EMPOWERING COASTAL FUTURES: LESSONS FROM THE BLUE EMPOWERMENT PROJECT

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Preface

This knowledge product synthesizes the journey, insights, and innovations of the Blue Empowerment Project, implemented in Kenya's coastal counties of Kilifi and Kwale. By integrating climate smart aquaculture, gender transformative approaches, community finance, and policy engagement, the project sought to redefine how coastal livelihoods can be strengthened through inclusive blue economy pathways. As the project concludes, this book documents what worked, what was learned, and how the foundations we have built – particularly the Blue Empowerment Fund (BEF), can shape coastal resilience for years to come.

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About the project

The Blue Empowerment Project consortium, led by the African Centre for Technology Studies (ACTS), brings together premier institutions specializing in inclusive technology development, business development, climate resilience, and food and nutrition security, working collaboratively to enhance community wellbeing. The project is funded by the International Development Research Centre (IDRC).

Preferred Reference

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Executive summary

Between 2022 and 2026, the Blue Empowerment Project demonstrated that Kenya's coastal communities can strengthen resilience and advance gender equity through integrated approaches. Funded by the International Development Research Centre (IDRC), and implemented by the African Centre for Technology Studies (ACTS) in partnership with the Bahari Community-Based Organisation Network (BCBON), Kenya Industrial Research and Development Institute (KIRDI), Kenyatta University (KU), the Kenya Marine and Fisheries Research Institute (KMFRI), Seamoss Corporation and county governments of Kilifi and Kwale, the project combined climate-smart aquaculture, transformative gender programming, community finance, and participatory governance to address intersecting vulnerabilities facing coastal women.

The project established four women-led Savings and Credit Cooperative Societies (SACCOs) that mobilized over USD 22,000 in community savings while strengthening thirteen Beach Management Units (BMU) through constitutional reforms mandating gender inclusion. Women's representation in BMU leadership increased from 8% to 35%, while participants' household income rose by an average of 47%. The introduction of Integrated Multi-Trophic Aquaculture (IMTA) systems and improved seaweed farming techniques enhanced productivity by 30-40%, providing climate-adaptive livelihood options.

Most significantly, the Blue Empowerment Fund emerged as a sustainable financing mechanism owned and governed by communities, demonstrating that genuine transformation requires challenging power relations, building collective organization, and creating institutional infrastructure extending beyond project timelines. This knowledge product synthesizes lessons learned, providing evidence-based pathways for scaling integrated coastal development approaches that center community ownership, gender equity, and long-term sustainability.

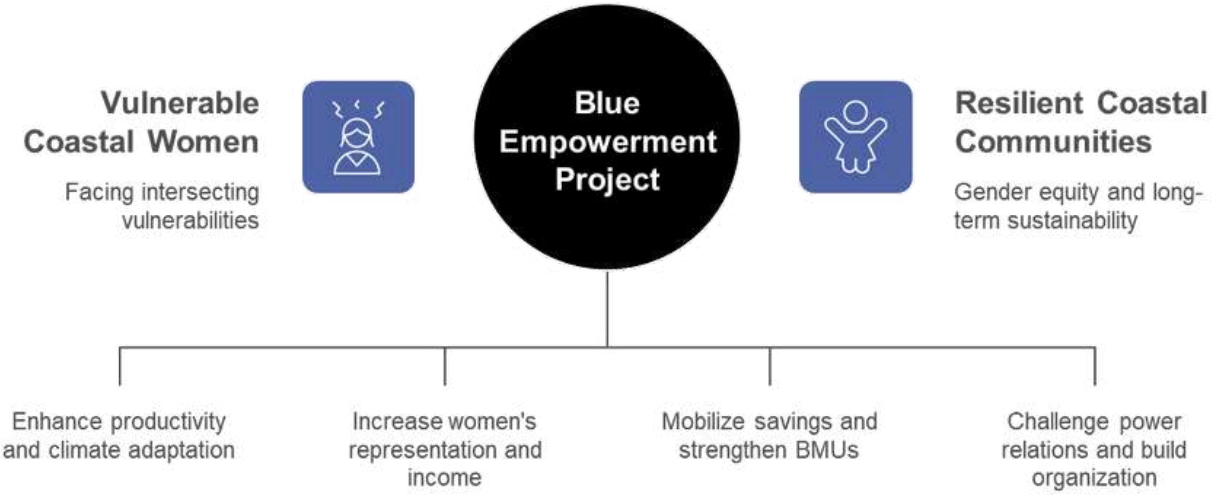

Figure 1: *Empowering Coastal Communities through Integrated Approaches: This illustration shows how the Blue Empowerment (BE) Project strengthens coastal livelihoods by combining climate-smart aquaculture, gender-transformative approaches, community finance, and inclusive governance.*

1. Chapter 1: Foundations of the Blue Empowerment Project

Authors: Joel Onyango, Linus K'Osambo

This chapter introduces the conceptual foundations and theory of change that guided the Blue Empowerment (BE) Project. It situates the initiative within Kenya's evolving blue economy policy agenda and the broader global shift toward inclusive, sustainable ocean governance. The chapter synthesizes evidence on coastal vulnerability, resource pressures, and governance fragmentation, highlighting why community-driven approaches are essential for resilience. It also draws on literature demonstrating the need for integrated, socio-ecological frameworks to address small-scale fisheries challenges. The BE Project's foundational assumptions - particularly the centrality of community institutions and gender inclusion - are grounded in established research on coastal development and governance.

1.1 Introduction

Along Kenya's Indian Ocean coastline, fishing communities in Kilifi and Kwale counties have sustained themselves for generations through intricate relationships with marine ecosystems. Yet the women who process fish, farm seaweed, and manage post-harvest activities - comprising nearly half the fisheries workforce, remain systematically excluded from decision-making structures and economic opportunities. This paradox mirrors a global pattern: while women constitute 47% of the world's fisheries workforce, their contributions remain largely invisible in formal governance systems, and they face persistent barriers to accessing credit, training, and leadership positions (Harper et al., 2020)

The Blue Empowerment (BE) Project emerged from recognition that Kenya's coastal development trajectory cannot be divorced from questions of equity, governance, and climate adaptation. Between 2022 and 2025, the project sought to demonstrate that sustainable blue economy pathways require more than technical interventions; they demand fundamental transformation of the structures that determine who participates, who benefits, and whose knowledge shapes coastal futures. As one BMU member from Kibokoni reflected during baseline consultations:

"We are always told about policies, but who writes these policies? Do they know what happens in our waters?" (ACTS, 2025a).

This opening chapter establishes the conceptual architecture and implementation foundations that guided the BE Project's integrated approach,

situating local innovations within global scholarship on small-scale fisheries, gender transformation, and climate-smart aquaculture

1.2 Context and Background

Recent systematic reviews of blue economy discourse reveal a troubling pattern: while environmental and economic dimensions dominate research agendas, critical social dimensions – particularly poverty alleviation, food security, and gender equality (SDGs 1, 2, and 5) - remain significantly underexplored (Gerou and Pantouvakis, 2025). This disciplinary blind spot has profound implications for coastal communities where livelihoods, cultural identity, and food security are inextricably linked to marine resources.

The case for centering gender equity extends beyond social justice imperatives. Evidence from diverse geographies demonstrates that women's participation in small-scale fisheries management generates positive outcomes across socio-cultural, environmental, and economic domains. More critically, women's exclusion from governance produces documented negative consequences for both human wellbeing and ecosystem health. As Issifu et al. (2023) argue, diversity, equity, and inclusion considerations are not peripheral to blue economy success – they are foundational to achieving sustainable outcomes.

The baseline survey conducted in Kilifi and Kwale documented systematic patterns of exclusion and vulnerability. Women's fisheries work concentrated in labor-intensive, low-value activities; BMUs operated with minimal women's representation in leadership; and access to financial services remained severely constrained, particularly for women. These structural barriers intersected with climate pressures that disproportionately affected women's nearshore resource dependencies (ACTS, 2022a).

Climate change impacts on small-scale fisheries extend beyond ecological disruption. Galappaththi et al. (2021) demonstrate that successful adaptation in marginalized Indigenous communities requires attention to how different groups experience and respond to climate stressors across scales. Their comparative analysis reveals that effective climate adaptation must address power asymmetries, support culturally appropriate responses, and strengthen community-level adaptive capacity through access to diverse assets. A fish trader from Mwazaro village articulated this lived experience:

"When the rains fail or come too heavy, we cannot dry our fish properly. The men go further out to sea, but we are stuck here with spoiled product and no money to buy from other sources" (Kimanga et al., 2025).

Such testimonies underscore how gender, climate vulnerability, and economic marginalization converge to constrain adaptive capacity.

The project's design responded to documented evidence that conventional fisheries interventions frequently fail to address the gender mechanisms underpinning vulnerability cycles in small-scale fisheries (Oloko et al., 2025). Rather than treating gender as a peripheral concern, the BE Project positioned transformative gender approaches as prerequisite conditions for achieving ecological and economic sustainability outcomes.

Initial consultations revealed that marine aquaculture - particularly seaweed farming and integrated multi-trophic aquaculture (IMTA) - offered underutilized potential for women's economic empowerment while addressing climate adaptation needs (Juma, 2022). However, realizing this potential required simultaneous investment in technical capacity, financial access, governance transformation, and norm change within households and communities.

Figure 2: *Achieving Gender Equity in the Blue Economy. This figure illustrates how addressing gender norms, access to resources, and inclusive governance structures enables women's meaningful participation across blue economy value chains*

1.3. Methods

1.3.1 Conceptual Framework for Transformation

The BE Project's theory of change integrated three mutually reinforcing strategic pillars, grounded in established scholarship on coastal development, gender transformation, and socio-technical transitions.

- **First,** community institutions as platforms for sustained change. Research on small-scale fisheries governance demonstrates that strengthening local institutions - particularly Beach Management Units and community finance mechanisms, creates sustainable anchors for collective action, resource stewardship, and financial inclusion (d'Armengol et al., 2018; Evans et al., 2011). The project recognized that technical innovations fail to achieve scale without institutional foundations capable of sustaining them beyond project timelines.

- **Second,** gender transformation as prerequisite rather than outcome. Global evidence reveals that addressing power imbalances within households and governance structures fundamentally expands women's agency and decision-making participation (Harper et al., 2020). The BE Project designed transformative gender programming not as ancillary activities but as core interventions that would precede and accompany all technical and economic initiatives.

- **Third,** climate-smart innovations as tangible entry points. Integrated multi-trophic aquaculture systems offer documented environmental and economic benefits through nutrient recycling, waste reduction, and production diversification (Buck et al., 2018). By combining fish culture with seaweed and other extractive species, IMTA demonstrates practical pathways for enhancing productivity while improving ecosystem health—particularly relevant in climate-vulnerable coastal settings where resource pressures continue intensifying.

These foundational assumptions positioned the project at the nexus of ecological sustainability, social equity, and economic viability—the three pillars increasingly recognized as non-negotiable for blue economy advancement (Martínez-Vázquez et al., 2021; Steven et al., 2019).

1.3.2 Multi-Actor Partnerships and Action Research Design

The project operated through a consortium model involving the African Centre for Technology Studies (ACTS), Kenya Marine and Fisheries Research Institute (KMFRI), county governments of Kilifi and Kwale, community-based organization – Bahari CBO Network - across six coastal sites, Kenyatta University, and Seamoss Corporation. This multi-stakeholder configuration enabled integration of technical expertise, policy influence, and grassroots mobilization while ensuring that interventions remained accountable to community priorities (ACTS, 2022b).

Methodologically, the project employed participatory action research principles that positioned community members as co-researchers rather than passive beneficiaries. As Onyango et al. (2022) articulate in their reflection on managing action research in the global south, effective coastal programming requires methodologies that center community knowledge, facilitate co-learning, and build local capacity for adaptive management.

This approach involved iterative cycles of planning, implementation, observation, and reflection – enabling course corrections as lessons emerged from practice.

1.4 Key Findings

1.4.1 Implementation foundations for building strategic infrastructure

The comprehensive baseline survey provided empirical grounding for all subsequent interventions. Beyond documenting livelihood patterns and institutional capacities, the assessment captured community members' own framings of challenges and opportunities. Women seaweed farmers in Kibuyuni identified three interconnected constraints:

"We need better drying racks, so our seaweed doesn't touch the ground, we need savings groups so we don't have to sell immediately at low prices, and we need our husbands to understand that this work is as important as fishing" (ACTS, 2022c, 2022a).

Such baseline insights revealed that technical solutions alone would prove insufficient. Effective interventions required simultaneous attention to infrastructure, financial access, and household power dynamics - an integrated understanding that shaped project design from inception.

Early-stage multi-criteria mapping workshops brought together diverse stakeholders—fishers, traders, county officials, researchers, and civil society representatives—to deliberate on priorities, risks, and opportunities (Fatuma et al., 2025). These facilitated dialogues generated shared understanding while surfacing divergent perspectives that conventional planning processes often obscure. The mapping process demonstrated institutional commitment to collaborative governance from project outset. Leading voices in the blue economy space participating in project consultations, emphasized the necessity of such inclusive processes:

"For too long, research has extracted knowledge from communities without building their capacity to use that knowledge. This project is different because we're learning together"(ACTS, 2023).

Critical groundwork included negotiating memoranda of understanding with county governments, securing aquaculture permits, establishing field offices in target communities, and recruiting field officers with deep local knowledge. These seemingly mundane administrative steps proved essential for building legitimacy and trust. Ninyoha Hamisi, environmental specialist and field officer with the project, reflected on this phase:

"Before introducing any technology or training, we had to spend time listening, attending community meetings, understanding local governance structures. This investment in relationship-building shaped everything that followed" (ACTS, 2024a).

Such foundational relationship work enabled the project to navigate complex local political dynamics while maintaining focus on equity-centered outcomes.

1.4.2 Integrated Interventions for Systemic Change

The project organized activities across four interconnected streams, each designed to reinforce others while maintaining distinct strategic objectives.

The project introduced integrated multi-trophic aquaculture combining fish culture with seaweed production, capitalizing on IMTA's documented capacity to enhance sustainability through waste conversion, nutrient cycling, and production diversification (Khanjani et al., 2022). Installation of demonstration IMTA cage systems at Kijiweni provided tangible evidence of technical feasibility while generating learning opportunities for surrounding communities (K'osambo et al., 2023). Complementary interventions included technical training on improved seaweed farming practices, support for crab fattening initiatives, and development of fishpond systems. Critically, these technical innovations targeted women as primary beneficiaries, deliberately disrupting gendered patterns where new technologies typically flow to men. As one seaweed farmer noted after receiving improved drying equipment:

"Before, buyers would reject our seaweed because of sand contamination. Now with raised racks, the quality is better and prices are higher" (Kimanga et al., 2025)

Transformative gender training engaged men, women, and youth in structured dialogues examining power relations, decision-making patterns, and resource control within households and communities (Achieng and Onyango, 2024). These sessions created spaces for reflection on taken-for-granted norms while modelling alternative possibilities for equitable relationships.

