Fishing Forever?
Gender, Power Dynamics and Natural Resource Governance in Coastal Communities

Briefing on the Qualitative Analysis of the Gender-Aware Climate and Vulnerability and Capacity Analysis (GCVCA) in Angoche and Moma Districts, Nampula Province, Mozambique


Executive Summary: This document summarizes key findings from the GCVCA carried out in two coastal communities in Nampula Province, February 2014. The research answers the question, how do exposures, sensitivities and adaptive capacities mediate shocks to affect well-being and resilience over time? A research team of five men and three women worked with sex-disaggregated focus groups, averaging 15 people, to conduct open-ended discussions guided by six participatory exercises. Men and women completed maps of livelihood resources, seasonal calendars of livelihood activities, product value chains, vulnerability matrices ranking the impact of shocks on livelihoods, historical timelines, and Venn diagrams of important institutions.

Findings indicate the importance of gender and power dynamics in determining the coping and adaptation strategies that people access to manage risks, stressors and shocks. Communities in Nampula are far more proficient in coping than adapting to diverse stressors and change. The case study points to a basket of diverse interventions that should be built to enable coastal communities to reduce their vulnerability and increase adaptive capacities over time. Given the limited number of external programs that promote adaptation, these interventions should promote the access of small-scale fishermen, poor women and girls to strategies for adapting to idiosyncratic shocks, economic risks and climate change impacts.
Coastal Mozambicans depend on mixed livelihoods

Livelihood strategies reflect a gendered division of labor in northern Mozambique, confirming different resource knowledge and use among men and women. Men earn most of the income through fishing in both Mucuvula and Thapua (see right map; see also Fisheries Value Chains sidebar, p. 3). Men consider agriculture a fallback activity, though it’s women’s primary livelihood. Men fish in estuaries (both communities) and the open sea (Thapua only) for diverse species, including rock fish. Women in both communities cultivate cassava (the staple), corn, beans, pumpkins, peppers, tomatoes, sweet potatoes, coconuts, bananas, and mangos.

Animal husbandry is the most common livelihood diversification strategy. Women in most house-holds raise chickens or ducks; men raise goats, sheep or cows less often. Women ensure protein for their families by harvesting from the estuary and its mangroves snails, oysters, crabs, and clams—either by hand or using a tool carved from bamboo or coconut shell. Women use freshwater rivers for washing clothes; they also transport water from Mucuvula’s borehole or Thapua’s river for domestic uses like cooking and drinking. In terrestrial and mangrove forests, men cut wood for construction of homes and roofs, while women transport branches for daily cooking. Household power dynamics affect resource use: almost without fail, men control decisions determining livelihoods and income.

Diverse risks and shocks cumulatively stress livelihoods

As the Vulnerability Matrix (p. 4) illustrates, ecological shocks are the key threat to livelihoods in Nampula Province. But ecological shocks are not isolated from economic, social and political stressors. Rather, they occur simultaneously or successively, with cumulative impacts.

Community members note changing weather patterns since 1998 and 2005 in Mucuvula and Thapua, respectively. Both communities report more regular cyclones with stronger winds, increasingly variable rainfall and higher temperatures. Cyclone Jokwe hit both communities in 2008, destroying schools, houses and crops and resulting in widespread hunger. But men and women in Mucuvula attribute the greatest fall in annual fisheries and farming productivity to irregular rainfall and rising temperatures. Low water levels and warmer temperatures in the estuaries mean the destruction of marine plants essential to fish reproduction, development and nutrition. This confluence of factors reduces nearby fishery harvests for communities like Mucuvula with less access to the open sea. Such climate-related shifts further stress already-overfished stocks.

