# MARINE BIODIVERSITY AND FISHERIES IN MADAGASCAR

## A Biodiversity and Extractives Political Economy Assessment Summary

Recognizing the high level of importance of conserving Madagascar's biodiversity, the USAID Biodiversity Policy identifies Madagascar as a geographic priority. Madagascar went through significant political and economic turmoil in recent decades, which resulted in a sudden stop of funding for development assistance from the United States and many other donors after a 2009 coup d'état. As stability has returned to Madagascar after the ensuing protracted political crisis, USAID has worked closely with the government of Madagascar, donor partners, and conservation groups to identify areas where assistance is most needed from USAID.

The protection of marine biodiversity has been identified both as an environmental and a food security priority. This island nation is threatened by overfishing and illegal, unreported, and unregulated (IUU) fishing. Accordingly, this summary is based on a rapid field-level political economy assessment[1] (PEA) conducted to support programmatic design in relation to USAID's biodiversity funding. It outlines the findings and recommendations for where USAID support can provide the most value.

[1] This research used USAID's Applied Political Economy Analysis framework. For more information, please see: https://usaidlearninglab.org/library/applied-political-economy- analysis-field-guide.

## OVERVIEW

Since 2004, important marine areas have been operating under Locally Managed Marine Areas (LMMAs), and some of these were already associated with Marine Protected Areas although they were operating in relative isolation. In 2012, Madagascar's first national forum of LMMAs came together to form a network called MIHARI. The Government welcomed this network given its limited financial resources to oversee large-scale marine conservation. In 2014 at the International Union for Conservation of Nature (IUCN) World Parks Congress, Madagascar's newly elected president pledged to triple Marine Protected Areas in the country, inclusion of a community-based management model for marine areas. Capitalizing on the Government's momentum on marine conservation, the USAID/Madagascar Mission began exploring ways to support this new programming area

USAID/Madagascar's Program Office and Environment and Climate Change Office took the lead in identifying opportunities for USAID to address needs in marine conservation. A multidisciplinary research team was deployed to two distinct geographical locations to collect information. Marine biodiversity in both locations is threatened despite the existence of Marine Protected Areas. In both areas the concept of *dina*, or customary law, used by communities to govern resources at the local level, was identified as an important feature upon which to build stronger local resource management regimes. Building stronger resource governance is seen a priority because Madagascar's local fisheries provide livelihood and food security for its coastal communities. Although fishing is an important source of protein in the local diet, it is far from sufficient. Malnutrition is widespread. By all accounts the fisheries have collapsed, with multiple informants reporting far lower yields in recent years, when compared to historic levels. Moreover, frequent conflicts between traditional and commercial vessels as a result of weak enforcement of existing laws and of exclusive rights zones of locally managed marine areas are of concern.

## BACKGROUND

Two regions were selected to represent the geographical and cultural variation of coastal Madagascar, the drought-prone Southwest and the rainforest zone of the Northeast. Antongil Bay, in northeastern Madagascar is a biologically significant marine biodiversity area and forms a key part of a larger landscape/seascape that includes threatened moist tropical lowland rainforests in Masoala National Park and critically endangered coastal forests in Makira Protected Area possessing some of the country's most important terrestrial biodiversity and forming the coastal watershed for Antongil Bay. The area is managed by the Wildlife Conservation Society (WCS) which has involved LMMAs in marine biodiversity conservation efforts since 2008. This area's management plan covers some of Madagascar's first Marine Protected Areas, formed in 1997 to protect the rich numbers of crustaceans, finfish, sharks, and humpback whales, as well as extensive coral reefs stretching up to 100 kilometers in length. In addition, it is the first region in the country to have a marine resources management plan. In 2010, the entire bay and its outer reaches were put under temporary full protection by an interministerial decree (no.52005/2010) and since that time Antongil Bay has been placed under a management plan that works with 25 LMMAs around the bay and includes marine protected areas or no-take zones as well as exclusive community fishing use and management rights. In 2015, the Government of Madagascar established the country's first marine sanctuary for sharks in Antongil Bay as part of an effort to safeguard marine resources and the communities who rely on them. The vast majority of local fishers fish for subsistence, but some of the catch reaches local markets. Local fishers have exclusive fishing

rights as the 2015 law establishing the shark sanctuary restricts international vessels from entering the bay and limits the number of small-scale and industrial fishers allowed to fish in the bay. With the more recent advent of the LMMA approach, there has been progress delimiting boundaries and establishing local jurisdictions. In the absence of agreement on limits to access for commercial prawn fishers, local fishers are in frequent conflict with commercial trawlers. The research found that Antongil Bay's management plan and steering committee could provide a mechanism for addressing some of those disputes and proposing the conditions required for improved management but current power asymmetries between traditional and commercial fishers in Antongil Bay will require some adjustment.