Parallel leadership development initiatives positioned women for governance roles within BMUs—historically male-dominated institutions. Young women capacity-building programs in aquaculture entrepreneurship opened pathways for younger generations to engage coastal livelihoods through climate-smart practices. Feminist leadership mentoring connected emerging women leaders with established role models who exemplified transformative leadership in coastal contexts (Komba et al., 2022).

Formation and registration of four women-led Savings and Credit Cooperative Societies (SACCOs) created institutional infrastructure for financial inclusion. Business model training using widely accepted templates as a methodology equipped SACCO members with entrepreneurial skills - as a framework to introduce the Blue Empowerment Fund (BEF), as sustainable financing mechanism beyond project duration (Maundu et al., 2023) .

Peer-to-peer learning exchanges enabled cross-site knowledge transfer, while market linkage facilitation connected producers with buyers. One SACCO chairperson described the transformation:

"Before, if I needed money for school fees, I had to borrow from loan sharks at 20% interest. Now our SACCO will loan at 5%, and the interest we earn stays within our community" (ACTS, 2025b).

The project maintained parallel commitments to rigorous documentation and strategic policy influence. Regular community feedback sessions, focus group discussions, and participatory monitoring ensured interventions remained responsive to evolving contexts. Simultaneously, county-level policy dialogues created platforms for institutionalizing gender-responsive approaches within fisheries governance frameworks (Kalele et al., 2025a, 2025b). Community-based media initiatives amplified local voices while building capacity for self-representation. As marine researcher and BE project field officer Meali Mohammed emphasized:

"When communities can tell their own stories, they shape how others understand their challenges and successes. This narrative power matters for sustaining change" (ACTS, 2024b).

1.5 Lessons Learned and implications for future work

While the project began with clear strategic objectives, implementation remained deliberately flexible. Early experiences revealed needs for intensified gender transformation work before introducing technical interventions, expanded SACCO capacity-building beyond initial plans, and strengthened policy engagement mechanisms to ensure county-level ownership (ACTS, 2025a).

These adaptations reflected commitment to evidence-based learning rather than rigid adherence to predetermined workplans.

As adaptation scholarship demonstrates, successful climate and development interventions require ongoing adjustment based on monitoring feedback and stakeholder input (Bossier et al., 2025). The BE Project's willingness to course-correct proved essential for achieving transformative outcomes.

From inception, the project designed interventions with sustainability horizons extending beyond implementation timelines. The Blue Empowerment Fund represents the most tangible legacy mechanism, but institutional strengthening of BMUs, SACCO capacity development, and policy engagement created multiple anchors for sustained impact.

County government partnerships ensured local ownership while policy dialogue processes embedded project learnings within governance frameworks. Technical training equipped community members with transferable skills, while feminist leadership development cultivated change agents positioned to catalyze continued transformation. Documentation through multiple media formats created knowledge resources for replication across contexts.

Figure 3: *Project Evolution from Initial Plans to Sustained Impact. This figure traces the Blue Empowerment Project's progression from initial planning and baseline assessments through integrated interventions and institutional strengthening, culminating in sustained community-owned impact*

1.6 Conclusion

The Blue Empowerment Project's foundations rested on several integrated recognitions.

- that coastal resilience requires more than technical solutions – it demands transformation of power relations, governance structures, and economic systems that have historically marginalized small-scale fishers, particularly women.
- that climate adaptation and gender equity are inseparable objectives; climate-smart innovations cannot achieve sustainability without addressing structural inequities that constrain adaptive capacity.
- that community institutions - when strengthened through inclusive finance, participatory governance, and capacity building - provide sustainable platforms for long-term change beyond project cycles.

These foundational principles positioned the BE Project within evolving global discourse on inclusive blue economies while remaining grounded in locally-articulated priorities. The chapters that follow explore how these conceptual and strategic foundations translated into concrete activities, measurable outcomes, and lessons for coastal development practice. They document successes and challenges encountered along the pathway from baseline realities to transformative impacts, demonstrating that equitable blue economy development becomes possible when communities are positioned as agents of change, when gender equity is treated as essential rather than peripheral, and when short-term interventions deliberately catalyze long-term institutional transformation.

As Dr. Catherine Kilelu, project socio-technical pathways research lead, reflected:

"The Blue Empowerment Project was never just about fish cages or seaweed farms. It was about demonstrating that different futures are possible - futures where coastal women lead, where communities govern their resources, and where climate adaptation strengthens rather than undermines equity. That vision required building foundations strong enough to outlast the project itself" (ACTS, 2025c).

References

- Achieng, G.F., Onyango, J., 2024. Transformative gender training for sustainable development (Info Note). Nairobi, Kenya.
- ACTS, 2025a. About the Blue Empowerment Project. ACTS, Kenya.
- ACTS, 2025b. Women-Led SACCOs Training Highlights. African Centre for Technology Studies (ACTS), Kenya.
- ACTS, 2025c. Dr. Catherine Kilelu on Policy and Governance. African Centre for Technology Studies (ACTS), Kenya.
- ACTS, 2024a. Environmental Specialist Ninyoha Hamisi speaks about Community-based media in the Blue Economy. African Centre for Technology Studies (ACTS), Kenya.
- ACTS, 2024b. Marine Researcher, Meali Mohammed highlights the importance of storytelling in the Blue Economy. African Centre for Technology Studies (ACTS), Kenya.
- ACTS, 2023. BE Project Team speaks with Dr. Jacqueline Uku – Senior Research Scientist, KMFRI. African Centre for Technology Studies (ACTS), Kenya.
- ACTS, 2022a. Baseline survey report: Gender analysis of the fish & aquaculture sector in Kwale & Kilifi. Nairobi.
- ACTS, 2022b. BE Consortium on the Project. African Centre for Technology Studies (ACTS), Kenya.
- ACTS, 2022c. BE Community Seaweed Processing. African Centre for Technology Studies (ACTS), Kenya.
- Bossier, S., Ota, Y., Pozas-Franco, A.L., Cisneros-Montemayor, A.M., 2025. How much time and who will do it? Organizing the toolbox of climate adaptations for small-scale fisheries. Front Mar Sci 12. https://doi.org/10.3389/fmars.2025.1521526
- Buck, B.H., Troell, M.F., Krause, G., Angel, D.L., Grote, B., Chopin, T., 2018. State of the Art and Challenges for Offshore Integrated Multi-Trophic Aquaculture (IMTA). Front Mar Sci 5. https://doi.org/10.3389/fmars.2018.00165

- d'Armengol, L., Prieto Castillo, M., Ruiz-Mallén, I., Corbera, E., 2018. A systematic review of co-managed small-scale fisheries: Social diversity and adaptive management improve outcomes. Global Environmental Change 52, 212–225. https://doi.org/10.1016/j.gloenvcha.2018.07.009

- Evans, L., Cherrett, N., Pemsl, D., 2011. Assessing the impact of fisheries co-management interventions in developing countries: A meta-analysis. J Environ Manage 92, 1938–1949. https://doi.org/10.1016/j.jenvman.2011.03.010

- Fatuma, L., Otieno, C., Onyango, J., Kalele, D.N., Kilelu, C., 2025. Multi-Criteria Mapping Workshop Proceedings. Nairobi.

- Galappaththi, E.K., Ford, J.D., Bennett, E.M., Berkes, F., 2021. Adapting to climate change in small-scale fisheries: Insights from indigenous communities in the global north and south. Environ Sci Policy 116, 160–170. https://doi.org/10.1016/j.envsci.2020.11.009

- Gerou, A., Pantouvakis, A., 2025. The transition to a sustainable blue economy explored through frameworks and SDG alignment. Discover Sustainability 6, 1039. https://doi.org/10.1007/s43621-025-01953-9

- Harper, S., Adshade, M., Lam, V.W.Y., Pauly, D., Sumaila, U.R., 2020. Valuing invisible catches: Estimating the global contribution by women to small-scale marine capture fisheries production. PLoS One 15, e0228912. https://doi.org/10.1371/journal.pone.0228912

- Issifu, I., Dahmouni, I., Deffor, E.W., Sumaila, U.R., 2023. Diversity, equity, and inclusion in the Blue Economy: Why they matter and how do we achieve them? Front Polit Sci 4. https://doi.org/10.3389/fpos.2022.1067481

- Juma, S., 2022. Unpacking the potential of marine aquaculture: Blue Empowerment [WWW Document]. Blue Empowerment Project Blog Series. URL https://blueeconomy.acts-net.org/blog/unpacking-the-potential-of-marine-aquaculture-blue-empowerment (accessed 11.19.25).

- Kalele, D.N., Ouma, N., Kimanga, F., Kopa, A., Odary, K., 2025a. Institutionalizing and catalyzing gender responsive policies, and strengthening collaboration and coordination in Kenya's fisheries and aquaculture sector: Kilifi County multistakeholder policy dialogue report. Nairobi, Kenya.

- Kalele, D.N., Ouma, N., Kimanga, F., Kopa, A.B., Ninyoha, M., Odary, K., 2025b. Institutionalizing and catalyzing gender-responsive policies, and strengthening collaboration and coordination in Kenya's fisheries and aquaculture sector: Kwale County multistakeholder policy dialogue report. Nairobi, Kenya.

- Khanjani, M.H., Zahedi, S., Mohammadi, A., 2022. Integrated multitrophic aquaculture (IMTA) as an environmentally friendly system for sustainable aquaculture: functionality, species, and application of biofloc technology (BFT). Environmental Science and Pollution Research 29, 67513–67531. https://doi.org/10.1007/s11356-022-22371-8

- Kimanga, F., Ladan, L., Mirera, D., Maundu, A., Moyoni, H., Bironga, C., Onyango, J., 2025. Gendered Value Chain Opportunities and Challenges in Seaweed Aquaculture: The Changing Gender and Socio-Economic Dynamics in Mwazaro and Kibuyuni Villages, South Coast Kenya. International Journal of Research and Innovation in Social Science IX, 3456–3473. https://doi.org/10.47772/IJRISS.2025.90400251

- Komba, E., Odary, K.., Oduor, A., 2022. Feminist leadership: How Mama Fatuma is transforming the fortunes of women in a Kenyan coastal village. [WWW Document]. Blue Empowerment Project Blog Series. URL https://blueeconomy.acts-net.org/blog/feminist-leadership-how-mama-fatuma-is-transforming-the-fortunes-of-women-in-a-kenyan-coastal-village (accessed 11.19.25).

- K'osambo, L.M.D.O., Obondo, J., Kopa, A., 2023. Setting up of the IMTA cage at Kijiweni: Cage assembly at Changai and setting at Kijiweni in Kwale County (Info Brief No. 004/2023). Nairobi.

- Martínez-Vázquez, R.M., Milán-García, J., de Pablo Valenciano, J., 2021. Challenges of the Blue Economy: evidence and research trends. Environ Sci Eur 33, 61. https://doi.org/10.1186/s12302-021-00502-1

- Maundu, A.M., Obondo, J., Nazi, B., Mohamed, O., Kondo, M.M., Oduor, A., Makayoto, F., Onyango, J., 2023. Business Canvas Model: Inclusive business training models for coastal fisher women in Kwale and Kilifi County (Info Brief No. 003/2023). Nairobi.

- Oloko, A., Dahmouni, I., Le Billon, P., Teh, L., Cheung, W., Sánchez-Jiménez, A., Issifu, I., Sumaila, U.R., 2025. Gender dynamics, climate change threats and illegal, unreported, and unregulated fishing. Discover Sustainability 6, 494. https://doi.org/10.1007/s43621-025-01227-4

- Onyango, J., Oduor, A.,, Mwanzi, L., 2022. Managing action research in the global south [WWW Document]. Blue Empowerment Project Blog Series. URL https://blueeconomy.acts-net.org/blog/managing-action-research-in-the-global-south (accessed 11.19.25).

- Steven, A.D.L., Vanderklift, M.A., Bohler-Muller, N., 2019. A new narrative for the Blue Economy and Blue Carbon. Journal of the Indian Ocean Region 15, 123–128. https://doi.org/10.1080/19480881.2019.1625215

2. Chapter 2: Coastal Livelihoods, Gender Dynamics, and Climate Realities

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Chapter 2 analyses socio-economic baseline findings, gender norms, and climate-related risks affecting coastal households in Kilifi and Kwale. The narrative incorporates global and regional scholarship that illustrates gender inequities in fisheries and the climate vulnerabilities shaping livelihood decisions. It synthesises how intersecting structural factors - including limited access to finance, gendered labour divisions, and climate hazards, affect participation in marine-based livelihoods. These insights provide the basis for the project's gender-transformative and climate-responsive design.

2.1 Introduction

The fishing village of Kibuyuni in Kwale County appears tranquil at dawn, with traditional dhows silhouetted against the horizon and women beginning their day's work mending nets, preparing fish for market, or heading to seaweed farms at low tide. Yet beneath this seeming calm lies a complex web of gendered power relations, climate-driven uncertainties, and economic vulnerabilities that shape daily life and constrain adaptive capacity. Understanding these intersecting realities proved essential for the Blue Empowerment Project's design and implementation, as no intervention—however technically sophisticated—could succeed without addressing the structural conditions determining who participates, who benefits, and whose needs receive priority.

This chapter synthesizes baseline findings on livelihood strategies, gender dynamics, and climate vulnerabilities affecting coastal households in Kilifi and Kwale counties. Drawing on comprehensive survey data collected at project inception, complemented by longitudinal observations and community narratives, it reveals how intersecting structural factors—limited access to finance, gendered labor divisions, climate hazards, and governance exclusion—compound to constrain resilience among coastal communities.

These empirically grounded insights provided the foundation for the project's gender-transformative and climate-responsive programming, while illustrating broader patterns documented across small-scale fisheries globally.

2.2 Context and Background

Gender inequality pervades small-scale fisheries worldwide, with women constituting nearly half the workforce yet experiencing systematic exclusion from decision-making, resource access, and formal recognition (Harper et al., 2020). Recent systematic reviews document that women's participation in small-scale fisheries management remains critically low, with over 80% of documented cases showing no or limited women's involvement (Chambon et al., 2024). More significantly, this exclusion generates documented negative consequences: management decisions made without women's input frequently undermine their livelihoods while reinforcing structural inequalities (Lawless et al., 2021).

In coastal Kenya, the Blue Empowerment project baseline assessments revealed patterns consistent with global evidence. Women dominated post-harvest activities - fish processing, trading, seaweed farming - yet Beach Management Units (BMUs) operated with minimal women's representation in leadership positions. When asked about participation in BMU meetings, one woman trader explained:

"We are invited to meetings, but when we speak, they say we don't understand fishing. But who processes the fish? Who knows the markets? They make rules without hearing what we need" (ACTS, 2022).

This exclusion stems from both formal barriers and informal social norms. As documented in African small-scale fisheries, even when state agencies engage with community fishing organizations, they frequently fail to invite women to critical meetings, depriving them of access to information, training, and decision-making opportunities (March and Failler, 2022). The Kilifi and Kwale baseline revealed similar dynamics: women's work remained invisible in official statistics, their contributions undervalued in household decision-making, and their priorities marginalized in resource governance (ACTS, 2022).

