Integrating Climate Adaptation, Poverty Reduction, and Environmental Conservation in Kwale County, Kenya

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Abstract

Shoreline erosion, flood surges, river sediments, and water pollution are only a few of the common threats to many coastal areas, with extreme climate-related events exacerbating the intensity and urgency of the resulting negative impacts. In addition, some coastal areas are excessively mined for sand, protective

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mangroves are destroyed, and coastal waters are overfished, affecting the well-being, safety, and livelihoods of local communities. These threats disproportionally affect the poorest and most marginalized groups, including women and children, leading to their increased vulnerability to climate change and adoption of negative coping mechanisms.

This chapter proposes an integrated people-centered approach, with a particular focus on women, to address the triple crisis – poverty, climate change, and nature – at the local level. Findings will be shared from a 2-year project implemented in the southernmost coastal region of Kwale County in Kenya, which aimed to achieve beneficial and interconnected social, environmental, and climate outcomes. The chapter discusses findings, successes, and lessons learned from the action and the requirement to position vulnerable groups at the center of initiatives designed to address the triple crisis. Limitations of the study and main recommendations for future programming in similar contexts are also shared.

Keywords

Triple crisis · Climate change · Ecosystems · Nature · Coastal livelihoods · Poverty

Introduction

Climate, Poverty, and Nature: Three Interconnected Societal Challenges

Originally, 2020, now running into 2021 – due to the ongoing global pandemic – is expected to be a pivotal year for the promotion of a more sustainable and climate-resilient future. Major events are scheduled where decisions will be made around development targets (UN Sustainable Development Goals will be revised), conservation of biodiversity (UN Convention on Biological Diversity), and climate actions (review of the Paris Agreement targets).

In the last few years, there has been growing recognition among the scientific and development community that climate change, nature, and poverty are interconnected – often described as *triple crisis*, *triple emergency*, or *triple jeopardy*. Various publications and institutions are attempting to identify the linkages between the three areas and are currently promoting integrated approaches to better inform the Sustainable Development Goals (SDGs) and advocate for national and international policy changes (WWF-UK 2018; People and Nature Campaign 2019). In a review of recent literature, Howe et al. (2013) attempted to elucidate the linkages between climate change, ecosystem services, and poverty alleviation. The authors identified the need for further research to focus on how those pathways work to promote policy changes and ways to adapt to and mitigate climate change on the ground.

There is significant evidence climate change has already affected and is likely to drive even more biodiversity and ecosystem services loss (Turner et al. 2012;

Gosling 2013; Boone et al. 2018; van der Geest et al. 2019) over the coming decades. This disproportionately affects the poorest people and communities who rely on sustainable ecosystems for their livelihoods, health, climate regulation, shelter, security, and social relations. Worsening biophysical conditions such as ecosystem degradation, biodiversity loss, and less productive agricultural lands compromises people's ability to move out of poverty (Barbier and Hochard 2018; Hansen et al. 2019). Conversely, increased poverty is widely recognized as a key factor contributing to increased climate change vulnerability (Leichenko and Silva 2014).

While ecosystem services are essential to sustainable development and human well-being, they are also a key component in helping to adapt to changes in climate patterns, providing carbon sinks, and reducing disaster risk (MEA 2005; Munang et al. 2011; Temmerman et al. 2013; Lo 2016). According to the IPCC Special Report on Global Warming of 1.5 °C, there is high confidence that constraining global warming to 1.5 °C instead of 2 °C will result in many benefits for the preservation of ecosystem services to humans (Hoegh-Guldberg et al. 2018). With this in mind, the 14th UN Convention for Biological Diversity (CBD) in 2018 formally integrated climate change issues into national biodiversity strategies and vice versa, stating "that climate change is a major and growing driver of biodiversity loss, and that biodiversity and ecosystem functions and services, significantly contribute to climate change adaptation, mitigation and disaster risk reduction" (CBD 2018).

The role of ecosystem losses in the loss and damage to human well-being has also been a new emerging topic that needs further investigation (UNEP 2016). Since 2016, nature-based solutions (NbS) have received increasing levels of attention as sustainable solutions to meet societal challenges. A global standard for NbS is currently under public consultation, but two definitions are presented below. The IUCN defines NbS from the perspective of societal good as "actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits."

