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LIVELIHOOD INTERVENTIONS AND BIODIVERSITY CONSERVATION IN QUIRIMBAS NATIONAL PARK

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EXECUTIVE SUMMARY

Coastal livelihood interventions can help communities by providing additional incomes, while protecting and maintaining resources and the environment. The identification and promotion of resilient and diversified livelihood opportunities are crucial to enhance communities' adaptive capacity to respond to the multiple stresses and shocks in a changing coastal environment.

Coastal livelihood opportunities are especially important in their support for biodiversity conservation in and around protected areas. Quirimbas National Park (QNP) in Mozambique has some of the greatest marine biodiversity in the region and is one of the country's largest and most important protected areas. This policy insight considers the most appropriate livelihood-focused interventions for coastal communities in the QNP, taking account of past and current project experiences. In areas where communities and park officials need additional support, it makes recommendations on how to best enhance initiatives.

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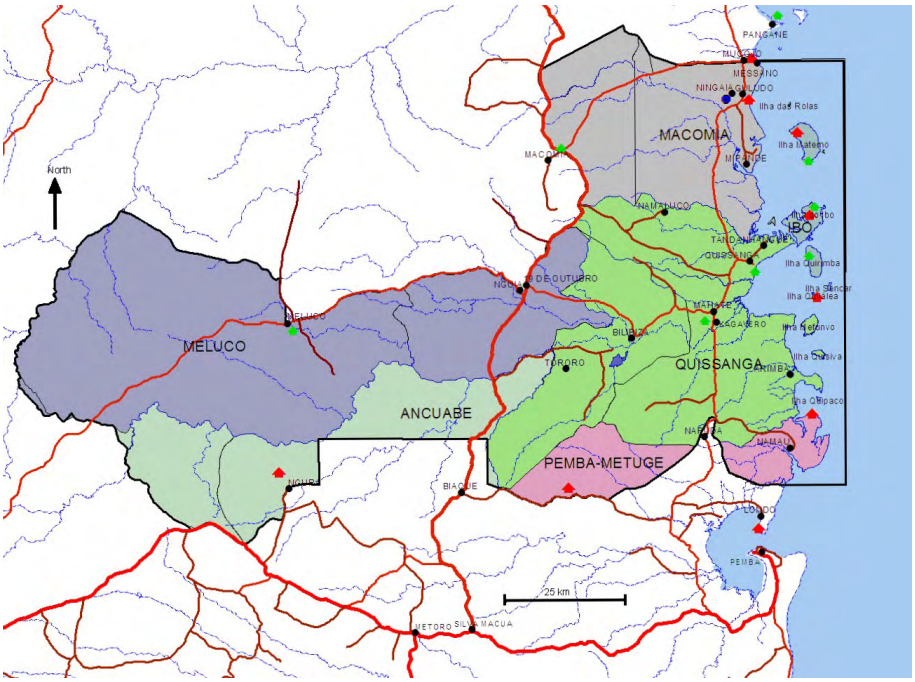
INTRODUCTION

The QNP is located in the southern part of the Quirimbas archipelago, protecting approximately 7 500km^2 of terrestrial and marine habitat in Cabo Delgado Province in northern Mozambique. There are 11 islands in the marine component of the QNP,[1] as well as the St Lazarus Bank, over a coastal stretch of approximately 100km.

Based on its size and the presence of important species, habitats, ecosystems and landscapes, this park plays a key role in the conservation of local, regional and global biological diversity,[2] particularly given its position within the broader East African Marine Ecoregion, which includes neighbouring Kenya and Tanzania.[3] In 2017 the Mozambican government applied to have the QNP re-categorised as a UNESCO biosphere reserve. The outcome of this application should be announced by mid-2018.

FIGURE 1 QUIRIMBAS NATIONAL PARK IN MOZAMBIQUE



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The decree establishing the QNP, together with the park's management plan and Mozambican law on protected areas, gives it considerable legal and administrative protection. However, the park faces substantial challenges in the implementation of these planning and legislative frameworks. This is partly the result of the constraints around protected area management and sustainable resource extraction,

as well as of the growing demands of the 170 000 people who reside within the park's boundaries and the adjoining buffer zone.