Global fisheries policy increasingly acknowledges gender equality, yet implementation lags far behind rhetoric. Analysis of fisheries policy instruments reveals that gender equality is pursued predominantly for instrumental reasons—improved environmental outcomes—rather than for intrinsic value as a matter of fairness and human rights (Lawless et al., 2021). Over two-thirds of gender strategies focus on organizational human resourcing rather than direct action within communities or for people dependent on fisheries. This instrumentalization reflects foundational differences between fisheries and development sectors: fisheries practitioners view gender equality as means to achieve fisheries objectives, while development practitioners treat it as core value (Mangubhai et al., 2022).

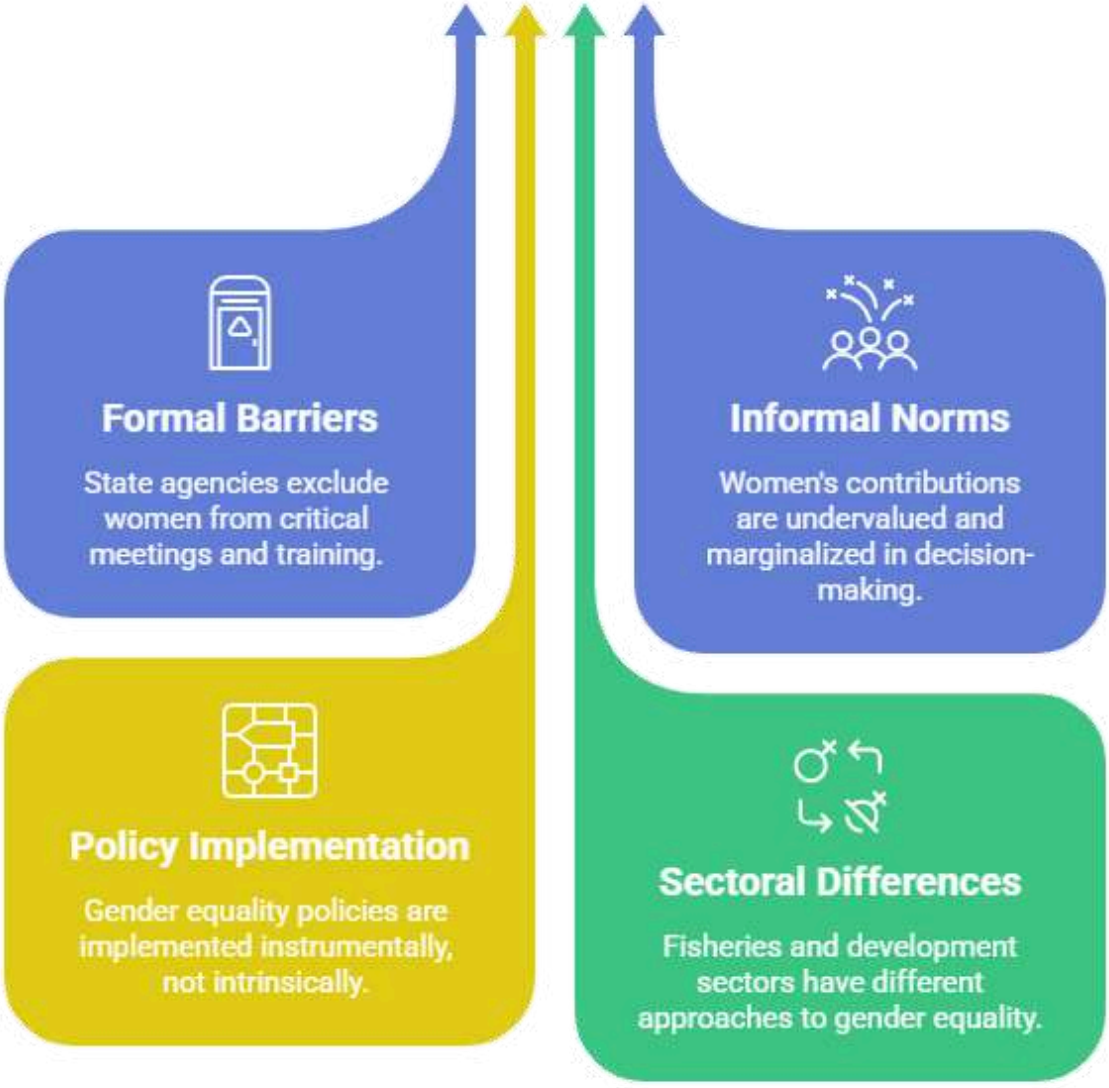

Figure 4: *Pathways to Fisheries Gender Equality – highlighting formal and informal barriers, undervaluation of women's contributions, and the gap between policy rhetoric and community-level implementation.*

The BE Project deliberately positioned gender transformation as both intrinsically valuable and instrumentally necessary. Kenneth Odary BE project Gender Specialist emphasized:

"Gender equality isn't just about counting women in meetings. It's about changing power relations that determine who controls resources, who makes decisions, and whose knowledge matters. Without that transformation, technical interventions simply reproduce existing inequalities" (ACTS, 2025) .

2.3 Implementation

The baseline survey employed mixed methods combining household surveys (n=365), focus group discussions, key informant interviews, and participatory mapping exercises across target sites in both counties (ACTS, 2022). The assessment framework integrated gender analysis with climate vulnerability assessment, recognizing that gender relations fundamentally shape exposure, sensitivity, and adaptive capacity to climate stressors.

Data collection protocols prioritized women's voices while examining how gender intersects with other identity markers—age, wealth, ethnicity, household structure—to produce differential vulnerabilities. Enumerators received training on feminist research ethics, ensuring that data collection processes themselves did not reinforce extractive relationships or put women at risk. As one field officer reflected:

"In some households, husbands initially refused to let us interview their wives alone. We had to explain repeatedly that we needed to understand women's specific experiences to design appropriate support. Even the baseline process required negotiating gender relations" (Meali et al., 2025).

2.4 Key Findings

2.4.1 Precarious livelihood portfolios and economic stratification

Baseline data revealed highly diversified yet precarious livelihood portfolios. Households engaged in multiple income-generating activities simultaneously - fishing, seaweed farming, fish trading, agriculture, casual labor - reflecting both resourcefulness and economic insecurity. Women's work centered on activities compatible with domestic responsibilities: processing fish near home, farming seaweed during low tides, trading at local markets.

Importantly, women's fisheries contributions remained systematically undervalued. While women constituted approximately 60% of post-harvest workers in target communities, their earnings averaged 40% less than men's for comparable time investments. This wage gap reflected gendered market access patterns: women traders had less access to social and economic resources, profitable markets, and high-value fish species, resulting in lower income (Kimanga et al., 2025). A fish trader from Shimoni explained:

"Men go to Mombasa to sell high-value species—tuna, lobster, grouper. We sell dagaa [small fish] and octopus here in the village. When we try to travel to better markets, people say we are neglecting our families. So we accept lower prices" (Komba et al., 2022a).

This constraint illustrates how social norms governing women's mobility directly limit economic opportunities—a pattern documented across African small-scale fisheries (Adjei et al., 2023).

2.4.2 Resource Access constraints and Asset Poverty

The project documented severe constraints on productive asset ownership. Few women owned fishing gear, processing equipment, or boats. Those engaged in seaweed farming typically lacked proper drying infrastructure, leading to quality degradation and price penalties. Access to credit remained profoundly gendered: women reported systematic exclusion from formal lending institutions due to lack of collateral, inability to meet documentation requirements, and discriminatory assumptions about creditworthiness.

The implications extended beyond individual economic outcomes. Asset poverty constrained households' climate adaptation capacity, limiting ability to invest in resilient technologies, diversify income sources, or weather economic shocks. Research on climate vulnerability in Western Indian Ocean coastal communities demonstrates that social adaptive capacity—determined largely by livelihood diversity, material assets, and social capital—fundamentally shapes communities' ability to respond to climate-induced fisheries disruptions (Cinner et al., 2012). Women in Kibokoni articulated this constraint directly during focus groups:

"When heavy storms and floods damage our seaweed farms, we have no savings to restart. We must borrow at high interest or wait for buyers to give us ropes on credit. This keeps us trapped in debt" (ACTS, 2022).

These testimonies underscore how gender-based asset poverty and climate vulnerability intersect to produce debt cycles that further constrain agency.

2.4.3 Inherent Decision-Making Power and Household Dynamics

The project revealed complex intra-household power dynamics governing resource allocation and strategic decisions. Women's decision-making authority varied according to factors including financial contributions, gender role attitudes, and the nature of work performed. Significantly, research from Ghanaian small-scale fisheries demonstrates that women's participation in physically demanding "male-typed" fishing tasks dampens the positive relationship between their financial contributions and decision-making power—suggesting that violating gender norms incurs social penalties (Adjei et al., 2023)

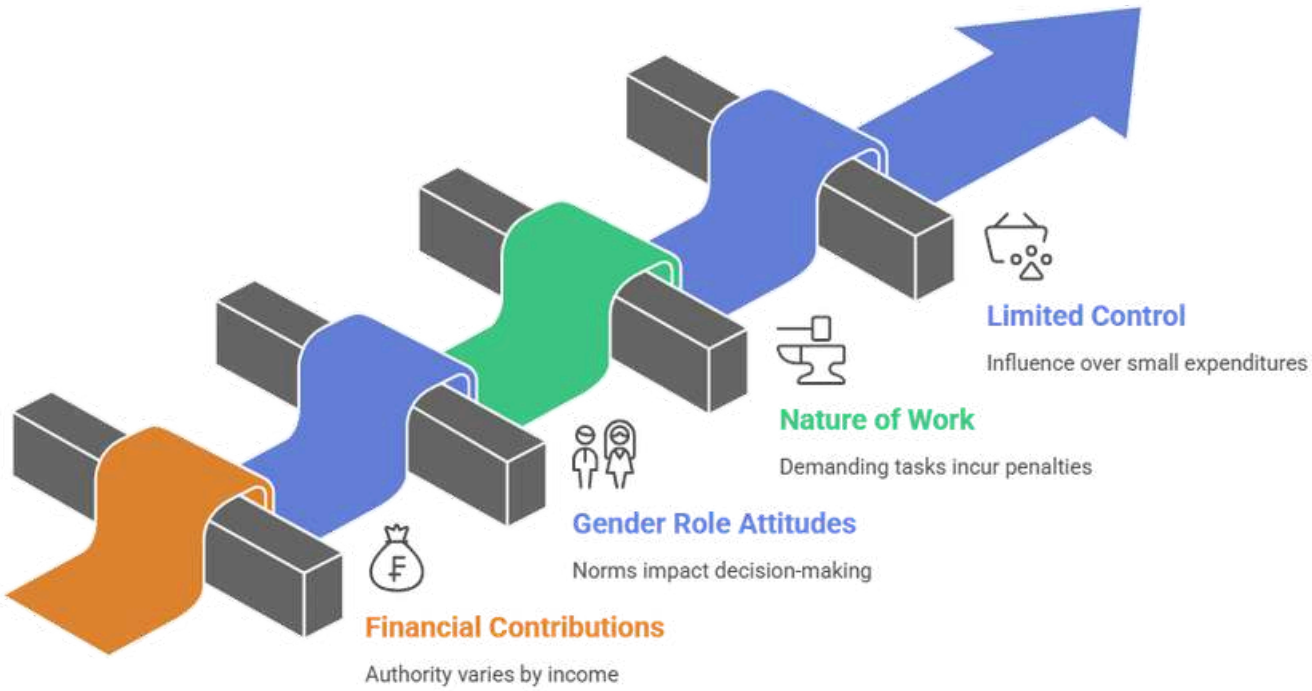

Figure 5: *Household Power Dynamics and Women's Decision-Making – illustrating how financial contributions, gender norms, and type of work shape women's influence over household resource allocation, highlighting constraints on major decisions despite economic participation.*

Similar dynamics emerged in Kilifi and Kwale. Women who contributed substantially to household income through fish trading or seaweed farming sometimes gained influence over small expenditures—food purchases, children's school supplies—but rarely controlled major household decisions around land use, capital investments, or children's education beyond primary level. As one seaweed farmer explained:

"I earn money from seaweed, but my husband decides how we use it. If I protest, he says I am disrespecting him" (Kimanga et al., 2025).

These patterns reflect deeply entrenched gender ideologies linking masculinity to breadwinning and household authority. Transforming such relations requires more than economic interventions; it demands explicit engagement with norms, beliefs, and power structures governing gender relations.

2.4.4 Differentiated vulnerabilities from climate change impacts

Community members across both counties reported observable climate changes over recent decades: declining and increasingly erratic rainfall, rising temperatures, intensifying storms, and shifts in marine conditions affecting fish availability. Meteorological data corroborated these perceptions, confirming significant declines in rainfall and increased temperatures since the 1980s (Ochieng et al., 2023). These climate pressures generated cascading livelihood impacts: crop failures reducing food security and cash income, reduced fish catches forcing longer fishing trips, storm damage to fishing gear and processing infrastructure, and saltwater intrusion affecting coastal agriculture. Critically, climate impacts intersected with gender relations to produce differentiated vulnerabilities.

Women's concentration in nearshore activities—seaweed farming, shellfish collection, beach seine fishing—exposed them disproportionately to coastal erosion, storm surges, and intertidal zone disruptions. Their limited mobility constrained adaptive strategies available to men, who could fish in deeper waters or migrate temporarily for work. As Komba et al. (2022b) documented in their analysis of women's economic fortunes through seaweed farming:

"When extreme weather damages seaweed crops, women have fewer fallback options. Men can switch to different fishing grounds or gear types, but women are constrained by domestic responsibilities and social norms limiting their mobility."

Research from across African coastal communities demonstrates that climate change compounds existing gender inequalities, with women experiencing greater livelihood disruptions, reduced adaptive capacity, and intensified time poverty as they manage multiple roles under stress (Oduor & Makayoto, 2022a, 2022b). The COVID-19 pandemic provided a recent illustration: pandemic-related movement restrictions and market disruptions disproportionately affected women fish processors and traders, who lacked savings buffers and alternative income sources (Komba, 2022).

2.4.5 Institutional Exclusion and Governance Gaps

Perhaps most significantly, the project revealed systematic exclusion of women from formal governance structures. Beach Management Units – the primary institutions for local fisheries co-management – operated with overwhelmingly male leadership. Of 12 target BMUs, only two had women serving in executive positions at baseline. Women's attendance at general meetings remained low, constrained by meeting times coinciding with domestic responsibilities, social norms discouraging women's public speaking, and meeting dynamics that marginalized women's contributions when they did attend.

This exclusion mattered profoundly for outcomes. As comparative research across 29 Western Indian Ocean sites demonstrates, governance regimes significantly influence vulnerability to climate impacts on fisheries (Cinner et al., 2012). Community-based management can enhance resilience, but only when governance processes meaningfully include diverse community members – particularly those most dependent on marine resources yet systematically excluded from formal decision-making. When asked about BMU participation, women consistently cited time conflicts, lack of childcare, discomfort speaking in male-dominated spaces, and perceptions that their concerns would not be taken seriously. As one woman explained:

"BMU meetings happen in the evening when I must prepare dinner and care for children. Even if I attend, the men ignore what we say. They already decided everything before the meeting" (ACTS, 2022).