Earlier, hotter and longer dry seasons, and wet seasons with more intense rainfalls, combine to undermine agricultural productivity, as well. Bone-dry soils lose the ability to soak up water, so rains wash away important nutrients during key growing periods. Men and women in Mucuvula lament, “If it doesn’t rain, there’s drought;
if it rains, it floods.” Agricultural production also suffers from greater human-wildlife conflict, and crop and livestock diseases. As poor soils and growing population pushes agricultural fields into forest margins, wild animals’ diets shift from wild foods to cultivated crops in both communities. Meanwhile, brown streak in cassava rots the staple crop year round, but is especially severe in April and May. Since 2002, Newcastle disease affects chickens, often fatally, in March, July and November.

These ecological stressors result in lost income, especially for artisanal fishermen. Poor fisheries governance, especially low enforcement capacity of the Ministry of Fisheries (MinPesca), also stresses the economic viability of artisanal fishing. Small-scale fishermen complain that industrial and semi-industrial fishing vessels don’t respect artisanal fishing waters or the annual industrial fishing ban. Similarly, most small-scale fishermen violate the artisanal ban; few are penalized due to poor monitoring. (See Participation & Exclusion in Fisheries Governance sidebar, p. 10.)

In Mozambique, poor governance is not unique to the fisheries sector. Men and women in Thapua reported an extracts research station constructed within the community’s boundaries without their consent in 2006. As of February 2014, the foreigners (believed to be American) had not even communicated the company’s name, intention, or research objectives.

Broader economic risks include poorly-functioning markets. Communities lament that few products, whether fished or farmed, earn them income. Particularly in Mucuvula, lack of information about current cash crop prices puts producers further at risk. The confluence of economic isolation and more frequent or severe climate extremes results in a more severe hunger season in Mucuvula. In contrast, because Thapua is closer to the district’s main city and more diverse marine resources, its residents experience more market access, more consistent food supplies and more varied diets—including an endless supply of marine products that women collect throughout the year.

The vulnerabilities and reduced well-being that results from those ecological and economic shocks are mediated and reinforced by social and political shocks and stressors. The lack of health and education services seriously challenges the capacity to cope with natural disasters in the short term and to address social inequalities over the long run. Neither community has a health post or hospital. Both communities lost their primary schools to 2008’s Cyclone Jokwe. Thapua’s nearest school is 7 km away. Most children don’t make the trek because the distance is compounded by problems experienced en route, including petty robbery and physical harassment.

### Fisheries Value Chains

Several value chains exist for fresh and smoked fish within the communities. Fisherman prefer to sell the product fresh to community members or businessmen because they have no access to ice, and smoking takes more time and yields lower returns.

- The majority of products travel short distances to neighboring communities, the district capitals of Angoche or Moma, with a smaller proportion of fish reaching the provincial capital Nampula and beyond.
- When a fisherman has a good catch, he uses his cell phone or that of a friend to call a businessman, who brings ice from afar to keep the product fresh during transport. The businessman will then resell the fresh fish or process it by drying or smoking, if necessary or desired.

Women’s roles in fisheries value chains are secondary. Men are responsible for processing and storing products for sale, while their wives process and store fish for household consumption. Women are active in processing for sale when there is a huge catch.

- Fishermen decide the quantities of marine products for sale versus consumption, as well as whether to sell fish fresh or processed. The default position is that fish men capture are for sale, while marine products women harvest are for household consumption. Only when women in Mucuvula collect a large quantity of snails, do they control the decision to sell some of their harvest; they earn less than US $1.00 per cup.
- Women’s main role in the household relates to nutrition-provision through agriculture and hand collection of marine products. In rare cases, a fisherman may delegate to his wife the task of selling fresh fish from the home, but he decides the cost of the fish and controls the destination of the income generated.
**Table 1. Vulnerability matrix for men and women in Nampula Province**

**Key:** Bold = groups in both Mucuvula and Thapua identified the resource or hazard as important to their livelihoods or well-being. Red = hazard rated as having [severe impact] on livelihood resource; orange = [significant impact]; yellow = [minimal impact]; blank = [no impact]. Finally, ♀ refers to only women’s ratings, and ♂ refers to men’s ratings alone; no symbol indicates an average rating across women and men.

