that rural communities apply empirically to their individually-held lands, but it needs to be systematised and rationalised if it is to be applied to more extensive areas. The experience gained by MPA managers has given rise to a certain number of recommendations about zoning:

- The number of zones should not be too large so that users can easily grasp their boundaries and the rules associated with each one. As a general rule, there should be no more than three zones. The core area is the one that encompasses the most sensitive natural habitats and cultural sites; these are subject to exploitation only on an exceptional basis or for subsistence purposes. It is here that living resources breed, that bird colonies nest and juveniles grow to adulthood. These are also sites where initiations take place and where traditional medicinal plant biodiversity is high. They are reserves, that is reservoirs of life. Ringing the core areas are the buffer zones. These are generally reserved for the exclusive use of resident communities and can be exploited at a subsistence level or commercially within strict rules, which are often modelled on traditional rules and rely on internal surveillance mechanisms. The third type is the peripheral zone which is more distinctly development-oriented and which may be made accessible to external users when resource levels and surveillance capabilities permit.

Kite aerial photography is less expensive and more ecologically-friendly than other aerial imaging techniques, and can easily be mastered at the local level.

➤ Biosphere Reserve of Bijagos Archipelago (Guinea-Bissau)



1 > Diawling National Park (Mauritania)

- The increasing strictness of the rules from the peripheral zones toward the heart of the protected area (the core area) gradually dampens pressures from the outside. Conversely, giving protected status to sensitive areas for biodiversity and breeding allows a spillover of natural resources into the buffer and peripheral zones, creating development opportunities. To use a metaphor from the world of finance, the core area is the capital and the interest on that capital is paid in the surrounding areas.
- It is important that the people whose efforts protect the core areas benefit the most directly from them, by way of exclusive or priority rights of use in the buffer zones.

The actual delimitation of zones, which should ideally be part of a shared governance system and be based on local knowledge, varies depending on the nature of the habitats and the purpose for which they are used. In marine protected areas, zoning is most often geared toward fisheries resource management (see figure). Therefore, the core area should cover the first few hundred meters from the water's edge outward, an area which is generally occupied by juveniles, whereas the buffer zone will be further from the shoreline, extending over a distance that is sufficient to allow exploitation by resident fishermen. In a river system, zoning will be based on the hierarchy of the river's branches and smaller channels; the furthest channels will be the core area while the main river channel will contain the buffer and peripheral zones. In an island system, it is the bays and inlets, the shallow and sheltered areas of water that will make up the core area. Mangroves, mudflats, seagrass beds and coral formations should insofar as possible be incorporated into the core areas.



Possible types of zoning in different ecosystems: In red, sacred bolons; in green, zones reserved for subsistence fishing by resident fishermen; in yellow, zones reserved for commercial fishing by resident fishermen; in blue, commercial fishing zone open to non-residents.

Restoration of natural habitats

Some MPAs have achieved great successes in restoring degraded natural habitats, thus enabling them to recover their capacity to provide services to human communities.

When a natural habitat has been degraded and no longer produces the resources that populations need, it is possible to make changes that restore its ability to provide services. Some tremendous successes have been achieved in restoring protected areas in this situation, one case being the Diawling National Park in Mauritania.

Located on the right bank of the Senegal river, the Diawling National Park protects a portion of the delta near the river's mouth. The wetlands that are fed by season floodwaters were heavily affected by the construction of Diama dam. The lush green floodplains turned into desolate stretches of cracked clay and were gradually abandoned by human communities. When the Park was established, the decision was made to restore the functioning of this habitat by simulating the annual flood. The fishers and herders who had traditionally used the area and were knowledgeable about it were called in to give advice. By building water infrastructures upstream of the dam, a part of the river's water was diverted toward the floodplain in order to recreate an artificial estuary. After a few years, fish catches rose from less than one tonne to over 100 tonnes. Shrimp fishermen returned to the area and the number of women gathering *Sporobolus* grass for mat-weaving went from 20 to 600. Waterbirds returned to the lower delta in their tens of thousands, a clear sign that the delta had been brought back to life. The spectacular comeback of the birds gave rise to a small ecotourism operation, and the increase in the warthog population was sufficient to enable a hunting camp to reopen. Today, the Diawling National Park is once again rich and productive. Those who took a chance on the restoration of its habitats were rewarded and local users accepted the principles of protected areas.



The West African coastline abounds in mangroves, the forests that grow along the shore in muddy soils and salt water. Mangroves play a major role in coastal protection, in the production of living resources, in carbon sequestration and in water purification. Their ecosystem provides countless services, so much so that some economists estimate the value of mangrove services to be greater than 4,000 USD per hectare per year. The catastrophic tsunami that hit the Asian coast in 2004 showed that areas still covered by mangroves were to a large degree spared.

