Helping People and the Planet Thrive

Cornell University
College of Agriculture and Life Sciences

Living Well and Using Resources Sustainably:
The CARE-WWF Alliance in Northern Mozambique

A ConservationBridge case study with an accompanying 18-minute film
available for free educational use worldwide
through ConservationBridge.Org

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Contents

1. Summary

This case study provides background about the CARE-WWF project *Primeiras e Segundas* (hereafter P&S), an ongoing development project in northern Mozambique run by a collaboration between two international organizations, CARE and the World Wildlife Fund. The report provides an overview of diverse terrestrial and marine natural resources in Mozambique's coastal region and discusses the ways in which these resources are used as well as various efforts to make such uses more sustainable. Known after the archipelago of the same name, the P&S area boasts extensive and diverse natural resources, including nesting areas for marine turtles and sooty terns. This environmental base led to the declaration of the P&S Environmental Protected Area. The area is also home to over 300,000 people who rely predominantly on natural resources for their livelihoods, especially farming, fishing and forest product use.[1] It is an area accessible only by poorly-maintained roads or by boat, with a weak private sector network, poor access to basic services of health and education, low levels of education and high gender inequality. More than half of the population in the region lives in poverty, and severe chronic malnutrition with stunting affects over half of its children under 5.

The report outlines the key resources that form the basis both for local livelihoods and for global investments in the area, and it introduces some of the key impacts on biodiversity and sustainability. It introduces the concepts of ecosystems services and management of common pool resources because the CARE-WWF Alliance program in the area uses these concepts as the basis for interventions that seek to enable government and communities to maintain or rebuild the health of marine and terrestrial ecosystems, enabling more sustainable use now and in future. Finally, the report summarizes some results and challenges of the CARE-WWF program and suggests opportunities for potential collaboration.

2. Natural Resources

2.1 Natural Resources in Mozambique

Mozambique's terrestrial and marine resources are the basis for the livelihoods of millions of people, and they attract investment from around the world. The country is rich with resources such as arable land, a wide range of minerals (from coal to graphite to rubies), extensive miombo forests, and a coastline that is almost 2,500 kilometers in extent – longer than the distance from Tijuana, Mexico to Vancouver, Canada. In recent years, discovery of large deposits of coal and huge off-shore fields of natural gas have the potential to generate further rapid growth.

Despite this natural capital, the vast majority of the population lives in extreme poverty, particularly in rural areas where people depend on natural resources for their subsistence. Mozambique is still largely an agrarian society, with approximately 80% of its population in agriculture and over half of the rural population living on less than $1.25 a day (Government of Mozambique, 2011). Agriculture is the basis of most people's livelihoods, largely using hand power: as of 2014, only about 2% of farmers used machinery, and a mere 9.5% used animal traction. Key services are limited: extension services reach just 8.3% of farmers (Ministry of Agriculture and Food Security, 2012-2014), and literacy and numeracy levels are extremely low. Child malnutrition is high; in Nampula province, which includes the P&S area, up to 56% of children under 2 are stunted.

[1] The P&S Archipelago covers 4,020 square miles of marine and coastal areas across Mozambique's northern Nampula and Zambezia provinces that are unparalleled in their importance to the local community and ecology.

Despite the clear needs, a combination of factors may actually be undermining government investment in rural development. Decades of civil war and political infighting among a small elite have left the state financially and politically extremely weak (Sumich, 2010).

Policymakers in the capital, Maputo, argue that the vast majority of smallholder farmers in the countryside are "wasting their land" (cited in Tanner, 2010: 108), and most government investments favor larger-scale commercial farming. In a meeting with the authors in 2014, the Director of the Provincial office of the Ministry of Agriculture in Nampula likened his department to a "toothless lion" because it made a lot of noise but had very little money to actually implement new programs or develop effective policies (Hickey, Wolford and Young, 2015). Where there are investments, they tend to focus on development corridors; the former District Director for Economic Development in Angoche district complained that the Ministry of Agriculture's interest in 'high priority' areas of the well-known trilateral development project called ProSavana, funded by the Japanese, Brazilian and Mozambican governments to promote commercial agriculture, sucked resources out of his budget (personal communication, 2014). New sources of wealth (particularly coal, natural gas and minerals) hold out the promise of revenues to the national government, possibly exacerbating the already low investments in small-scale farming.

2.2 Natural Resources in the Primeiras and Segundas

In the northern province of Nampula, a 250-kilometer stretch of coastline is paralleled by a set of barrier reefs and islands set roughly 5 to 50 kilometers offshore that are referred to as the Primeiras and Segundas. The Primeiras, meaning "the firsts" in Portuguese (so named because they were the first set found by Portuguese explorers coming up from the south), are a group of five islands in the southwestern area of the coastline. The Segundas (meaning "the seconds" in Portuguese) are a neighboring group of five islands to the northeast. Politically, this area comprises the three administrative districts of Angoche, Larde and Moma in Nampula Province, as well as the Pebane District in Zambezia Province.

Figure 1. Location of Primeiras and Segundas Region

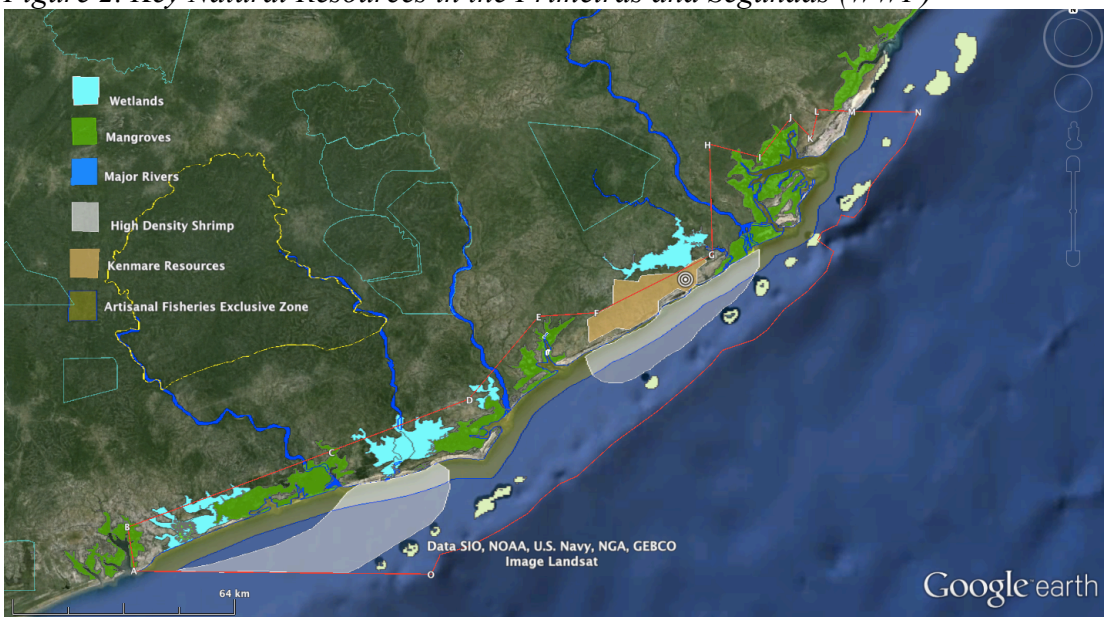
The P&S ecosystem is rich in natural resources. The land still boasts some tracts of coastal forest, though most has been converted into small-scale farming for hundreds of villages. Extensive sand beaches run up and down the coast, but the entire coastline has been blocked out for mining concessions targeting titanium minerals including ilmenite, rutile and zircon. Two mines are currently fully operational. The outflows of several rivers form estuaries with largely healthy mangrove forests boasting seven different species of trees.