Dimension	Key Findings
Beach Management Units (BMUs) leadership composition (baseline)	Of the 12 target Beach Management Units (BMUs), only 2 had women serving in executive positions, while 10 were led exclusively by men.
Women's participation in BMU meetings	Women's attendance at general BMU meetings was consistently low across sites.
Primary barriers to participation	• Meeting times conflicted with domestic and care responsibilities • Lack of childcare support • Discomfort speaking in male-dominated spaces • Perceptions that women's concerns would not be taken seriously
Governance implications	The exclusion of women from formal governance structures limited the inclusiveness and responsiveness of BMU decision-making processes.
Implications for resilience and climate vulnerability	Exclusion from governance weakened the effectiveness of community-based fisheries management and increased vulnerability to climate impacts, consistent with evidence from the Western Indian Ocean region (Cinner et al., 2012).

Table 1: *Institutional Exclusion of Women in BMU Governance. Summarizes the extent and drivers of women's exclusion from Beach Management Unit (BMU) leadership and decision-making processes, including gendered participation barriers and the implications for inclusive fisheries governance and climate resilience.*

2.5 Case Narratives

2.5.1 Navigating Multiple Constraints: The Mama Halima Story

Halima Kadzo (not her real name), a seaweed farmer from Kibuyuni, exemplified the complex challenges facing coastal women. A widow supporting five children, Halima engaged in seaweed farming, fish trading, and small-scale agriculture. Despite working from dawn to late evening, her earnings barely met basic household needs. She lacked capital to expand operations, had no savings buffer for emergencies, and faced multiple climate-related disruptions annually.

"During the baseline survey, Halima told us: 'I work harder than most men, but I remain poor. When I harvest seaweed, the buyers pay what they want because I need cash immediately for food. I have no storage, no way to wait for better prices. If my children get sick or schools require fees, I borrow from neighbors at high interest. I know I should save, but there is nothing left to save'" (Komba et al., 2022c).

Halima's situation illustrated how multiple vulnerabilities – gender-based economic marginalization, asset poverty, climate exposure, and lack of financial inclusion - intersected to constrain adaptive capacity. Yet the baseline also revealed Halima's remarkable agency and knowledge. She experimented with improved seaweed varieties, mentored younger women in farming techniques, and advocated for women's inclusion in BMU decision-making. The BE Project recognized that supporting women like Halima required addressing structural constraints while leveraging their existing capabilities and social networks.

2.5.2 Climate Shocks of the 2022 drought

The 2022 drought that affected much of East Africa provided a real-time illustration of climate vulnerability's gendered dimensions. In Kwale County, prolonged rainfall failure devastated both agriculture and marine-dependent livelihoods. Women faced compounded pressures: crop failures eliminated food supplies and income; reduced river flow affected nearshore fisheries productivity; and intensified economic stress elevated household tensions and gender-based violence. As documented during project monitoring:

"Women reported spending significantly more time searching for water, leaving less time for income-generating activities. Food insecurity increased. Some women resorted to distress selling of productive assets—selling processing equipment or seaweed farming materials—to buy food. This coping strategy, while necessary for immediate survival, further undermined future livelihood capacity" (Oduor & Makayoto, 2022b).

The drought also revealed inadequate institutional support. Emergency response programs largely overlooked marine-dependent communities, focusing on agricultural areas. Women lacked formal employment status that would qualify them for social protection programs. Their invisibility in official statistics translated directly into exclusion from drought relief efforts.

2.5.3 When management ignores gender, conflict

During baseline consultations in Kilifi, a conflict emerged illustrating governance exclusion consequences. The local BMU imposed new regulations restricting beach seine net use – a fishing method employed predominantly by women and landless men targeting small pelagic species in nearshore areas. The regulations aimed to reduce juvenile fish capture, a legitimate conservation concern supported by scientific evidence. However, the rule-making process excluded women fishers entirely. The restrictions provided no alternative livelihood options or transition support. Women dependent on beach seining for household income faced sudden livelihood disruption with no recourse. As one affected fisher stated:

"They banned our fishing without asking what we would eat. The men who made this rule have boats and go deep sea fishing. We have nothing else" (ACTS, 2022).

This case demonstrated how gender-blind fisheries management can generate inequitable outcomes even when pursuing legitimate conservation objectives. Effective governance requires inclusive processes that consider differentiated impacts and build in support for transitioning toward sustainable practices rather than simply imposing restrictions on vulnerable actors.

2.6 Lessons Learned

2.6.1 Integration is essential, not Optional

The BE project baseline demonstrated unequivocally that coastal development interventions cannot treat technical, economic, social, and environmental dimensions as separate domains. Gender relations shape access to and control over productive resources. Climate vulnerabilities interact with asset poverty to constrain adaptation options. Governance exclusion prevents marginalized groups from influencing decisions affecting their livelihoods. As such, effective interventions must simultaneously address these intersecting factors rather than pursuing single-dimensional solutions.

This insight aligned with emerging scholarship arguing for integrated, food systems approaches that situate fisheries within broader social-ecological contexts (Rice et al., 2024).

The BE Project's subsequent programming deliberately combined climate-smart aquaculture innovations with gender transformation, financial inclusion, and governance strengthening - recognizing that technical solutions alone would fail without addressing structural barriers.

2.6.2 Participatory Baselines Generate Ownership

The time-intensive baseline process proved invaluable beyond data collection. Participatory methods that engaged community members as co-researchers built relationships, generated trust, and created shared understanding of priorities. Communities that actively participated in baseline assessments subsequently demonstrated stronger engagement with project activities and greater ownership of outcomes. One BMU chairperson reflected:

"The baseline was different from other surveys. They didn't just extract information and leave. They came back to share findings with us, asked what we thought, discussed what would help. This made us feel the project was ours, not just another external intervention" (ACTS BE Project, 2025b).

2.6.3 Measuring Change Requires Robust Baselines

The comprehensive BE project baseline provided critical benchmarks for subsequent impact assessment. Gender-disaggregated data on income, time use, decision-making authority, asset ownership, and governance participation enabled rigorous evaluation of change over time. Climate vulnerability indicators allowed tracking of adaptive capacity improvements. Documentation of household dynamics informed monitoring of norm change processes.

Research methodologies matter profoundly for gender research quality in small-scale fisheries (Rice et al., 2024). The BE Project's investment in methodologically rigorous baseline assessment – using multiple methodologies, participatory methods, and gender-disaggregated data collection – positioned subsequent monitoring and evaluation on solid empirical foundations.

2.7 Implications for Future Directions

The BE project, especially the baseline research conducted, generated several strategic implications that shaped project implementation while offering broader lessons for coastal development programming.

2.7.1 Prioritize transformative over accommodative Approaches

The documented depth of gender inequalities revealed that accommodative approaches – simply adding women to existing structures without changing power relations – would prove insufficient. Women's exclusion from governance stemmed not from oversight but from systematic barriers requiring transformative intervention. The project's subsequent emphasis on transformative gender training, feminist leadership development, and institutional norm change reflected this recognition.

Global evidence increasingly demonstrates that transformative approaches – those explicitly challenging unequal gender norms and power relations – generate more sustained empowerment outcomes than accommodative strategies (Rabbitt et al., 2022). The BE Project positioned gender transformation as foundational work preceding technical interventions, ensuring that new opportunities would benefit women rather than reinforcing existing inequalities.

2.7.2 Address climate vulnerability through diversification and insurance

The climate vulnerability documented in the baseline required interventions targeting both immediate adaptive capacity and long-term resilience. Livelihood diversification through climate-smart aquaculture provided immediate alternatives to climate-vulnerable activities. However, diversification alone proved insufficient without financial mechanisms enabling households to weather climate shocks without asset depletion.

The project's subsequent establishment of women-led SACCOs with built-in community development funds represented explicit response to baseline findings on financial vulnerability. By creating community-controlled financial infrastructure, the project aimed to build insurance capacity that would outlast project timelines – a critical sustainability consideration.

2.7.3 Build on existing social capital

Despite documented vulnerabilities, the baseline revealed substantial existing social capital: informal savings groups, knowledge-sharing networks, mutual support systems. Women demonstrated remarkable agency within constrained circumstances. Rather than treating communities as passive beneficiaries requiring external solutions, the project positioned itself as supporting and amplifying existing capabilities.

This asset-based approach aligned with scholarship emphasizing the importance of recognizing and building on community strengths rather than deficit-focused interventions (Galappaththi et al., 2021). Subsequent chapters document how the project leveraged existing social networks while creating new institutional platforms for collective action.

2.8 Conclusion

The comprehensive BE project baseline assessment provided far more than data for project monitoring. It generated nuanced understanding of the complex, intersecting factors shaping vulnerability and constraining agency among coastal communities. This understanding fundamentally influenced intervention design, ensuring programming addressed documented realities rather than assumed needs. Three overarching insights emerged:

- gender inequality in small-scale fisheries extends far beyond simple exclusion; it reflects and reinforces systematic power asymmetries governing access to resources, decision-making authority, and economic opportunities.

- climate change does not affect all community members equally; differential vulnerabilities emerge from intersections of gender, wealth, age, and social position.

- technical or economic interventions implemented without attention to structural barriers risk reinforcing existing inequalities rather than transforming them.

As Ms. Eva Komba, BE project gender lead, reflected on the baseline findings:

"We learned that coastal communities are not homogeneous units. They are complex social systems with power relations determining who participates, who benefits, who bears costs. Understanding this complexity was essential for designing interventions that would genuinely transform rather than simply accommodate existing inequalities. The baseline showed us where we needed to intervene and how" (ACTS BE Project, 2025a).

The subsequent chapters explore how the baseline insights translated into concrete programming across climate-smart aquaculture, gender transformation, community finance, and governance strengthening. The chapters document the journey from documented vulnerabilities toward transformative outcomes, revealing both successes achieved and ongoing challenges requiring sustained attention beyond project timelines.

2.9 References

- ACTS, 2025a. Gender specialist Kenneth Odary. African Centre for Technology Studies (ACTS), Kenya.

- ACTS, 2025b. Voices from the community. African Centre for Technology Studies, Kenya.

- ACTS, 2022. Baseline survey report: Gender analysis of the fish & aquaculture sector in Kwale & Kilifi. Nairobi.

- Adjei, M., Chan, A.H.N., 2023. What Women Do, Believe in, and Financially Contribute—What Matters More in Couples' Decision Making? Gender Inequality in Ghana's Small-Scale Fisheries ☆ . Rural Sociol 88, 220–251. https://doi.org/10.1111/ruso.12474

- Chambon, M., Miñarro, S., Alvarez Fernandez, S., Porcher, V., Reyes-Garcia, V., Tonalli Drouet, H., Ziveri, P., 2024. A synthesis of women's participation in small-scale fisheries management: why women's voices matter. Rev Fish Biol Fish 34, 43–63. https://doi.org/10.1007/s11160-023-09806-2

- Cinner, J.E., McClanahan, T.R., Graham, N.A.J., Daw, T.M., Maina, J., Stead, S.M., Wamukota, A., Brown, K., Bodin, Ö., 2012. Vulnerability of coastal communities to key impacts of climate change on coral reef fisheries. Global Environmental Change 22, 12–20. https://doi.org/10.1016/j.gloenvcha.2011.09.018

- Galappaththi, E.K., Ford, J.D., Bennett, E.M., Berkes, F., 2021. Adapting to climate change in small-scale fisheries: Insights from indigenous communities in the global north and south. Environ Sci Policy 116, 160–170. https://doi.org/10.1016/j.envsci.2020.11.009

- Harper, S., Adshade, M., Lam, V.W.Y., Pauly, D., Sumaila, U.R., 2020. Valuing invisible catches: Estimating the global contribution by women to small-scale marine capture fisheries production. PLoS One 15, e0228912. https://doi.org/10.1371/journal.pone.0228912

- Kimanga, F., Ladan, L., Mirera, D., Maundu, A., Moyoni, H., Bironga, C., Onyango, J., 2025. Gendered Value Chain Opportunities and Challenges in Seaweed Aquaculture: The Changing Gender and Socio-Economic Dynamics in Mwazaro and Kibuyuni Villages, South Coast Kenya. International Journal of Research and Innovation in Social Science IX, 3456–3473. https://doi.org/10.47772/IJRISS.2025.90400251

- Komba, E., 2022. Women empowerment in fish and aquaculture in the context of Covid-19 pandemic. [WWW Document]. Blue Empowerment Project Blog Series. URL https://blueeconomy.acts-net.org/blog/women-empowerment-in-fish-and-aquaculture-in-the-context-of-covid-19-pandemic (accessed 11.24.25).

- Komba, E., Odary, K.., Oduor, A., 2022. Feminist leadership: How Mama Fatuma is transforming the fortunes of women in a Kenyan coastal village. [WWW Document]. Blue Empowerment Project Blog Series. URL https://blueeconomy.acts-net.org/blog/feminist-leadership-how-mama-fatuma-is-transforming-the-fortunes-of-women-in-a-kenyan-coastal-village (accessed 11.19.25).

- Komba, E., O.K., & O.A., 2022. Transforming women's economic fortunes through seaweed farming in Kenya. [WWW Document]. Blue Empowerment Project Blog Series. URL https://blueeconomy.acts-net.org/blog/transforming-womens-economic-fortunes-through-seaweed-farming-in-kenya (accessed 11.21.25).

- Lawless, S., Cohen, P.J., Mangubhai, S., Kleiber, D., Morrison, T.H., 2021. Gender equality is diluted in commitments made to small-scale fisheries. World Dev 140, 105348. https://doi.org/https://doi.org/10.1016/j.worlddev.2020.105348

- Mangubhai, S., Lawless, S., Cowley, A., Mangubhai, J.P., Williams, M.J., 2022. Progressing gender equality in fisheries by building strategic partnerships with development organisations. World Dev 158, 105975. https://doi.org/https://doi.org/10.1016/j.worlddev.2022.105975

- March, A., Failler, P., 2022. Small-scale fisheries development in Africa: Lessons learned and best practices for enhancing food security and livelihoods. Mar Policy 136, 104925. https://doi.org/https://doi.org/10.1016/j.marpol.2021.104925

- Meali, M., Nazi, B., Madzitsa, N., Kopa, A., Kondo, M., Onyango, J., Simiyu, B.,, Wainaina, R., 2025. Field officer's perspective on women empowerment in the blue economy sector at the coast of Kenya, 1st ed. ACTS Press, Nairobi.

- Mulonga, J., Olago, D., 2023. Perceptions of climate variability and change in coastal Kenya: The case of mangrove-dependent communities in the Lower Tana Delta. Environmental Challenges 13, 100799. https://doi.org/10.1016/j.envc.2023.100799

- Oduor, A., Makayoto, F., 2022a. Socio-economic dividends of seaweed farming in Kenya's coastal region [WWW Document]. Blue Empowerment Project Blog Series. URL https://blueeconomy.acts-net.org/blog/socio-economic-dividends-of-seaweed-farming-in-kenyas-coastal-region (accessed 11.24.25).