In recent decades, West African mangrove forests have suffered greatly. The causes are many: the droughts of the 1970s, the building of dams and roads, clearing for the extension of rice farming, salt production or fish smoking, cutting aerial roots to harvest oysters, etc. In response to this situation, reforestation initiatives sprang up in several countries in the region, most notably in Senegal where several million mangrove trees were planted by the communities with support from NGOs. The method most commonly uses *Rhizophora* or red mangrove, which produces bean-shaped seeds, or propagules, that are easy to plant. The technique consists of selecting sites with muddy soils which are flooded by the tides, gathering the propagules from the trees or off the ground and planting them during the rainy season. Experience shows, however, that it is best to diversify the species planted. *Rhizophora* mangroves are highly vulnerable to soil salinisation, which is precisely the cause of the degradation that made restoration necessary. Also, monospecific planting resulted in parasite (caterpillar) infestations, a common problem in all monocultures. It is therefore important to diversify with *Avicennia* and *Conocarpus* species, which are more resistant to salt. However, this technique is labour-intensive because it requires establishing tree nurseries.

In regions such as Casamance, Guinea-Bissau and Guinea where rice is grown in the mangroves, farmers are being encouraged to restore the area to its former state once the rice paddies have been abandoned. If the dikes around the rice fields are left standing, the tidal waters will no longer inundate them and soil acidification and salinisation will gradually make it impossible for the mangroves to spontaneously regenerate. The idea is to convince farmers to demolish the dikes so that the system can return to its normal functioning. These communities can also contribute actively to the reforestation effort by planting new trees. In order to reduce deforestation for the purposes of salt production and fish smoking, alternative technologies like solar salt production and Chorkor ovens (which use far less wood but offer higher productivity) are being promoted.

The presence of an MPA network - RAMPAO - along the West African coast is instrumental in maintaining a healthy coastal zone that is more resilient to the many sources of disturbance: overfishing, pollution, climate change...

1 > Saloum Delta Biosphere Reserve (Senegal)

Techniques for saving mangrove wood... and the efforts being made by women.

In a combined effort to reduce the impact on the mangrove environment and assist women who produce salt and smoked fish, wood-saving techniques have been devised. Traditional salt production relies on a cooking technique in which brine is heated in pots on wood stoves. The process requires large quantities of wood, about 300 kg for every 100 kg of salt produced. The alternative method involves filtering sea sand in order to extract brine which is then poured onto ground sheets where crystallisation takes place: the sun and the wind do the rest and the women do not need to cut and carry wood and do not have to inhale smoke and other harmful cooking fumes. One woman in the Tristao Islands MPA in Guinea put it this way: *"Thanks to this technique, I have more free time. I come here in the morning, I fill the basin with brine and then I can go about my other business. All I have to do is to come back in the evening to harvest the salt."*

Similarly, new techniques have been developed to improve traditional smoke ovens. There is, for example, the Chorkor or breezeblock oven, which measures between 2 and 12 m long, 1 m wide and 90 cm high. The fish is placed on a wire mesh on top of the oven which is then closed with a metal cover. The two side openings are designed to regulate smoke density. This type of oven offers greater production capacity (a 10 m oven can produce up to 1500 kg of smoked fish per operation), along with greater control over the quality of the product and longer shelf life. Not only is its performance better in economic terms, it also represents major savings of wood resources and the time and effort required to cut and carry the wood to the oven. The cost of operating this oven is estimated at 1,300 FCFA (€2) for 100 kg of smoked fish as compared to 3,370 FCFA (€5) using a conventional oven.

Improved cookstoves are based on the same principles. The most common traditional technique is to light a wood fire between three stones and to set the pot or cauldron directly on the stones, but this results in the loss of nearly 95% of the energy produced. Furthermore, harmful fumes are emitted into the home, causing respiratory tract infections and eye damage. Since cooking is traditionally a task for women, they are the primary victims along with their young children who are often around them. Improved cookstoves are built with local materials (clay) at zero cost. The lower portion holds the wood and an opening above is designed in the exact shape of the cooking pot it will hold, thus significantly reducing energy loss.

1 > Banc d'Arguin National Park (Mauritania)

Resource production and healthy marine ecosystems

Banc d'Arguin National Park accounts for 23% of the total fish production of Mauritania, and the percentages rises to 50% for coastal species alone.

