

Peru's northern mangrove corridor

An ITTO project is helping develop a strategy for conserving and sustainably using mangroves in Peru's Northwest Biosphere Reserve

by José Otivo¹,
Oswaldo Saavedra²,
Henry Preciado³,
Dely Ramos³ and
Daniel Coronel²

1 Consultant, Mecanismos de Desarrollo Alternos (otivobar@yahoo.com)

2 Associate consultant, Mecanismos de Desarrollo Alternos

3 Consultant



Canoe race: The aims of this canoe competition in the Tumbes National Mangrove Sanctuary in 2015 and a “treasure hunt” in 2017 were to increase public awareness of the importance of mangroves and to boost tourism in the area as a way of increasing incomes for local communities. Photo: ITTO–MDA project

The great challenge we face in conserving mangroves in Peru (and other countries) is generating tangible benefits from their multidimensional values. One requirement for doing this is to convince small producers that mangrove conservation and sustainable use is the best way to improve their quality of life. A second requirement is to persuade the private sector that mangrove conservation can help in creating private profits. And a third requirement is to persuade the public sector of the fundamental importance of investing in conservation and sustainable use—for example by providing seed capital to finance conservation processes. Based on these three general requirements, Alternative Development Mechanisms (*Mecanismos de Desarrollo Alternos*, MDA)—an environmental non-governmental organization—is developing a strategy for the conservation and sustainable use of mangroves in Peru.

Existing situation

Mangroves in northern Peru are crucial components of the Northwest–Amotapes–Manglares Biosphere Reserve (one of five biosphere reserves in Peru).¹ This reserve, which was established in 1977, has only included mangroves since March 2016, when it was expanded (to 961 414 hectares) to include the Tumbes National Mangrove Sanctuary as a core area as well as the entire department of Tumbes and, in the department of Piura, the provinces of Sullana and Talara (SERNANP undated).

The main mangrove species in the region are red mangrove (*Rhizophora mangle*), mangrove colorado (*Rhizophora harrisonii*), black mangrove (*Avicennia germinans*), white mangrove (*Laguncularia racemosa*) and button mangrove (*Conocarpus*

erectus). These species are affected by anthropogenic activities, especially aquaculture, agricultural expansion and the dumping of solid waste from towns. Wildlife species include the Tumbes (or American) crocodile (*Crocodylus acutus*), a species endemic to the neotropics; perico cachetigre (grey-cheeked parakeet) (*Brotogeris pyrrhopterus*), which is close to extinction; and perrito conchero (crab-eating raccoon) (*Procyon cancrivorus*).

About 700 000 people live in the biosphere reserve (INEI 2015). Primary economic activities include the harvesting of crustaceans and molluscs from marine–coastal ecosystems, fishing and agriculture. In addition, there are oil extraction platforms and refineries and plants for processing and packing aquacultural and agroindustry products.

The Tumbes National Mangrove Sanctuary (now part of the biosphere reserve, as mentioned above) was created in 1988²; in 1997, it was recognized as a wetland site of international importance under the Ramsar Convention. This mangrove ecosystem provides local people with important resources and the tourism sector with recreation-related ecosystem services. Two towns close to the sanctuary, Puerto Pizarro and El Bendito, each with a population of about 6000 people (INEI 2015), have direct relationships with the mangroves. Other mangrove forests outside the sanctuary also need conservation strategies.

The northern mangrove corridor is a unique ecosystem in Peru and therefore warrants conservation; moreover, it provides ecosystem services for around 130 000 inhabitants³ in the coastal towns of Piura (Vice and Vichayal districts) and Tumbes (Tumbes and Zarumilla provinces) (INEI 2015),

1 Unless otherwise indicated, the source of information in this section is SERNANP (2017).

2 Government of Peru supreme decree 018-88-AG.

3 Population of the districts of Tumbes, Zarumilla, Vice and Vichayal.



Ground work: A local man plants mangrove propagules in a degraded mangrove area in La Chepa, Tumbes, Peru. Photo: ITTO–MDA project

and many small and medium-sized shrimp enterprises depend on them. Nevertheless, the northern mangroves face the following problems:

- a low capacity—especially in local governments—to manage mangroves for their sustainable use and conservation;
- a lack of financial strategies to support conservation activities; and
- ecosystem fragmentation.

The National Service of State Protected Natural Areas (*Servicio Nacional de Áreas Naturales Protegidas por el Estado*, SERNANP)—the institution in Peru responsible for managing natural protected areas—helps maintain the Tumbes National Mangrove Sanctuary, but mangroves outside the sanctuary are yet to be placed in any conservation category. Some have become highly degraded due to pressures from local people and industries.