<table>
<thead>
<tr>
<th>Resource (across) / Hazard (down)</th>
<th>Sea</th>
<th>Estuary</th>
<th>Agricultural land</th>
<th>Forest</th>
<th>Mangroves</th>
<th>Fruit trees</th>
<th>Domestic animals</th>
<th>School</th>
<th>House</th>
<th>Health</th>
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<td>Rising temperatures &amp; drought</td>
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<td>Strong winds</td>
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**Gender & power mediate exposure & sensitivity to hazards**

Vulnerability analyses generally focus on exposure and sensitivity to specific covariate shocks—e.g., a kind of ecological event that touches the whole community. This discussion is more nuanced for two reasons. First, while it’s true that some shocks affect all community members, individuals within the community are not equally exposed or sensitive to the hazard (see Definitions sidebar, p. 5). Second, the cumulative experience of covariate shocks with idiosyncratic stressors—often specific to gender, socioeconomic status or age—may substantially account for sustained poverty and vulnerability, or conversely, sustained power and resilience.

During ecological shocks, the elderly, disabled, women and children may be more sensitive to their impacts. This is because lack of physical force or ability, and gendered roles and responsibilities, are factors that determine access to the resources (information, materials, support systems, etc.) for coping with or adapting to shocks. Given the precarioussness of buildings made from local materials, families tend to pass extreme events outside. The elements can be deadly for the elderly, sick or weak; strong winds or rushing water have
literally carried children away. But experience has taught communities that the risk of collapsing buildings is greater still.

In both communities, the dry season affects drinking water availability, yet women and children suffer the most. Men from Mucuvula did not rank this as a risk after CARE’s installed a borehole in 2013. But, given the community’s location on the estuary, women argued that, when it floods, salt water still contaminates the fresh water. During the last drought, the distance to gather the closest potable water was so great, and the heat during the day so strong, that women preferred to walk from night until dawn. They not only lost sleep, but one woman came down with malaria because of the nighttime exposure to mosquitos. The dry season affects children, who suffer more illnesses because they bath less often and go to school dirty.

The lack of health services within these communities generally has more dire implications for individuals who fall ill (e.g., with malaria) but lack access to vehicles or money for transport to obtain medicine, much less care. The communities say the elderly and pregnant women suffer most. First, take the example of an old man from Thapua who survived Cyclone Jokwe, but couldn’t find ways to cope; he went hungry and ultimately died from anemia. Second, as the vulnerability matrix makes clear, women experience pregnancy as a risk because, like seniors, women entering labor cannot walk the 10 or 12 km to the nearest health post. If complications arise giving birth in the community, the risk of death for mother or infant is very high.

**Many coping strategies increase individual or community vulnerability**

Short-term coping strategies help individuals and households get by in the face of a particular shock, whereas adaptation strategies are practices or choices that anticipate a challenge, facilitating longer-term growth through change. While coping strategies are actions necessary for survival in the short term, they often diminish assets necessary for adaptation and lead to lower levels of well-being over time. Across coping and adaptation strategies, there are at least three kinds of responses to shocks and stressors. First, *individual* actions vary according to a person’s assets and power—i.e., financial, natural, physical and human capital. Second, *collective* action is mediated by the strength of social capital, particularly bonding capital within the community rather than bridging capital outside of the community. A third response to challenges is reliance on *external assistance* or interventions, including not only government services, like social safety nets, but also participation in development and conservation programs.

At the beginning of every wet season, *strengthening houses to withstand the elements* appears the lone preparation strategy amongst various ex-post strategies for coping with ecological risks. In traditional households, women gather mud and coconut leaves to reinforce the walls, while men cut certain woods and tall grasses to reinforce the roof. Women don’t have the ecological knowledge or physical strength to do the latter. As such, *female-headed households* enlist a male family member or pay a male community member to perform these tasks. If she doesn’t have the social or financial capital to obtain assistance, she will suffer a leaky roof that could result in her house collapsing or spolit food and early hunger. To avoid this scenario, some single women in Thapua resort to paying men for their labor with sex.