The production of resources is probably the first service that comes to mind when we think of MPAs. They are, by definition, areas of high biological productivity. This is why they attract a large number of marine species during decisive phases of their life cycle, from breeding to juvenile rearing. These species find the specific conditions they need for their development in marine protected areas: an abundant supply of food, sheltered habitats, protection from predators. This explains why shrimp seek refuge in mangroves during their juvenile phase and why fish find seagrass beds or coral reefs to breed in; and these are all habitats which are subject to special protection within MPAs. The resources produced by these veritable "fish factories" migrate once they have reached adulthood. They swim back out to sea, moving out of the protected area to populate commercial fishing grounds. Several studies have highlighted the fact that fish density decreases the further one moves from an MPA, illustrating their role in resource production. Banc d'Arguin National Park accounts for 23% of Mauritania's total fish production, and the figure rises to 50% if coastal species alone are considered.

The ecosystems protected within MPAs are considered healthy ones, not only in terms of productivity but also species diversity. In the same way that a healthy individual develops a stronger immune system through contact with diseases, a healthy and diverse natural environment is more resilient to attacks. This means that it will tend to recover more easily from a stressful event. A network of MPAs like the RAMPAC, along the West African coast, helps to maintain a healthy coastal zone that is better equipped overall to withstand various sources of disturbance: overfishing, pollution, and climate change. One vivid example is the large populations of sea turtles that breed in the MPAs – they feed on the algae and jellyfish that have a tendency to proliferate due to ocean warming and overfishing, thereby curbing these invasions. This is important because if these species do become invasive, the consequences for fishermen can be disastrous.

For all of the abovementioned reasons, MPAs are essential for maintaining plentiful marine resources and, by extension, the food security of the West African populations that are vitally dependent on them. Fishermen are now aware of the value of MPAs. They themselves push for the designation of new areas, like the Joal-Fadiouth MPA on the Senegalese coast southeast of Dakar, in which they take an active management role.

1 > Bamboung Marine Protected Area, Saloum Delta (Senegal)

Ecotourism: Valuing local knowledge and creating livelihoods

Ecotourism showcases the knowledge of human communities and the efforts made to preserve natural and cultural heritage: this means that there are positive synergies between ecotourism, protected areas and the communities that live in them.

Ecotourism offers a large number of potential benefits while at the same time minimising the common drawbacks of mass tourism. It is an activity that local communities can exercise some control over by taking part in hosting and guiding the tourists, ensuring that they derive more direct economic benefits. The unique feature of ecotourism is that it showcases the knowledge of these communities as well as efforts to preserve the natural and cultural heritage. It can therefore be said that there is a positive synergy between ecotourism, protected areas and the communities that live in them.

Several MPAs in West Africa have implemented ecotourism initiatives which as examples have the power to positively influence national development and tourism policies. For example, in the Banc d'Arguin National Park, the inhabitants organised visitor accommodation consisting of traditional tents or *khaimas*. The main attractions for tourists are discovering the desert and the lifestyle of herdsmen in an arid ecosystem, and at the opposite end of the spectrum, discovering the islands and mudflats with their extraordinary migratory bird populations. The latter activity takes place with the fishermen on their sailboats and with specially trained guides. The experience and knowledge of the local people are showcased in this way and fishermen also have an incentive to diversify their activities and to reduce their fishing effort. Tourists also have the opportunity to taste local gastronomic specialities such as "méchoui" (traditional spit-roasted lamb) and "poutargue" (salted and dried mullet roe). The contacts and dialogue between the visitors and their hosts open minds and attitudes in a mutually beneficial way.

In the Bamboung MPA, a group of huts built on the banks of a bolon now accommodate visitors. The site is ideal for discovering the mangroves and their typical fauna. Hosting tourists creates employment and marketing opportunities for food products and local crafts. In addition to this, a portion of the proceeds is used to cover the cost of surveillance, which is performed on a rotating basis by inhabitants of the villages involved in the initiative. These pieces come together to form an effective architecture thanks to the integration of the economic, surveillance and environmental aspects.

The tourist camps in the Orango Islands National Park, the Cantanhez Forest National Park in Bissau-Guinea and the Tanji Bird Reserve in Gambia are based on the same concept. They represent a relatively large source of local employment opportunities. The entire staff of the Orango Parque Hotel – some twenty employees – come from the nearby village. These opportunities are by the same token incentives for the community to effectively preserve their natural and cultural heritage. Their deep knowledge of their environment makes them highly appreciated as tourist guides. The meals they prepare, often using local recipes and products, represent an additional source of income and provide opportunities for the tourists to discover new dishes that are directly related to the biodiversity and extraction practices they observe during their nature visits. A share of the income from the tourist camps is sometimes reinvested in community-interest projects.