- Oduor, A., Makayoto, F., 2022b. How aquaculture is shifting gender and socio-economic dynamics in coastal communities in Kenya [WWW Document]. Blue Empowerment Project Blog Series. URL https://blueeconomy.acts-net.org/blog/how-aquaculture-is-shifting-gender-and-socio-economic-dynamics-in-coastal-communities-in-kenya (accessed 11.24.25).

- Rabbitt, S., Tibbetts, I.R., Albert, S., Lilley, I., 2022. Testing a model to assess women's inclusion and participation in community-based resource management in Solomon Islands. Maritime Studies 21, 465–483. https://doi.org/10.1007/s40152-022-00282-1

- Rice, E.D., Gondwe, E., Bennett, A.E., Okanga, P.A., Osho-Abdulgafar, N.F., Fakoya, K., Oloko, A., Harper, S., Kawaye, P.C., Chuku, E.O., Smith, H., 2024. The future of gender research in small-scale fisheries: Priorities and pathways for advancing gender equity. Fish and Fisheries 25, 401–408. https://doi.org/10.1111/faf.12814

3 Chapter 3: Climate-Smart Aquaculture Innovations: IMTA and Seaweed Enterprises

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This chapter documents the project's technical innovations in aquaculture, focusing on Integrated Multi-Trophic Aquaculture (IMTA), seaweed production, and climate-smart practices. The narrative situates BE's IMTA interventions within global evidence showing the ecological and economic benefits of nutrient recycling and multi-species integration. It also draws on African seaweed farming research that demonstrates its potential to support women's livelihoods and climate resilience. Empirical project data—such as increases in seaweed productivity, adoption of improved drying technologies, and enhanced IMTA cage performance—illustrate how science-based aquaculture models can enhance household adaptive capacity.

3.1 Introduction

On a humid March morning in 2023, a crowd gathered at the Kijiweni shoreline in Kwale County to witness the launch of Kenya's first community-managed Integrated Multi-Trophic Aquaculture (IMTA) system. The cage structure – combining fish culture with seaweed production – represented more than technical innovation. It embodied a fundamental reimagining of how coastal communities could produce food, generate income, and adapt to climate pressures through ecosystem-informed practices. Dr. Linus Kosambo explained to the assembled community members and county officials:

"This is not just about fish and seaweed. It's about demonstrating that we can work with ocean ecosystems rather than against them, creating production systems that enhance rather than degrade marine health" (ACTS BE Project, 2025a).

This chapter documents the Blue Empowerment Project's climate-smart aquaculture interventions, focusing on IMTA systems, seaweed farming improvements, and complementary aquaculture innovations in fishpond development. These technical components operated as entry points for broader transformation, providing tangible livelihood diversification options while demonstrating principles of ecological sustainability, climate adaptation, and gender-responsive development. The narrative situates BE's innovations within global evidence on multi-trophic aquaculture benefits while revealing the socio-technical negotiations required to translate promising concepts into functioning community-managed systems.

3.2 Context and Background

3.2.1 IMTA as Circular Aquaculture

Integrated Multi-Trophic Aquaculture represents a paradigm shift from conventional monoculture toward ecosystem-based production systems. IMTA combines fed species (fish, shrimp) with extractive species (seaweed, shellfish) that assimilate waste nutrients, converting potential pollutants into valuable biomass (Checa et al., 2024). This approach capitalizes on fundamental ecological principles: nutrients cycling through trophic levels, waste from one species becoming resources for another, and species diversity enhancing system resilience.

Recent systematic reviews demonstrate IMTA's multiple benefits across environmental, economic, and social dimensions (Zhu et al., 2025). Environmental advantages include reduced nutrient pollution, improved water quality, enhanced biodiversity, and increased carbon sequestration through seaweed biomass. Economic benefits emerge from production diversification, risk spreading across multiple revenue streams, and potential premium pricing for sustainably produced seafood. Social benefits include employment creation, skills development, and community engagement in marine stewardship.

Seaweed plays a particularly critical role as inorganic extractive species within IMTA configurations. Seaweeds absorb dissolved nutrients – nitrogen, phosphorus, and carbon – released by fed aquaculture, effectively functioning as biological filters while producing commercially valuable biomass (Huong et al., 2025). Moreover, seaweed cultivation requires no land, freshwater, or chemical fertilizers, offering resource-efficient production pathways particularly relevant for climate-vulnerable coastal regions (UNCTAD, 2024).

Figure 6: *The process of seaweed farming, from planting to drying. (a) Seaweed planting in progress, (b) an already planted Seaweed plot, (c) harvesting of Seaweed, (d) transportation of Seaweed by boat to the beach, (e) Seaweed drying on raised racks. The whole process takes 45 to 50 days (Images by Roshni Lodhia, Sebastian Jan and Victor Omondi).*

3.2.2 Gender and Climate Dimensions on IMTA

African seaweed farming, led predominantly by women in countries like Tanzania, Madagascar, and Kenya, has demonstrated potential for improving coastal livelihoods while advancing gender equity (Nyonje et al., 2022). Tanzania's Zanzibar archipelago exemplifies this potential: 88% of seaweed farmers are women, making seaweed farming the third largest income source and a critical vehicle for women's economic empowerment (Aqua-Farms Organization, 2023). Women farmers report using seaweed income to pay school fees, improve housing, and establish themselves as recognized breadwinners within households and communities.

However, African seaweed farming faces compounding challenges. Climate change impacts – rising ocean temperatures, altered salinity patterns, more frequent storms – increasingly disrupt production and force adaptation strategies (Dogeje, 2025). In Zanzibar, women farmers describe being forced to cultivate in deeper, cooler waters as nearshore temperatures rise, creating safety challenges for non-swimmers and requiring paid assistance from fishermen (AUDA-NEPAD, 2023). Quality degradation from climate stress has undermined export market access, constraining income potential.

Systemic barriers compound climate vulnerabilities. Women farmers face unequal access to equipment, limited competition among licensed buyers producing price suppression, socio-cultural norms restricting mobility and decision-making authority, and weak representation in producer organizations (Dogeje, 2025). These intersecting challenges position seaweed farming at the nexus of climate adaptation, gender transformation, and blue economy development – precisely the integration the BE Project sought to demonstrate with the IMTA system.

3.3 Implementation

3.3.1 IMTA System Design and Installation

The BE Project's IMTA intervention centered on installing a demonstration cage system at Kijiweni, Kwale County, combining Nile tilapia culture with seaweed production. The design process integrated technical specifications with community input, ensuring cultural appropriateness while maintaining ecological functionality (K'osambo et al., 2023). Key technical parameters included cage dimensions optimized for local conditions, stocking densities balancing productivity with ecosystem capacity, and seaweed line configurations maximizing nutrient capture from fish metabolism.

Installation involved multiple phases: cage assembly at Changai village engaging community labor, transportation to the Kijiweni site, anchoring in appropriate depth and current conditions, and establishment of monitoring protocols (K'osambo et al., 2023).

The process deliberately emphasized skill transfer rather than external implementation. As Field Officer Ninyoha Hamisi reflected:

"We wanted community members to understand every component so they could maintain and eventually replicate the system independently. Technical capacity-building happened through doing, not just training sessions" (ACTS BE Project, 2024a).

The IMTA cage operated as a living laboratory where community members – particularly women and youth – learned integrated aquaculture principles through hands-on participation. Regular monitoring tracked fish growth, seaweed productivity, water quality parameters, and broader ecosystem indicators. This action research approach generated locally relevant evidence while building community confidence in IMTA feasibility.

3.3.2 Seaweed Farming Improvements

Complementing the IMTA demonstration, the project intensified support for existing seaweed farmers through technical training, infrastructure provision, and value chain strengthening. Interventions targeted documented constraints: poor post-harvest handling causing quality degradation, limited drying infrastructure, weak market linkages, and minimal value addition capacity (Kimanga et al., 2025).

The project supplied improved drying racks – at the SolCool facility – that elevated seaweed off contaminating surfaces, dramatically improving product quality and market prices. Training covered optimal farming techniques, climate-adaptive practices, quality management, and basic value addition processes including soap and cosmetic production. Crucially, these interventions prioritized women as primary beneficiaries, deliberately disrupting gendered patterns where new technologies typically flow to men. As documented in the gendered value chain analysis:

"Women farmers receiving improved drying infrastructure reported 30-40% price premiums as buyers accepted their higher-quality seaweed. More significantly, reduced post-harvest losses meant higher effective incomes per farming cycle, strengthening women's economic security and household bargaining position" (Kimanga et al., 2025).

3.3.3 Complementary Aquaculture Innovations

Beyond IMTA and seaweed, the project supported diversified aquaculture initiatives tailored to specific site conditions and community interest. In Kilifi North, crab fattening initiatives capitalized on abundant wild crab populations, demonstrating how short-cycle aquaculture could generate income between fishing seasons (ACTS BE Project, 2022a).

Fishpond development in areas with suitable groundwater conditions provided additional production options, particularly for youth seeking entry into aquaculture entrepreneurship (ACTS BE Project, 2022b).

These complementary interventions reflected adaptive programming responsive to community priorities. Rather than prescribing uniform technical packages, the project facilitated community experimentation with climate-smart aquaculture pathways aligned with local ecological conditions, cultural practices, and livelihood strategies.

3.4 Key Findings

3.4.1 IMTA Performance and Community Response

The Kijiweni IMTA system demonstrated technical viability while revealing socio-institutional complexities requiring ongoing negotiation. Fish growth rates aligned with established tilapia aquaculture benchmarks, confirming that integrated systems could match monoculture productivity under community management conditions. Seaweed productivity within the IMTA configuration exceeded control plots, supporting theoretical expectations that nutrient enrichment from fish metabolism would enhance seaweed growth (Achieng et al., 2024).

More significantly, the IMTA demonstration catalyzed community dialogue around marine resource management, collective action, and technological innovation. As Dr. Jacqueline Uku from KMFRI observed:

"The IMTA cage became a focal point for community organizing. People who had never worked together on marine initiatives found common purpose around managing this shared resource. That institutional outcome mattered as much as the fish and seaweed produced" (ACTS BE Project, 2023a).

However, challenges emerged around governance complexity, technical maintenance requirements, and benefit-sharing mechanisms. Managing integrated systems demands more sophisticated coordination than monoculture, requiring clear roles, transparent decision-making processes, and equitable distribution of costs and benefits. These institutional dimensions proved more challenging than technical aspects, highlighting that IMTA success depends fundamentally on social organization rather than merely technical design.

3.4.2 Seaweed Production Enhancements

Women seaweed farmers across project sites reported substantial productivity and income improvements following technical and infrastructure interventions. In Kibuyuni and Mwazaro villages, where baseline assessments documented chronic quality problems, improved drying infrastructure reduced contamination losses by approximately 35% while enabling higher market prices (Kimanga et al., 2025). The economic implications proved substantial: farmers earning KSh 15,000-20,000 per harvest cycle at baseline reported incomes of KSh 30,000-40,000 following improvements, thus doubling earnings without expanding farming area.

These productivity gains translated into measurable improvements in women's economic security and household wellbeing. As one seaweed farmer explained:

"Before, I farmed seaweed but remained poor because half my harvest was rejected for poor quality. Now with proper drying racks, buyers accept everything at good prices. I paid school fees for three children last term - something that i struggled with before" (Komba et al., 2022a).

Value addition training opened additional revenue opportunities. Women who learned soap-making and cosmetic production from seaweed reported both direct income from these products and increased confidence in their entrepreneurial capabilities. As Omondi et al. (2025) documented:

"Seaweed value addition created new market niches, particularly targeting tourists and urban consumers willing to pay premiums for natural, locally-produced cosmetics. Women entrepreneurs who mastered these skills positioned themselves as business owners rather than merely primary producers."

3.4.3 Climate Adaptation Outcomes

Climate-smart aquaculture interventions demonstrated practical adaptation pathways while revealing ongoing vulnerabilities requiring continued innovation. Seaweed farming provided income diversification reducing dependence on climate-sensitive capture fisheries and rain-fed agriculture. The relatively short farming cycles (45-60 days) enabled rapid recovery from storm-related losses compared to annual crop production. Moreover, seaweed's nutrient absorption capacity contributed to local ecosystem resilience, helping buffer against ocean acidification and nutrient pollution (Earth Journalism Network, 2024).

However, climate pressures continued intensifying during project implementation. Farmers reported observable increases in ocean temperature, more frequent extreme weather events, and growing pest/disease pressures affecting seaweed health. These experiences underscored that climate adaptation requires continuous learning and adjustment rather than one-time technical fixes. As Wandili et al. (2025) reflected:

"Climate-smart aquaculture is not a static solution but an ongoing process of community-led experimentation, knowledge sharing, and adaptive management responding to changing conditions."

3.4.4 Youth Engagement and Generational Transition

The project deliberately targeted youth as primary beneficiaries of aquaculture training, recognizing that sustainable coastal development requires attracting younger generations to marine livelihoods. Youth participants in IMTA management, fish pond development, and crab fattening reported enhanced technical skills, entrepreneurial confidence, and renewed interest in ocean-based livelihoods. As one young fish farmer explained:

"My parents told me to leave the village and find city jobs because fishing has no future. But now with aquaculture skills and the SACCO providing startup capital, I see opportunities here that didn't exist before" (ACTS BE Project, 2025b).

This generational engagement proved strategically vital. Many coastal communities face youth outmigration as younger people pursue opportunities in urban centers, leaving aging fishing populations with limited capacity for innovation. The BE Project demonstrated that when youth access appropriate training, financial support, and viable business models, they become agents of coastal transformation rather than simply migrating away.

3.5 Case Narratives

3.5.1 The Kibokoni Fishpond Collective: Women Reclaiming Coastal Futures

In Kibokoni village, Kilifi County, a group of women transformed abandoned land into productive fishponds, demonstrating women agency in climate adaptation (ACTS BE Project, 2022b). The collective formed after project-sponsored aquaculture training sparked interest in freshwater fish production as complement to declining marine catches. With technical guidance from KMFRI the women excavated ponds, established water management systems, and stocked tilapia fingerlings.

Initial challenges proved substantial. Pond construction demanded intensive labor during a period when income needs remained urgent. Water quality management required constant attention and technical problem-solving. Marketing infrastructure proved initially inadequate, forcing low-price sales to intermediaries. However, the youth persisted, applying adaptive learning and mutual support to overcome obstacles.

By harvest time, the Kibokoni collective achieved commercially viable production, generating income that exceeded expectations while building technical expertise and collective efficacy. As one member explained:

"People doubted us, saying young people are lazy and not serious about farming. But we proved that when we have knowledge, support, and belief in what we're doing, we can create successful enterprises. Now other youth groups want to learn from us" (Meali et al., 2025).

The Kibokoni case demonstrated youth capacity for aquaculture entrepreneurship when enabling conditions exist. However, it also revealed systemic barriers requiring continued attention: limited access to land for pond construction, inadequate marketing infrastructure constraining price realization, and persistent social norms questioning women capability in food production roles.

3.5.2 The Seaweed Processing centre: towards Value Addition

At Mwazaro, the project supported establishment of a community seaweed processing business centre where women learned value addition techniques transforming raw seaweed into soaps, lotions, and cosmetics (ACTS BE Project, 2022c). The centre operates as both production facility and training center, with experienced members teaching newcomers while collaboratively manufacturing products for local and tourist markets.