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**Definitions**

*Exposure*- the extrinsic subjugation of individuals, communities or ecological systems to a risk or hazard.

*Sensitivity*- their intrinsic susceptibility to that hazard.

*Idiosyncratic*- a shock affecting specific individuals or households, e.g., crop loss, illness or death.

*Covariate*- a shock affecting virtually everyone in a community, e.g., cyclone, drought or flooding.

*Coping*- The *ex-ante* risk management measures, i.e. pro-active initiatives in advance, and those *ex-post* mechanisms that facilitate a move back out of poverty, i.e. reactive initiatives following an unforeseen shock to the household.

*Adaptive capacity*- the ability of individuals or communities to adjust to shocks and maintain system functioning.

When fish captures are poor, men cope by appropriating *mosquito nets for fishing*. Fishing with this fine mesh is *mal-adaptive* because the capture of more, smaller fish undermines long-term, ecosystem sustainability. Some fishermen also cope by *reporting fisheries governance infractions*. Fishermen in Thapua alert the authorities when (semi-) industrial fishing vessels pass into artisanal fishing waters or when they fish during the banned industrial fishing period. Fishermen also fall back on agriculture during times of fish scarcity. During the dry season, households with the option chose to cultivate in geographically lower fields to retain greater soil humidity. This coping strategy can also be mal-adaptive when a long dry period is followed by intense rain.

*Hunger* season, which often lasts from January into March, indicates that these coping strategies are insufficient. During this time, meals tend to be smaller and less frequent. Women cope by selectively pulling cassava leaves to supplement meager meals. In order to feed their families, households may *pull agricultural products early* to prematurely sell the product or to avoid rotting from brown streak. Families also cope by *collecting wild forest fruits*, which mature throughout the year. Although these fruits cause indigestion, stomach pains and diarrhea, they are sometimes the only food available.

To avoid putting their families in these situations, some households seek *alternative income sources*. Making and *selling artisanal pots or mats* (see right photo) and *informal agricultural labor* (*ganho ganho*) are common ways to earn money to purchase food or other necessities. *Domestic animals* provide another source of cash in times of need; unfortunately, domestic animals are also subject to ecological shocks. Take the example of Mucuvula, where wildlife numbers rebounded after the Alliance’ introduced community-based natural resource management (*CGRNs, comités de gestão de recursos naturais*) in nearby Potone Forest. One night, a lion attacked and killed several community members’ livestock. The community secretary’s goats survived because he had invested in building a sturdy pen for the animals; two years later, he remains Mucuvula’s sole livestock producer. This anecdote makes clear that primary producers experience human-wildlife conflict as economic costs (as is the case with plant and livestock diseases). Moreover, it suggests how political and economic power accumulates and shocks reinforce existing inequalities in Nampula Province.

Rotating *savings and loans groups* (*PCRs, poupanças de credito rotativas*) are vital because they offer a financial safety net to women, who would otherwise have little to none. In both communities, the women’s group doubles as a savings groups and business collective—whether agricultural (Mucuvula) or “fish processing” association (Thapua). Whereas women’s group members access small amounts of savings or credit in the case of idiosyncratic shocks (see *Definitions* sidebar), men can only access these funds through female group members. However, because PCRs function with capital internal to the community, they cannot serve as a safety net for everyone when covariate shocks affect the entire community. Women in Mucuvula, nonetheless, recognize this group as the community-based organization (CBO) contributing most to their well-being because it: offers a safety net in times of crisis; acts as a safe space for informal exchange of experience about how to improve their lives; and constitutes collective financial power that they otherwise lack.