1 > Ecotourism in the mangroves, Makasatu Forest (Gambia)



The great majority of MPAs include a terrestrial portion which is exploited by its inhabitants, chiefly for farming and biodiversity resources. One of the practices that jeopardises the sustainability of these activities is slash and burn agriculture, in which the vegetation is burned just before the rainy season to clear it for food crops. There is little future for slash and burn agriculture because of increasing population density, soil depletion and the probable impacts of climate change. It is destroying the natural vegetation and more specifically the last of the region's forests, thereby depriving the populations of biodiversity services. Forest loss is also pushing wildlife into cultivated areas where it causes conflicts with farmers. This is how the forest chimpanzees of Guinea and Bissau-Guinea came to be causing damage in the banana and citrus plantations. Creating protected areas that aid in conserving forests can partially curb this trend. Not only do the primates prefer their own natural habitat, but forests also offer a number of services to humans, from wild fruit and medicinal plants to climate protection and ecotourism.

The establishment of a protected area can sometimes give rise to paradoxical situations. In the newly created Orango National Park, in the Bijagos archipelago, the hippopotamus population increased sharply. The inhabitants began to report damage to their lowland rice fields and were forced to move into forested areas where they began growing slash and burn rainfed rice. The conservation action had resulted in the degradation of the forest and disgruntled resident communities who wanted to eliminate a part of the hippopotamus population, in other words exactly the opposite of what the Park had set out to do. Park officials looked for a way to protect the lowland rice paddies from damage by the marauding animals. The most effective solution turned out to be solar-powered electric fences. Every rice field in the Park was fenced for a relatively low overall cost (one solar panel provides enough electricity for 10 ha). Not only did the inhabitants stop wanting to kill the hippos and fearing for their own safety, but rice harvests in the Park's 33 villages also increased from 16 tonnes to 93 tonnes, i.e. by 450%. The impact was thus huge in terms of food security. In economic terms, the higher yields represented between 23 and 27 million FCFA (€35,000 - €41,000) in additional income. The experiment was so successful that it was reproduced outside the protected area in most parts of the country where the hippopotamus still occurs. It is an example that clearly illustrates the role protected areas play as laboratories for sustainable development.

1 > Community Marine Protected Area of Urok Island, Bijagos Archipelago (Guinea-Bissau)



Coalitions working for food security

Forest loss forces wild fauna to move into areas under cultivation, thus causing conflicts with farmers. Establishing protected areas is a way to partially curb this trend.

1 > Mangrove Natural Park of Cacheu River (Bissau-Guinea)

1 > Banc d'Arguin National Park (Mauritania)

Natural products from protected areas can derive added value from their provenance through eco-labelling schemes.

Adding value to biodiversity products: a way to combat poverty



One way to encourage human populations to think about resource sustainability is to promote the quality of products rather than quantities harvested. This translates into more time spent enhancing the value of products and less time gathering them. The approach is not an easy one since it requires changing attitudes, training, technology and markets.

In Banc d'Arguin National Park, the yellow mullet is a key resource. This migratory fish occupies a central place in the life and culture of Imraguen communities. There was a time when the Imraguen were losing control over this resource to fish traders who bought up their mullet catches at low prices and then sold the roe as "poutargue", a luxury product for export to Europe. Park staff stepped in to assist the women in developing a poutargue preparation and vacuum-packing technique that meets market standards and enables them to benefit directly from the added value. This initiative was subsequently extended to include traditional fish-drying methods and mullet oil, which has reputed medicinal properties. Turnover from the combined activities of the women's groups is now between 15 and 20 million FCFA (€23,000 and €30,000) with profits exceeding 7 million FCFA (€10,700).

In Saloum Delta Biosphere Reserve, women have discovered an oyster farming technique which is reducing harvest pressure on natural oyster beds. They string out lines of empty shells in the mangroves to which oyster larvae attach themselves and grow to their full size. This form of oyster farming has been developed in Senegal and Gambia, and successful exchange visits have brought women from protected areas in Bissau-Guinea, who are facing a similar local decline in wild oysters, to learn the technique.

In Rio de Buba, Guinea-Bissau, community development measures compensate fishermen for the decision to suspend net-fishing during the barracuda breeding season. The women proposed reviving a traditional technique for drying fish using chili pepper. A range of actions were undertaken involving a total of 525 women: horticulture to produce chili peppers, well-drilling for irrigation, literacy and micro-credit activities. Women were then trained in vacuum-packing and a high-quality product is now being sold under the name *bubacalhau* (meaning *your* bacalhau). It is a local substitute for the bacalhau imported from Portugal at 7,500 FCFA/kg (€11.4) while fresh fish sells locally for 1,000 FCFA/kg (€1.5). Above and beyond the high added value it generates, this form of processing has provided a partial response to the question of how to preserve fish and by extension, how to cope with variable and unpredictable transport times to market. This integrated approach to sustainable management and to maximising returns on the resource earned the Rio de Buba women's association the PRCM Forum's Conservation Award in 2013.