Southwest Madagascar is a much larger geographical area than the Northeast research site and it is not isolated. The Southwest is the most important commercial fishing area in the country despite dwindling fish stocks. The area has a longer history of LMMAs, with numerous donor interventions that have tried to address depleted fisheries, high levels of poverty, malnutrition, pressures from drought-affected inland populations, and wildlife trafficking. Many local and international non-governmental organizations (NGOs) are working with coastal communities in the Southwest under an array of different types of management regimes allowing the research teams to see how community resource governance and management effectiveness overlay with different levels of government commitment. In the Southwest, management regimes include: formal Marine Protected Areas, co-management arrangements (called Management Transfers), and community-managed reserves. Although all three involve communities, the first two options provide some government oversight and establish permanent or temporary reserves managed by communities with formalized plans with the involvement of NGOs including international organizations like WWF and WCS, and Reef Doctor, a national network known by the acronym SAGE, and a local organization known as Honko which means mangrove in Malagasy.

The NGOs in the Southwest coordinate their work informally through regular meetings with the Regional Directorate of Fisheries. There is also a regional civil society network on combatting wildlife trafficking. The network is part of a national civil society platform. Private international foundations, European donors, and other international assistance agencies are the primary sources of support for these NGOs. They work closely with the Regional Directorate of Fisheries, through support from the European Union and the World Bank's *Pôle-Integré Coordination,* (or PIC II) project. The Regional Directorate of Fisheries is in the process of compiling research findings and other relevant information from all the different marine science research projects and the work of NGOs in the Southwest to be housed at the Regional Directorate of Fisheries in Tuléar. This is particularly important as a means of providing better information locally about the regional variation of livelihood opportunities and fisheries pressures. The Directorate acknowledges that because it is under-resourced, it works closely with and relies heavily on the work of NGOs and the Institute of Fisheries and Marine Sciences (*Institut Halieutique et des Sciences Marines*—IHSM) to monitor changes in fisheries.

The Institute of Fisheries and Marine Sciences, located in Tuléar, is one of the nation's premier research institutes; it has been working for more than two decades on developing and scaling up alternative livelihood options for coastal communities. In addition to improving harvests of shrimp, crab, and octopus through annual closures of temporary reserves, IHSM has encouraged private sector and parastatal investment in two common near-shore products with high export value: seaweed and sea cucumbers. Copefrito, the largest company in the Southwest has been active in the area for 20 years. It sources 70 to 75 percent of its marine products from the Southwest. Both seaweed and sea cucumbers can be harvested for sale by fishers. The investment costs, which might otherwise be prohibitive, are

typically covered by the NGOs or companies. The seaweed, which fetches a modest supplementary income, is farmed mostly by women, harvested every 45 days, and sold to company agents. Copefrito and Murex both work in the area and have storehouses or resident agents in some villages. Both companies work closely with NGOs and LMMA associations.

Sea cucumber (*trepang*) farming requires a larger up-front investment in materials to construct netted pens to hold in the tiny juveniles. They also have to purchase the juveniles, which are bred by the Indian Ocean Trepang (IOT) company based in Tuléar. These juveniles are placed in pens in the near-shore waters for nine months, until they are mature. A pen will hold thousands of sea cucumbers. The farmers can sell sea cucumbers for export at US$2.50 a piece, contrasted with daily incomes from fishing, which averages around US$1.50. Unfortunately, not all communities are suitably located for these livelihood options. Currents and nutrient flows in the water dictate the quality of the seaweed, and the relative protection of the sea cucumbers. The largest challenge for sea cucumbers, however, is guarding against theft. Communities that produce sea cucumbers have reported that armed bandits stole the entire stock. Crime has caused many smaller companies that had been working with the IOT to pull out of these vulnerable communities. As a result, active sea cucumber farming was not apparent in any of the communities the research teams visited. Asian demand for sea cucumbers is high and many communities in the Southwest reported being offered substantial sums to assist Asian vessels to hunt for wild sea cucumbers which is illegal, unreported, and unregulated. Other illicit products such as turtle shells are also sought by these unspecified Asian vessels. Seaweed has a low-value but an almost limitless demand exists for industrial uses as carrageenan.

None of these options exist in the Northeast. Temporary marine reserve closures, however, have improved size and number of octopus found in both the Northeast and Southwest. The closures are enforced nationwide at least once a year and often twice a year by LMMAs. These earlier restoration efforts played an important role in convincing fishers to join together to manage the fisheries with *dina,* or customary law, through LMMAs. The Northeast's 25 LMMAs are part of the nationwide network of LMMAs called MIHARI and play an important role in the network. The network is supporting fisher communities committed to protection of their marine resources. Community associations have vastly different levels of organizational capacity, something that MIHARI is trying to address. The effective use of *dina* to establish and enforce local management varied across communities as well. Closer study of the communities around Antongil Bay revealed important insights into the nature of *dina.* For example, if dina is imposed upon a community, it is not likely to be enforceable. *Dina* emerges from the horizontal accountability of customary institutions and from community recognition of a need for regulation. Yet, *dina* is not always enforceable on outsiders and the majority of conflicts over resources that occur in both North and South are related to outsiders with commercial vessels. The power imbalances make conflicts difficult to resolve. In the South, fishers reported boats with armed gangs on board could fish with impunity and LMMAs had little recourse. Criminality in the Southwest puts livelihoods at risk. Likewise, in the Northeast, commercial vessels destroy fishing equipment routinely with impunity threatening livelihoods. The inability to resolve these asymmetrical conflicts has implications for food security and nutritional health as well as livelihoods.