The processing initiative addressed a critical value chain gap. Women farmers had long sold raw seaweed to distant buyers at low prices, capturing minimal value despite providing the primary production labor. Value addition kept more wealth within communities while creating additional employment in processing and marketing. Moreover, producing finished consumer goods enhanced women's business skills, market knowledge, and entrepreneurial confidence. As participants described during monitoring visits:

"When we only sold raw seaweed, buyers treated us poorly because we had no alternatives. Now we make soaps that tourists love and pay good prices for. We control our income. We decide our prices. We run a real business, not just farming" (Komba et al., 2022a).

The processing workshop also functioned as social infrastructure strengthening women's collective identity and mutual support. Women gathered regularly to work, share experiences, problem-solve challenges, and support each other's personal and business development. This social dimension proved as valuable as economic outcomes, creating sustained platforms for solidarity and collective action.

3.6 Lessons Learned

The IMTA experience revealed that **technical integration demands corresponding institutional integration**. Managing systems where multiple species interact across trophic levels requires coordination mechanisms far more sophisticated than monoculture management. Clear governance structures, transparent decision-making processes, equitable benefit-sharing arrangements, and effective conflict resolution mechanisms proved prerequisite for IMTA success (Kilelu et al., 2023). Communities with strong pre-existing institutions such as functioning BMUs, established savings groups, and active women's organizations, demonstrated greater capacity for managing IMTA complexity. Those lacking such institutional foundations required intensive capacity-building before technical interventions could succeed. This insight suggests that institutional strengthening should precede or accompany climate-smart aquaculture introduction rather than being treated as secondary concern.

The seaweed interventions demonstrated that **simply introducing improved technologies does not automatically benefit women unless gender dynamics receive explicit attention**. Technologies flow along existing power channels, typically reinforcing rather than disrupting male privilege. Deliberate strategies targeting women as primary technology recipients, accompanied by household-level dialogue on gender relations, proved necessary for equitable technology access (Achieng & Onyango, 2024). Moreover, technologies succeeded when designed with women's constraints in mind. Lightweight equipment compatible with women's care responsibilities, production processes requiring less mobility, and value addition activities conducted near home all enhanced adoption. Technology design should reflect rather than ignore the gendered realities of work, time, and space in coastal communities.

The climate adaptation dimension reinforced that **aquaculture innovations must remain dynamic rather than static**. Climate impacts continued evolving during project implementation including temperature tolerances shifting, while storm patterns intensified. Responding effectively required creating learning systems where farmers documented changes, experimented with adaptations, shared observations, and adjusted practices collectively (Omondi et al., 2025). This adaptive management approach contradicts conventional extension models premised on transferring predetermined technical packages.

Climate-smart aquaculture demands co-learning processes where scientific knowledge and indigenous observations inform each other, where community experimentation generates locally relevant innovations, and where flexibility trumps rigid adherence to prescribed practices.

Technical productivity improvements proved necessary but insufficient for sustainable livelihoods. **Economic viability depended fundamentally on value chain functionality**: access to quality inputs, competitive markets offering fair prices, processing infrastructure enabling value capture, and supportive business environment reducing transaction costs. Without these value chain conditions, even highly productive farming generated inadequate income (Kimanga et al., 2025). The project's integrated approach that combined production improvements with market linkage facilitation, value addition training, and financial access, reflected recognition that aquaculture development requires simultaneous attention to technical, institutional, and economic dimensions. Siloed interventions addressing only production or only markets typically fail because value chain constraints operate systemically rather than in isolation.

3.7 Implications

The BE Project's aquaculture innovations **demonstrated clear replication potential** across Kenya's coastal region and throughout the Western Indian Ocean. IMTA systems adapted to local species combinations, ecological conditions, and cultural contexts could expand marine aquaculture while enhancing ecosystem health. Seaweed farming improvements offer scalable pathways for women's empowerment and climate adaptation. Youth-focused aquaculture entrepreneurship can attract new generations to marine livelihoods. However, scaling requires addressing systemic enabling conditions beyond project-level interventions. Policy frameworks must recognize and support integrated aquaculture. Regulatory systems should facilitate rather than obstruct community-based marine farming. Public investment in technical services, market infrastructure, and research support proves essential. Financial mechanisms providing appropriate aquaculture credit at accessible terms remain critically needed (Onyango & Mukubwa, 2025a, 2025b).

Implementation revealed **several research priorities requiring continued attention**. Optimal species combinations for IMTA under varying environmental conditions need systematic investigation. Climate-adaptive seaweed varieties tolerating warming waters and storm intensification require development. Integrated pest management strategies for emerging aquaculture challenges demand research attention. Economic modeling identifying financially viable business models across different scales and contexts needs refinement. Critically, research must employ participatory methodologies engaging communities as co-investigators rather than merely study subjects.

The BE Project demonstrated that farmer knowledge and observations generate invaluable insights that formal research often overlooks. Genuine research partnerships respecting multiple knowledge systems produce both more locally relevant and more scientifically robust outcomes.

The seaweed experiences confirmed that aquaculture development offers powerful entry points for gender transformation when deliberately designed with equity objectives. Women's concentration in aquaculture - 88% of Zanzibar seaweed farmers, 60% of Kenyan coastal post-harvest workers - creates opportunities for interventions directly benefiting women (Nyonje et al., 2022). However, realizing this potential requires **explicit commitment to transformative rather than accommodative approaches**. Future aquaculture programming should integrate gender analysis from inception, target women as primary beneficiaries of technical innovations, address household power dynamics constraining women's economic agency, and create governance structures ensuring women's meaningful participation in decision-making. The evidence demonstrates unequivocally that gender equity enhances rather than compromises aquaculture sustainability and productivity.

Scaling climate-smart aquaculture **demands innovative financing mechanisms appropriate to small-scale producer needs.** Traditional commercial lending typically excludes coastal communities due to perceived risks, lack of collateral, and transaction costs of small loans. The BE Project's SACCO model demonstrated community-controlled finance as viable alternative, but SACCOs require initial capitalization and ongoing technical support to achieve sustainability. Emerging blue finance frameworks present opportunities for mobilizing climate adaptation funding toward community aquaculture. However, accessing such finance requires capacity-building in proposal development, financial management, and impact monitoring. Intermediary organizations connecting community producers with climate finance sources can play catalytic roles, as demonstrated by initiatives like Tanzania's proposed Africa Seaweed Finance Facility (Aqua-Farms Organization, 2023).

3.8 Conclusion

The Blue Empowerment Project's climate-smart aquaculture interventions demonstrated that technical innovation achieves transformative impact only when embedded within broader social, institutional, and economic change processes. IMTA systems, seaweed farming improvements, and complementary aquaculture innovations provided tangible livelihood diversification and climate adaptation pathways. However, their effectiveness depended fundamentally on simultaneous investment in institutional strengthening, gender transformation, financial inclusion, and value chain development.

Three overarching insights emerged from the aquaculture component.

a. Ecological sustainability and social equity prove complementary rather than competing objectives. IMTA systems that mimic ecosystem functions while enhancing biodiversity also create diversified livelihood opportunities benefiting marginalized groups. Seaweed farming that absorbs nutrients and mitigates ocean acidification simultaneously empowers women economically and socially.

b. Climate adaptation requires more than introducing climate-resilient technologies; it demands creating institutional capacity for ongoing learning, experimentation, and adjustment as climate impacts evolve. The communities demonstrating greatest climate resilience were those with strong social capital, diverse livelihood portfolios, and collective problem-solving capacities, that is attributes cultivated through participatory programming rather than merely technical interventions.

c. Sustainable aquaculture development must simultaneously address production, governance, finance, and markets. Technical fixes applied to dysfunctional institutional or economic contexts typically fail. Integrated approaches combining technical innovation with institutional strengthening, financial access, and market development prove more demanding but ultimately more effective and sustainable.

As Onyango et al. (2025) reflected on the project's aquaculture legacy:

"The IMTA cage at Kijiweni, the improved seaweed drying racks scattered across coastal villages, the fishponds managed by youth and women collectives – these material artifacts matter less than the human capabilities, institutional capacities, and collective confidence they represent. Climate-smart aquaculture succeeds when it builds people's power to shape their own coastal futures rather than simply delivering technical solutions designed elsewhere."

3.9 References

- Achieng, G. F., & Onyango, J. (2024). Transformative gender training for sustainable development (Info Note). Blue Empowerment Project, African Centre for Technology Studies. https://blueeconomy.acts-net.org/images/publications/Info_Briefs/Transformative-Gender-Training-for-Sustainable-Devt.pdf

- Achieng, G. F., Simiyu, B., K'osambo, L. M. D. O., Obondo, J., Wanjiku, E., & Juma, S. (2024). Understanding IMTA Systems in the Context of the Blue Empowerment Project: The Case of Aquaculture of Fish and Seaweed in Kwale and Kilifi Counties (Info Brief No. 002/2024). Blue Empowerment Project, African Centre for Technology Studies. https://blueeconomy.acts-net.org/images/publications/Info_Briefs/Understanding-IMTA-Systems.pdf

- ACTS BE Project. (2022a). Crab Fattening in Kilifi [Video]. YouTube. https://youtu.be/QsOM1KEt04E

- ACTS BE Project. (2022b). Kibokoni Fish Farming [Video]. YouTube. https://youtu.be/6wOo-rmHEQo

- ACTS BE Project. (2022c). BE Community Seaweed Processing [Video]. YouTube. https://youtu.be/zvLM04NIU_M

- ACTS BE Project. (2023a). BE Project Team speaks with Dr. Jacqueline Uku – Senior Research Scientist, KMFRI [Video]. YouTube. https://youtu.be/3X6i6hhYjwM

- ACTS BE Project. (2024a). Environmental Specialist Ninyoha Hamisi speaks about Community-based media in the Blue Economy [Video]. YouTube. https://youtu.be/bHENP3LHS8c

- ACTS BE Project. (2025a). Dr. Linus Kosambo on Sustainable Aquaculture through IMTA Systems [Video]. YouTube. https://youtu.be/-2f0CthQ8Gw

- ACTS BE Project. (2025b). Voices from the community [Video]. YouTube. https://youtu.be/GX0ifEAi79M

- ACTS BE Project. (2025c). Fatuma Usi on Championing Women's Empowerment and Sustainable Livelihoods [Video]. YouTube. https://youtu.be/rzfVuCKrjBk

- Aqua-Farms Organization. (2023). The "seaweed women" of Tanzania. Global Center on Adaptation. https://adaptationportal.gca.org/llahub/stories/3fa8215a-2a6a-4068-aa3c-7f63567b98af

- AUDA-NEPAD. (2023). Livelihoods at stake: The story of Zanzibar women in seaweed farming battling climate change effects. https://www.nepad.org/news/livelihoods-stake-story-of-zanzibar-women-seaweed-farming-battling-climate-change

- Checa, D., Franch Bibiloni, G., Gallagher, M. C., Nevejan, N., Ramesh, K., Fernandes, P., Alvarado Aguilar, P., & Abreu, M. H. (2024). Circularity assessment in aquaculture: The case of integrated multi-trophic aquaculture (IMTA) systems. Fishes, 9(5), 165. https://doi.org/10.3390/fishes9050165

- Dogeje, F. (2025). Empowering coastal economies: Gendered insights into women's participation in seaweed aquaculture in Zanzibar. Ocean & Coastal Management, 262, 107610. https://doi.org/10.1016/j.ocecoaman.2025.107610

- Earth Journalism Network. (2024). Empowering women, boosting economies: Seaweed farming's coastal resilience solution in Kenya and Tanzania. https://earthjournalism.net/stories/empowering-women-boosting-economies-seaweed-farmings-coastal-resilience-solution-in-kenya

- Huong, H. K., Nam, T. N. H., Sirikwa, L. N., Nhan, N. T. T., Dung, T. T., Nghi, N. T. T., Anh, N. T. N., Thi, N. T., Trang, D. V. T., & Van, V. N. (2025). Integrated multi-trophic aquaculture (IMTA) of seaweed and shrimp, Litopenaeus vannamei, with partial reduction in feed rate for improved water quality and nutrient efficiency of the culture system. Aquaculture International, 33, 259. https://doi.org/10.1007/s10499-025-01944-7

- Kilelu, C. W., Atieno, E., Juma, S., & Wanjiku, E. (2023). Socio-technical perspectives for enabling adoption and scaling of sustainable and gender-transformative mariculture development: The Case of IMTA in Coastal Kenya (Info Brief No. 002/2023). Blue Empowerment Project, African Centre for Technology Studies. https://blueeconomy.acts-net.org/images/publications/Info_Briefs/The-Case-of-IMTA-in-Coastal-Kenya.pdf

- Kimanga, F., Ladan, L., Mirera, D., Maundu, A., Moyoni, H., Bironga, C., & Onyango, J. (2025). Gendered-value chain opportunities and challenges in seaweed aquaculture: The changing gender and socio economic dynamics in Mwazaro and Kibuyuni villages, South Coast Kenya. Multidisciplinary Journal of Technical University of Mombasa, 4(1), 1-17. https://doi.org/10.47772/IJRISS.2025.90400251

- Komba, E., Odary, K., & Oduor, A. (2022a). Transforming women's economic fortunes through seaweed farming in Kenya. https://blueeconomy.acts-net.org/blog/transforming-womens-economic-fortunes-through-seaweed-farming-in-kenya

- Komba, E., Odary, K., & Oduor, A. (2022b). Feminist leadership: How Mama Fatuma is transforming the fortunes of women in a Kenyan coastal village. https://blueeconomy.acts-net.org/blog/feminist-leadership-how-mama-fatuma-is-transforming-the-fortunes-of-women-in-a-kenyan-coastal-village

- K'osambo, L. M. D. O., Obondo, J., & Kopa, A. (2023). Setting up of the IMTA cage at Kijiweni: Cage assembly at Changai and setting at Kijiweni in Kwale County (Info Brief No. 004/2023). Blue Empowerment Project, African Centre for Technology Studies. https://blueeconomy.acts-net.org/images/publications/Info_Briefs/Setting-Up-of-the-IMTA-Cage-at-Kijiweni.pdf

- Meali, M., Nazi, B., Madzitsa, N., Kopa, A., Kondo, M., Onyango, J., Simiyu, B., & Wainaina, R. (2025). Field officer's perspective on women empowerment in the blue economy sector at the coast of Kenya. ACTS Press. https://blueeconomy.acts-net.org/images/publications/Booklet/Field_Officers_Perspective_on_Women_Empowerment_BE_Project.pdf

- Nyonje, B. M., Chepkirui-Boit, V., Shilabukha, K. D., Kaloki, P., Oduor, N., Ngela, R. L., Owuor, M. A., Msuya, F. E., Abreu, M. H., Cottier-Cook, E. J., Ash, C. J., Brodie, J., Maharavo, J., Andrifidy, E., Bolton, J. J., Duarte, P., Mtolera, M., Msuya, F., & Wakibia, J. G. (2022). Seaweed farming in Africa: Current status and future potential. Journal of Applied Phycology, 34(2), 985-1007.