Many other products have similarly been targeted for value enhancement combined with resource management actions to secure sustainability: solar salt has already been mentioned, and honey is another example. Modern hives have been installed in order to put an end to tree felling at harvest time. These products can also be labelled to indicate their provenance from a protected area, further increasing their value.

Environmental education

The attitude changes needed to achieve sustainable development require in-depth and long-term work. The move to create protected areas did not wait for Education Ministers to formally include environmental education in school curricula (although that process is underway at various stages in different countries) and raise the awareness of the younger generations. A number of initiatives developed highlight a range of approaches that can inspire future teaching practices.

IUCN has made environmental education a longstanding priority for action, working together with teaching teams to produce periodical news bulletins. The entry point is usually iconic wildlife species of high emotional and cultural value. Once children's awareness has been awakened, it is easier to open their minds to the need for sustainable development. The PRCM Regional Environmental Education Programme has designed more broadly-targeted teaching materials such as the West African Coastal Knowledge Notebook (Cahier de connaissances sur le littoral ouest-africain) and the Teacher's Handbook, which is geared towards schoolteachers. Both can be adapted by teachers to suit the local context. These tools advocate an active teaching approach in which children are not asked to passively listen, learn and obey, but are actively involved in conducting surveys, organising exhibitions or compiling plant collections, running clean-up campaigns in their school or village, writing to local elected officials to report problems, or even setting up their own nature reserve.

Some original initiatives are worth special mention: one of these is the cinema-debate, where films about the environment are screened in villages, followed by a discussion among the audience about their own environmental situation. The entire community turns out for these festive events, and realise that the problems they are facing also affect other communities, some of whom have succeeded in finding solutions. The resulting dynamic in the village can be the start of a virtuous process.

In Guinea-Bissau, a network of "environmental audit" schools" (EVAs) has been established. Pupils in these schools are asked to regularly monitor certain environmental parameters, do exploratory work for or implement restoration initiatives, and become ambassadors for nature within their families. Interpretation centres have been opened in some MPAs, including Banc d'Arguin; they use different types of visual displays (models, interpretive panels, crafts and works of art, ethnographic materials, etc.) to show visitors in an informative way how a natural and human habitat is organised.

Communication about the environment in general is directed at all audiences and relies on a wide range of means, including community radio and television which are important in guiding and catalysing conservation and development dynamics. These tools are widely used in protected areas, which are ideal places for experimenting with and delivering environmental education. There has been a gradual move to extend the scope of protected areas' communication action to address populations living in outlying areas as well as local elected officials and other policymakers. In this field as in many others, protected areas are centres of excellence, and society as a whole can benefit from their experience.



This approach does not ask children to simply listen, learn and obey, but to conduct surveys, mount exhibitions, gather plant collections, run clean-up campaigns, write letters to local elected officials or establish their own nature reserve.

➤ Mindelo Bay, São Vicente Island (Cabo Verde)

Culture, identity and territory

Some MPAs have opened Culture and Environment Centers which are hubs of cultural expression and activity. These centers contribute to greater cohesiveness in the society but also help to bring about necessary changes.

➤ Community Marine Protected Area of Urokk Island, Bijagos Archipelago (Bissau-Guinea)

While in some countries, conservation tends to exclude human populations from protected areas, MPAs in West Africa regard the traditional inhabitants as, on the contrary, an integral part of an interdependent whole. All of the ancestral knowledge and traditions that connect these societies to their environment contribute to the conservation and management of the MPA.

The custom of the Imraguen fishermen of the Banc d'Arguin is to set the dates for the yellow mullet fishing season according to the phases of the moon, which they call itanes. This tradition was abandoned in the 1970s, but has recently been revived as a protective management measure for a species whose numbers are declining. In Casamance, certain marine species are considered as respected totems due to their mystical power, and in the Saloum some bolons are protected because of the spirits who live there. The Bijago people in the archipelago that bears the same name wear masks in the shape of shark's heads, sawfish or hippopotamus during their ceremonial dances; it is their way of expressing the ties that bind them to nature and their respect for these emblematic species. The fishermen of Kayar, on the Senegalese coast between Saint Louis and the Cape Vert peninsula, observe traditional biological recovery periods which coincide with the rainy season, and have established collectively-agreed rules prohibiting certain types of fishing gear such as set nets.

As a general rule, most communities base their land-use and resource management on cultural mechanisms that are inspired by tradition and widely accepted within their society. All members of the society share the same territory which is also the land of their ancestors; they also share the same values, beliefs and knowledge. If these social ties are damaged or destroyed, often as the result of pressure from external forces, it is the very cohesion of the society and its attachment to its home territory that is in danger. Internal conflicts begin to arise, particularly over the use of natural resources, which are no longer managed according to the rules once adhered to by all.