## KEY FINDINGS

This PEA provides important first-hand qualitative evidence about the state of fisheries resources and insights into effective management regimes, including the use of *dina*. This research also offers a better understanding of research needs for exploring how to strengthen and measure the effectiveness of local marine management in Madagascar. During this PEA, the team found widespread recognition by government institutions and conservation organizations that fisher communities themselves have a critical role to play in marine management. Further, the emergence of MIHARI created huge potential for fundamentally strengthening the marine sector in Madagascar, although further efforts are needed to ensure that this potential is fully realized.

This analysis found that any programming in the marine sector must not only consider how to strengthen the LMMA network, but must also seek to address the external systems within which the LMMAs operate. Because many other donors and partners are working to strengthen these broader systems, however, USAID should strategically focus on developing ways to monitor and support the internal dynamics and principles that make LMMAs effective. For USAID, an important dimension of these internal dynamics is how *dina* can be used to support LMMAs.

This field research also highlighted the importance of food security and nutrition, mainly through small-scale fisheries, in coastal areas with few if any livelihood alternatives. In Madagascar more than 50 percent of children under five years of age are suffering from malnutrition, and more than 65 percent of the population is affected by persistent food insecurity. The decline of Madagascar's fisheries resources – as evidenced by the leveling off of total catches, declining commercial landings and declining small-scale fisheries catch rates – is an important factor in food insecurity.

During this assessment the team met with researchers studying micronutrient deficiencies in Antongil Bay. Recent analyses by the Harvard's T.H. Chan School of Public Health and the University of British Columbia-based organization Sea Around Us have found that "deficiencies in the micronutrients fish provide including vitamin B12, iron, and zinc, can affect maternal mortality, child mortality, cognitive defects, and immune function. Some 45 percent of mortality in children under five years old is attributable to undernutrition." In Antongil Bay, studies indicate a 30 percent stunting rate among children also correlated with this undernutrition. Researchers who have worked in Madagascar conclude that better management of fisheries through control of unsustainable fishing practices and foreign fleets could be beneficial not only for the marine environment but also for human health.

Although USAID may not, in the near term, be able to directly address the degree to which fisheries decline is affecting food security at the national level, by strengthening the protection of sustainable small-scale fisheries it can help to address both the marine biodiversity and food security problems locally. Among other things, resolving conflicts between the commercial fleets and traditional or artisanal fishers, such as those found in Antongil Bay should be a priority. Likewise, because commercial fishing off the West Coast is primarily illegal, unreported, or undocumented, involving large quantities of by-catch, it will be important to promote a more aggressive policy for dealing with foreign fleets as a long term goal. The focus for programming in the near term may be limited to strengthening community level management through LMMAs and resolving the conflicts that these communities encounter.

## RECOMMENDATIONS

1. **Support Uptake of Research** – Recognizing that there are a number of donors engaged in research coordination, USAID should focus on supporting MIHARI and others to integrate research finding into better LMMA management

2. **Build LMMA Effectiveness through MIHARI** – Improving marine management will require strengthening not only the existing internal functioning of LMMAs, but also the institutions that support them. USAID should support the coordination efforts of MIHARI, strengthen its ability to provide technical analysis and support, and identify incentives mobilizing LMMA effectiveness.

3. **Strengthen Community Based Management Efforts** – USAID should focus efforts on local learning and evidence based conservation approaches associated with *dina*. This would enable the program to coordinate closely with the government, donors and partners to identify gaps and focus on ways that *dina* can be supported and strengthened.

4. **Explore Alternative Livelihoods** –Viable alternatives are needed to deal with declining fisheries and food insecurity as well as poverty and climate change. Developing scalable alternatives is so important that any new biodiversity project should incorporate partners with this expertise. Integrating biodiversity and food security programming where geographically feasible will also be important.

5. **Engaging with the Private Sector to increase Market Transparency** –the private sector has a critical role to play, NGOs, and key stakeholders should work to improve transparency around fisheries livelihood activities and seek to reduce the possibility of criminality.

6. **Build Enforcement Capacity to reduce Conflicts** - Conflicts among various stakeholders with divergent incentives is a critical barrier to marine conservation. To address these conflicts, USAID should bolster effective management of marine resources in ways that can credibly resolve conflicts within the community and at the regional level, where they exist.

7. **Explore New Forms of Commercial Licensing** – Support improved transparency in fishing vessel licensing so that information is accessible at the district level. USAID, working with other donors, may consider new approaches for commercial licenses to plan more strategically around food security and long-term support of policies that allow fishers some form of exclusive rights to pelagic waters. This work would be coordinated through LMMAs, Ministry of Fisheries, district and local government and MIHARI to shift fishing from the reef to pelagic waters in the Southwest and enforceable boundaries for LMMAs in the Northeast.

8. **Increase Monitoring and Enforcement of IUU fishing** – USAID may need further study and collaboration with government and partners of how to best address this issue, but it is the key to ensuring sustainable marine biodiversity resources.