The *Islamic community* also mobilizes in times of idiosyncratic need. The leader of the mosque’s women’s group usually decides who will visit whom and what assistance will be offered. Take the scenario of the head of household perishing in a cyclone, leaving behind a pregnant mother with young kids. While the woman’s family has the primary responsibility to help, the religious community would also rally to support her by carrying water, cooking food or lending her money to buy white cloth for traditional burial.
Such support can be critical for FFHs. One single woman confided that, when selling bivalves in a nearby community failed, she used to engage in *sex for fish or money* to feed her children. She was able to escape this desperate situation by remarrying. For women in rural Mozambique, *marriage* is a double-edged sword, both a *social safety net and a social risk*. Men in Mucuvula explain that girls as young as 13 are ready to marry. Parents may force their daughter to marry against her will because they lack the financial means to support her or to save face, i.e., avoid the disgrace of an unplanned pregnancy. Once married, women cope with men’s control over decision-making by influencing their husbands—principally through “emotional blackmail,” e.g., denying him sex. Women can also refuse to prepare meals or wield the threat of divorce.

Communities in Nampula Province have more limited coping mechanisms to deal with *poor educational opportunities and health services*. In the wake of Cyclone Jokwe, the community of Thapua petitioned the *Ministry of Education (MinEd, Ministério da Educação)* to rebuild their primary school; nothing ever came of the feasibility study they conducted. Compare this to Mucuvula, which banded together to rebuild their primary school; yet the building fails to ensure a quality education because MinEd’s teacher remains unpaid. Individual strategies for coping with insufficient healthcare, likewise, rely on *bonding social capital*. When one woman in Mucuvula struggled to produce breast milk for her new-born, a friend through the women’s association nursed the baby to bide the new mother time. If a woman is pregnant and too ill to work during the dry season of fish scarcity, men take on women’s roles, hoeing the fields and preparing food for his family.

Collectively, both communities use medicinal plants as a substitute for Western medicine. The strength of *traditional medicine* in Mucuvula reflects its location on the edge of Potone Sacred Forest. The traditional healing organization, *Ametramo*, is comprised of at least 24 local healers (*curandeiro/as*) of both sexes. As in Western medicine, patients pay for the diagnostics and health services *curandeiros* provide. Community members distinguish between illnesses sometimes cured in the community and those only cured in the hospital. Only when traditional medicine fails and the individual’s illness persists do community members travel to the nearest *health post*, if they can manage the transport effort and cost.

In this context, awareness-raising and free services by the District’s Ministry of Health (*MinSau, Ministério da Saude*) are critical preventative measures. That’s why, after a year without *monthly health services*, the community of Thapua engaged in collective action, refusing to attend a meeting requested by a government representative. Thereafter, *MinSau* reinstated its polio vaccinations and vitamin A supplements. For several years, USAID funds supported a complementary nutrition program called SANA. With the help of a trained teacher (*animadora*) from the women’s association, Save the Children expanded women’s knowledge about how local foods can be combined to provide children with a nutritious diet, especially critical in their first 1000 days. After the program ended, the *animadora* stopped advocating the practice and other women admit that they often fail to make *papinhas* (mashed potatoes with additions like banana, beans or improved sweet potatoes) because of the time burden of making a separate meal for children after a long day’s work.

Since 2011, the only formal social safety net available to community members in Nampula Province is an *old age pension* from the National Institute of Social Action (*INAS, Instituto Nacional da Accao Social*). This monthly subsidy (USD $25) makes affordable the trip to the nearest health post to purchase medicine; it also helps seniors to buy necessities for daily living, like soap, salt, and oil. The pension does not reach all the community’s elders, primarily because the application and collection processes are arduous and time-consuming. Many citizens comply with the requirements, but their names never appear on the INAS recipient list; others have waited two or three years for successful inscription in the program. In Thapua, just one man and two women of 1000 receive pensions.