The EC definition of NbS focuses on an element of cost-effectiveness: "inspired and supported by nature, and which simultaneously provide environmental, social and economic benefits and help build resilience, with positive benefits in urban environments, landscapes and seascapes" (EC 2018). A further report released in May 2019 by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) on biodiversity and ecosystem services highlighted the importance of promoting nature protection and restoration and its critical contribution to the global economy and people's ability to withstand future climate-related, economic, social, and additional environmentally driven shocks that a changing world may bring (IPBES 2019). Healthy mangroves, as an example, and the restoration of mangrove habitats, in particular, have been identified as important resources to help coastal regions withstand climate-related hazards and promote carbon sequestration (McIvor et al. 2013; Murdiyarso et al. 2015) as well as support rich biodiversity and contribute to replenishing decreasing fish stocks (Hutchison et al. 2014; IUCN 2017).

While interest and investment in people-centered bottom-up approaches to address any one of those challenges have slowly increased, little attention has been paid to the potential those interventions have in helping people manage the triple crisis (Reid and Swiderska 2008).

This chapter provides an overview on the interconnections between climate-, nature-, and poverty-related challenges at the local level and in a coastal context and the role and benefits from taking an integrated pro-poor people-centered approach in addressing them.

Main findings are presented from a case study in coastal Kenya (Kwale County) where Plan International is working with local stakeholders. The limitations of the study and recommendations for similar interventions are also shared.

Context: Kenya and Kwale

The blue economy is a relatively new concept that promotes better management of the oceans and coastal resources and includes all economic activities related to oceans, seas, and coastal areas. As Kenyan national and local government departments are now recognizing the growth potential of the blue economy, it is important to understand how biodiversity and ecosystem service loss, climate change, and poverty intersect with this. According to the Kwale County Integrated Development Plan (Kwale County Government 2018), the blue economy demonstrates a potential for growth that could positively impact on peoples' income levels and contribute to climate change adaptation and mitigation outcomes in the coming years. This potential can only be achieved by investing in fisheries, improved regulations, ocean monitoring and surveillance, coastal protection, and improved waste management (Kwale County Government 2018), and it should be assessed through a people-centered approach that looks at the local challenges and linkages across the triple crisis.

As in most contexts, men and women, girls and boys, experience and respond to challenges differently – this includes natural resources, social structures, and physical environment. Women and girls relate to forests, rivers, and land differently than men (Kimani and Kombo 2010). Gender considerations are included in more recent Kenyan government policy (Republic of Kenya 2018), but the link between gender and climate change and, to a lesser extent, environmental considerations is still not well established despite an understanding the unequal impact climate change has on women and girls and their adaptation capacity. Likewise, child protection risks are starting to be understood in economic activities in Kwale – with the fishing sector and tourism being self-identified by children as being among the most harmful to them. The "sex-for-fish" phenomenon – which refers to the practice by which poor and vulnerable women and young women fish processors and traders are at risk of being coerced into sex in order to buy and/or sell fish products – has been widely reported over the past few years and remains an issue in Kwale County (Nyawade et al. 2019). This practice (alongside the sex trade) often affects underage boys and girls, some of whom are at risk of being victims of human trafficking (IOM 2018),

and has been identified as one of the harmful consequences of poverty and a lack of income-generating activities (UNICEF and the Government of Kenya 2006). There is also increased reporting of children being forced to drop out of school and co-opted into mangrove cutting, charcoal production, and agricultural activities for household and community income generation (Nyawade et al. 2019).

Fisheries research, management, and policy have traditionally focused on direct, formal, and paid fishing activities that are often dominated by men, ignoring roles performed by women that are indirect, informal, and/or unpaid (Harper et al. 2017). Indeed, the economic activities related to fisheries value chains are still very much determined by the traditional gender division of labor, power, and the patriarchal system of male dominance (Kizito et al. 2017). The gendered labor pattern concentrates production in hands of men with women at the periphery of postharvest processing and retailing. The role of women is largely marginalized to *fish mammies or mama karanga* in terms of resources and training (Nyawade et al. 2019). In Kenya, *mama karanga* is the name given to women who buy fish from fishermen, process the fish (usually through deep frying it), and sell it in their local communities or those nearby. Women report that they engage in this activity due to the lack of alternative income-earning options as the work does not require much education and skills, and although the barriers to entry are low, the profit margins are also very small (Matthews et al. 2012).