- Omondi, V., Mohe, B., Onyango, J., & Maina, A. (2025). Seaweed farming: An economic breakthrough for women in Kwale County, Kenya. https://blueeconomy.acts-net.org/blog/seaweed-farming-an-economic-breakthrough-for-women-in-kwale-county-kenya

- Onyango, J., & Mukubwa, C. (2025a). Seaweed farming: Shaping the future of women, youth, and the blue economy. https://blueeconomy.acts-net.org/blog/seaweed-farming-shaping-the-future-of-women-youth-and-the-blue-economy

- Onyango, J., & Mukubwa, C. (2025b). Catalysing inclusivity and climate-smart coastal economies in Kenya. https://blueeconomy.acts-net.org/blog/catalysing-inclusivity-and-climate-smart-coastal-economies-in-kenya

- Onyango, J., Simiyu, B., & Kabasa, M. (2025). Exploring the Blue Empowerment Project: Empowering coastal communities and promoting sustainable practices. https://blueeconomy.acts-net.org/blog/exploring-the-blue-empowerment-project-empowering-coastal-communities-and-promoting-sustainable-practices

- UNCTAD. (2024). Seaweed aquaculture for food security, income generation and environmental health in Asia and the Pacific. United Nations Conference on Trade and Development.

- Wandili, U., Omondi, V., & Simiyu, B. (2025). Riding the blue wave: Harnessing the blue economy for women empowerment and climate resilience in the coastal region of Kenya. https://blueeconomy.acts-net.org/blog/riding-the-blue-wave-harnessing-the-blue-economy-for-women-empowerment-and-climate-resilience-in-the-coastal-region-of-kenya

- Zhu, S., He, Z., Zhang, W., Sun, T., & Tao, Y. (2025). Effects of integrated multi-trophic aquaculture on aquaculture sustainability: A meta-analysis. Reviews in Aquaculture, 17(1), e70042. https://doi.org/10.1111/raq.70042

4 Chapter 4: Community Institutions, Governance, and Knowledge Pathways

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Chapter 4 presents the institutional strengthening and governance outcomes achieved through BMUs, SACCOs, and county engagement. It integrates scholarship on co-management effectiveness in small-scale fisheries and emphasises how participatory governance improves compliance, collective action, and ecosystem stewardship. The chapter also highlights the project's communication and knowledge-transfer strategies, connecting them to literature on governance learning and multi-actor knowledge systems. These elements collectively demonstrate the multidimensional nature of governance transformation.

4.1 Introduction

In a crowded community hall in Msambweni, Kwale County, representatives from twelve Beach Management Units gathered for what would prove a transformative policy dialogue. County officials sat alongside fish traders, boat owners, processors, and BMU committee members—many of them women participating in such forums for the first time. The discussions ranged from technical fisheries regulations to fundamental questions about who governs coastal resources and whose knowledge counts in management decisions. As one woman BMU member stated during deliberations:

"For years, policies were made about us without us. Today, we are not just invited to listen - we are shaping what gets written and how it will be implemented" (Kalele et al., 2025b).

This chapter examines the Blue Empowerment Project's work strengthening community institutions, transforming governance processes, and creating knowledge pathways that amplified local voices while building capacity for sustained collective action. It documents how participatory governance mechanisms, institutional capacity-building, strategic policy engagement, and innovative communication strategies converged to shift power relations and create platforms for continued transformation beyond project timelines. The narrative is framed by scholarship demonstrating that effective co-management in small-scale fisheries depends fundamentally on institutional strength, equity in participation, and integration of diverse knowledge systems.

4.2 Context and Background

4.2.1 Towards Collaborative Management

Approaches to fisheries management have shifted dramatically over recent decades, responding to recognized flaws in conventional top-down governance. Traditional "command and control" management which are characterized by centralized decision-making, excessive focus on biological productivity maximization, and minimal fisher participation, has proven inadequate for achieving sustainable outcomes (Puley & Charles, 2022). These top-down approaches often left fishers with no voice in processes directly affecting their livelihoods, generating compliance challenges, alienation from management objectives, and ultimately contributing to resource decline.

Co-management emerged as alternative governance paradigm wherein fishers, other resource stakeholders, and government share responsibility for making and enforcing rules around resource and area use (Evans et al., 2022). This collaborative approach compensates for shortcomings of unilateral government control while capitalizing on local knowledge, creating accountability to communities, and building legitimacy for management measures. Research demonstrates that co-management has become the dominant management approach for small-scale fisheries in developing countries, with documented evidence of positive outcomes across environmental, social, and economic dimensions (Fernández et al., 2024).

However, co-management effectiveness varies substantially depending on design and implementation factors. Recent systematic reviews reveal that while co-management can improve equity, it can also exacerbate power imbalances, facilitate elite capture, and intensify conflicts when not carefully designed (Gammage et al., 2025). Success depends critically on factors including meaningful participation across diverse stakeholder groups, clear rights and responsibilities, effective enforcement mechanisms, conflict resolution capacity, and genuine power-sharing between government and communities.

4.2.2 Kenya's Co-Management Architecture

Kenya's Fisheries Management and Development Act (2016) established Beach Management Units (BMUs) as primary community-based institutions for fisheries co-management. BMUs are intended to facilitate participatory resource management, provide platforms for fisher organization, serve as liaison between communities and government, and contribute to local economic development. In principle, BMUs represent promising institutional infrastructure for collaborative governance. In practice, their effectiveness varies widely depending on factors including capacity, resources, leadership quality, and inclusiveness.

The BE Project's baseline assessment revealed that while BMUs existed in all target sites, their functionality and inclusiveness showed substantial variation. Most BMUs operated with male-dominated leadership, limited women's participation, irregular meetings, weak financial capacity, and unclear relationships with government fisheries departments. These institutional weaknesses constrained BMUs' potential as platforms for effective co-management. As one BMU chairperson acknowledged:

"We have the structure but not the capacity. We know there should be rules but don't know how to enforce them. Women are members but don't feel welcome in meetings. Government tells us we're responsible for management but gives us no resources" (ACTS, 2022).

Strengthening BMUs, particularly by addressing gender exclusion and building institutional capacity, represented a strategic imperative for the BE Project. Functional, inclusive BMUs could serve as sustained platforms for resource governance, collective action, and community empowerment beyond project duration.

4.3 Implementation

4.3.1 Participatory Knowledge Generation

Early in project implementation, multi-criteria mapping (MCM) workshops created structured spaces for diverse stakeholders to deliberate on coastal development priorities, risks, and opportunities (Fatuma et al., 2025). MCM employs participatory methods enabling stakeholders with differing perspectives, values, and interests to express preferences, evaluate options, and explore trade-offs through systematic comparison.

The BE Project MCM process brought together fishers, traders, processors, government officials, researchers, and civil society representatives to examine aquaculture development pathways, gender integration strategies, financial mechanisms, and governance arrangements. Rather than assuming consensus, MCM deliberately surfaced divergent views, revealed power dynamics shaping decision-making, and created space for marginalized voices, particularly women's, to influence outcomes. As documented in workshop proceedings:

"MCM generated rich dialogue revealing that community members often held more nuanced, sophisticated understandings of trade-offs than external experts assumed. Women processors articulated complex analyses of value chain dynamics, environmental risks, and social constraints that formal planning processes had overlooked. Youth participants challenged assumptions about generational knowledge transfer. These insights fundamentally shaped project design" (Fatuma et al., 2025).

Beyond substantive inputs, MCM cultivated participatory governance capacities. Community members learned structured decision-making methods, gained confidence expressing views in multi-stakeholder forums, and experienced decision-making processes that genuinely valued their contributions. These process benefits proved as important as content outcomes.

4.3.2 Strategic Policy Engagement at County Level

Recognizing that community-level transformation requires enabling policy environments, the project invested heavily in policy engagement targeting Kilifi and Kwale county governments. This multi-year process combined technical policy analysis with participatory dialogue, capacity-building, and relationship cultivation. The approach positioned counties as partners rather than merely target audiences, recognizing that sustained policy change requires government ownership and commitment.

Policy dialogue series brought together county executives, fisheries department staff, BMU representatives, women's groups, youth leaders, and technical experts to examine policy gaps, institutional coordination challenges, and opportunities for strengthening gender-responsive fisheries governance (Kalele et al., 2025a, 2025b). These forums moved beyond conventional advocacy, that is simply presenting recommendations, to facilitated problem-solving wherein government and community stakeholders jointly analyzed challenges and co-designed solutions.

The policy engagement strategy deliberately linked community experiences with policy implications. Women BMU leaders testified about exclusion from decision-making; county officials heard directly how policies affected livelihoods; technical evidence on gender inequalities complemented personal narratives. This integration of experiential knowledge and scientific evidence proved particularly powerful for catalyzing policy commitment.

4.3.3 Communication, Documentation, and Knowledge Sharing

The project developed comprehensive communication strategies amplifying community voices, documenting innovations, and facilitating knowledge transfer across sites and scales. These efforts extended far beyond conventional project reporting to strategic knowledge mobilization aimed at shifting narratives, building community confidence, and creating enduring knowledge resources.

Multiple media formats served complementary purposes. Documentary films in English and Kiswahili reached diverse audiences while centering community perspectives (ACTS BE Project, 2025b, 2025c). Short video features highlighted individual leaders, technical innovations, and institutional transformations (ACTS BE Project, 2025d-2025i). Blog posts and info briefs distilled lessons for practitioner audiences. Radio programs in local languages engaged broader coastal populations. Photo galleries documented visual narratives of change. Academic papers contributed to scholarly discourse.

Notably, communication strategies emphasized community agency and voice rather than external expert interpretation. As Ninyoha Hamisi (project field officer, and environment specialist) explained:

"We wanted communities telling their own stories in their own words, not filtered through project staff. When Fatuma speaks about seaweed farming, or Rehema describes SACCO benefits, or youth explain aquaculture entrepreneurship – those authentic voices communicate in ways technical reports never can" (ACTS BE Project, 2024a).

Figure 7: *BE Field Officer, Mwandazi Mwarabu, checking on the status of the net housing the rabbit fish under the IMTA set-up at Kijiweni, Kwale County*

This commitment to community storytelling extended to capacity-building in media engagement. Workshops trained women, youth, and BMU leaders in effective communication, media interviews, and self-representation. These skills served project documentation while building capacities for ongoing advocacy and knowledge sharing.

4.4 Key Findings

4.4.1 Policy Dialogue Outcomes and Institutional Commitments

The multi-year policy engagement culminated in county-level commitments that positioned gender-responsive fisheries governance as priority within county development frameworks. Both Kilifi and Kwale counties endorsed policy recommendations emerging from participatory dialogues, committing to specific actions including establishing fisheries gender focal points within county departments, allocating county budget resources for women fisher groups, streamlining BMU registration and support processes, and creating platforms for ongoing BMU-government collaboration (Kalele et al., 2025a, 2025b).

Beyond formal commitments, policy dialogues shifted relationships between government and communities. County officials developed deeper appreciation for community knowledge and coastal livelihood complexities. BMU representatives gained confidence engaging policy processes and articulating community priorities. These relational shifts, which are difficult to quantify but critical for sustained collaboration, emerged through sustained engagement creating mutual respect and understanding.
As Kilifi County Director of Youth and Gender Affairs, Mwangome Shumaa, reflected:

"These dialogues changed how we think about coastal development and gender. We realized that community members aren't just beneficiaries waiting for government programs - they're experts in their own livelihoods with sophisticated understandings of what works and what doesn't. Our role is supporting their priorities, not imposing our assumptions" (ACTS BE Project, 2023a, 2023b).

4.4.2 Knowledge Products and Narrative Transformation

The project's prolific documentation and communication output created substantial knowledge legacy extending well beyond project duration. The documentary films garnered significant viewership, reaching coastal communities, policy audiences, international development practitioners, and academic researchers.

Blog posts attracted substantial online engagement, sparking dialogue on blue economy development pathways. Academic publications contributed evidence to global discourse on gender-transformative fisheries development and climate-smart aquaculture.

Perhaps most significantly, community members themselves became knowledge producers and communicators. Women seaweed farmers who initially felt uncomfortable speaking publicly developed confidence presenting at forums, engaging media interviews, and mentoring peers. Youth who began as training participants evolved into trainers teaching others. BMU leaders who initially deferred to external experts grew into authoritative voices on coastal governance.

This shift from knowledge recipients to knowledge producers represented profound empowerment outcome. As Marine Researcher Meali Mohammed emphasized:

"When communities can document and communicate their own experiences, they control their narratives rather than being subject to external interpretations. That narrative power translates into agency—confidence that their knowledge matters and capacity to influence how others understand their realities" (ACTS BE Project, 2024b).

Selected Blogs

- Catalysing Inclusivity and Climate-Smart Coastal Economies in Kenya - https://blueeconomy.acts-net.org/blog/catalysing-inclusivity-and-climate-smart-coastal-economies-in-kenya
- Seaweed Farming Shaping the future of Women, Youth and the Blue Economy-https://blueeconomy.acts-net.org/blog/seaweed-farming-shaping-the-future-of-women-youth-and-the-blue-economy
- Riding the Blue Wave: Harnessing the Blue Economy for Women Empowerment and Climate Resilience in the Coastal Region of Kenya - https://blueecon"MCM generated rich dialogue revealing that community members often held more nuanced, sophisticated understandings of trade-offs than external experts assumed. Women processors articulated complex analyses of value chain dynamics, environmental risks, and social constraints that formal planning processes had overlooked. Youth participants challenged assumptions about generational knowledge transfer. These insights fundamentally shaped project design" (Fatuma et al., 2025).
- omy.acts-net.org/blog/riding-the-blue-wave-harnessing-the-blue-economy-for-women-empowerment-and-climate-resilience-in-the-coastal-region-of-kenya

Click **here** for more blog posts.

4.4.3 Cross-Site Learning and Peer Networks

Structured peer-to-peer learning exchanges enabled communities to learn from each other's experiences, adaptations, and innovations. These exchanges operated on multiple levels: BMU leaders visiting other BMUs to observe governance practices, women SACCO members learning from established SACCOs, seaweed farmers sharing climate adaptation strategies, youth aquaculture entrepreneurs exchanging business insights.

Cross-site learning proved particularly powerful because participants recognized peer communities as facing similar challenges rather than distant experts offering abstract solutions. When Kibuyuni seaweed farmers explained improved drying techniques to Mwazaro farmers, the advice carried credibility born from shared context. When Shimoni BMU leaders described their journey toward inclusive governance, other BMUs saw achievable pathways rather than impossible ideals. The project deliberately facilitated these exchanges while allowing organic relationship-building and knowledge sharing. As documented during monitoring:

"The most valuable outcomes from exchange visits often emerged during informal conversations - over meals, during travel, in casual discussions after formal sessions. These unstructured interactions enabled participants to ask questions they wouldn't raise in formal settings, share challenges they felt uncomfortable discussing publicly, and build relationships that continued long after exchanges concluded" (Meali et al., 2025).