The chain of ten sand and coral islands and two seamounts sit atop massive coral formations that stretch most of the 250-kilometer length of the P&S archipelago. They are home to a wide range of pelagics, populations of whales, and fish and crabs that rely on the proximity to the land. A series of estuaries is home to large mangrove forests and coral islands where speckled shrimp, sea turtles and birds maintain key breeding sites fundamental to their existence.

Although it's tempting to think of the terrestrial and marine environments as two parallel environments that meet at the beach, it is actually much more accurate to see them as connected, in what has been called a "blue highway."[2, 3] The relationship between land and sea form the basis for much of the richness of the coastal region, underpinning biodiversity and providing the foundation for the lives and livelihoods of many thousands of people. Dozens of species of fish are spawned in the corals around the islands, but up to 80% migrate as juveniles into the estuaries, where the mangroves act as nurseries that provide food and shelter. Sedimentation from coastal forests brings silt and nutrients into the estuaries, enabling mangroves to grow. Mangroves also provide important natural barriers, protecting coastal communities and their fields from the ocean surges that heavy storms and cyclones bring. Protection of this natural connectivity – and barrier – between land and the sea is essential for the biodiversity of both, as well as for the long-term sustainability of livelihoods based upon these resources.

The entire area is strongly affected by climate change, which affects the weather and exacerbates extreme events. Rainfall in the December-to-April rainy season is increasingly erratic, with prolonged dry spells and droughts, as well as flooding, all of which severely affect farming. The coast is hit by cyclones coming off the south-west Indian coast bringing storm surges, heavy winds and torrential rains that destroy crops, trees and homes. People in the region say that such extreme weather events used to happen once in a generation, and now they are happening every few years

Figure 2. Key Natural Resources in the Primeiras and Segundas (WWF)



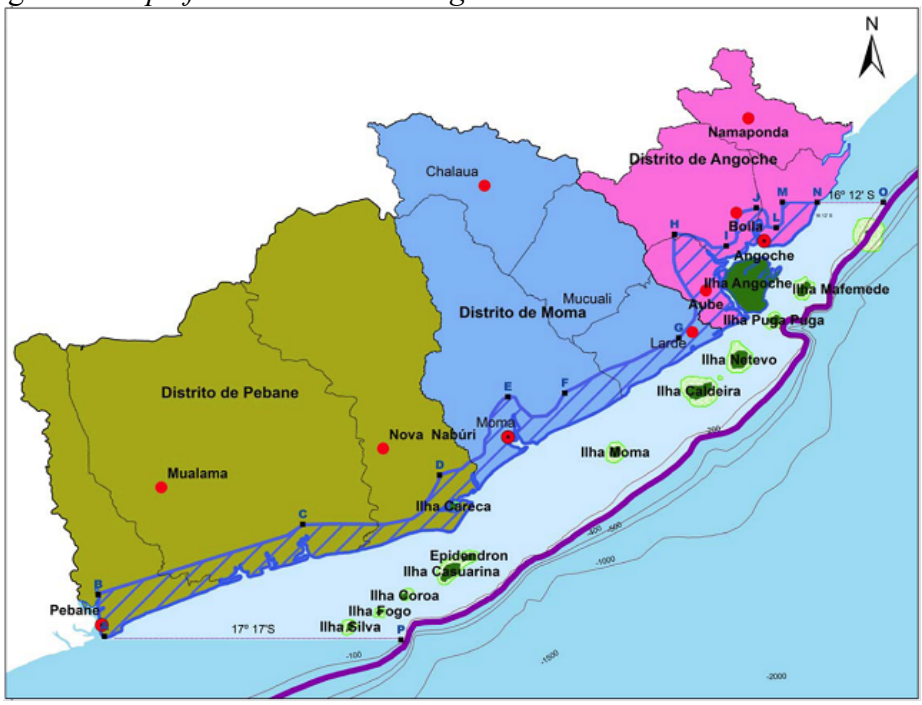
[2] See video "Primeiras and Segundas: The Story From Land to Sea" at https://vimeo.com/75502282
[3] See visual with more detail, focused on Australia's Great Barrier Reef: http://www.russellkelley.info/print/bh.html

2.3 Declaration of the P&S Environmental Protected Area

Encouraged by civil society including the WWF, on November 6, 2012, the Mozambican government announced the creation of the P&S Environmental Protected Area. Covering over 1 million hectares along 250 km of coastal and marine areas, this area provides a structure of state support and protection for the people, wildlife and natural resources in the area. The protected area designation should attract funding that will facilitate more sustainable management and use of marine and terrestrial natural resources, which will help the most vulnerable families earn income, support gender empowerment or otherwise ensure sufficient access to nutritious food for the household.

While the Management Plan calls for the total protection of marine areas around the off-shore islands in the archipelago, primarily to protect nesting marine turtles, the majority of the area is designated as marine and terrestrial multiple-use areas. The multi-use zones include the 1.9-mile strip of near-shore marine areas where most artisanal fishermen currently earn their livelihoods, the shoreline where women and girls gather mussels and other bivalves to sell, and and land along the coast where subsistence smallholders—mostly women—cultivate food crops and use forest products. The Management Plan explicitly refers to and builds upon the primary approaches and interventions introduced over the years by the CARE-WWF Alliance, outlined below.

Figure 3. *Map of the Primeiras & Segundas Environmental Protected Area*



Source: http://primeirasesegundas.net/the-program/

2.3 2.4 Users and Uses of Natural Resources in the P&S

2.4.1 Range of Local and Global Users

Natural resource-based economic activity in the region primarily consists of four sectors: agriculture, fishing, forest use, and mining. There is limited large-scale agriculture. Tourism has been touted as an opportunity, but so far, it is more of a possibility than a reality. Oil and gas exploration has started and may become an important source of jobs – with opportunities for incomes but significant risks for the environment – in coming decades. The P&S has a

complex web of users, including those who actually are from the P&S region, businesses from elsewhere in Mozambique, and companies from around the world. What may seem at first glance a remote corner of the world is actually a representation of the global economy at work, with examples of collaboration and competition, as well as examples of how people can destroy the very resources upon which they depend.

In the 10-kilometer band of land along the shoreline of the P&S, over 300,000 people live in small district towns (all of which are fishing ports) and small villages dotting the coast. These communities rely heavily on natural resources for farming, fishing, timber and timber products, and non-timber forest products. Some residents are employed by mining companies. Household livelihood strategies rely on diversity. In coastal communities, over 90% of families farm, and just over half engage in fishing at least 2 or 3 times a week.

A number of domestic and international companies have been drawn to the area by opportunities to extract and sell natural resources. Many products are transported to towns and cities within Mozambique, including agricultural products, fish and forest products such as timber, building materials and charcoal. Other resources are exported globally. Chinese, Indian, Portuguese, Japanese and Korean companies export shrimp, lobster, fish and octopus to Dubai, Europe and Asia. Irish and Chinese heavy mineral sand mining companies send titanium and zircon primarily to manufacturers in Asia. Mozambican and Indian companies export cashews to Europe, the United States, and India. Some of these international businesses provide markets for small-scale producers in the area; others directly compete with small producers for limited resources such as fish; while yet others provide employment in the short term but damage the broader resource base upon which all depend.

