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**Community Based
Marine Conservation
and Management Initiatives
in the Western Indian Ocean**



Expansion of community based marine conservation in the WIO

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The remarkable marine and coastal biodiversity of the western Indian Ocean (WIO) is vital for ecosystem health and local livelihoods, as well as commercial and international fisheries markets. Yet throughout the WIO, government agencies often lack the finances and resources to effectively manage the region's vast coastlines, and overexploitation has contributed to unprecedented degradation of fisheries stocks and marine ecosystem health in recent years. Exacerbating the effects of direct human exploitation, climate change impacts, such as increased frequency and intensity of warm water episodes and

severe tropical storms, have further weakened the resilience and productivity of already stressed ecosystems.

Marine protected areas (MPAs) are a useful tool for both mitigating direct human pressures on the marine environment and buffering ecological resilience to climate change. However, unless MPAs are appropriately managed and provided with adequate resources, they may be ineffectual at meeting conservation objectives. Indeed many of the WIO's MPAs currently suffer as a result of insufficient management resources at the community and government

level, weak enforcement, or a lack of respect or awareness by neighbouring communities. Such limitations are often inevitable within conventional 'top down' approaches to coastal management, sometimes greatly undermining the potential effectiveness of MPAs.

One solution to these management challenges that has proven effective in a number of places around the WIO is the development of MPAs as locally managed marine areas (LMMAs), a method of management that empowers communities to govern the use of their marine and coastal resources independently.

First developed in the Pacific Ocean, LMMAs are also often referred to as community managed marine areas or community based MPAs. An LMMA is defined as an area of near-shore waters and coastal resources that is largely or wholly managed at the local level by coastal communities, land-owning groups, partner organisations, and/or collaborative government representatives who reside or are based in the immediate area. A wide range of manage-

Above: A community meeting.
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ment tools, appropriate to the specific social and environmental context of each area, can be implemented within an LMMA.

The LMMA approach is an essential component of integrated coastal zone management, protecting coastal biodiversity, allowing for the management of fisheries, and providing socio-economic benefits needed for poverty alleviation and long-term sustainability of coastal communities' traditional livelihoods. With management and enforcement the responsibility of local community members, operational costs are relatively low, and as such, LMMAs have the potential to affect larger areas of coastal waters than many existing 'top-down' MPAs. Furthermore, because they often incorporate both environmental and socioeconomic objectives, LMMAs are proving to be an effective approach to addressing the threat of human pressures on marine ecosystems, as well as increasing both short-term and long-term ecological and social resilience to climate change impacts.

The Velondriake LMMA Located in southwest Madagascar, Velondriake, meaning "to live with the sea" in the local Malagasy dialect, is the Indian Ocean's largest LMMA, covering more than 600 square kilometres of marine and coastal environment and home to over 8,000 people. An arid, isolated region in an economically depressed

country, Velondriake's communities are highly dependent on natural resources for daily subsistence and income, with over 80 percent of households in the coastal villages relying on the direct use of coastal and marine resources for their livelihoods .

Blue Ventures Conservation has played a key role in helping to establish this LMMA, supporting twenty-five coastal villages to collaboratively manage their marine and coastal resources. The Velondriake LMMA is governed by a local set of laws, called dina , which was created, and is now enforced, by community

Throughout the entire managed area, dina ban the destructive fishing practices of poison fishing, beach seining, and physically damaging coral. Selected reef flats are given further protection through two to three month closures, allowing quick-growing reef octopus (*Octopus cyanea*) to increase in number and size. Octopus is the primary export fishery for the region's fishing communities, and having already implemented over 60 successful temporary closures in the last six years, Velondriake communities are able to manage this important commodity while ensuring steady local incomes

Although the dina has proved an invaluable management tool at a local level, it remains vulnerable to outside interests such as industrial fishing, tourism development and mining; stakeholders for whom local dinas may have little meaning. Velondriake is therefore seeking more substantial legal protection to reinforce the dina against these threats. The LMMA will soon receive definitive protection as a category V protected area within the Madagascar Protected Areas System (SAPM), which will support the existing dina and ensure stronger legal backing against industrial resource ex-

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members. In Madagascar, dina can be used to complement formal legislation and carries authority that is recognised by national law. The Velondriake dina controls access to, and use of, marine resources through various forms of restrictions.

These restrictions have been developed and agreed upon by all local stakeholders through village meetings and regional workshops. Social marketing campaigns and frequent educational sessions have been used to increase knowledge and further encourage and support community enforcement of the dina.

and ecological sustainability.