The project

Given the perilous state of the mangrove resource in northern Peru, MDA, in partnership with the National Forest Service (*Servicio Nacional Forestal y de Fauna Silvestre*) and SERNANP and with financial support from ITTO, started a project⁴ in 2015 to improve the conservation of mangroves in northern Peru. The objective was to create a mangrove corridor that was adequately conserved, sustainable and supported by a financial strategy. The first stage of the project ended in August 2016 (the second stage started in April 2017 and will end in November 2017). The project has three main

outputs: 1) the provision of legal assistance to ensure that subnational and local governments can make use of their competencies for mangrove conservation; 2) efforts to improve mangrove management and conservation; and 3) the development of a draft financial strategy to guarantee the sustainability of conservation policies.

Outcomes

To date, the project has achieved the following:

- The enlargement of the Northwest Biosphere Reserve (from 231 402 hectares to 961 414 hectares) in 2016 included the Tumbes National Mangrove Sanctuary, thanks to the support of the ITTO–MDA project.
- Three new mangrove protected areas have been created in collaboration with local governments and civil society, with a total area of 3804 hectares (see Table 1).
- Local environmental policies have been updated in five governments, in which mangrove conservation has been prioritized.

More than 50 families have been trained in the sustainable use of mangroves, and more than US\$160 000 of public resources has been committed to support smallholder value chains (Table 2).

Promoting tourism in mangroves

With the purpose of promoting sustainable tourism in the Tumbes National Mangrove Sanctuary, the project promoted the first canoeing competition through the protected area in 2015. In 2017, it contributed to the “Búsqueda del Tesoro” (“treasure hunt”) event organized by SERNANP and the Tumbes Regional Tourism Directorate. With the motto “Discover the magic of nature in the Tumbes National Mangrove Sanctuary”, the treasure hunt, which was open to people of all ages, permitted travel by canoe along mangrove channels in the sanctuary to find three points and perform a series of “challenges” related to activities aimed at the restoration, conservation and sustainable use of mangroves, such as planting mangrove seeds, collecting trash (plastic bottles) and extracting black shells (*Anadara tuberculosa*).

The treasure hunt helped in educating people about mangroves and the importance of their conservation and sustainable use. The idea is to establish an annual contest to engage not only local people but also national and international tourists, thereby creating a tourism destination linked to mangrove ecosystems.

⁴ “Strengthening mangrove ecosystem conservation in the biosphere reserve of northwestern Peru” [PD 601/11 Rev.3 (F)].

Table 1: New conservation environmental areas in Piura and Tumbes

Name of conservation environmental area	Area (ha)	Creation law	Department
Mangroves of Estero La Chepa-Corrales	313.54	Ordenanza Municipal N° 004-2016-MDC-CM	Tumbes
Mangroves of Chulliyache	1595.38	Ordenanza Municipal N° 06-2016-MPS/A	Piura
Mangroves of Delta del Río Tumbes-Bahía Puerto Pizarro	1895.24	In process	Tumbes
Total	3804.16		

Ensuring strategy sustainability

A major challenge is to develop and implement a financial strategy that builds on the initial measures taken under the project and ensures their long-term viability. Mangrove conservation and production can be complementary when production systems respect ecological limits. To put such a complementary approach into practice, the following questions need to be addressed:

- What measures can be put in place to ensure that small-scale shrimp producers do not overharvest what is possibly their only means of subsistence?
- How can local-government decision-making best be influenced to bring sustainable economic benefits to local communities and avoid the authorization of industrial facilities that could cause mangrove loss or degradation?
- Who pays for mangrove conservation if everyone sees the ecosystem as a resource to be exploited and not a natural asset to be used sustainably?
- Who will give money for conservation in a region where everyone is so poor?

The efficient, productive use of mangroves is a means of increasing the value of mangroves. When local people are able to use their resources to improve their quality of life

and local governments can increase their financial capacity through such productive uses, they become willing actors in support of conservation. The economic use of mangroves will also help finance the strict protection of core areas.

We are aware, however, that thinking only about economic efficiency and increasing production can have perverse effects and cause more destruction. For example, contrary to desired outcomes, an increase in profitability could increase pressure to deforest mangrove areas or overexploit them. That is why it is necessary to think of production and protection as a package—that is, a bundle of measures carried out through an interinstitutional, multidisciplinary approach (King et al. 2016). Such an approach would:

- use explicit strategies to increase the productivity of small and medium-sized collectors of shrimps, black shells and fish to reduce pressure in the wider mangrove area;
- increase the environmental performance of local government (e.g. by building capacities in monitoring, control, zoning and territorial planning); and
- identify instruments and channels for allocating resources from the public and private sectors to conservation actors.