These natural resource-dependent sectors utilize the region's natural resource base and are crucial for the local population as a means of survival but are also subject to changes in the global economy; several of these sectors are directly affected by climate change. The combination of local residents, national companies and multinational corporations has led to an unsustainable level of natural resource use. The increasing threat of climate change also translates into increased an exploitation of the ecosystem and further uncertainty for the future of households in the region. Natural disasters such as cyclones, droughts and erosion are particularly harmful to this region given residents' reliance on the local natural resource base for survival and the vulnerability of the coastal ecosystems to the effects of climate change.

2.4.1 Agriculture

Farming is vital but difficult. Over 90% of households in the rural areas of the P&S rely on rain-fed agriculture for the majority of their food and income. Most farming in this semi-arid, coastal unimodal rainfall area involves intercropping manioc (a.k.a. cassava) and several varieties of legumes like pigeon peas, cowpeas and mung beans. Some farmers grow vegetables such as tomatoes, garlic, onions and greens on small plots near water. Virtually all farming is based on hand hoeing, involving a tremendous amount of work. Besides a few hectares of an old sisal plantation, there is basically no commercial farming.

Yields are low. Manioc (also known as cassava) can yield up to 30 tons per hectare under good conditions; farmers in the P&S tend to get only about 2 tons out of their local varieties under the poor farming conditions they face. Soils in this area are poor and sandy with little natural fertility. The soils are further degraded by overuse, burning and reductions in organic matter. Farmers routinely burn crop residues to reduce the labor needed to preparing fields

for planting, which takes organic matter out of the system, so already poor soils get worse over time. Almost no one uses chemical inputs. There are very few places that sell improved seeds or planting material, fertilizers, insecticides and herbicides, and when they are available, they tend to be far more expensive than most people can afford.

One of the key features of farming here is a reliance on swidden (a.k.a. shifting cultivation, or slash and burn) agriculture. As soil fertility on a field declines after a few years, farmers either shift to new areas that are under forest cover or they move back onto land that has been lying fallow for some time. This type of land management has multiple impacts: besides putting remaining coastal forest under severe pressure, it means that significant effort goes into clearing new fields instead of maintaining existing ones, which has serious implications in terms of gender and vulnerability. Over a quarter of households are headed by women, and these households face particularly serious labor shortages at key times of year. Clearing fields is difficult and time-consuming, so women-headed families, as well as other vulnerable families such as those headed by the elderly and those with high dependency ratios, tend to stay longer on old, less fertile soils.

Climate change is exacerbating the difficulties. The area is subject to floods, cyclones, droughts and prolonged dry spells during the rainy season. When yields are good, prices tend to be low due to the distance to markets, the very poor state of roads, the lack of local buyers, and the tendency for farmers to sell small amounts of products individually instead of bulking up through farmer groups.[4]

2.4.2 Fishing

Fishing is a key part of the economy involving artisanal, semi-industrial and industrial aspects. Artisanal fishing is a mainstay for communities, usually as part of a mixed livelihoods strategy in which a family will both farm and fish. While 90% of families farm, and farming brings in most food and money, fishing can be an important contributor to family food and income.

The results of household surveys conducted in 2008 and 2014 showed that just over half of families have someone (virtually always a man) who fishes three or more days a week. While men focus on catching fin fish in estuaries and open waters, women tend to catch mollusks and crustaceans in the mangroves and in intertidal zones. Fishing brings in less overall money than farming; on the other hand, returns from farming take months to realize, while cash from the sale of fish comes in within a day or so of the catch. Fish is a vital food here. Over 75% of the households in both surveys eat fish as part of their daily diet,

[4] Some promising commercial opportunities such as production of manioc for large-scale beer production are not feasible due to the difficulty that trucks have in accessing the coastal area, and in the costs of transporting such a low value product over long distances (pers. Comm. DADTCO 2016).

with the percentage increasing from 2008 to 2014 (Fisher, 2015).

Industrial trawlers from several countries fish the waters deeper offshore. Closer in, a network of semi-industrial boats, and fish processors and exporters, provides both employment and competition. Angoche hosts a fleet of Chinese owned and operated semi-industrial boats, largely focused on shrimp for export. Companies from India and Portugal operate contract fishing, supplying boats and equipment to local fishers. They guarantee the purchase of shrimp, lobster and octopus, and they process the catch for export to markets as diverse as India, Europe and South Africa. Other foreign companies from Korea and China directly do their own fishing, exporting mostly to Asia.

Over the years, the number of artisanal fishers has dramatically increased; combined with the influx of semi-industrial fishers and seafood processors that buy as much as they can get, the P&S region has seen dramatic declines in catches.

Some of the sandy P&S islands themselves are vital nesting areas for three species of marine turtles as well as for endemic sooty terns. However, as competition grows for a declining for fish population, these other species offer a source of food and income for fishers and are severely threatened by poaching. Some fishers turn to eating or selling tern and turtle eggs as well as capturing mature marine turtles. This foundation of important but threatened marine resources, and the important role these resource play in local livelihoods, was a key part of the rationale to declare the P&S Protected Area in 2014.

2.4.3 Forests and Mangroves

Coastal forests that used to cover much of the terrestrial areas have been largely cut down. The Potone forest, comprising 30,000 hectares just 20 kilometers outside of Angoche town, is still largely intact due to its status as the region's most important sacred forest. Surrounded by 11 villages, Potone is used both as a source of timber and non-timber forest products and is an important area for training traditional healers from across northern Mozambique in how to find and use medicinal plants.

Most coastal forestland along Africa's east coast has been destroyed or degraded due to heavy pressure from growing populations. People have largely hunted out wildlife and use timber for firewood and construction materials; some residents have set up charcoal making operations, selling the product into towns and cities. Potone Sacred Forest is one of only a few patches of forest left in the P&S.

More positively, extensive and mostly healthy mangrove forests still fill the estuaries, providing important resources and services for communities, who use the timber for fuel wood and construction, especially prizing its rot-resistant qualities. As noted above, mangroves are essential habitats for many marine species and provide the basis for near-shore artisanal fishing. However, WWF compared satellite imagery over several years and identified clear 'hotspots' of mangrove deforestation, especially near high-density population centers like Angoche.

2.4.4 Mining, Oil and Gas

Mining mostly focuses on heavy sands and ilmenite, a titanium and iron ore mineral. Kenmare Resources, an Irish mining company, has been working in Moma district for several years and has also expressed interest in modernizing the port in Angoche with Chinese interests. The Chinese-owned Haiyu Mozambique Mining Limitada has invested $30 million

in a heavy sands mine and processing plant in Angoche district.

Further up the coast in Cabo Delgado province, vast proven reserves of off-shore natural gas are set to transform coastal areas. Although there are no confirmed hydrocarbon reserves in the P&S, international companies have received the exploration rights for off-shore blocks near Angoche. Estimates are that hundreds of millions of U.S. dollars will be spent on exploration in the coming years.[5] These investments provide some opportunities for employment and also represent threats to the environment.

2.4.5 Tourism

Presently, tourism is minimal in the P&S. Although there are many kilometers of wide, clean sandy beaches, as well as the islands, the area is far from highly populated areas, and road access is poor. While there is abundant coral, there are strong winds and choppy seas as well as poor underwater visibility caused by the same upwellings that make the coastal waters area a nutrient-rich environment for fish, crab and shrimp. Not far away, up the coast to the east, more protected districts in Nampula and Cabo Delgado boast beautiful beaches, clear waters, and established tourism infrastructure. In the P&S, tourism may eventually focus on smaller-scale niches such as sport fishing, advanced diving, adventure tourism and sightseeing based on nesting marine turtles.

3. Conceptual Underpinnings of Natural Resource Use

Two major, inter-related concepts underpin much work on natural resource use, and they serve as the basis for the CARE-WWF P&S initiative: natural capital and the provision of ecosystems services, and the sustainable management of common pool resources.