In addition to these temporary closures, five zones of coral reef and one of mangrove forest have been designated as permanent no-take-zones. These core protected areas were identified via a participatory process with local communities in which fishers identified areas where they would be willing to forego harvesting, and subsequent scientific surveying by Blue Ventures' scientists validated that the areas are, in fact, biologically and ecologically important.

traction. This recognition will also allow the Velondriake Association, the community-based governing body of the LMMA, to charge a reserve entrance fee; a critical step towards financial independence for the association.

An Integrated Approach Recognising the close relationship between ecosystem health, community well being, and sustainable local livelihoods, several community development programmes led by Blue Ventures work within Velondriake to indirectly safeguard the marine environment. Frequent health clinics and

community-based agents provide family planning and community health services throughout the region, working in areas not previously reached by public health practitioners. This provision of basic health services has met with great success over the last five years, with more than 30 agents trained to distribute contraception, diarrheal treatments and water purification solution, as well as give basic advice on maternal and child health. Giving women and their partners the choice to space childbirth, or to have fewer children, improves family welfare and ultimately reduces the number of people dependent on marine resources in the future. Likewise, healthy families are better able to be good stewards of their local environment.

Diversifying income-generating activities and providing environmentally sound alternatives to subsistence fishing is important in reducing pressure on the region's fragile marine resources. To this end, Blue Ventures' community-based aquaculture programme works with local fishermen and their families throughout the region to raise hatchery-reared sea cucumbers and cultivate seaweed. These mariculture products, sold on the international market through regional export companies, allow families to access additional income without increasing pressure on marine resources within the LMMA.

Formal education is promoted as a path towards individual success and increased social capital within the community. A school scholarship programme within Velondriake provides financial assistance to nearly 200 motivated children and young adults to attend primary and secondary schools, while a separate programme provides assistance for undergraduate, masters, and PhD students interested in pursuing higher education in environmental sciences.

In partnership with UNICEF, Blue Ventures hosts a number of weekly environmentally focused education sessions with local youth that incorporate computer skills, video production, and art. Informal, village-wide education presentations are conducted frequently across the entirety of Velondriake, bringing messages about environmental stewardship, health, and family planning to rural villages. Ongoing sessions with the Velondriake Association include record and book keeping, habitat monitoring techniques, and management and leadership skills to oversee the LMMA.

An essential component of both the marine conservation and social development interventions is adaptive management through frequent feedback. Socio-economic surveys are conducted with community members across Velondriake to better

understand if and how the programmes are achieving their purpose. This also allows for gaps to be identified and for new programmes or interventions to be created to improve community marine management and local economic development. Blue Ventures recognizes that community members are the key stakeholders in all activities and that their support and buy-in for conservation projects is essential for the long-term success of any initiative.

Creating a Network

In recent years, the success of Velondriake has inspired replication and expansion of this LMMA model around Madagascar and the WIO, creating a network of community-led conservation areas. New initiatives have been established with the support of a number of communities and conservation NGOs looking to replicate Velondriake's experiences. For example, an ambitious national initiative entitled *Projet d'Appui aux Communautés des Pêcheurs* (Project to Support Fishing Communities) funded by the African Development Bank, replicated Velondriake's model for temporary octopus fishery closures throughout 50 coastal villages in southwest Madagascar over the last five years. This management tool was also recently incorporated into the national fisheries plan in the Mauritian island of Rodrigues, and piloted in 2012.

Several hundred kilometres north of Velondriake lies Belo-sur-Mer, a coastal village located adjacent to the Kirindy-Mite national park, a fine example of western dry deciduous forest and home to the world's highest concentration of endemic baobab trees. Madagascar's national park service (MNP) is working to expand the Kirindy-Mite national park offshore to protect the ecological integrity of a chain of coral cays. The seven barrier islands, located 15 - 20 kilometres west of Belo-sur-Mer, are surrounded by coral reefs that have, in recent decades, increasingly become the focus of an annual migration of fishermen coming from the south. The area is also home to extensive mangrove forests and seagrass beds, which are heavily utilised by local and migrant fishing communities.

The park service is working with Blue Ventures to incorporate lessons learned from the Velondriake LMMA within zoning plans for this new marine national park. While MNP is responsible for the management of the marine park, which includes a number of permanent no-take coral reef reserves, nascent community-based management initiatives have begun in communities around the park. These efforts have focused largely on management of mangrove fisheries, with temporary closures being used to target increased production

of the mud crab, *Scylla serrata*. Communities have also suggested the implementation of temporary octopus reserves, similar to those of the Velondriake LMMA. In combination with the national park, the combined area under management spans almost 100 kilometres in length and extends up to 25 kilometres offshore.