The Quirimbas National Management Plan (2012–2021) uses a system of zoning that includes protection zones, specific-use zones, community development zones and a buffer zone. The buffer zone is 10km wide around the current boundaries of the park; it is in this buffer zone where many coastal communities are currently located, although some of the islands within the park are also inhabited.[4] The management plan specifies a small number of no-take zones/sanctuaries located adjacent to Ibo, Matemo and Quilalea islands (and nine other areas demarcated for partial protection). In these areas only non-extractive, low-impact activities are permitted, related to eco-tourism and recreational diving. The area within the QNP designated for 'community use and development' makes up some 70% of its marine area, and can be used to support community livelihoods.

Aside from agricultural activities, coastal communities in the QNP are largely dependent on marine resources for income and subsistence, with few alternative livelihood options. Other challenges include a growing demand for building materials (such as mangrove poles and coral for lime) and agricultural land, which contributes to habitat destruction. There are also major challenges related to the use of destructive fishing gear; the illegal harvesting of crabs, molluscs and other valuable seafood; and the presence of migrant fishers in the park, causing conflict with local fishers over access to fishing grounds and overexploitation of marine resources.[5]

Despite the numerous livelihoods projects (with both socio-economic and biodiversity conservation goals) implemented since the QNP's establishment in 2002, little is known about their effectiveness in contributing to biodiversity conservation in the park. This is largely because of the lack of comparative data, monitoring and baseline studies. Many projects implemented in the QNP have been unsuccessful or have stopped prematurely without achieving their desired outcomes. This policy insight will look at the reasons for the mixed record of livelihood projects and evaluate the livelihood characteristics of existing coastal communities in the QNP. It will also seek to assess alternative and diversified opportunities for livelihood enhancement within the park that are aligned to Mozambique's broader goals of sustainable resource management, biodiversity conservation and enhanced resilience to climate change impacts.

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SOCIO-ECOLOGICAL SYSTEM CHALLENGES

According to the Intergovernmental Panel on Climate Change – the UN body responsible for assessing the science on climate change – low-lying areas, coastal zones and small islands will be the most susceptible to future climate impacts, owing to their geographical positioning and direct exposure to climate-related shocks and stresses, as well as high population densities in coastal areas and on floodplains.[6] In 2015 and 2016 the World Wide Fund for Nature (WWF) conducted climate vulnerability and capacity assessments[7] in and around the QNP,[8] identifying local climate risks such as flooding, variable rainfall patterns and drought, and changes in seasonal wind. In addition, warming ocean temperatures, sea level rise

and ocean acidification will lead to the increased frequency and severity of tropical storms, shifts in the range of economically important fish stocks, and threats to coastal infrastructure. The implications are far reaching for communities reliant on artisanal fisheries, transport and coastal tourism for employment and subsistence.

In developing regions, other non-climatic sensitivities also contribute to the increasing vulnerability of coastal communities. Socio-economic challenges such as health risks, high levels of unemployment and rising food prices, coupled with the poor adaptive capacity of local populations, make adaptation a key concern for coastal and island developing countries. Coastal communities are embedded in broader social, political and economic systems, resulting in complex interactions that require comprehensive responses.

Well-managed, diverse and healthy ecosystems provide multiple ecosystem benefits to poor societies, including important climate adaptation enhancement benefits, food supply, carbon storage, livelihood diversification and water filtration. To ensure the provision of such ecosystem services, these valuable ecosystems must be managed sustainably through appropriate resource governance frameworks and biodiversity conservation efforts. Indeed, social, economic and environmental systems cannot be considered in isolation, but must instead be viewed as integrated socio-ecological systems, which are themselves embedded in broader systems. As such it is essential that climatic and non-climatic stresses and shocks – factors that have a range of environmental, social and economic impacts – be considered in the design of livelihood strategies for the QNP.

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LIVELIHOOD INTERVENTIONS: A MIXED RECORD

There has been a substantial shift over the past decades in the conservation–development paradigm, with an increasing focus on the integration of conservation and development objectives to better ensure sustainable co-benefits to species, ecosystems and people. Despite much debate among academics and practitioners with regard to the degree to which conservationists should focus on social issues, livelihood projects have developed as common conservation interventions since the early 1980s. The terms 'livelihood-focused intervention' or 'alternative livelihood strategy'[9] are used to describe interventions that aim to reduce the prevalence of environmentally damaging activities by substituting lower-impact livelihood activities that provide at least equivalent benefits.