It is due to this realisation that MPAs in West Africa have paid particular attention to the cultural dimension in their management methods. Spatial zoning and rules for resource use are often inspired by traditional rules, which gives them greater authority and makes them easier to understand and to enforce. This approach also explains the communities' renewed interest in their old sacred sites and the growing success of community heritage protected areas: faced with threats from the outside, society rallies its forces and unites its members around collective cultural values. It must be said, however, that some of these values are not so well-respected by users from the outside and they are also questioned by young people in search of new horizons.

In light of these situations, some MPAs have explored approaches that are worthy of being disseminated. Beyond shared governance models that favour consensus-building, there is the idea of holding forums for specific categories such as women or youth. Issues of specific interest or concern to the group can be discussed and a vision for the future developed along with proposals or demands directed at other categories in society. Some MPAs have opened Culture and Environment centres as places of cultural expression and activity; they offer discussions on a broad range of issues, theatre, documentation collections and objects from the local culture. They are resource centres, contributing to social cohesion but also to social transformation, places where support can be garnered for the values embodied by protected areas. In fact, any and all opportunities to maintain the vitality of the community's relationship to their environment need to be seized: cooking competitions using traditional recipes, festive ceremonies marking special events or important decisions, carnivals, etc.

1 > Alcatraz Island (Guinea)

MPAs are considered as fisheries management tools or as areas for tourism development. As such, their work has an important place in the broader perspective of spatial planning.

In the past, MPAs were designed to be closed spaces, locked inside their boundaries and seeking at all costs to protect themselves from outside influences and preserve biodiversity by putting it under a virtual glass dome. Their managers gradually realised that two-way exchanges with the outside world were important, especially since the marine environment is typified by the connectedness and mobility of its components. Migratory species transiently pass through the area, resources produced in the MPA, such as fish and crustaceans, subsequently exit its boundaries, nutrients are carried in and out by winds and currents. All of these phenomena make MPAs dynamic entities in constant connection with the environment that surrounds them.

The nature of these influences can sometimes prove to be negative and threaten to upset the balance of the protected area. This is true of marine pollution, which no physical boundary can hold back, and also the decline of adult populations of certain fish species in the open ocean that no longer return to the MPA to breed. There are also pressures from external sources, such as migrant fisherfolk, tourism developers or even religious groups seeking to broaden their sphere of influence.

These positive and negative trends alike, accentuated by the effects of trade globalisation (artisanal fishers in West Africa catch sharks for their fins which are exported to Asia!), awakened MPA managers to the realisation that MPAs are part of a much larger geographical whole, with functions that determine their contributions to territorial dynamics in a very specific way. Aside from biodiversity and cultural heritage preservation, some key MPA functions are natural resource production, ecotourism, providing natural infrastructure for coastal and climate protection, education and scientific research.

Putting MPAs together in a network also creates a platform for tackling issues of mutual concern that spill over national borders: migrant fishing, mangrove management, marine pollution and migratory species are some of the issues that need to be taken up on a regional scale. In this respect RAMPAO, often working with the Sub-regional Fisheries Commission (CSRFP), has been instrumental in finding solutions and recommending relevant approaches to problems that are often difficult to deal with at national level alone.

Protected areas become fully meaningful when these functions are articulated with sectoral policies. For example, they are now seen as fisheries management instruments and as hubs of tourism development; as such they now work with relevant ministries within integrated approaches. In the same perspective, Banc d'Arguin National Park acted on its concern over influences stemming from developments in areas surrounding the Park by calling for a process of consultation and dialogue with entities in various sectors including mining and oil, tourism, fishing, Nouadhibou ports authority, the environment and local communities in a forward-looking approach to territorial management and planning.



1 > Banc d'Arguin National Park (Mauritania)

MPAs,
actors in
territorial
dynamics

Transboundary conservation initiatives – *Parks for Peace* – were launched to provide frameworks for cooperation and conflict resolution between neighboring States.

 > Casamance Landscape (Senegal)

Population movements and the interconnectedness of natural phenomena, especially in the marine and coastal environment, are potential sources of conflict between neighbouring countries. These conflicts, which are likely to worsen due to high population growth rates in the region as well as climate change, arise mainly in areas adjacent to national borders encompassing shared ecosystems or resources. Transboundary conservation initiatives – Parks for Peace – were mounted precisely to provide frameworks for cooperation and conflict resolution for these neighbouring States. Experience to date shows that the conditions needed for the Parks to function effectively are transparency, appropriate funding and political support.

The protected areas on both the Senegalese and Mauritanian sides of the Senegal river delta came together to create a Transboundary Biosphere Reserve, which offers a good framework for implementing concerted spatial planning measures. Similar initiatives are underway on adjacent sides of the border between Senegal and Gambia, where the first African transboundary wetland of international importance (Saloum-Niumi) has been designated under the Ramsar Convention. Informal initiatives are being developed between Casamance and Bissau-Guinea and between Bissau-Guinea and Guinea with NGO support, the aim being to promote a culture of dialogue and peace between border communities who share the same resources and face the same problems, in the same spirit as Parks for Peace, which deserves to be widely disseminated.