The case study for this chapter draws on Plan International's experience of working in Kwale County in Southeast Kenya. Situated along the southernmost Kenya coast and bordering Tanzania, Kwale County is divided into 4 constituencies and 20 county assembly wards. The total population of Kwale County was estimated at 820,199 (397,841 of which were males and 422,358 were females) in 2017 and is projected to rise to 909,929 in 2022. The County is one of the poorest, and youngest, in Kenya: as of 2013, 48% of the population of Kwale County was 0–14 years old, and the poverty rate was 71% (UNICEF 2013) – with high levels of unemployment or underemployment (30% of the total labor force between 15 and 64) (Kwale County Government 2018). In coastal communities, the population is exposed to rapid-onset weather-related events such as flash floods and slow-onset ones such as rising temperatures, recurrent droughts, rising sea levels, land and forest degradation, and loss of biodiversity. The economy in Kwale is highly sensitive to its climate, with water, agriculture, forestry, health, and tourism among the most affected sectors by weather and climate extremes (Ngaruiya et al. 2018).

Coastal communities suffer from high-income inequality, and fishing communities are highly impoverished. Artisanal fishers earn around $3–4/day and retain some of the fish catch to take home as food. Low economic returns have contributed to the emergence of destructive fishing practices to reef habitats and fishery resources (Global Coral Reef Monitoring Network 2017). Outside of the four marine parks (fully protected) and six marine reserves (partially protected), fishing has been difficult to regulate. Beach Management Units (BMUs), established under The National Kenyan Fisheries Act of 2007, were introduced in order to provide increased community participation in inshore marine management. This relatively new initiative still has a way to go and requires additional support in areas of

reporting, record-keeping, financial sustainability, resources, and cooperation (SmartFish 2011). The lack of resources and pursuit of short-term goals prevalent in most fishing communities means that harmful practices persist.

Kwale County has suffered from significant deforestation over the past few decades: since 2000, the county has witnessed the loss of 20% of tree cover. Local communities engage in tree cutting for a myriad of reasons: agricultural expansion, rapidly growing populations, charcoal production, overreliance on wood energy, and, to a lesser extent, mining – exacerbated by weak governance (Ministry of Forestry and Wildlife 2013). Deforestation contributes to soil erosion by water, wind, and activities associated with land-use change, increasing soil degradation, and water resource loss and exposes vulnerable populations to the more extreme climate and weather events. Likewise, mangrove forests have been subject to alarming levels of destruction in Kwale over the past few decades – generally for firewood and pole production despite their importance to the region's biodiversity. According to the 2017 National Mangrove Ecosystem Management Plan, the mangroves of Kwale County comprise Vanga-Funzi, Gazi Bay, and Ukunda areas covering an area of approximately 8354 ha, with 3725 ha (45% of the area) of mangroves requiring rehabilitation.

Mangrove destruction results in a decreasing amount of coastal wood, fish and prawn stocks, shoreline erosion, storm surges, and eventual reduction of seagrass and coral reefs, which could have a damaging effect on coastal livelihoods and tourism. Recent government initiatives are promoting reforestation activities, and carbon offsetting provides direct financial incentives for tree planting alongside the indirect benefits of greater forest and mangrove cover.

Kenya has been at the forefront of climate change strategy development and launched the National Climate Change Response Strategy (NCCRS) in 2010 and the National Climate Change Action Plan (NCCAP 2013–2017) in 2013 and submitted its intended nationally determined contributions (INDC) in 2016. Specifically, in Kwale County, historical records indicate a significant increase in average temperatures over the past 20 years, with the number of heat- and drought-stressed days expected to continue to increase under future climate projections. At the same time, extreme precipitation is expected to become more frequent (MoALF 2016).

Over the past couple of decades, the Kenyan government has developed a raft of policies and legislation addressing poverty, environment, and climate change. The 1999 Environmental Management and Coordination Act (EMCA) provided the foundation for Kenya's first framework environmental law – the National Environmental Policy – launched in 2013. The Poverty Environment Initiative (a joint UNDP-UNEP program launched in 2005 in nine countries, including Kenya) began to detail the poverty-environment nexus and suitability of using economic valuation of environmental and natural resources. Likewise, Kenya's National Environmental Policy in 2013 referenced poverty, climate change, and environment in its situational analysis – although it was yet to draw on the triple crisis as interconnected factors. In the past few years, national policies and frameworks have addressed specific components of Kenya's environmental policy, the 2005 Forests Act for preparation of management plans for all gazetted forests, the National

Climate Change Framework Policy of 2016, and the National Mangrove Ecosystem Management Plan of 2017, which provides a road map toward sustainable management of mangrove ecosystems in Kenya for enhanced livelihoods and climate regulation.