All in the same boat: Representatives of local authorities, SERNANP, local communities and the ITTO-MDA project inspect a mangrove area as part of building an alliance for the sustainable use of the resource. *Photo: ITTO-MDA project*



Making a stand: These mangrove seedlings were planted as part of restoration efforts in the Estero La Chepa–Corrales Mangrove Conservation Area. Photo: ITTO–MDA project

In the case of the northern mangrove corridor, it is possible to work along the following lines:

- **Increase ecosystem productivity through biotechnologies and other technical assistance in sustainable-use areas:** the project has developed a partnership with a local research institute called Inca Biotec that is developing new techniques for increasing metabolism in commercial shrimp species, improving their genetics, and preventing diseases in cultivated shrimps. These technologies are being shared and tested with small producers, who can use them to increase profitability and their livelihoods.
- **Engage with medium-sized and large companies to invest in research and development, especially into the genetic resources of crustaceans and molluscs:** research and development is not cheap and it is important, therefore, to obtain the participation of companies with sufficient financial means. Are they willing to pay for such research and development? Some companies have damaged mangroves in the past, and such damage should be compensated, especially in a commercial context in which consumers (e.g. in export markets) are increasingly concerned about responsible consumption. Public regulations are also becoming stricter, requiring the mitigation of (or compensation for) damage caused by industrial activities. Companies will act when they perceive that engaging in conservation will generate value, increase

trade or reduce reputational risks. The objective is to establish mangrove areas for the *in situ* conservation of genetic resources for related industries.

- **Encourage public investment in seed capital to build capacities among local producers committed to conservation:** as noted above, thinking only about economic aspects can be harmful for mangroves. We need a public sector that is active and committed and which has the capacity to develop and implement appropriate policies. Typically, local governments are weak and have only scarce resources, and it is essential that any available funds are spent efficiently and focus on key transformational activities. For example, new technologies can be deployed to delimit and zone mangrove areas. Another type of investment is to build capabilities for monitoring and regulating core mangrove areas. A third investment type is to support local enterprises by providing facilitative public goods (e.g. local roads and assistance to enterprises whose activities are compatible with conservation). A final form of public investment is to build conservation infrastructure and generate capacities among local producers to kick-start transformational processes.

The approach outlined here requires alliances between communities, the public sector and the private sector with the common goal of mangrove conservation and sustainable use. Such alliances can determine appropriate operational measures, facilitate them and, above all, support them financially.

Table 2: Public funds committed to supporting smallholder value chains using mangrove resources

Project	Beneficiaries	Source	Amount (Peruvian soles/US\$*)	Situation	Support provided by ITTO–MDA project
Strengthening tourism activities in the Estero La Chepa–Corrales–Tumbes mangroves	Ecotourism, Fishing and Collectors of Marine Products Association of La Chepa (AEPEPH)	Procompite**; Tumbes province, 2016	38 872/12 250	Approved	Technical assistance for project formulation
Improving ecotourism in the mangroves of Puerto Pizarro Bay, Los Tumbes, Peru	Puerto Pizarro Tourism Board	Procompite**; Tumbes province, 2016	42 083/13 262	Approved	Technical assistance for project formulation
Improving and equipping rural ecotourism in the community of Rica Playa–San Jacinto, Los Tumbes	Rica Playa Tours Ecotourism Association	Procompite**; Tumbes province, 2016	202 641/63 862	Approved	Technical assistance for project formulation
Improving the production, post-production and marketing of limes in the La Capitana Rural Association, district of de San Jacinto, Los Tumbes	La Capitana Rural Association	Proyectos de Servicios de Extensión Agraria (PNIA), 2017	224 100/70 625	Under assessment	Technical assistance for project formulation
Total			507 696/160 000		

Notes: * Exchange rate: 1 US dollar = 3.1731 soles. ** Procompite (procompite.socodevi.org) is a competitive fund for local governments; here, the local government awarded the funds is listed, along with the year it obtained the funds.

Conclusion

There will be no conservation if local people do not obtain benefits from it. Mangrove conservation, therefore, needs to be associated with the social and economic development of communities that depend on these highly productive but fragile ecosystems. In addition, ensuring sustainable mangrove management requires strategies that are developed and implemented through true participatory approaches involving all actors with a stake in the mangroves.