In other words, livelihood interventions seek to reduce locally driven threats to biodiversity while simultaneously improving the well-being of local people.[10] In some cases, this might mean providing an alternative resource to the one being exploited: for example, encouraging local people to farm cane rats to replace bush meat as a source of protein.[11] In other cases, the focus of the project may be on providing an alternative occupation or source of income to reduce the need to exploit the biodiversity target. Common alternative occupations include handicrafts, bee-keeping and photographic tourism as a substitute for expanding subsistence agriculture around protected areas, or the promotion of kelp farming as an alternative to artisanal fishing. A third approach involves encouraging an alternative method of exploiting a resource that has a lower impact than the original method. Examples of such interventions include the promotion of fuel-efficient

stoves to reduce the demand for mangrove firewood, or the introduction of certain gear types that lessen the by-catch of endangered species such as dugongs or juvenile fish. While conservation examples are often the most cited, alternative livelihood projects can also include projects implemented to combat other destructive practices such as illegal artisanal mining or drug trafficking.

The ability to generate income and achieve livelihood outcomes depends to a great degree on the natural, social, financial, human and physical assets available to communities and households at any given time, the context in which they live (including periodic shocks such as climatic events, or seasonal stresses in food prices or outbreaks of disease), and the institutional structures and processes that affect access to resources.[12] Therefore, alternative livelihoods do not always involve new activities per se. Some interventions can include actions that influence the sociopolitical setting of peoples' livelihoods or address access to assets such as credit schemes and infrastructure. Such projects can include disincentive and/or incentive schemes.[13] Commonly used disincentives include resource access restrictions, with penalties imposed if restrictions are not adhered to; increased law enforcement; and land/resource use zoning. Incentives, on the other hand, provide in-kind payment for changed behaviour in accordance with agreements negotiated in advance. This can include payments for ecosystem service schemes.

LEARNING FROM EXPERIENCE

Over the years there have been significant investments in interventions to enhance the livelihoods of local people in and around high biodiversity areas (both formally protected and unprotected areas),[14] targeted especially at those communities reliant on fishing, hunting and non-timber forest product harvesting. Yet very little is known about what has worked, what has not worked, and why.[15] Many critics believe that alternative livelihoods projects do not protect, maintain or even improve biodiversity objectives. There is a lack of comprehensive and comparative analytical data to assess the impact of these projects, measure and evaluate their merits and limitations, and understand the circumstances under which they thrive.[16] As such it is important to clearly state the intended biodiversity outcomes at the outset of the project so that they are targeted and monitored effectively against a baseline. There is also a need for more precise quantitative analysis of the social, economic and environmental co-benefits that result from new or diversified livelihood projects, beyond household benefits and income generation. It is important to quantify the contribution that these projects make to local governance institutions, such as skills development, increased knowledge, greater community confidence and advocacy skills, and the institutional base for managing local affairs.

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Livelihood projects have been implemented worldwide and many offer valuable lessons for decision makers and investors in the QNP. For example, a shortcoming of many livelihood ventures has been the emphasis on the commercial and technical viability of projects without adequate attention being paid to the socio-economic and political context in which these projects operate. This includes consideration of peoples' capacities, aspirations, constraints (or enabling circumstances) and appetite for risk. An understanding of these factors and the way they interact with drivers of unsustainable resource exploitation is an inherent part of designing alternative livelihoods projects.

Past experiences show that many communities targeted by such projects have reinvested the resultant income back into livestock, agriculture or fisheries, which in turn place additional pressure on conservation areas. Target communities thus simply add the new income streams resulting from these 'alternative' activities to their existing activities, rather than replacing traditional economic activities or practices. In low-income communities that are subject to a range of environmental, social and economic shocks, income-stream diversification is a valuable risk-mitigation strategy. Such new opportunities may also result in the reallocation of household roles or not reach the intended target audience, such as when aquaculture or tourism projects intended to serve as an alternative to unsustainable fishing are taken up largely by women, while men continue with traditional fishing activities. Gender is also a major axis of differentiation related to the social roles within different communities – with women's livelihood responsibilities differing from those of men. Other dynamics are also important to consider, such as religious and kinship affiliations.

Communities are not homogenous. The uptake of a project by one community, or group within a community, does not necessarily indicate the same for other communities or groupings within the community. Gains achieved through such projects may also be undermined by in-migration of other groups into communities in search of economic opportunities, placing further strain on natural resources in the area. Therefore, even in cases where there is a significant uptake of alternative livelihood options, unsustainable resource exploitation can continue.

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Such examples again illustrate the complexity of the socio-ecological systems present within and around protected areas and underline the importance of a systems approach that takes due consideration of potential unintended consequences and interactions. While it may be unreasonable to expect communities that traditionally rely on crops and livestock to abandon these practices entirely, specific quantitative or zoning limitations need to be placed on highly destructive practices that directly undermine conservation efforts.