3.1 Natural capital, ecosystems services and their value

Our understanding of the benefits people obtain from ecosystems has developed over thousands of years. The most intensive analysis of ecosystems services was the Millennium Ecosystem Assessment, which assessed human impact on the environment and the implications for the ability of ecosystems to provide services to people. Called for in 2000 by United Nations Secretary-General Kofi Annan, the report was published in 2005. As it noted:

> "Ecosystem services are the benefits people obtain from ecosystems, which the (Millenium Ecosystem Assessment) describes as provisioning, regulating, supporting, and cultural services . . . Ecosystem services include products such as food, fuel, and fiber; regulating services such as climate regulation and disease control; and nonmaterial benefits such as spiritual or aesthetic benefits." [6]

In this categorization, "supporting services" are the services that underpin others; for example, soil formation and nutrient recycling enable ecosystems to provide food. The concept puts attention on the wide range of scales involved, "from microbes to landscapes."[7]

Ecosystems are too often seen merely as something to exploit, often with short-term benefits accruing to limited numbers of people, while negative consequences are pushed off to others – including to future generations. By "externalizing the costs" of environmental damage,

[5] http://www.clubofmozambique.com/solutions1/sectionnews.php?secao=business&id=2147494205&tipo=one
[6] Millennium Ecosystem Assessment, *Ecosystems and Human Well-being: A Framework for Assessment*, page 26. Island Press, 2003.
[7] https://en.wikipedia.org/wiki/Ecosystem_services

those who destroy biodiversity often do not pay the real costs of environmental damage that they cause through the negative impacts of greenhouse gas emissions and toxic waste. A report for the United Nations "into the activities of the world's 3,000 biggest companies estimates one-third of profits would be lost if firms were forced to pay for use, loss and damage of environment."[8] This problem is in part due to the fact that ecosystems services have seldom been given value in the traditional economic analysis of the factors of production. When the possible dangers of environmental damage are brought up, those who use these natural resources have often fought back, claiming that this attention to externalized costs would 'prevent progress.' The concept of 'natural capital' was developed with the intent of framing natural resources as vital resources that must be valued, along with more traditional economic concepts such as financial capital and labor.[9]

The Stern Report of 2006 attempted to put a price on the global costs of climate change and stated that climate change is the greatest and widest-ranging market failure ever seen."[10] In line with such thinking, there have been concerted efforts made to demonstrate the value of nature and of ecosystems services to people in economic terms, in order to enable these benefits to be brought into discussions of the full costs and benefits of how ecosystems are used. Two examples include The Economics of Ecosystems and Biodiversity initiative [11] and the Natural Capital Project.[12]

The diverse ecosystems and natural capital in the P&S provide the basis for a wide range of benefits to people, including the people living there now as well as companies exporting products such as charcoal, fish and mining products and their customers in Mozambican towns and in countries around the world. However, many costs of this extraction are shifted, often to the detriment those people with the least power. This cost shift can happen in at least three ways; for example:

- external investors: mining companies shift the costs of land degradation around mining sites to local farming communities;
- inequity within communities: better-off families that can afford fishing gear may overfish and reduce the fish available to poorer neighbors; or
- intergenerational inequity: today's community members pass on overfished waters, destroyed mangrove forests and depleted soils to future generations.

Often, these negative consequences are related to the fact that the natural resources in question are openly accessible "common pool resources."

3.2 3.2 Management of Common Pool Resources

Fishing grounds, mangroves, and forests are not owned by any individual but can be openly accessed by anyone with limited or no regulation. This open access often results in what is called the "Tragedy of the Commons"[13]: many individuals each try to get the most they can from shared resources, but in ways that eventually deplete the resource as the actions of many people add up. Some of the most frequently discussed common resources include oceans, fishing areas, forests and the atmosphere. Increasing numbers of fishers catching more fish than the sea can replenish, or huge numbers of individuals and companies pumping carbon

[8] https://www.theguardian.com/environment/2010/feb/18/worlds-top-firms-environmental-damage
[9] http://naturalcapitalforum.com/about/
[10] Full Report available at: http://www.hm-treasury.gov.uk/stern_review_report.htm
[11] http://www.teebweb.org/
[12] http://www.naturalcapitalproject.org/
[13] Hardin, Garrett, "The Tragedy of the Commons," *Science,* 13 Dec 1968: Vol. 162, Issue 3859, pp. 1243-1248

into the air, are both examples of short term "rational thinking" that pit short term economics against environmental protection, as well against the future economic needs of other people and future generations. In response, many feel that only private property rights (which allow a few people to exclude others), or strong government regulations, can avoid this tragedy.

However, the economist Elinor Ostrom showed that there are thousands of examples of communities coming together to manage common resources in ways that enable a combination of short and long-term benefits while protecting the resources in question.[14] Based on examples from around the world, she developed a set of eight principles that come up again and again in the successful management of common pool resources (see text box). These principles can guide the sustainable use of common pool resources in ways that ensure the health of the resources, while enabling users to benefit from important ecosystems services.

Ostrom's Principles for Management of Common Pool Resources

1) Define clear group boundaries
2) Match rules of governing common resources to local needs and conditions
3) Ensure that those affected by the rules can participate in modifying the rules
4) Make sure the rule-making rights of community members are respected by outside authorities;
5) Develop a system carried out by community members for monitoring members' behavior
6) Use graduated sanctions for rule violators
7) Provide accessible, low cost means for dispute resolution
8) Build responsibility for governing the common resources in nested tiers from the lowest level up to the entire interconnected system.

These principles can be useful guidelines to help local communities design how to use natural resources in sustainable ways. However, it is not always an easy and straightforward process. The design of local institutions and capacity constraints can present challenges to the efficacy of common pool resource management (Ostrom, 1990; Agrawal, 2003). Additionally, existing inequalities and external factors such as market forces and national governmental policies can interfere with the ability of local community institutions to manage common pool resources. One way to improve local capacity is to increase people's access to information and establish opportunities for participation, deliberation and the monitoring of established goals (McGinnis and Ostrom, 2014).

The CARE-WWF Alliance has explicitly used Ostrom's principles as the basis for designing many interventions in the P&S region.

4. CARE-WWF Initiatives in the Primeiras & Segundas Region

4.1 Starting the Alliance

The World Wildlife Fund (WWF) began working in the P&S in 2006 to support fishing communities, along with efforts to create a protected area around the islands, due largely to their importance as nesting areas for birds (sooty terns) and for three species of marine

[14] "Governing the Commons: The Evolution of Institutions for Collective Action." Elinor Ostrom, Cambridge University Press, 1990.

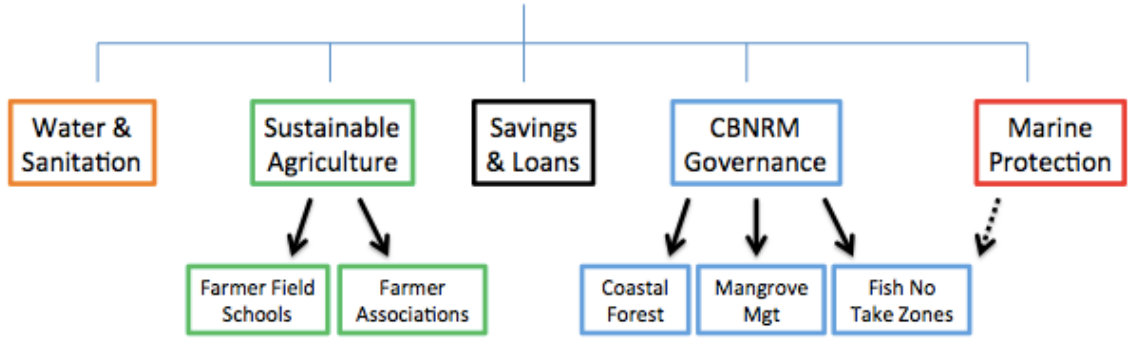
turtles. CARE joined the effort in 2008, largely focusing on sustainable agriculture. WWF and CARE then formed the CARE - WWF Alliance to protect key natural resources and to support sustainable livelihood activities for communities that depend upon these resources.