Conservation and Sustainable Management of Marine Ecosystems in Kwale County Project

In 2016, Plan International Kenya and Plan International UK developed the *Conservation and Sustainable Use of Marine Ecosystems in Kwale County* project – from now on referred to as the COSME project – as a response to a lack of viable income-generating activities, increasing environmental degradation, climate threats, and dwindling fishing returns along the southernmost coast of Kwale County. The project aimed to improve the lives – and livelihoods – of coastal communities, particularly women, through participatory and sustainable development (including the introduction of diversified responsible economic opportunities), promoting environmental conservation and management of environmental risks and increasing resilience to climate-related extremes. The project activities formally started in January 2017 and closed in May 2019, with the final evaluation finalized in June 2019. An ex-post-evaluation exercise was conducted in February–April 2020.

The COSME project mobilized groups in the Lunga Lunga and Msambweni constituencies and reached the community groups listed in Table 1.

Overall, the COSME project reached 4145 people (1440 directly and 2705 people indirectly).

In partnership with the Kenya Marine and Fisheries Research Institute (KMFRI), the project sought to introduce improved and environmentally sustainable fishing techniques and promote alternative and supplementary income-generating activities (seaweed farming being the most prominent and successful intervention) among communities heavily reliant on the fishing economy – and alleviate the pressures on the stressed fishing waters. The activities were informed by research into current and alternative livelihood practices, the viability of local fisheries, and child protection and gender dynamics in the local coastal economy.

Interventions also included awareness raising and education in local schools and communities aiming to increase knowledge and capacity around natural resource management and environmental protection – particularly focusing on the impacts of illegal forest cutting, mangrove destruction, and unsustainable fishing practices. As referenced previously, engaging in illegal practices and natural resource degradation are partially a result of negative coping mechanisms of community members and fishing groups when the returns from fishing are inadequate. With technical support from the Kenya Forestry Service (KFS), the project worked with schools and community-based organizations to promote tree and mangrove seedling production with the long-term goal of encouraging a rejuvenation of fish stocks, reestablishing natural defenses against flooding, and promoting soil and water resource management.

Table 1 Project communities and community group by main initiative

Group	Number of groups	Names
Responsible fishing	10	Gazi
		Chale Jeza
		Mgwani
		Mwandamo
		Nyumba Sita
		Bodo
		Mwazaro
		Kibuyuni
		Majoreni Aleni
		Mkuphani
Mangrove forest regeneration	4	Shangani-Amani self-help group
		Mwazaro Beach Management Unit
		Bodo Beach Management Unit
		Cheichakale self-help group
Seaweed farming	3	Shangani-Amani self-help group
		Tujuane seaweed farmers
		Imani seaweed farmers
Terrestrial tree planting	4	Mkanda Primary School group
		Lukore Primary School group
		Jirani charcoal producers
		Mkurumudzi

A People-Centered Approach to Address the Triple Crisis at Local Level

Figure 1 illustrates the integrated people-centered approach developed and used in the COSME project (2017–2019) to bring together actions that seek to address climate, nature, and poverty issues at the local level.

In the diagram, the main activities of the project and their contributions are listed at the center of the pie, under the domain of the main challenge they explicitly aim to tackle. The integrated nature of the project means that subsidiary results of the activities will contribute to addressing other challenges and was a key project goal. The diagram also identifies the components of the approach that promote community ownership and leadership, facilitated through engagement with self-managed community groups. Those components have been grouped under three categories, represented in the diagram using icons: (i) local environmental stewardship, (ii) women's inclusion and agency, (iii) pro-poor responsible value chain development. The emphasis placed on the role of local communities in catalyzing social, economic, and ecological transformation is central to the approach – promoting ownership of local natural capital and transparency in its management while valuing and strengthening traditional knowledge and ability to identify solutions. Local