While improved and alternative livelihoods can contribute to changes in the use of natural resources (and therefore contribute to conservation outcomes), these do not replace the formal conservation actions of other entities, such as law enforcement officers. An array of other management measures remains necessary.

THE STATE OF COASTAL LIVELIHOODS IN THE QNP

Livelihood assessments of coastal fishing communities in the QNP show that, for most of the population, livelihood strategies consist mainly of agriculture combined with fishing activities.[17] Seafood products provide a cash income, while agriculture predominantly plays a subsistence role. To a lesser extent, people also derive income from other informal activities such as lime production, boat construction, carpentry, mat making, tailoring, etc. Another important insight emerging from such livelihood assessments is that each island in the QNP has specific livelihood characteristics. Currently, livelihoods on Quirimba are supported by the small-scale production of and trade in coconuts, while Ibo Island is an accessible and attractive tourism destination. Subsistence agriculture takes place on Ibo and Quirimba, but

Matemo has limited fresh water, lacks fertile soil for agriculture, and sees relatively low levels of investment.

Female fishers on Ibo, Quirimba and Matemo generate an income from octopus harvesting,[18] oyster and pen shell gleaning,[19] and small-scale agriculture. These women value a diversified income. As such they prize numerous income streams and look for means to enhance their livelihood activities, such as through trading octopus and fish to Pemba mainland. These secondary activities represent a higher social status, linked to higher incomes. Women in these communities also expressed the wish to start local village tourism projects (such as overnight visits to their homes), but this will require significant financial investment and hospitality training. Men on these islands, on the other hand, would like to enhance their line, net and trap fishing techniques in response to reduced fish catches. This includes the use of sailboats/dhows (as opposed to canoes) to explore deeper waters in search of pelagic fish of higher commercial value.

RECOMMENDATIONS FOR ENHANCING LIVELIHOOD OPPORTUNITIES

Despite considerable investment, about a third of the livelihood interventions in the QNP have stopped prematurely or failed to achieve their intended outcomes.[20] Some reasons cited include the lack of a sustainability or exit strategy, and subsequent dependence on the continued involvement of a single investor or non-governmental organisation (NGO) for resources such as building materials and technical support. Some projects did not adequately account for constraints related to market dynamics such as market linkages, seasonal demand for products, and inconsistent prices for fish. Other projects required additional technical skills that were not readily available in the community.

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Learning from these failed attempts, as well as from other global livelihoods examples, there are numerous interventions that can be put in place to help support the achievement of more resilient coastal livelihoods within the QNP.

Access to finance through savings groups

The WWF livelihoods assessment[21] illustrates the need for suitable access to financing for all groups wishing to start a new activity. Financing may be derived from rotating savings and credit groups, the government-supported District Development Fund[22] and micro-credit provision. In the case of the QNP, particular consideration must be given to the Village Savings and Loans Association (VSLA) approach that is currently being implemented on Matemo Island by environmental NGO Associação do Meio Ambiente (AMA).[23] By offering cost-effective credit and savings products (members make savings contributions to the pool and can also borrow from it through interest-free loans or cash grants), VSLAs can play a critical role in bringing financial services to rural areas where access to formal financial services is limited. This can improve financial inclusion, household business outcomes, women's empowerment and livelihood resilience. AMA has experience in VSLA implementation using village agents – members of the community with the skills to train others to start VSLA groups. This model has significant potential for implementation in other communities in and around the QNP.

Piloting new techniques for more sustainable resource use

Following a decade of successful temporary octopus fishery closures in south-western Madagascar, in April 2017 two sites[24] were selected for temporary closure in the QNP. This move was initiated by the fisheries communities themselves, in collaboration with local government, park authorities, the WWF and the tourism sector.

In August 2016 members of community fisheries councils (*Conselho* Comunitários de Pesca, or CCPs) were also selected to attend an exchange trip to south-west Madagascar to learn more about the octopus closure model and other successful management practices implemented by Blue Ventures and the Velondriake Association.[25] Blue Ventures helped with the feasibility assessments and planning.[26] Subsequently, two areas were closed for an initial period of seven months to allow the octopus fishery time to replenish, as well as to grow to a reasonable size for sale (octopus is a fast-growing species). These temporary closures also have positive spin-offs for other species, and it is hoped that they will act as a catalyst for more permanent closures and no-take zones. However, the prospect of larger catches unfortunately enticed fishers from elsewhere, and the areas were not policed sufficiently. With stricter enforcement these closures will reap more lucrative results.