Parks for Peace



MPAs as instruments for mitigating and adapting to climate change

Closely monitored and offering ideal conditions for scientific research, protected areas are sentinel sights for monitoring climate change.

➤ Mangrove Natural Park of Cacheu River (Bissau-Guinea)



In fulfilling their mission to preserve habitats and species, MPAs have had to develop and use tools to measure environmental change. Meteorological parameters are monitored by automatic weather stations that send data via satellite at regular intervals. Satellite remote sensing is also used to measure changes in ecosystems and in land-use patterns: a number of MPAs have Geographic Information System capabilities which facilitate interpretation of the factors driving these changes. Change can also be monitored using kite aerial photography. Monitoring is used to track flooding that may be caused by sea level rise, and erosion that threatens the coastline, destroying human settlements, mangrove rice paddies and coastal infrastructure.

Another focus of monitoring is change in biodiversity status. The MPAs belong to international networks that collaborate to monitor entire migration flyways of bird, fish or sea turtle species. These species are considered as indicators of the changes that are already underway. For example, one clear trend that has been pinpointed is the displacement of several fish species from tropical to temperate latitudes due to ocean warming. According to specialists, it is urgent to conserve sufficiently large populations of these species in West Africa until they can adapt genetically to the new climatic conditions: this is another key role protected areas play in preserving the fishing economy and food security. They also have to monitor sea level rise because of the threat it poses to the bird colonies that nest on certain small islands and because it could submerge the beaches where sea turtles nest.

The part MPAs play in mitigating climate change was brought into sharper focus when the effectiveness of mangroves and seagrass beds in sequestering carbon was measured. Now called "blue carbon sinks", these areas have become the focus of international transactions in which their recognised functions generate financial compensation. This compensation is paid in the form of carbon offsets by industrial firms that emit carbon dioxide, thus providing for the long-term conservation of natural habitats and for development action that will benefit their human communities. To put it in more general terms, by maintaining healthy ecosystems MPAs make a significant contribution to improving the ability of societies that are heavily dependent on ecosystem services to adapt to climate change.

As closely monitored sites which are ideal for scientific research, protected areas can be seen as sentinel sites for global change. In this respect, they satisfy the commitments made by States under international environment, biodiversity and climate change conventions. They work as pioneers together with local communities, seeking solutions and ways to adapt to change and can thus share the fruit of their experience with the rest of society.

➤ Archipel des Bijagós et zone côtière de la Guinée-Bissau

Future challenges

Rural populations have now entered a monetarised economy, an economy in which natural resources are not simply a means to achieve self-sufficiency but have also become potential commercial goods. This is the change of direction that has to be made, by developing rules for use that are consistent with the regeneration capacity of resources and that ensure equity among community members. As we have seen, protected areas have already begun to embark upon this new direction and their experience should be put to use in other places.

Even in the best-managed protected areas, not all of the problems have been resolved, far from it. The transformational work toward sustainable development requires long-term investments by populations and their partners. And within communities themselves there are disagreements about levels of resource use that will never be totally settled. Well-managed sites where resources are still plentiful attract users from outside the area. In fact, the better an area is managed, the more it will require effective surveillance. Surveillance is a costly undertaking, especially in the marine and coastal environment. The greater the difference between resource quantities available inside and outside a protected area, the higher the risk of conflict. This is why protected areas must seek to become part of the broader territorial fabric. Public authorities and their development partners should be able to draw inspiration from protected areas and seek to spread their experience to outlying areas.

The objectives to be pursued in this regard can be summarised as follows:

- Capitalise the experiences and lessons learned in MPAs, something which most members of the RAMPAO network are already doing.
- Ensure that best practices, which are still too often at the experimental or demonstration stage, are applied systematically in protected areas.
- Ensure that the fruits of these experiences radiate outward to surrounding areas.
- Promote the incorporation of protected areas into larger territorial frameworks by working with other sectors that have a stake in development.
- Calculate the value the services provided by MPAs and incorporate them into national accounting mechanisms.

Protected areas have already partially experienced this change of direction, and their experience should be used to serve society as a whole.

➤ Rice farming in Casamance (Senegal)



Conclusion

MPAs in West Africa are not isolated portions of territory that have been put under glass simply to satisfy the needs of conservation. Inhabited by human populations who have a very deep relationship with their lands and waters, they are also centres of excellence, pioneering areas where exploration leads to the discovery of more sustainable paths to development, testing grounds in the search for solutions that can also be used outside their boundaries.