Blue Ventures also seeks to support Madagascar's existing LMMAs and in June 2012 brought together 55 community members representing 18 LMMAs throughout the country for Madagascar's first national LMMA forum. The forum was designed to support information exchange between LMMA-implementing communities, allowing them to develop faster, adapt better to challenges, and have a stronger voice in regional and national decision-making. The forum resulted in the creation of a national LMMA network, MIHARI, an acronym that translates to "marine resource management at the local level". The forum is intended to become an annual event which will hopefully lead to the further spread of the LMMA approach and raise general awareness of the LMMA approach among regional and national government.

Beyond Madagascar, visitors from Comoros, Seychelles and Rodrigues have travelled to Velondriake to learn about the steps involved in setting

up the LMMA. While terminology may vary, similar community-based marine conservation efforts are now emerging throughout the WIO. As LMMAs gain popularity in the region, opportunities to collaborate and share relevant knowledge with other WIO management bodies become more prevalent and essential. In southwest Madagascar, a forum to facilitate communication and coordination of activities between LMMA supporters was established. Known as the Capricorn Coastal Alliance, because of its position spanning the tropic of Capricorn, members include NGOs such as Blue Ventures, WWF, WCS, MNP and ReefDoctor, as well as the regional offices of the Ministry of Environment and Forests and Fisheries authorities.

To further promote information sharing, Blue Ventures hosted a side event on LMMAs at the 2011 Western Indian Ocean Marine Science Association (WIOMSA) symposium held in Kenya. The side event was attended by over 60 marine conservation practitioners and aimed to begin building these communication connections across the region, namely by developing a WIO LMMA directory and kickstarting much-needed dialogue on issues related to community-based management. Using a website dedicated to community marine conservation in the WIO, www.livewiththesea.org, the website connects

marine conservation practitioners and helps to facilitate information sharing and collaboration. In addition, through connecting community members, LMMA practitioners can expect improved peer-to-peer learning and better community engagement and ownership of projects.

The side event at the WIOMSA symposium was recently followed up with a series of LMMA workshops and information sharing sessions at the 2012 IUCN World Conservation Congress in South Korea. Sixteen LMMA leaders, hailing from countries such as Fiji, Kenya, Madagascar, Vietnam, Papua New Guinea and India, came to the Congress to share their experiences in community-based marine management. In a workshop hosted by Blue Ventures, CORDIO, the Pacific LMMA Network, and the United Nations Environmental Programme (UNEP) World Conservation Monitoring Centre Topics, LMMA representatives discussed cost-effective and proven ways to tackle common conservation challenges faced by coastal communities around the world. The event enabled representatives from LMMAs and regional LMMA networks to connect in person and provided vital linkages for ongoing communication amongst LMMA communities worldwide.

The Future of WIO Marine Conservation

Although a relatively new approach to coastal management within the WIO, LMMAs have considerable potential for expansion throughout the region to meet the needs of coastal communities while safeguarding threatened marine ecosystems.

The rapid replication of innovative LMMA models in recent years illustrates the extent to which this approach offers low cost, adaptable, scalable and locally acceptable solutions to coastal conservation challenges, while at the same time empowering communities to take control of their own coastal environment and resources.

Blue Ventures is actively working with partner organisations across the region to build knowledge and understanding of similar initiatives in coastal conservation and community development. Ultimately, sharing experiences of best practices in community-based coastal conservation and development will be essential to protecting the critical biodiversity and marine ecosystems upon which the region's diverse coastal livelihoods and cultures depend.

For more information on Velondriake and Blue Ventures' work in community-based coastal conservation and development visit www.livewiththesea.org, www.blueventures.org, or contact Shawn Peabody at shawn@blueventures.org.



WIOMSA's mission is to generate the best in marine science through its comprehensive research funding pro-gramming and then use the results to ensure that the marine environment is understood, protected, enhanced and maintained for the benefit of everyone that works and lives on the coastal areas of the Western Indian Ocean.

WIOMSA's vision and activities are based on the notion that quality science leads to better governance and management, which, in turn ensures a sustainable & stable marine environment needed in efforts to reduce poverty and ensure a better life for us all in the region.

WIOMSA, operates as a regional umbrella organization in Somalia, Kenya, Tanzania, Mozambique, South Africa, Madagascar, the Seychelles, Mauritius, the Comoros Islands and Reunion with a network of membership of over 1200 regional and international scientists, over fifty academic and marine research institutions and in partnership with organizations like SIDA, NEPAD, UNEP, EU, USAID and IOC/UNESCO.



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