The NGO community (particularly the WWF and the Wildlife Conservation Society) has also for some time been working with fishing communities to develop gated fish traps to improve catch selectivity. These are to replace the small traps currently in use in Ibo and Quirimba that trap juvenile fish. While fishers are receptive to this mechanism, there is a collective use problem in that all fishers must utilise it in order to alleviate fishing pressure. It is therefore essential that the QNP management authorities regulate trap fishing in the area.

It must be noted that, before the implementation of any new livelihood approach, thorough baseline studies need to be conducted. For example, for wild harvested products such as pen shells, mud crabs and sea cucumbers, information must be generated to ensure the sustainable use and harvesting of these products.

Strengthening community-based organisations

Community-based organisations with technical, organisational and institutional capacity are better able to assume management responsibilities and enhance partnerships with public and private sector actors. They therefore need support through training. Groups such as the Women's Octopus Harvesting Association (Associação de Mulheres Apanhadoras de Polvo) need support to promote entrepreneurialism and strengthen managerial, financial management and basic legal skills. Exchange trips can also provide valuable learning opportunities. For example, in 2017 community members were provided with support to travel to Quiwia in Cabo Delgado Province to learn about climate adaptation measures and options for more sustainable resource use.

There are a range of institutions and NGOs operational in and around the QNP that can provide training and support to CCPs. As previously mentioned, local NGO AMA can build community capacity in terms of local financing possibilities. The

WWF, QNP and Blue Ventures are key role players in implementing sanctuaries and temporary fishery closures. Government departments such as the Provincial Directorate of the Sea, Inland Waters and Fisheries have undertaken capacity-building activities focused on improving market access, while the National Institute for the Development of Small-Scale Fisheries supported the establishment of a fish purchase and trade centre in the QNP. NGOs and private sector foundations such as the Ibo Foundation and Oikos are well placed to support the development of community tourism projects with conservation objectives. There are major opportunities in this respect, with significant potential to promote cultural tourism, recreational fishing, volunteer tourism and adventure tourism – activities that do not compromise ecologically sensitive areas.

Implementation and enforcement of marine management measures by community members and CCPs

CCPs have been set up to support the government in the co-management of designated fisheries areas. Fisheries communities may view conservation interventions and restrictions on access to former fishing grounds as a threat to their livelihoods, rather than mechanisms to support them. It is therefore important to actively engage CCPs in conservation planning and activities, such as jointly patrolling no-take zones and establishing temporary octopus closures. There are initiatives that are currently underway led by the QNP, CCPs, provincial authorities (the Provincial Directorate of the Sea, Inland Waters and Fisheries), tourism operators and the WWF.

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In an area like the QNP, protection is inextricably linked to the capacity of the QNP to enforce the park's management plan. It is a vast, remote area and the QNP management authorities lack sufficient resources and capacity. As such, CCPs offer real value to park officials. Regional programmes such as the Management Orientated Monitoring System (MOMS) have been successful elsewhere and can be expanded within the QNP.[27] These community-led monitoring and patrolling systems can record information on octopus, crabs, fish catches and special species sightings, and monitor and report illegal activities. MOMS can thus play a fundamental role in ensuring that the QNP Management Plan is upheld and effectively implemented.

CONCLUSION

The management and conservation of biodiversity should be at the core of any livelihood strategy in the QNP. It is important that interventions contribute to livelihood enhancement, sustainable biodiversity management and climate resilience. From the outset of all livelihoods projects, local and sector-specific baselines must be established, and the intended biodiversity outcomes of each project must be clearly stated so that they can be monitored effectively. Through the project's lifecycle it is also necessary to collect and monitor comprehensive analytical data to support impact assessment. While there are many feasible livelihood options for the QNP, past lessons can help policymakers and project investors to fully understand the livelihood characteristics of particular locations and implement projects that eliminate the main drivers of unsustainable resource extraction. A prerequisite for their success is the degree to which fisheries

communities are actively involved in biodiversity conservation, monitoring and law enforcement. Livelihood alternatives that flourish elsewhere also serve as good examples for replication. This includes the octopus closure model of Blue Ventures and lessons from AMA regarding village saving and loan schemes. There are also a large number of technical, private sector partners that can be consulted in a QNP-wide livelihood strategy.