Protected areas and their mission make us implicitly more demanding about the quality of development. Their existence, their heritage value, their sensitivity and the benefits they provide force us to be more vigilant about the potential threats coming from certain sectors such as offshore oil drilling, mining, coastal infrastructure and mass tourism.

The goal of sustainable development is within our reach and thanks to marine protected areas we already have many tools to achieve it.

MPAs should also be considered as instruments for positive territorial transformation: natural infrastructures that protect the coastal zone, public spaces for culture, research or recreation, ideal areas for high-quality tourism that values the presence and knowledge of local communities, breeding grounds for fisheries resources, these are all public service functions that fit together with other development sectors.

But it would be wrong to conclude with a totally positive image. Protected areas are still struggling with structural problems: the high cost of surveillance, external influences that are sometimes insidious and know how to play on some societal categories' desire for development, more remote influences by certain entities that are difficult to involve as stakeholders (offshore oil production, industrial fishing), political timescales that differ from those of environment and sustainable development, and last but not least the impacts of climate change which will require a tremendous increase in effort. It will be up to the institutions, resource persons and communities on the front lines to convince the rest of society that the goal of sustainable development is within our reach and that thanks to marine protected areas, we already have many tools to help us attain it.

Appendix



Table 1. Characteristics of MPAs belonging to the RAMPPO regional network

	MPA	Status	Year est.	Year joined RAMPPO	Surface area(ha)	Total surface/ country (ha)
Mauritania	Banc d'Arguin National Park	National Park	1976	2007	1,170,000	
	Cape Blanc Satellite Reserve	Satellite reserve	1986	2007	578	
	Diawling National Park	National Park	1991	2007	16,000	1,186,578
Senegal	Langue de Barbarie National Park	National Park	1976	2007	2,000	
	Madeleine Islands National Park	National Park	1976	2007	450	
	Saloum Delta National Park	National Park	1976	2007	76,000	
	Popenguine Nature Reserve	Nature Reserve	1986	2007	1,181	
	Bamboung Community-managed MPA	Community MPA	2004	2010	6,800	
	Kayar MPA	MPA	2004	2010	17,100	
	Joal-Fadiouth MPA	MPA	2004	2010	17,400	
	Abéné MPA	MPA	2004	2010	11,900	
	Saint Louis MPA	MPA	2004	2011	49,600	
	Somone Community Nature Reserve	Community nature reserve	1999	-	700	
	Kawawana ICCA	ICCA	2010	2011	9,487	
	Palmarin Community Nature Reserve	Community nature reserve	2011	2011	10,400	305,018
Gambia	Niumi National Park	National Park	1986	2007	4,940	
	Tanji River and Bijol Islands Bird Reserve	Reserve	1995	2007	612	
	Bao Bolon Wetland Reserve	Wetland	1996	2007	22,000	
	Tanbi Wetland Complex	Wetland	2000	2007	6,000	53,552
Bissau-Guinea	Tarrafes de Cacheu National Park	National Park	1997	2007	80,000	
	Orango National Park	National Park	2000	2007	158,200	
	Joao Vieira and Poilao Marine National Park	National Park	2000	2007	49,513	
	Urok Islands Community MPA	Community MPA	2005	2007	54,500	
	Cantanchez National Park	National Park	2008	2008	104,767	446,980
Guinea	Tristao	Managed nature reserve	2009	2010	850,000	
	Alcatraz	Strict nature reserve	2009	2010	20654	
	Loos Islands Wildlife Refuge	Wildlife refuge	1992	2010	15	852,667
Total MPA RAMPPO					2,722,595	

Table 2. Characteristics of West African MPAs non-members of RAMPPO

	MPA	Status	Year est.	Year joined RAMPPO	Surface area(ha)	Total surface/ country (ha)
Cabo Verde	Santa Luzia Strict Marine Reserve	Marine nature reserve	2005	-	105,000	
	Sal/Murdeira Bay		2005	-	2,063	107,063
Sénégal	Kalissaye Ornithological Reserve	Ornithological Reserve	1978	-	16	
	Lower Casamance National Park	National Park	1970	-	5,000	5,016
Guinée Bissau	Cufada Lagoons Nature Park	National Park	2000	-	89,000	89,000
Guinée	Rio Kapatchez MPA	Ramsar site	1992	-	20,000	20,000
MPAs NOT YET MEMBERS OF RAMPPO					221,079	

How to ensure that the development and social progress needs of rural communities are not fulfilled at the detriment of nature?

It is in the search for a solution to this issue that Marine Protected Areas have gradually become laboratories for sustainable development. This brochure aims to disseminate the experience of MPAs beyond their borders in order to preserve a healthy and productive environment for the benefit of communities living on the coastline of West Africa.

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