The ITTO–MDA project identified, as a basic step, the need to expand the extent of mangrove protected areas. Another priority must be to support local and regional governments in designing policies for mangrove protection and including mangroves (which are usually forgotten or undervalued) in the scope of their work. To ensure sustainability in the long term, however, the people living in or near the mangroves need mechanisms by which they can use the resource while protecting it (a production–protection approach). In that sense, efforts should be strengthened to encourage local enterprises that harvest and process molluscs and crustaceans or tap the area’s tourism potential. Stronger partnerships are needed with the private sector, including on research aimed at protecting and sustainably using mangrove ecosystems in the Northwest Biosphere Reserve.

References

- INEI 2015. Population report. Instituto Nacional de Estadística e Informática (INEI).
- King, D., Hicks, F., Gammie, G., Galarreta, V., Szott, L., Coronel, D., Ormeño, L.M. & Lea, M. 2016. *Towards a protection-production compact for Peru: elements and lessons from global experience*. Forest Trends, Washington, DC.
- SERNANP. 2017. Plan Maestro del Santuario Nacional “Los Manglares de Tumbes”, periodo 2017–2021. Servicio Nacional de Áreas Naturales Protegidas por el Estado (SERNANP).
- SERNANP undated. Reserva de Biosfera del Noroeste Amotapes-Manglares. Servicio Nacional de Áreas Naturales Protegidas por el Estado (SERNANP). Available at: www.sernanp.gob.pe/reserva-de-biosfera-noroeste

Managing Madagascar's mangroves

More coordination and capacity building are needed to ensure the sustainable management of the country's invaluable mangrove assets

by Rantonirina Rakotoaridera

PhD candidate, Department of Water and Forestry, Graduate School of Agricultural Sciences (École supérieure des sciences agronomiques), Madagascar (rakotoaridera@yahoo.fr)



Frontline: Local people plant mangrove propagules in a restoration effort at the Mahavavy-Kinkony Wetland Complex in Madagascar. Photo: Asity

Madagascar—an island 400 km to the east of Africa—has nearly 300 000 hectares of mangroves, which is 2% of the world's resource and the second-largest area of mangroves in the western Indian Ocean (Rakotobe et al. 2015).¹ Mangroves are known to play diverse economic, environmental, social and other roles, and Madagascar's mangroves, therefore, are an extremely important resource.

Malagasy people are not the only ones who enjoy the benefits of their mangroves, which sequester carbon and are therefore of value to the entire planet. In addition, mangrove-based products are sold in both local and export markets.

Madagascar's mangroves are under threat, with an estimated 20% of the resource lost since 1990 due to various pressures (Rakotobe et al. 2015). The sustainable management of the remaining mangroves is becoming a pressing issue.

The role of mangrove forests in Madagascar

Fishing is one of the main means by which Madagascar's coastal communities earn their livelihoods. Mangrove forests are the most favoured fishing zone, especially on the west coast, where 98% of Madagascar's mangroves are located. Moreover, mangroves play crucial ecological roles in the fisheries sector: for example, shrimps—a major source of foreign currency in Madagascar—lay their eggs in mangrove forests, which are also sanctuaries for crabs and produce various other fish products. Depending on the financial means of operators, fishing is done at varying scales in mangroves, from subsistence, through small-scale commercial operations, to an industrial scale.

Mangrove timber is also in high demand. Coastal communities use mangrove timber as fuel and for processing fish products.

In some areas where forests are disappearing on land, mangrove forests offer an affordable and easily accessible energy source. Mangrove timber is processed into charcoal, which is used as fuel by urban citizens.

The mangrove species *Avicennia marina* has high calorific potential and is in high demand in the Boeny region, where lime is produced. Coastal communities also use mangrove timber for house construction because of its durability. Coastal-city dwellers favour the use of mangrove timber as pillars in their buildings.

Mangrove tree products are used in traditional medicine for their therapeutic properties in treating various disorders, such as stomach ache. Finally, mangrove forests play significant roles as habitat for many fauna and flora species, including species endemic to Madagascar.

Pressures

Although mangrove forests are widely recognized as important resources, they are vulnerable to various pressures. Commercial harvesting is not permitted in mangrove forests but, because mangrove charcoal and timber are in high demand, there is significant illegal harvesting and sale of these products. Especially in areas where land forests are disappearing, people have no choice but to harvest mangrove forest timber.

The unregulated use and overuse of mangrove forests results in deforestation and degradation. In addition to uncontrolled use, mangroves are affected by activities such as upstream deforestation and associated erosion, and urban pollution, both of which can lead to sedimentation and the consequent degradation of mangrove forests. Various other upstream activities can also cause hydrological changes (Jeannoda & Roger 2008).

¹ Rakotobe et al. (2015) provide original sources for the data presented here.