The CARE – WWF Alliance works with dozens of communities, government and the private sector on the overall challenge in this region: how to improve the wellbeing of the region's residents who rely on natural resources without compromising the long-term sustainability of the region's environment, all in the face of climate change.

This program is geographically focused on the coastal lands and forests, estuaries, near-shore waters and islands in the province of Nampula (in the districts of Angoche and Moma, and Larde which was created out of Moma in 2014), and in Pebane district in Zambezi province. The emphasis has been on locations in or near natural resources of high conservation value with significant population centers, including those that offer good opportunities for significant improvements in productivity while reducing environmental damage.

Over several years, CARE and WWF developed a single unified program with a range of interventions, which continues to evolve. Key efforts have focused on the protection of key habitats and species; the management of common resources including forests, estuaries and mangroves; sustainable agriculture; disaster risk reduction; and savings groups and water and sanitation. This work is all underpinned by support for the establishment and strengthening of various community groups, and the formalization of community- based associations; more recently, there has been an increasing emphasis on gender and on nutrition.

CARE-WWF Activities in the Primeiras and Segundas Region



4.2 Formalizing the Primeiras and Segundas Protected Area

One of the driving efforts of WWF's engagement in the region focused on encouraging and supporting the development of the P&S Protected Area. Three key aspects have included the official declaration of the Protected Area, the design of the Management Plan, and access to funding to enable the establishment of the Protected Area management (separate from the CARE-WWF program that supports the Protected Area).

The Protected Area was legally declared in late 2014 by the national Council of Ministers. The wording of the Declaration explicitly notes both the importance of biodiversity in the area and the role of healthy natural resources as the basis for community livelihoods.

Following the declaration, the Alliance provided funding for the design of the Management Plan, including a series of consultations with communities, companies and other interested parties. The final version of the Plan explicitly refers to the CARE-WWF Alliance initiatives

and builds many key elements of the Alliance strategy into the design of the Protected Area. In terms of governance, it highlights the role of co-management involving communities and specifically refers to some of the Alliance interventions mentioned below, such as community-managed fish sanctuaries, mangrove reforestation and Farmer Field Schools that emphasize sustainable agriculture. The plan also emphasizes the need for a mosaic pattern, involving diverse land uses and marine resources in different areas, ranging from fully protected areas on the P&S islands to protect marine turtles and sooty tern nesting sites, estuaries as the sites of community managed fish sanctuaries, and other locations for such activities as sustainable agriculture, artisanal fishing and mining.

The key challenge for the Protected Area is a continued lack of funding and staffing. While the PA exists based on the declaration, and Alliance program is advancing many of the elements of the management plan, the Protected Area itself still has insufficient funding and no staff. Conservation International's Global Conservation Fund provided a $1 million endowment as a contribution towards the operations of the Protected Area, distinct from the Alliance program. However, as of late 2016, the government had not identified a Warden to oversee the establishment and operations of the Protected Area, and the endowment was not enough to hire staff and cover the required combination of equipment and operational costs.

4.3 Sustainable Agriculture

One of the most successful aspects of the Alliance program involves sustainable agriculture, which aims to increase agricultural productivity while reducing the environmental impacts of farming. Led by CARE and its local partner AENA (a non-governmental organization called Associação Nacional de Extensão Rural) in collaboration with the Ministry of Agriculture, this program builds on CARE's earlier work in the area going back to the early 2000s. For years, two elements involved the formation of farmer associations, and technical assistance on the use of sustainable agriculture techniques, with a focus on conservation agriculture.

Individual resource-poor farmers usually lack access to basic information and extension services, cannot easily get inputs or improved seeds or services, and tend to sell small quantities of products for low prices. Farmer associations serve as community-based institutions that use the power of collectives and the efficiencies of scale to help farmers access information, buy inputs and seed in bulk, and negotiate better prices with buyers. Extension agents can support many more farmers if they operate in groups rather than as individuals. Also, traders pay significantly more per kilo or ton if they can be guaranteed minimum amounts that meet key standards. For example, an individual farmer may sell 50 or 200 kg, while a group may be able to combine crops from many members to provide 10 or more tons in a single location, while ensuring that buyer requirements for packaging and cleanliness are met. The Alliance has helped over 80 informal farmer groups to take the extra step of creating legally-recognized associations, which can open bank accounts and enter into contracts.

On the technical side, the Alliance started by promoting conservation agriculture. As recognized by the Food and Agriculture Organisation and many others, conservation agriculture encourages the use of practices that "improve and sustain productivity, increased profits and food security while preserving and enhancing the resource base and the environment."[15] Locally-appropriate practices should be selected that can implement these three key principles: 1) minimum tillage and minimum soil disturbance, 2) permanent organic

[15] http://www.fao.org/ag/ca/1a.html

soil cover, and 3) the diversification of crops in sequences or via inter-cropping. These practices help to build the organic matter and improve the sandy soil structure in the P&S, increasing water infiltration and improving productivity even without additional inputs. At the same time, the practices enable farmers to stay on their same fields for year after year, reducing reliance on swidden agriculture and minimizing both deforestation and extensive burning.

Beginning in 2011, Farmer Field Schools (FFS) were introduced as another feature of the Alliance program. Widely promoted by the FAO,[16] Farmer Field Schools put farmers themselves at the forefront of active learning. In contrast to top-down "technology transfer" models in which extension agents tell farmers about new techniques or inputs, FFS emphasize helping farmers gain the confidence and skills to run their own experiments on small areas, comparing varieties and techniques, and to decide based on observation and analysis and discussion amongst group members what works best for them.

The FFS also include various ways to outreach to non-members. The schools are usually located in easily-accessible place so that neighbors can see the experiments and speak with members. Also, each FFS is encouraged to host at least one Farmer Field Day every year, providing a more formal opportunity for neighbors to discuss the experiments and lessons with FFS members. Finally, there have been several programs on local language radio talking with members and extension agents and discussing results.

The Alliance program initially supported 21 FFS and later 36. The main focus in the P&S program has been on identifying locally appropriate improved varieties (especially of cassava, the staple food, as well varieties of corn, beans and cover crops) and the best techniques to improve soil fertility and water infiltration.

During the time when this case study was written in 2016, some of the FFS were in their fifth season at the same locations, although the farmers involved differed during that time period as some graduated and new farmers joined. Several FFS have moved to new locations, in part to help attract members from different locations in the communities. Each FFS is located in a community with one or more farmer groups or associations. The main focus is on manioc and legumes, with some work on additional crops; as soils improve, many farmers want to experiment with new varieties for maize – legume systems, testing improved seed varieties developed by Mozambique's Agrarian Research Institute (IIAM) and IITA (International Institute for Tropical Agriculture).