*Limited adaptation strategies for a more resilient future*
Communities in Nampula are far more proficient in coping with than adapting to diverse stressors and change.
Table 2. Coping versus adaptation strategies of women and men in northern Mozambique

Key:  green text represents a strategy accessible through a non-governmental intervention; blue text represents government assistance. ♂ refers to women’s roles or strategies; ♀ refers to men’s roles or strategies; finally, no symbol indicates a strategy available to both men and women.

<table>
<thead>
<tr>
<th>Challenge resulting from 1+ risk or shock</th>
<th>Coping Strategies</th>
<th>Adaptation Strategies</th>
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</table>
| Extreme weather events (floods, cyclones, and droughts- including fresh water scarcity) | • Before wet season, reinforce house with mud, leaves (♀), grass & sticks (♂); single ♀ obtain men’s assistance through family or payment in money or sex  
• Gather food & water to survive bad weather (♀)  
• During dry season, ration water for drinking & cooking; ♀ use river water or walk further to gather water for domestic use  
• Access weather alerts on the radio  
• Access savings or loan from rotating savings and loans group (♀) to rebuild home | • Move agricultural production-lower fields to retain soil humidity during drought, higher fields to avoid flooding  
• Build improved water source |
| Declining fisheries productivity (due to climate change impacts, increased fishing effort, and unsustainable practices) | • ♀ use finer mosquito nets to capture smaller/younger fish  
• ♀ hand collect marine products for nutrition & income  
• Fall back on agriculture for nutrition & income  
• Report industrial infractions to the Ministry of Fisheries | • ♀ migrate seasonally for improved fish captures & income generation  
• Establish, monitor & enforce fisheries no-take zone |
| Lower agricultural productivity (due to climate change impacts, plagues and human-animal conflict) | • Fall back on fishing (♂) or hand collection of marine product (♀)  
• Seek informal agricultural labor for crops or income  
• Pull crops early to avoid brown streak or sell for income (♀) | • Adopt conservation agriculture techniques, e.g., to retain soil nutrients & moisture  
• Plant improved crop varieties |
| Limited cash income (due to low productivity livelihoods, low market integration & gender discrimination) | • Seek informal agricultural labor for income  
• Income diversification, such as chicken (♀) and goat (♂) creation or selling artisanal pots (♀) or mats (♂)  
• ♀ withhold sex or refuse to make meals to influence ♀’s financial decisions  
• Force ♀’s into premature marriage | • Income diversification, such as small-scale business  
• Access current price information before selling crops  
• Access a grant from the District Development Fund to develop an income generation project  
• Migration for ♀’s education  
• ♀ migrate for mining |
| Hunger & malnutrition | • Reduction in meal number &/or size  
• Hand collection of marine products (♀) & wild fruits from the forest  
• Exchange crops, sex (♀) or fish (♂) products for food  
• Practice more nutritious food preparations for children | • Plant fruit trees for communal use |
| Illness, old age & death | • Treatment by community healer using traditional plants/medicine  
• Travel to the nearest health post for medicine or treatment  
• Care for partner and fill his/her role(s)  
• Access old age pension  
• Pay for funeral by accessing savings from rotating savings and loans group (♀) or loan from mosque | |
In contrast to coping, adaptation strategies can promote longer-term resilience by responding to the changing environment. While adaptive capacity is a critical element to reducing vulnerability (see Definitions sidebar, p. 5), the few adaptation strategies uncovered are largely attributable to external investments. Again, availability and outcomes of individual and collective adaptation strategies are mediated by gender and power dynamics.

Most men who belong to a fishing crew adapt to low fish captures by migrating together for two to six months annually. Seasonal migration has long been an answer to poor captures, but lengthening dry seasons and declining catches have reinforced this adaptation strategy and increased migration distances.

Fishermen migrate to earn money to smooth income and consumption during the hunger season, and to pay their sons’ school fees in the city. In Thapua, if the boat owner has the ability to leave some money with the family before the crew migrates, he does so as a sort of down-payment for the man’s absence. Men’s ability to send remittances to support household needs depends on the distance and urbanity of the destination as well as the fishermen’s social capital. Men from Mucuvula rarely if ever send money home, because the community’s relative financial, geographic and social isolation.