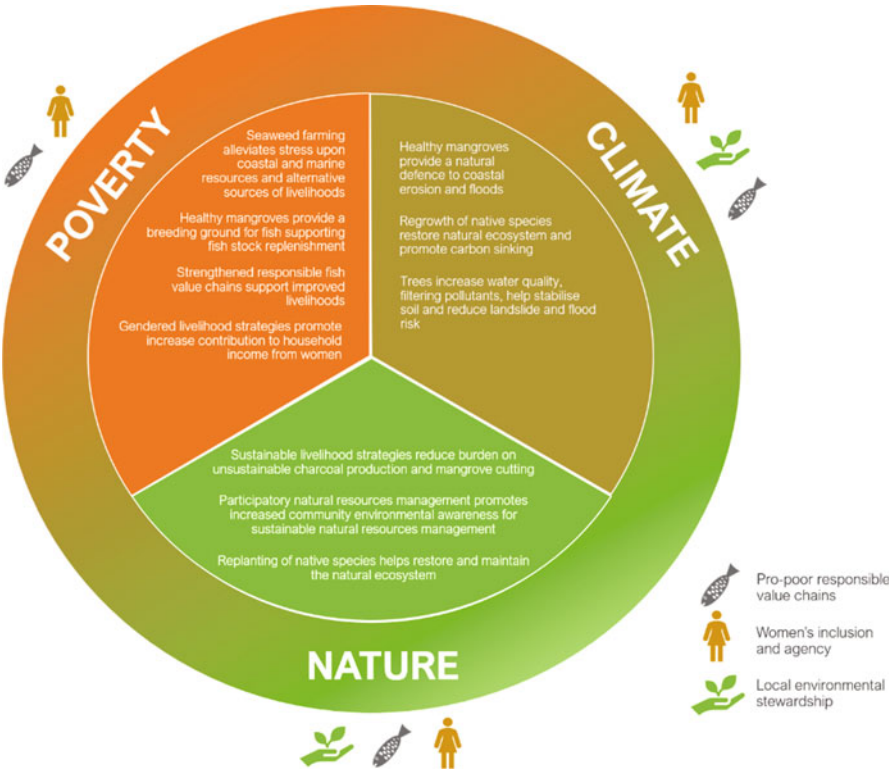

Fig. 1 People-centered approach to address the triple crisis in coastal Kwale County, Kenya. (Adapted from WWF-UK 2018)

communities are critical to the design and implementation of interventions due to their wealth of knowledge and experience in dealing with localized climate and ecological risks and their role as long-term stewards of natural resources. Local ownership is also central to ensuring long-term sustainability and scale-up of the project interventions.

Local Environmental Stewardship

Local environmental stewardship is defined as the sum of the actions taken by individuals, groups, or networks of actors, with various motivations and levels of capacity, to protect or responsibly use the environment in pursuit of environmental and/or social outcomes (Bennett et al. 2018).

Restoration of local natural capital, particularly in the form of mangrove ecosystems, which has been emphasized as one of the planet's most efficient carbon sequestration ecosystems, helps mitigate the risks of coastal erosion and coastal floods and promote breeding grounds for local fish species (Kumar 2019).

Over the years, illegal logging, charcoal production, encroachment of forested areas, overgrazing, and other human activities have all contributed to forest loss and degradation. Along the Kwale coast, mangrove forest has been degraded and overexploited primarily for timber and firewood from within and outside the communities. In Kwale County, most of the mangrove forest are currently found in the Shimoni-Vanga area where a number of successful community-based conservation initiatives have been established, notably the Mikoko Pamoja project in Gazi.

Led by coastal community mangrove groups and tree planting groups in the upstream communities, the COSME planting activities have returned increasing yields in terms of numbers of trees growing and their survival rate. Over the 2-year period, 127 people across 4 groups, of which 50% members are women, planted 137,000 seedlings of mangroves, with an additional 56,000 since the project formally closed. Additionally, 820 (women, girls, boys, and men – with a 50% female participation rate) have planted 7940 seedlings for reforestation of fruit-bearing trees, native forest species, and sustainable charcoal replacement trees. Although there has been some attrition rate with seedlings being lost at the project start due to poor management, the survival rate has subsequently grown and stabilized at 80% on average. In addition to this, one of the groups – a charcoal cooperative – involved in tree production and planting has decided to cease with charcoal production all together and is now focusing their income-generating activities on goat-rearing and beekeeping. The group is now hoping to work with the local government partners to identify and receive further training on additional alternative and sustainable income-generating activities.