Conservation agriculture was the technical foundation, but over recent years, the Alliance and its partners have been working with farmers to design a locally appropriate package for sustainable agriculture that includes additional elements. This package can then serve as a starting point from which farmers can continue to experiment and make improvements. The 36 FFS have provided the organizational basis for this design work, ensuring that farmers are at the forefront of testing, comparing results, and determining what works best for them. Key elements of this sustainable agriculture package currently include:

- CA practices such as avoiding burning, using minimum tillage, increasing soil cover (with grass mulch and with green manure cover crops), and intercropping with a combination of cash crops and green manure cover crops.

[16] http://www.fao.org/agriculture/ippm/programme/ffs-approach/en/

- Identification of improved varieties of food crops such as maize (*Zea mays*), mandioca / cassava (*Manihot esculenta*), pigeon peas (*Cajunus cajun*), mung beans (*Vigna radiata*), and cowpeas (*Vigna unguiculata*).
- Identification of the best green manure crops for intercropping to improve soils with beans that are edible, and that reduce labor. Most experiments have included velvet beans (*Mucuna pruriens*), lab-lab beans (*Lablab purpureus*), and jack beans (*Canavalia ensiformis*).
- Multiplication of improved seed varieties selected by farmers.
- Agronomic practices, such as planting in lines and improved spacing to increase plant populations.
- Post-harvest handling, e.g. the drying of groundnuts on racks and / or in the shade, to reduce aflatoxin.

The results have been assessed through annual studies on cassava yields and water infiltration rates with the Ministry of Agriculture. Cornell University teamed up with the Alliance in 2014 to better understand the impacts of Farmer Field Schools and the sustainable agriculture techniques.[17] In 2015, a further study on the adoption of practices by over 500 FFS members and non-members in the same communities was undertaken.

The results were impressive: participation in the FFS network steadily increased each year of the program, production increased, and overall soil health and natural resource sustainability has improved. Some key findings from these studies are as follows:

- **Better Yields:** Use of either improved varieties or conservation agriculture alone showed 40% higher yields than traditional methods. Plots that used the combination of improved varieties and conservation agriculture techniques showed 80% more yield than traditional farmer practice.
- **More efficient use of water:** Water soaked into the soil 33% faster in fields using CA than in fields under traditional practices— which means crops got more water during dry seasons. CA fields were also less likely to be damaged during floods, with less erosion largely due to increased cover by organic matter. This is a critical issue as rainfall becomes more erratic and temperatures rise due to climate change.
- **Adoption**: The most important evidence of success comes when farmers adopt key practices on their own fields, outside of small, jointly managed FFS plots. There is strong evidence that CA practices are being adopted both within and outside of the Farmer Field Schools. In a survey[18] of 520 farmers, virtually all FFS graduates and

[17] The Cornell team adopted a participatory approach to learn from local farmers about their challenges and successes by conducting interviews with 78 farmers and 5 focus group discussions.
[18] In 2015, a team comprising the Alliance, AENA and the Ministry of Agriculture's district teams conducted a survey using wealth ranking and CARE's Participatory Performance Tracker to understand adoption. The survey used focus groups with 520 farmers (FFS graduates, incoming FFS members, non-members) in 36 communities in Angoche, Larde and Moma districts, and on-field triangulation visits with 465 of these farmers.

incoming FFS members had adopted techniques for at least one of the conservation ag principles, and between 55% and 65% adopted techniques relevant for two or all three principles. Adoption rates amongst non-members were also high.

- **Bridging the gap between science and communities:** Scientific research has already shown that CA improves soil health and a crop's ability to use water, but some researchers have dismissed the method as impractical for communities, feeling it requires too much investment in time and effort for farmers. The Alliance program shows that farmers can and do play active roles in running and learning from their own experiments, and that they do implement practices when they see the benefits.
- **Continuously improving results:** The data show that the longer a farmer uses the sustainable agricultural techniques on her farm, the better the results are. The availability of FFS with several years of experience on the same plots, combined with testimonials from farmers who have already adopted on their own fields, has begun to convince more farmers to use CA.
- **Enthusiastic participation in the Farmer Field Schools:** In the qualitative Cornell study, it was clear that people in the rural areas of Angoche and Moma were eager to learn more about new practices in agriculture. The farmers who participated did so enthusiastically, and many who did not participate expressed a desire to do so. The four main reasons why people participated in the associations and farmer field schools and adopted the new practices they learned about were:
    - Increased yield: participation and adoption reflected the desire to improve productivity, particularly after learning from the positive results of others;
    - Improved soil conditions: moisture and fertility;
    - The possibility that participation would bring other benefits such as water or sanitation; and
    - Diversification of risk by investing a small part of family resources (labor power, mainly) to see whether or not the FFS were worthwhile.

At the same time, there are still several challenges:

- *Environmental impacts are unclear:* The program has not yet measured whether the agricultural package has actually reduced reliance on swidden agriculture or reduced deforestation due to agriculture.
- *Nutrition:* There is no evidence yet on whether agricultural improvements actually contribute to improved dietary diversity and other nutritional outcomes for the key target groups of children under 2 and pregnant and nursing women.
- *Methodological issues:* Issues with some of the data collection methodology on adoption makes systematic evaluation difficult. For example, in the 2015 survey of adoption, demographic data was limited to the respondents' name, gender, location, and relationship to FFS. While the Cornell study in 2014 also collected information on education levels, household size, dependency ratios, and marital status, this type of data was not gathered in the larger 2015 survey, making it hard to generalize from the findings. Also, a clear definition of 'adoption' was not used, so it is not certain if farmers are adopting on 10%, 50% or 100% of their fields.
- *Increasing participation further:* There is still work to be done to expand the FFS model and to enable the poorest families to participate and benefit. People who do not participate in schools or in associations gave a variety of reasons for why they could not participate including health, number of children, and social barriers.

Finally, while local results have been largely impressive, there has only been sporadic effort to use this evidence to influence national policy, practice and funding allocations. The

Alliance has co-hosted several technical meetings at provincial and national levels, and it was invited to send the only NGO representative to the Ministry of Agriculture's national planning meeting on Farmer Field Schools. However, there could be a much more proactive, systematically resourced effort to use the results to influence the national network of Farmer Field Schools and shape how agricultural research and extension can better support communities in ways that also achieve environmental protection.

4.4 Marine Protection and Management

The diverse marine ecosystems, including a range of key habitats and species, are vital sources of food and income for communities and the attraction for several companies involved in fishing as well as the processing and export of seafood products. These marine systems and species were also the driving factor in the declaration of the P&S Protected Area. The Alliance program has undertaken various interventions designed to protect and make use of marine resources more sustainable.

For several years, the program actively supported law enforcement against illegal fishing and poaching. Doing so involved paying the costs of community rangers based in island encampments to combat the use of illegal fishing gear, such as the use of mosquito nets and agricultural shade cloths that devastate fish populations by capturing larvae and juvenile fish, as well as the poaching of sooty terns and marine turtles. In the past couple of years, the Alliance has reduced its direct involvement, trying to shift responsibility back to a government-managed system. This has resulted in a less comprehensive effort, however, and there is a clear need for a better-funded, better-coordinated system.

A second marine intervention has focused on work with informal community efforts and with more formal community-based natural resource management committees to address the over-harvesting of mangroves. These estuarine mangrove forests provide wood for construction and fuel, protect the coastline from storm surges, and provide vital habitat for a wide range of marine species, including some fish that spawn on the P&S islands and then pass part of their juvenile lives in the mangrove. This second part of the program has concentrated on helping communities to replant specific species of mangroves in areas that have been deforested. Some efforts have also been put into helping communities to shift from clear cutting mangrove trees to the use of sustainable harvesting techniques.