ENDNOTES

1 Ibo, Matemo, Quisiwe, Quirimba, Quipaco, Mefunvo, Quilalea, Sencar, Quirambo, Fion and Rolas.

2 This includes five species of mangroves (covering 3% of the QNP), 160 species of coral, 10 species of seagrass, five species of IUCN Red-Listed endangered turtle species (loggerhead, hawksbill, leatherback, olive ridley and green turtle), and huge numbers of commercial fish and marine mammals (dolphins, whales and dugongs).

3 The East African marine ecoregion occupies a coastal and shallow marine area covering more than 480 000km^2 and extending approximately 4 600km along Africa's eastern coast. It includes the territorial waters of all the countries from Somalia in the north to South Africa in the south, as well as the international waters beyond the 200-mile exclusive economic zone. See WWF (World Wide Fund for Nature), *East African Marine Ecoregion*, http://d2ouvy59p0dg6k.cloudfront.net/downloads/eastafricamarine.pdf, accessed 25 February 2018.

4 Mozambique, 'Quirimbas National Park's Management Plan 2013–2022'.

5 There have also been baseline studies or situational analyses conducted by the WWF on marine turtles in the QNP, shark fin trade and fish spawning aggregation sites.

6 Nurse LA *et al.*, 'Small islands', in: Barros VR *et al.* (eds.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge & New York: Cambridge University Press, 2014, pp. 1613–1654.

7 Muaves L & A Cremildo, 'Climate Variability and Capacity Analysis (CVCA), Quirimbas National Park, Cabo Delgado Province, Mozambique'. Maputo: WWF Mozambique, 2015.

8 *Ibid.*

9 Roe D *et al.*, 'Are alternative livelihood projects effective at reducing local threats to specified elements of biodiversity and/or improving or maintaining the conservation status of those elements?, A systematic review protocol', *Environmental Evidence*, 3, 2014, pp. 1–22.

10 *Ibid.*

11 SCBD (Secretariat of the Convention on Biological Diversity), 'Livelihood Alternatives for the Unsustainable Use of Bushmeat', Report prepared for the CBD Bushmeat Liaison Group, Technical Series, 60. Montreal: SCBD, 2011 p. 46.

12 Ireland C, Malleret D & L Baker, 'Alternative Sustainable Livelihoods for Coastal Communities: A Review of Experience and Guide to Best Practice'. Gland: IUCN (International Union for Conservation of Nature), 2004.

13 Springer J, 'Addressing the social impacts of conservation: Lessons from experience and future directions', *Conservation and Society*, 7, 2009, pp. 26–29.

14 Wright JH, *et al.*, 'Reframing the concept of alternative livelihoods', *Conservation Biology*, 30, 1, 2016, pp. 7–13; Roe D *et al.*, *op. cit.*

15 Roe D *et al.*, *op. cit.*

16 Davies T *et al.*, 'Missing the trees for the wood: Why we are failing to see success in pro-poor conservation', *Animal Conservation*, 17, 2014, pp. 303–312.

17 Riddell M, 'Assessment of Sustainable Livelihood Opportunities for Coastal Fishing Communities of Quirimbas National Park'. Maputo: WWF Mozambique, September 2017.
18 This is considered a relatively risky livelihood (for example, encounters with poisonous stonefish) and is also highly weather dependent.
19 Risks involved include accidents, thievery and conflict over access to resources.
20 Riddell M, *op. cit*.
21 *Ibid*., p. 48.
22 This is loan funding made available by the government of Mozambique at district level. The District Development Fund (FDD) is commonly known as the '7 million' because it began in 2006 with the allocation of MZN* 7 million (about $115,000) from the budget to each district to manage in the form of loans for activities aimed at development. The funds were intended to be revolving, with the districts recovering the money from the loans, with interest, and re-lending the money. However, there have been significant problems with repayment of these loans. (*Mozambican metical)
23 AMA (Associação do Meio Ambiente), https://ama-amigosdaterra.org/ama-in-english/, accessed 3 March 2018.
24 One site (396ha), Songossawe, is located between Ibo and Matemo, and the other (434ha), Banco T'Chamba, is east of Quirimba Island.
25 Blue Ventures, 'Sharing the success of temporary octopus fishery closures', 1 September 2017, https://blueventures.org/sharing-success-temporary-octopus-fishery-closures/, accessed 3 March 2018.
26 Neuhaus A, 'Veda de polvo: Temporary octopus closures in Mozambique', Blue Ventures, 26 April 2017, https://blog.blueventures.org/veda-de-polvo-temporary-octopus-closures-mozambique/, accessed March 2018.
27 Recently, Management Orientated Monitoring System game scouts have been using bicycles, which has decreased the time spent on accessing and collecting information from a broader area.

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