Community groups have shown a high level of understanding of the relevance of the activities, the expected positive ecological and disaster risk reduction outcomes, and the beneficial effects resulting on their well-being and livelihoods. Since project closure, 80% of the groups continue to be active. Additionally, a number of mangrove groups have, independent of the project, started to engage in money-saving practices through village savings schemes to invest in project-related activities. Individuals contribute funds which have been used to secure formal registration of the savings group, which will allow the group to access additional funds and purchase products to continue and expand operations – including signs to identify the sites under rehabilitation, seedling inputs, record-keeping material, and a boat to reach the areas under rehabilitation. The engagement of fisherfolk through the community BMUs and mangrove groups has been critical to ensuring commitment from the wider community demonstrating the beneficial effects of a healthy mangrove forest for the local economy and livelihoods. These activities have been complemented with sensitization on the negative effects of illegal fishing practices, particularly the use of explosives, seine nets, and poison. Orientating fishing groups around destructive fishing practices that have a degrading effect on the ecological balance of the reef and the seafloor has been complemented by the promotion of responsible fishing techniques which contribute to long-term environmental benefits attached to a key economic activity.

Women's Inclusion and Agency

Gender consideration is particularly important in coastal communities as (i) the responsible management and use of marine and coastal resources can offer an important entry point and opportunity for women's economic and social empowerment, alongside strengthening resource governance and conservation, and (ii) gender-based violence (GBV) is a specific concern in the fisheries sector (Siles et al. 2019). FAO estimates that women directly engaged in some form of primary fishery production account for more than 15% of the people engaged in fisheries and aquaculture, with 90% of those engaged in processing activities. However, while women often play significant roles both in the fisheries value chain and in providing support to the organization – e.g., repairing fish nets, processing, and marketing fish – they often have limited decision-making power and tend to be absent from leadership positions (FAO 2016a). Additionally, failure to engage women in management efforts, coupled with women's prominent roles as environmental stewards, results in lost opportunities to improve conservation practices and sustainably manage natural resources upon which these communities' livelihoods depend. Integrating gendered considerations into conservation and development interventions increases the likelihood that they will achieve targeted outcomes of poverty alleviation and improved food security in coastal communities (Matthews et al. 2012).

Findings from the project highlighted high vulnerability of women and girls to GBV, particularly exacerbated by decreasing fishery resources – women and girls are at greater risk of GBV from fish sellers and traders in order to be able to sell or purchase fish (Siles et al. 2019). Women reported supplementing the household income through activities such as soap-making, animal husbandry, farming, and selling firewood.

Through analysis of the women's unique contribution to the local economy, their capacities, needs, and constraints placed upon them, the project has identified strategies to better involve women and uphold women's interests at varying stages of the intervention.

The project was largely successful in reaching women and girls through awareness-raising and education initiatives – where they have been prominently involved in promoting reforestation activities and in-school education. Further to this, women have been supported and have strongly engaged in seaweed farming and the monitoring, management, and promotion of environmental conservation activities. The project evaluation also found reports of improvement on issues related to children and girls' welfare at the local level, including a reduction in reported cases of child trafficking, a reduction in reported child pregnancy among fishing communities, a reduction in girls dropping out of school to engage in fish processing and marketing, a reduction of children (especially boys) dropping out of school to engage in local touristic activities, and a reduction of children supporting parents in boat and local furniture production and in mangrove harvesting.

Pro-poor Responsible Value Chain Development

Value chain development refers to extending or improving the productive operations of a value chain and generating social benefits – e.g., poverty reduction, income and employment generation, economic growth, environmental performance, and gender equity (UNIDO 2011). A value chain refers to the full range of activities that are required to bring a product, or a service, from conception through production, delivery to final consumers, and disposal after use. Pro-poor value chain initiatives often try to overcome entry barriers for poor producers to inputs and services, including technical capacity, and help them gain access to output markets.

As part of the project, research activities were conducted to investigate feasible alternative livelihood activity (a completely different occupation from the usual primary occupation practiced by the individual household), supplemental livelihood activities (a portfolio of activities that are added to and complement the usual primary occupation practiced by the individual household), and strategies and barriers that stop income diversification within coastal households. As part of the research, extensive consultations were held with key actors, including community members, KMFRI, and other relevant local government agencies. Researchers reported that discussions on alternative livelihoods are not straightforward with fishing groups, referencing that fisherfolk "will continue to fish till the last fish species is caught" (Nyawade et al. 2019). Identifying sustainable livelihood options in co-participation with the local communities, therefore, was one of the main objectives of the COSME project.