Some results are being seen in the initial areas where mangroves have become re-established enough to produce visible results. For example, in the district of Moma, there is anecdotal information that there has been an increase in *Scylla serrata* crabs, which are an important part of local diets. Furthermore, crabs are usually gathered by women, who either cook them for their families or sell them locally to generate income that they control themselves. Strong data on these impacts are not yet available.

One of the most successful efforts has involved helping people in Thapua and Corone, two communities that lie on the shores of Moma estuary, to set up and manage community-based fish sanctuaries in the estuary. Established in January 2010, these sanctuaries are relatively small areas of the estuary (each roughly ½ kilometer by 1 ½ kilometers) within which no fishing is allowed, so they serve as safe habitats and nurseries for many species. The areas are large enough to have positive biological impacts (e.g., fish populations rebounded significantly in and around the no-take zones), yet the livelihoods of local communities were not undermined. Fishers (usually men) continue to catch fish outside the perimeter, without

having to travel long distances. Others (mostly women) continue to collect crabs and shellfish in the mangroves along the shorelines, in front of their homes.

Results have been clearly positive as demonstrated by a biological study and a socio-economic survey done in collaboration with the Ministry of Fisheries in January 2014. These studies showed that the number of fish species inside the sanctuaries doubled, and over 90% of community members were strongly supportive of the sanctuaries. Further, word spread informally to other fishing communities, and based on this experience in Moma, fishing communities in Angoche district, over 100 km away, asked the Alliance to help them establish similar community-managed no-take zones. One such sanctuary in Angoche estuary was approved by the Ministry of Fisheries and marked out in 2015.

One of the key lessons learned from the conservation efforts was that the initial two sanctuaries were designed in ways that did not take into account Ostrom's principles of common pool resources; in particular, the design process did not take into account the full extent of the estuarine fishing area, nor did it include the participation of the full set of communities that use the resource. The team worked only with the two communities located immediately in front of the areas that were eventually set up as no-take zones. Therefore, the ownership for this work, and the burden of managing and protecting the no-take areas, fell onto these two communities, while its users come from several communities along the estuary.

This lesson has been learned. The team used a different approach in Angoche estuary, working with a much larger set of communities in order to involve all those affected by over-fishing so that decisions on where to locate the new no-take zone, and the responsibilities for managing this new sanctuary, are spread over all the communities involved. As a result, the Alliance team is framing this approach in line with the idea of a mosaic of uses, in which a single estuary may have several specific, clearly delimited no-take zones, all managed by the communities that benefit from the improvements in biodiversity.

This collaborative approach to natural resource management is not common in Mozambique. One of the key issues outstanding involves the effort to work with the Ministry of Fisheries to shape national regulations. The draft regulations emphasize how to open up access to fishing areas; successful fish sanctuaries require giving communities the right to exclude potential users.

4.5 Community-Based Natural Resource Management

As noted above, the Alliance approach emphasizes co-management, including a central role for community control and management of natural resources in ways that protect key ecosystems, habitats and species while providing benefits for today's communities and for future generations. One of the key governance interventions of the program involves helping communities to establish and develop Community-Based Natural Resource Management

(CBNRM) committees. This approach offers a way of implementing the principles of common-pool resource management.

Used in many countries, CBRNM is designed "to create the right incentives and conditions for an identified group of resource users within defined areas to use natural resources sustainably. This means enabling the resource users to benefit (economically) from resource management and providing strong rights and tenure over land and the resources."[19]

Based on the CBNRM approach, the Alliance is strengthening the participation of local residents in the use and conservation of local natural resources. In the first phase, eleven communities around Potone Sacred Forest near Angoche established CBNRM committees, legally recognized community institutions to enable communities to manage resources, and to control income from these resources. These eleven CBNRM groups provided the institutional base for formalizing each community's land tenure (see section below), including mapping the community boundaries, key natural resources, and developing micro-zoning plans. This formalization of land tenure gives them both the legal basis and interest to invest in improving the long-term health of key resources, ranging from soils and mangroves to fish reproduction areas and forests.

In a subsequent phase, farmers, fishers, traditional healers, beekeepers and charcoal producers living in 23 communities in the Koti Islands of Angoche estuary established new Community-Based Natural Resource Management (CBNRM) committees to identify and map out the most important natural resources and to agree on the boundaries of each of the communities. Based on this mapping, participants are designing measures to manage natural resources in their areas, starting with the identification of possible locations for community-managed fish sanctuaries.

This set of adjoining CBNRM committees also came to jointly manage common critical resources that are not owned by any single community – in particular, the fish that live in the mangroves, and which are fundamental to the livelihoods and nutrition of these island communities. CBNRM committee representatives from 23 Koti Island communities came together for a 1-day training to establish a Council to represent them at the district level. This training was attended by the Permanent Secretary for Angoche District government, a representative of the Ministry of Agriculture, the Potone CBNRM Council, the Traditional Healers Association, and Farmers Forums. This Council will engage with district government and any private sector initiatives that affect the health and use of natural resources in the area.

The CARE-WWF Alliance also works with 61 charcoal producers from the Boila and Saua Saua communities, which have mapped out forest areas where limited charcoal production will be allowed. They drew up zoning plans and designed management measures to curb the cutting down of trees for charcoal production. In 8 communities, 96 members of 7 Community-based Natural Resource Management (CBNRM) committees implemented early back-burning along fields and in selected areas of forests to avoid the effects of uncontrolled wildfires on the community managed protected areas.

Local members of CBNRM committees invest long hours in these processes without pay. In 2015, 94 members of CBNRM committees received business management training to help them identify income generating activities such as agriculture and beekeeping that can

[19] http://pdf.usaid.gov/pdf_docs/PA00JRV1.pdf

provide them with a way of earning food and money. The participants in these natural-resource based initiatives are clear on the benefits of healthy, well-managed ecosystems, which provides incentives for ensuring that the resources are managed sustainably.

Women comprise about half of the membership and leadership of most of the CBNRM committees. However, one of the continuing challenges is to ensure not only that women participate and hold leadership positions but also that their voices actually influence decisions. The program has recently started to use training materials with both men and women to facilitate discussion of gender and power issues and to explore gender roles as they relate to natural resources use. Gender is being built into the program much more systematically than in earlier years.

4.6 Securing Tenure Rights

From the early days of colonial rule, the Portuguese and British colonizers awarded land to a small, non-native elite that oriented production towards plantations for export. With the fight for independence, most Portuguese farmers fled, abandoning (and often destroying) the rural infrastructure. In 1975, the newly sovereign government nationalized all land and created collective farms but never succeeded in either supporting rural livelihoods or addressing the needs of the wide range of agrarian inhabitants (O'Laughlin, 1995). Collective farms were progressively dismantled in the 1980s as part of a brutal civil war, and land tenure and rural development were two of the most pressing questions as the war ended in 1992.

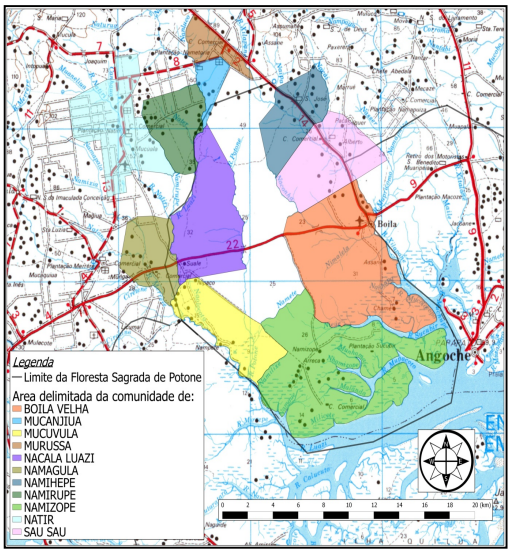
The land law of 1997 formalized land rights for community members based either on 10 years of continual use or on having obtained land using local processes (such as grants of land by traditional leaders). This law also specified options for foreign investors to get long-term leases for land use (Tanner, 2002). This law also provides a basis for communities to establish boundaries and procedures for use of common property.