Families that don’t receive remittances must sustain themselves through women’s and children’s subsistence activities. While women collect more marine products for protein during their husbands’ absence, they nonetheless suffer for lack of labor and protein during this period. Women are the day-to-day decision-makers in their husbands’ absence. Some women feel relief that she doesn’t have to suffer the weight of decision-making, while others savor the time her husband is away. Men hope to provide their wives with spending money upon their return; but, sometimes, they return with nothing.

Migration is not an adaptation strategy available to all fishermen. While all men in a migrating fish crew are invited to join, only some have the ability to pay for the journey; still others chose not to go to remain with their families. Men in Muculuva explain some stay to avoid the fate of others who returned to find their wives pregnant by another man. But it’s far more common that fishermen abandon their wives. Particularly for young fishermen, what started out as seasonal migration may become permanent. While divorce is uncommon in the area, communities believe migration is its leading cause.

Thapua fishermen have come to understand the marine sanctuary (see left map) initiated by the CARE-WWF Alliance as an adaptation strategy to declining fisheries. As the sidebar explains (p. 10), the community did not fully support the sanctuary initially, but support has grown through awareness-raising and as fishermen catch greater quantities of more diverse fish captures along the sanctuary borders. The whole community now participates in monitoring: rather than capturing a fishermen who enters the no-take zone to fish illegally as a monitor
Participation & Exclusion in Fisheries Governance

Fishermen in Thapua report that the fish sanctuary—established by the CARE-WWF Alliance in Moma District in 2010—is contributing to increased size, diversity and quantity of fish captures in the spillover zones.

- While there are two WWF-trained monitors from outside the community, the Alliance has also trained three community-based monitors for the Thapua no-take zone. In addition to the three male community monitors, other men and women feel enough ownership to call out fishermen from nearby communities who enter the no-take zone to fish illegally.
- Women don’t have a formal role in community-based sanctuary management, but wish they did. The Alliance recognizes women’s exclusion as problematic, and is mobilizing a more gender-balanced, CGRN that would also oversee sanctuary monitoring.

District-level government representatives of the Ministry of Fisheries’ Small Scale Fisheries Development Institute (IDPPE, Instituto de Pesca de Pequena Escala) occasionally visit the communities to improve compliance with the fishing law by mobilizing the abandonment of illegal fishing gear, such as ecologically-destructive mosquito nets. IDPPE also raises awareness about the brief annual artisanal fishing ban (around the month of January), which most fishermen violate by continuing to fish in the estuaries out of economic necessity.

- Neither community has formal representation in the Community Fishing Council (CCP) that is supposed to represent their interest in fisheries co-management with the MinPesca. Likely in part for this reason, most fishermen experience these political institutions and their regulations as short-term economic threats rather than long-term assets for ecological sustainability of their livelihood base.

might do, men and women call attention to the consequences trespassers could face for violating the sanctuary’s rules—fines, destruction of nets or boats, or imprisonment.

The Alliance’s local partner, AENA, has also catalyzed individual and collective strategies for adaptation to declining agricultural productivity. In Mucuvula’s farmer field school (FFS), conservation agriculture (CA) techniques are practiced alongside traditional farming techniques so farmers can compare the efficacy of practices in terms of soil conservation, water retention and other challenges exacerbated by climate variability and change. Mucuvula’s FFS has illustrated the benefits of improved cassava, resistant to both drought and brown streak. AENA’s FFS demonstrations are open to all community members, but access to triannual chicken vaccinations against Newcastle disease hinges on application of CA principles in one’s own field. Women in both communities report that they’ve adopted mulching—which helps to prevent soil loss during flooding and to retain soil humidity during drought—to ensure their families’ food security. Since 2010, two AENA-supported CBOs also facilitate implementation of CA techniques and negotiate with buyers outside of the community to increase members’ incomes from crop sales.