Findings from the research study reported a declining trend in fish productivity and diversity, and a low level of income diversification among coastal community households. That led to an increase in vulnerability to climate-related, idiosyncratic, and economic stresses. Willingness and readiness to diversify to supplemental and enhanced livelihoods, rather than alternative livelihoods, has been indicated as preferential by the interviewed households (Nyawade et al. 2019). As part of this exploration into income diversification, the COSME project explored opportunities to decrease gender inequalities within the household and community – to ensure that unequal power relations between men and women did not negatively impact diversification activities. Likewise, assessing, and adapting interventions that address the roles men, women, girls, and boys play in the value chain, contributes to increased household income that is increasingly more resilient to economic and climate risks.

Seaweed farming emerged as one of the preferred supplemental livelihoods. With that in mind, the Kenya Coastal Development Project (KCDP), a World Bank project that set up the Kibuyuni seaweed farmers association and individual seaweed farms in Kibuyuni, offered insights on the viability of the businesses and value chain market.

Historically, seaweed farming was considered "not [to be] a major livelihood and is mainly left for the women to perform," according to respondents from a male focus group discussion.

Seaweed farming is characterized by low barriers to entry and low risk for the poor while being particularly promising in its potential for scaling up across the

communities. Seaweed farming provided an opportunity for the women to exploit the blue economy and meaningfully contribute to household earnings. In the last year of implementation, however, the COSME project has seen an increase in popularity of seaweed farming among men. This will need to be closely monitored and managed to ensure that seaweed value chains do not start to reflect the gender disparity witnessed in fishing value chains.

The initial cost of investment is very small, with only a few tools needed – e.g., ropes, footwear, knives – and a growing cycle of roughly 45 days. On average seven cycles are expected per year with a productivity of 600 kg on average per cycle as reported by the interviewed group members. Since October 2018, the seaweed farmers have been selling to a single buyer for 25 KES/kg.

Among the communities, there is a supportive environment for seaweed farming and interest to expand their operations. One seaweed farming group was able to leverage public investment from the county government for the construction of a seaweed drying and processing facility, which is under planning. The end-line survey revealed that women participating in seaweed farming had increased their base of consumer and household assets. During focus group discussions, some women stated that they had used some of the additional seaweed income to purchase land and build permanent houses (a rare phenomenon before the COSME project in the local communities) and to pay school fees and medical expenses, and a number of female seaweed farmers have shown an interest in possibly expanding their farms.

Findings and Recommendations

The 2-year-long COSME project has shown encouraging results and demonstrated some positive outcomes that address poverty-, climate-, and nature-related issues. Experiential knowledge, monitoring reports, case studies, final qualitative evaluation, and a research exercise underpin the conclusions and recommendations for future initiatives and are shared here for consideration:

- While the ability – and appetite – to save income has sporadically been recorded in a number of community groups reached by the project activities, it has always been through independent actions and not formally facilitated by the project activities. Interviewed group members reported limited knowledge and increased desire to engage in community-level saving and loan schemes to reinvest capital to expand their businesses and increase their asset base. Financial literacy skills development and village savings and loan association (VSLA) schemes could offer a secure saving facility and access to loans to be reinvested into the family or group businesses, as well as to absorb any shocks the household may face.
- Seaweed farming has proved a viable and sustainable option, particularly successful in increasing economic and social empowerment of local women. Women have reported feeling proud to be able to contribute to the household needs and able to use the profits to purchase food for the family. Due to increased interest from men, it's critical to manage any potential conflict that might arise due to an

increased product offer as well as the competition with other coastal users for surface area needed to develop viable operations.