Rich and under threat: Flamingos graze in the du Menabe mangrove wetland. Madagascar's mangrove resources are host to diverse fauna and flora, but they are threatened by overuse.
Photo: Vololoniaina Raharinomenjanahary

Policy and governance

The Ministry of Environment, Ecology and Forests (*Ministère de l'Environnement, de l'Écologie et des Forêts*, MEEF) is responsible for the management of mangrove timber, but fishery and marine resources fall under the supervision of the Ministry of Fisheries Resources and Fisheries (*Ministère des Ressources Halieutiques et de la Pêche*, MRHP) and the State Secretariat in Charge of the Sea, respectively. The commercial use of mangrove forest timber and its byproducts (such as tannins) was regulated by the Forestry Administration and subject to the issuance of harvesting licences until 2000, when harvesting licences—including under user rights—were suspended in an effort to prevent illegal operation and overharvesting. The measure has been unsuccessful, however: the government is unable to prevent illegal use because of a lack of enforcement capacity. As a result, mangrove timber continues to be harvested and sold in Madagascar.

The National Commission for the Integrated Management of Mangroves was established in 2015 with the aim of increasing the coordination of mangrove management. The Commission falls under the authority of both MEEF and the MRHP, and it aims to develop a strategy document for managing mangrove forests. The Commission includes members from various sectors with stakes in mangroves.

Stakeholders involved in mangrove management

A range of stakeholders is involved in coastal areas, such as the grassroots communities that manage mangrove forests under Madagascar's GELOSE (*gestion locale sécurisée*, or "secure local management") programme for transferring the management of natural resources to the local level. Local community groups also participate in mangrove management but lack any real legal basis.

Managers in charge of protected areas play roles in managing mangrove forests, especially in protected areas.

International non-governmental environmental organizations provide support in various areas, such as climate-change adaptation; the restoration of degraded mangrove forests; the development of alternative livelihoods in mangroves; the promotion of sustainable funding mechanisms for mangrove management; and the implementation of sustainable management. In some areas, local stakeholders implement activities similar to those of international non-governmental organizations, either on their own or with the support of such organizations.

Issues

Madagascar has an established legal framework, and the various mangrove forest stakeholders are doing their utmost to fulfil their duties. Numerous challenges remain in implementing the legal framework, however, due to a lack of means in the administration in charge of monitoring and control.

Grassroots communities are often unable to manage mangroves effectively because they have only weak management capacity, and government support is inadequate because its own capacity is lacking. The capacity-building and management efforts of other stakeholders are scattered, and there is a lack of coordination among the various actors.

MEEF and the MRHP are working to achieve a consensus on the measures that should be adopted for the efficient management of mangrove resources. On the one hand, MEEF wants new regulations on mangrove timber harvesting and marketing with a view to reducing the risk of uncontrolled and illegal use. On the other hand, the MRHP wants to prevent any degradation that could have detrimental effects on fishery product development.

The divergent views of the two ministries stem from a lack of information and understanding: it is difficult to make effective decisions on the basis of existing knowledge. Policymakers lack information, for example, on the potential land area to be restored; the lifecycles of species most in demand; the disruptions that harvesting could cause; and the industries that could be developed based on mangrove resources.

Future prospects

Actions taken in mangrove forests should promote development while ensuring that ecological integrity is unaffected. They should take into account the multisectoral nature of mangrove forests, and all stakeholders should be involved in and ensure the coordination of their activities. The National Commission for the Integrated Management of Mangroves can therefore play an important role.

Support should be provided to grassroots communities living close to the resource, who are best placed to operationalize activities in the field. Local initiatives should be encouraged, and successful projects now under implementation should be extended to other communities.

Priority activities should include:

- conducting surveys to identify areas for mangrove forest restoration or reforestation;
- developing management plans in consultation with local communities;
- developing mangrove forest restoration/reforestation activities;
- developing alternative or improved income-generating activities aimed at alleviating pressure caused by unsustainable activities (e.g. providing training in improved charcoal production techniques);
- promoting the planting of fast-growing species inland of mangroves; and
- conducting surveys aimed at ensuring the sustainable management and valorization of mangrove forests.

References

- Jeannoda, V. & Roger, E. (eds.) 2008. *Honko: recueil d'articles sur les mangroves de Madagascar*. Plant Biology and Ecology Department, Faculty of Science, Antananarivo University, Madagascar.
- Rakotobe, H., Rabibisoa, N. & Razafarison, J.C. 2015. *Diagnosis study of the project intervention sites "Reinforcing the new protected area network and conservation of Madagascar's mangroves"*.