Small-scale business development is another adaptation strategy improving market integration in Thapua. In 2011, AENA founded a women’s PCR and “fish processing” association that showed little initiative in processing fish, likely due to women’s limited role in the fisheries value chain. The women instead proposed to purchase products of first necessity for resale at a mark-up. With the support of a grant and financial management training in 2013, the women’s association launched a small-scale business selling products like rice, oil and sugar within the community. Men and women, alike, referenced this infusion of business capital and capacity into the local economy as the intervention contributing most to Thapua’s communal well-being.

Some families are investing in their future by migrating for education, which helps the next generation diversify its livelihood beyond the precarious natural resource base. But this adaptation strategy is almost exclusively for boys of families with financial means. Unfortunately, fear of petty theft and harassment en route to Thapua’s nearest primary school has diminished attendance, especially amongst girls. Studying beyond fourth grade is very rare, though a handful of boys reportedly study in Moma’s secondary school. Men in Mucuvula confirm that parents opt to send boys to primary or secondary school in other communities, but thrust girls into early marriage. This practice is beginning to shift, as migrating fishermen aspire to offer their girls more choices. Yet some wives have resisted girls’ education because they equate it with increased domestic workloads.
Far less common than migrating for education or fishing, some young men leave Mucuvula to mine. The most common destination is Mavucu in nearby Moma District, where precious stones are mined; others have travelled as far as Cabo Delgado Province for gold mining. Compared with the seasonal migration for fishing, the individual adaptation strategy of permanent migration for mining has yet to result in remittances or other benefits for the community members left behind.

**Support coastal resilience through a basket of diverse interventions over time**

Overfished stocks, depleted soils and food insecurity in coastal communities appear to suggest distinct, technical interventions. Indeed, creating marine no-take zones, transferring conservation agriculture techniques, and teaching nutrition strategies for the first 1000 days of a child’s life are all effective tools. But the importance of holistic gender and power analysis for designing programs to help marginalized community members stay out of poverty cannot be overstated. Only by understanding the cumulative impact of idiosyncratic and covariate shocks and stressors on poor fishermen, women and children can ecologically, socially and economically-savvy investments be made.

This case study suggests that, in order to increase the adaptive capacities of communities dependent on small-scale fisheries, additional investments or coordination are required to ensure access to a suite of financial and social services and safety nets. These services may be provided in innovative new ways. Consider the model of SG Global, an artisanal fishing company based in the city of Angoche. SG owns a fleet of boats and pays the artisanal fisher crews by the kilo. A credit system enables small-scale fishing families to smooth their income and consumption during the less-profitable dry season. Meanwhile, minimum harvest size and quality standards ensure both long-term ecological and business sustainability. SG Global thus exports fresh, high-quality, artisanal fish, crab, lobster, squid, and shrimp to socially- and environmentally-conscious Europeans.

Without good governance, such market solutions will not deliver long-term sustainable livelihoods and well-being for coastal communities. Fisheries governance must be improved by expanding the meaningful participation of male and female marine resource users in fisheries co-management as well as the enforcement capacity of the Ministry of Fisheries. Integrated natural resource governance, including strong community tenure rights, is also critical to community resilience. Prospecting by the extractives industry is a looming ecological and economic risk and opportunity for many coastal communities. That’s why the CARE-WWF Alliance helped Mucuvula convert its customary land rights into a communal land title, and is now raising awareness in Thapua about the community’s right to informed consent of ongoing extractives research on their land.

*Empowering communities with knowledge* of their rights increases their power to negotiate with companies for more equitable benefit-sharing from exploitation of the natural resources upon which their livelihoods depend. Knowledge is also power in the face of poorly functioning markets and climate change impacts. Access to price information, weather alerts, climate projections, education and training can improve assessment and management of diverse risks. Expanding coastal communities’ adaptive capacity is vital for their resilience.