- A lack of a ready market to sell harvested seaweed and tree seedlings from the nurseries set up in the upstream communities proved challenging during the project. It's important to identify any existing and foreseeable constraints to sustainable income-generating opportunities to ensure uptake in the long term is achievable. A detailed and contextualized value chain analysis, including buyers, distribution, and consumption markets for seaweed, particularly exploring monopsony (a situation in the market where there is only one buyer for a given product who is able to determine prices and exert power over sellers) power that could affect market prices, is advised.
- A number of seaweed farms had to be moved to new coastal locations less exposed from the impacts of storm surges and heavy rains. A feasibility study and coastal mapping in the design phase of the project would help identify those locations at a lower risk of weather hazards.
- Gender inclusion in the value chain promotes women's empowerment and increases their contribution to household income. At the end of the COSME project, women reported investing their earning in paying for their children's school fees and health-related expenses and improving their quality of life (e.g., safe water access, house improvements) with clear outcomes for the wider household and community, including household-level risk diversification, children's well-being, and a shift to more sustainable livelihoods. Based on the importance of women's roles in the coastal economy, their inclusion in the sustainable development of value chains should be promoted through addressing gender issues, community dynamics, and cultural norms and systematically examine gender-based constraints that prevent them from accessing the same opportunities as men. An increase understanding of vulnerabilities, including those to climate-related shocks and stresses, should also be sought.
- GBV prevention training and sensitization at community level and for relevant local authorities may help address the risk of GBV in coastal communities and promote preventive action. Likewise, any technical or advocacy training should include a strong gender mainstreaming thread.
- Robust environmental monitoring and data collection activities – e.g., monitoring of restored areas of forest using geographical information systems, geocoordinates, and monitoring of fish catch species and amounts and fish sold – particularly involving women, should be encouraged to improve information transparency and decision-making at community and local level.
- Anecdotal evidence of more frequent occurrence of dry spells and shortening of the rainy season has been reported from within the communities and matches county-level historical records. Alternative and supplemental livelihood strategy diversification implemented through the COSME project has the power to enhance the ability to withstand climate and economic risks. To better understand their contribution to household-level climate resilience, initial analysis aimed to identify the drivers of household climate resilience should be conducted at the start of the initiative. Climate shocks and stresses that individuals, households,

communities, and larger systems are exposed to, and the severity and duration of these, should also be analyzed to enable a more robust measurement of household-level climate resilience.

- Worldwide, payments for environmental services (PES) have been identified as a viable income-generating option with major potential to promote sustainable ecosystem management and forest conservation (FAO 2016b). Learning from existing payment schemes for ecosystem services in Kwale – e.g., Mikoko Pamoja in Gazi – should be facilitated, and the possibility for increasing participating households' earnings through selling carbon credits should be explored with the potential of improving environmental outcomes, specifically through the increase in carbon stock trading.
- Local government engagement is particularly important to ensure that continued technical support and innovation are promoted to local groups and new approaches and learnings are informing policy, regulatory, and legal changes. Civil society and local government partners are working together to provide a much stronger, coherent approach to natural resource management and environmental stewardship and opportunities for learnings and best practice to be shared more widely.
- Waste management needs to be explicitly incorporated into environmental and conservation activities. Increasing levels of plastic waste is affecting mangroves and fisheries; therefore targeting beach clearing and education among upstream communities, as well as coastal communities, regarding waste disposal is strongly advised.

Limitations of the Study

While the project has yielded promising results in addressing the triple crisis at the local level, it's important to note that the limited duration in formal project activities meant only limited short-term outcomes were measured by the project closure. Additionally, the narrow geographical extent and scale of the project mean the initiative remains limited in scope. Likewise, the relatively small population sample the project reached, and the corresponding qualitative methods used in the research, means that any causality to positive change needs to be understood within these restrictions. While the team is confident in linking those positive results directly to project interventions, it does consider attribution with caution, and an ex-post-evaluation is in process to better understand the contributions of the initiatives to the recorded outcomes.

Conclusions

In recent years, the triple crisis concept has emerged in response to the acknowledgment that climate change, degradation of nature, and poverty are fundamentally interdependent of each other and among the biggest global challenges.

The proposed people-centered approach developed under the COSME project draws from previous publications and research and attempts to address the triple crisis at the local level. The study specifically looks at those components that promote community ownership and leadership in order to catalyze social, economic, and ecological transformation at the local level. The central role women play with regard to natural resource management and coastal economies has been recognized. Understanding gendered dynamics of environmentally minded interventions and strengthening their decision-making and leadership capabilities and providing them with the skills and knowledge to meaningfully participate in coastal economy value chains could have a multiplying co-benefit on future initiatives.

While the study has been limited due to the geographical scope and size of the project, encouraging results have been recorded in relation to the ability of the communities to respond to climate risks, promote environmental stewardship, and enhance their household economic empowerment.

Initial findings are discussed, and recommendations for similar initiatives have been shared. Furthermore, an ex-post-evaluation is currently in progress and expected to be completed in the first half of 2020 that will focus on the medium-term outcomes of the project through the triple crisis lens.

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