The Potone Sacred Forest, just outside of Angoche town, comprises about 30,000 hectares of forest. The 11 communities that encircle the forest use it for collecting timber and non-timber forest products, some hunting, and most importantly as a sacred area that the communities want to protect and that serves as the training area for traditional healers from across northern Mozambique. Two major threats to the forest include increasing needs from a growing local population combined with an influx of people cutting timber to produce charcoal for sale into towns and cities.

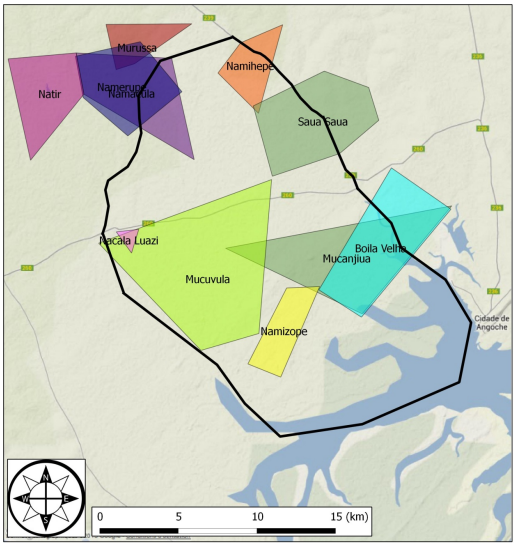
In response, community members asked for support in formalizing their own land security, partially to provide a basis for protecting the sacred forest. In 2012 and 2013, the Alliance worked with these 11 communities and the Ministry of Agriculture to delimit their boundaries and the boundaries of the Potone forest, producing maps of micro-zoning indicating different allowable uses for specific areas as defined by communities themselves. This process followed the technical annex to the land law, using participatory mapping and extensive consultations across neighboring communities to ensure conflicts were identified and resolved (see map below, left). The final step required a registered topographer, sent by the federal government, to formally delimit the land using GPS coordinates (see map below, right).

However, the results demonstrated that, while the law is supportive, land tenure administration practices in Mozambique are very weak. As seen in the community-generated maps, no rural community is a regular shape; all tend to follow natural boundaries such as

rivers or use features such as hills or rock outcroppings. In contrast, the topographer's map resulted in the super-positioning of communities, incorrect boundaries based on triangles or polygons that do not reflect community realities, and—at times—wholly inaccurate locations.



Community maps showing correct shape and locations.



Topographer's map: superpositioning, incorrect boundaries, inaccurate locations.

Besides resulting in 11 formal community delimitations, examples from this work have been used to seek improvements in the land administration system more broadly. The findings have been used in provincial meetings, as well as providing the basis for a national training program to strengthen the skills of topographers, emphasizing the value of combining GPS coordinates with community-based mapping.

There are still challenges. Most importantly, while this initiative did result in the delimitation of 11 communities and of Potone Sacred Forest and lead to efforts to improve the land system, it hasn't been extended or supported. This land delimitation process could be continued in dozens of other communities, helping to establish clear boundaries, develop micro-zoning plans, and delimit important resources that require protection and sustainable usage, such as coastal forest and mangroves.

4.7 More attention needed on gender and nutrition

As outlined above, the program has had a number of successes, primarily in technical areas, but generally with insufficient attention to gender and power, and to whether enhanced food security and increased incomes have actually improved nutrition outcomes. Without specific effort to address gender, efforts to strengthen the community management of ecosystems risk being dominated by men, who can also capture most of the benefits. At the same time, improvements in the production of food and access to cash do not necessarily translate into improved nutritional outcomes unless this is explicitly a part of the work.

The team has recognized this gap and, over the past couple of years, has started to address both gender and nutrition in ways that are integrated into the technical work on farming and marine resources. One institutional change began in 2015, based on a new relationship with the Nutrition Department of the University of Lurio (Nampula) 2014. Then, in 2015, CARE

designed training modules on gender equity and on nutrition, which have since been used to train staff of the Alliance, partners, and community members. In the coming years, these two key themes will be more explicitly built into all work.

5. Summary

Decades of conflict, insufficient government support, failing infrastructure and competition from external investors are serious obstacles for local residents to improve their livelihoods sustainably using local natural resources. Thus, any intervention in the P&S area is likely to have immediate results, but achieving long-term success requires continual participation and evaluation of the mechanisms currently in place. The CARE-WWF Alliance has only been working in the P&S since 2008 and is constantly learning and adjusting to the changing context of the region and country.

Early results have been promising, but the Alliance and its partners can still undertake significantly more work due to the high levels of poverty and the ongoing threats to important natural resources in the P&S. Importantly, much more effort can be invested in communicating local results, using them to scale out and scale up lessons in many more places, and by influencing national policies.

The Alliance has worked with universities, including Cornell University in the U.S. and the University of Lurio in Nampula, and with government ministries including Agriculture and Fisheries, to undertake research aimed at evaluating the work in the P&S. Based on these evaluations, the Alliance is currently in the process of redesigning some of the activities and implementing new ones. Such research can be more systematic and should be connected to a stronger day-to-day monitoring system and then turned into communications and advocacy materials that target a range of different users.

The Alliance has also worked closely with international stakeholders to expand and share the experience in the P&S. Four celebrity chefs and congressional staff members for Senators from North Carolina, Ohio and Kansas, together with the Administrator of the U.S. Department of Agriculture's Foreign Agriculture Service, visited the P&S in 2015 to learn how they could become stronger advocates for combating global hunger and malnutrition. This experience helped them to witness how U.S. investments in global food and nutrition security are paying off for healthier families with reduced malnutrition and stunting and also gave them a chance to understand where gaps remain. CARE is rolling out a series of communications based on these activities.[20]

As noted above, work in several sectors such as agriculture, the community management of natural resources, and land tenure has been successful. At the same time, the program is working to dramatically improve its efforts in terms of addressing gender inequity and ensuring successful contributions to nutrition outcomes.

Also, while the program has actively engaged with dozens of communities and with government institutions from local to provincial levels, it has invested relatively little in work with the private sector. There have been discussions with companies ranging from medium-scale exporters of fish and marine products to the Kenmare mining company; including ensuring that private sector players were invited to provide input to the development of the P&S Protected Area management plan. However, there has as yet been no systematic effort to

[20] See the first video here: https://youtu.be/owr-n0dGTtQ

engage with the private sector.

Overall, it is clear that the multidimensional nature of poverty, and the complex web of local and external users of natural resources, means that interventions have to be complex and multifaceted. The CARE-WWF Alliance and its partners have made some valuable contributions while also identifying gaps and challenges that should be addressed in coming years. One of the key issues will be to determine how the Alliance should best invest scarce resources: what should it continue to do, what should it modify, what should it drop, and what should it initiate?

6. Acknowledgments

Parts of this report drew on previous reports for CARE-WWF, including a report by a Cornell University research team that traveled to Angoche May-August 2014 (Amanda Hickey, Wendy Wolford and Katherine Young. 2015. "Building Sustainable Alliances: A Study of Participation in Farmer Fields Schools in northern Mozambique, report for the CARE-WWF Alliance.")

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