4.5 Case Narratives

4.5.1 The Kilifi Policy Dialogue: From Consultation to Co-Design

The Kilifi County policy dialogue exemplified transformative policy engagement methodology. Rather than conventional consultation, that is, wherein communities present grievances and government promises action, the dialogue employed structured co-design bringing government and community into genuine problem-solving partnership.

Day one focused on shared understanding, with community members presenting lived experiences of governance challenges while county officials explained policy constraints and institutional complexities. This mutual education created empathy and appreciation for different perspectives.

Day two moved to collaborative solution development using participatory methods enabling diverse stakeholders to jointly design implementation pathways for policy priorities.

The dialogue surfaced tensions that conventional consultation obscures. Community members questioned why gender policies existed on paper but not in practice. County officials acknowledged capacity and resource constraints limiting implementation. Rather than allowing these tensions to create impasse, facilitators structured dialogue enabling stakeholders to jointly identify realistic actions given existing constraints while building commitment to long-term systemic change. As documented in dialogue proceedings:

"The most powerful moment came when a woman BMU member and county fisheries director realized they were describing the same problem - inadequate women's participation in resource management - from different vantage points. That shared recognition created foundation for collaborative problem-solving. They moved from adversarial positions to partnership, jointly strategizing how to overcome barriers both identified" (Kalele et al., 2025a).

The dialogue produced concrete action plan with assigned responsibilities, timelines, and accountability mechanisms. More importantly, it shifted relationships and built trust enabling continued collaboration. Six months later, participants reported that informal channels established during dialogue continued facilitating government-community communication and joint problem-solving.

4.5.1 Community Radio and Coastal Knowledge Networks

Radio Rahma's Kilimo Baharini (Maritime Agriculture) program series demonstrated community radio's power for knowledge sharing and network-building (Radio Rahma, 2022a, 2022b). Broadcast in Kiswahili with local dialect terms, the programs featured community members discussing seaweed farming, IMTA systems, SACCO operations, and gender transformation - not as external experts explaining concepts but as practitioners sharing lived experiences.

The radio format enabled reach far beyond project sites, sparking interest in neighboring communities, generating listener call-ins with questions and experiences, and catalyzing informal knowledge networks.

Farmers listening in distant villages contacted featured farmers seeking guidance. BMUs heard about governance innovations they subsequently adapted. Women learned about SACCOs and initiated organization in their communities. As explained by one program participant:

"When people hear me on radio, as someone from their own community, speaking their language, describing challenges they recognize, they think, 'if she can do it, maybe I can too.' The radio makes our experiences accessible to others in ways written reports never could. It transforms local knowledge into shared regional knowledge" (Meali et al., 2025).

The radio programs also shifted power dynamics around knowledge legitimacy. Coastal communities accustomed to being told about policies and technologies by external experts heard peers presented as authorities on their own livelihoods. This validation of community knowledge challenged hierarchies positioning scientific or bureaucratic knowledge as inherently superior to experiential knowledge.

4.6 Lessons Learned

4.6.1 Process legitimacy matters as much as outcomes

The policy dialogue and MCM experiences demonstrated that governance process quality fundamentally shapes outcome legitimacy and sustainability. Decisions generated through genuinely participatory processes – wherein diverse voices receive serious consideration and stakeholders collectively shape solutions, command community ownership that top-down decisions never achieve, regardless of technical merit.

This insight challenges efficiency-focused governance approaches prioritizing rapid decision-making over participation. While participatory processes demand time and resources, the resulting legitimacy, ownership, and sustained implementation commitment justify investment. As co-management literature demonstrates, collaborative governance processes that meaningfully engage stakeholders generate outcomes more likely to be accepted, implemented, and sustained over time (Evans et al., 2022)

4.6.2 Communication is Development Intervention, Not Just Documentation

The project's comprehensive communication strategy illustrated that knowledge sharing constitutes development intervention rather than merely project documentation. When community members develop capacity for self-representation, when local innovations reach broader audiences through accessible media, when narrative control shifts from external interpreters to community storytellers – these communication outcomes generate empowerment, influence, and sustained change.

This perspective challenges conventional approaches treating communication as project afterthought focused on donor accountability. Instead, it positions strategic knowledge mobilization as core intervention catalyzing transformation through amplifying voices, validating knowledge, shifting narratives, and building networks. Future programming should integrate communication strategy from inception rather than appending it during implementation.

4.7 Implications and Future Directions

The BE Project's governance innovations d**emonstrated clear potential for replication** across Kenya's coastal region and beyond. Participatory policy dialogues, multi-criteria mapping, and community communication strategies could be adapted to diverse contexts. However, scaling requires addressing several prerequisites including government commitment to collaborative governance, adequate facilitation capacity, resources for participatory processes, and patience for deliberative decision-making that accommodates diverse voices. Scaling also demands attention to power dynamics that participatory approaches can either challenge or reproduce. Research on co-management equity demonstrates that participatory governance can improve equity but also risks elite capture, marginalization of vulnerable groups, and reproduction of existing inequalities (Gammage et al., 2025). Effectively scaling the BE model requires explicit safeguards ensuring meaningful participation from marginalized groups, transparent facilitation preventing elite domination, and accountability mechanisms monitoring inclusion outcomes.

The BE Project operated as action research initiative embedding learning into programming through participatory monitoring, adaptive management, and systematic documentation. This learning approach proved essential for responsive implementation and generated valuable knowledge for broader application. However, such learning systems rarely exist in conventional programming or government operations. Future coastal governance initiatives should **institutionalize learning systems** enabling systematic evidence generation, regular reflection, adaptive course correction, and knowledge sharing.

This requires dedicated monitoring and learning resources, skilled facilitation, organizational cultures valuing experimentation over rigid implementation, and mechanisms connecting learning across initiatives and sites. County governments establishing fisheries governance units should incorporate dedicated learning and adaptation functions rather than purely administrative roles.

The policy dialogue outcomes demonstrated that transformative governance change requires sustained **county government commitment extending beyond project timelines**. While project facilitation catalyzed initial engagement, genuine institutionalization demands government ownership, allocated resources, and integration within county development frameworks. Supporting such institutionalization requires long-term partnership approaches rather than short project cycles. Development partners should commit to multi-year county engagement providing technical support, convening platforms, capacity-building, and accompaniment as counties develop and refine governance systems. This patient capital approach recognizes that institutional transformation operates on different timelines than project implementation, requiring sustained support through inevitable challenges and setbacks.

The communication initiatives illustrated community members' sophisticated knowledge about coastal livelihoods, resource dynamics, and management effectiveness, that is, knowledge often overlooked by technical experts and policymakers. Effective governance requires creating systematic mechanisms for **integrating diverse knowledge systems** including community experiential knowledge, indigenous practices, scientific research, and policy analysis. This integration demands methodological innovation moving beyond token community consultation toward genuine knowledge co-production. Participatory action research, citizen science initiatives, collaborative monitoring systems, and community-based documentation can create platforms wherein different knowledge systems inform each other. Such integration enhances both decision quality (by incorporating fuller understanding) and decision legitimacy (by respecting diverse ways of knowing).

4.8 Conclusion

The Blue Empowerment Project's institutional and governance outcomes demonstrated that technical innovations and economic interventions achieve sustained impact only when embedded within strong community institutions, inclusive governance processes, and enabling policy environments.

Participatory policy engagement, strategic communication, and knowledge mobilization converged to shift power relations, build collective capacity, and create platforms for continued transformation beyond project duration. We drive various conclusions:

a) Institutional inclusion requires explicit, sustained intervention rather than assuming marginalized groups will automatically participate when invited. Transforming governance to genuinely include women, youth, and other marginalized actors demands constitutional reforms, capacity-building, norm change, and accountability mechanisms working synergistically over time.

b) Governance legitimacy depends profoundly on process quality. Decisions generated through genuinely participatory processes that meaningfully engage diverse stakeholders command ownership and sustained implementation commitment that top-down decisions never achieve. While participatory governance demands time and resources, the resulting legitimacy, adaptability, and sustainability justify investment.

c) Knowledge systems and communication strategies constitute development interventions rather than merely documentation activities. When communities develop capacity for self-representation, when local knowledge reaches broader audiences, when narrative control shifts from external interpreters to community storytellers – these communication outcomes generate empowerment, influence policy, catalyze replication, and sustain change trajectories.

Figure 8: *BE Project training on women-led SACCOs in Mombasa, with participants from Kwale and Kilifi*

4.9 References

- ACTS. (2022). Baseline survey report: Gender analysis of the fish & aquaculture sector in Kwale & Kilifi. African Centre for Technology Studies. https://blueeconomy.acts-net.org/images/publications/Reports/Baseline_Survey_Report.pdf

- ACTS BE Project. (2023a). BE Project speaks with Kilifi County Director of Youth & Gender Affairs, Mwangome Shumaa [Video]. YouTube. https://youtu.be/9HAH2QeD_HI

- ACTS BE Project. (2023b). BE Project yazungumza na Mkurugenzi wa Vijana na Masuala ya Jinsia Kaunti ya Kilifi, Mwangome Shumaa [Video]. YouTube. https://youtu.be/_T3e1KsC8Xw

- ACTS BE Project. (2024a). Environmental Specialist Ninyoha Hamisi speaks about Community-based media in the Blue Economy [Video]. YouTube. https://youtu.be/bHENP3LHS8c

- ACTS BE Project. (2024b). Marine Researcher, Meali Mohammed highlights the importance of storytelling in the Blue Economy [Video]. YouTube. https://youtu.be/9M0_C4jNjtg

- ACTS BE Project. (2025a). Dr. Catherine Kilelu on Policy and Governance [Video]. YouTube. https://youtu.be/WUOPsmfpCwo

- ACTS BE Project. (2025b). BE Project Documentary – English Narration [Video]. YouTube. https://youtu.be/xyDjQcfz-p0

- ACTS BE Project. (2025c). BE Project Documentary – Kiswahili Narration [Video]. YouTube. https://youtu.be/fv363GCzHXY

- ACTS BE Project. (2025d). Field Officer's Perspectives [Video]. YouTube. https://youtu.be/gAlT98wD_TU

- ACTS BE Project. (2025e). About the project [Video]. YouTube. https://youtu.be/YDD_Kpa3WAE

- ACTS BE Project. (2025f). Voices from the community [Video]. YouTube. https://youtu.be/GX0ifEAi79M

- ACTS BE Project. (2025g). Gender specialist Kenneth Odary [Video]. YouTube. https://youtu.be/kfOhTdRudj8

- ACTS BE Project. (2025h). Aquatic specialist Dr. Ann Maundu [Video]. YouTube. https://youtu.be/d-QWxH2iBpo

- ACTS BE Project. (2025i). Fatuma Usi on Championing Women's Empowerment and Sustainable Livelihoods [Video]. YouTube. https://youtu.be/rzfVuCKrjBk

- ACTS BE Project. (2025j). Voices from the community [Video]. YouTube. https://youtu.be/GX0ifEAi79M

- Evans, L. S., Cherrett, N., & Pemsl, D. (2022). Linking small-scale fisheries co-management to U.N. Sustainable Development Goals. Conservation Biology, 36(6), e13977. https://doi.org/10.1111/cobi.13977

- Fatuma, L., Otieno, C., Onyango, J., Kalele, D. N., & Kilelu, C. (2025). Multi-Criteria Mapping Workshop Proceedings. ACTS Press.

- Fernández, B. S., Freitas, C. E. C., Petesse, M. L., & Siqueira-Souza, F. K. (2024). Fisheries co-management strengthen the effectiveness of protected areas in Amazonian floodplain lakes. Fisheries Management and Ecology, 31(6), e12768. https://doi.org/10.1111/fme.12768

- Gammage, S., Harper, S., Peckham, S. H., & Maldonado, J. H. (2025). Equity through co-management in small-scale fisheries—A review. Fish and Fisheries, 26(1), e12889. https://doi.org/10.1111/faf.12889

- Kalele, D. N., Ouma, N., Kimanga, F., Kopa, A., & Odary, K. (2025a). Institutionalizing and catalyzing gender responsive policies, and strengthening collaboration and coordination in Kenya's fisheries and aquaculture sector: Kilifi County multistakeholder policy dialogue report. ACTS Press. https://blueeconomy.acts-net.org/images/publications/Reports/Kilifi_Policy_Dialogue_Report.pdf

- Kalele, D. N., Ouma, N., Kimanga, F., Kopa, A. B., Ninyoha., & Odary, K. (2025b). Institutionalizing and catalyzing gender-responsive policies, and strengthening collaboration and coordination in Kenya's fisheries and aquaculture sector: Kwale County multistakeholder policy dialogue report. ACTS Press. https://blueeconomy.acts-net.org/images/publications/Reports/Policy_Dialogue_Report_Kwale.pdf

- Meali, M., Nazi, B., Madzitsa, N., Kopa, A., Kondo, M., Onyango, J., Simiyu, B., & Wainaina, R. (2025). Field officer's perspective on women empowerment in the blue economy sector at the coast of Kenya. ACTS Press. https://blueeconomy.acts-net.org/images/publications/Booklet/Field_Officers_Perspective_on_Women_Empowerment_BE_Project.pdf

- Puley, C. F., & Charles, A. (2022). Dissecting co-management: Fisher participation across management components and implications for governance. Fish and Fisheries, 23(3), 645-665. https://doi.org/10.1111/faf.12645

- Radio Rahma. (2022a). Kilimo Baharini Ep 1, ACTS BE Project [Podcast]. https://anchor.fm/radiorahma/episodes/Kilimo-BahariniPart-1-e1qhmcl

- Radio Rahma. (2022b). Kilimo Baharini Ep 1 Part II, ACTS BE Project [Podcast]. https://anchor.fm/radiorahma/episodes/Kilimo-BahariniPart-2-e1qhmfc

5 Chapter 5: Gender Transformation, Women Inclusion, and Social Empowerment

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This chapter synthesises the impacts of gender-transformative programming, youth capacity-building, and inclusion strategies. It is framed by empowerment theory and recent studies linking gender inclusion to fisheries sustainability and social well-being. The chapter documents shifts in agency, leadership representation, decision-making power, and control over productive resources among women and youth participants. It illustrates how targeted training, mentoring, group strengthening, and livelihood diversification produced measurable social empowerment outcomes.

5.1 Introduction

In a community hall in Mwazaro village, thirty women gathered for the first session of transformative gender training. Many arrived hesitantly, uncertain what to expect from discussions about "gender relations" and "household power." By the first session's conclusion three hours later, animated conversations filled the space as women shared experiences, challenged assumptions, and began reimagining possibilities for their lives. One participant later reflected:

"For the first time, we were not told what to do or how to behave. Instead, we were asked what we wanted, why current arrangements felt unfair, and how we could create change together. That simple act - being asked rather than told - changed something fundamental" (Achieng & Onyango, 2024).

This chapter examines the Blue Empowerment Project's gender-transformative programming, youth inclusion strategies, and social empowerment outcomes. It documents how integrated interventions combining consciousness-raising dialogue, leadership development, skills training, and economic empowerment converged to shift power relations, expand agency, and create sustained platforms for collective action. The narrative is grounded in global scholarship demonstrating that genuine empowerment requires transformative approaches explicitly challenging unequal gender norms and power structures rather than merely accommodating women within existing systems (Cole et al., 2020).

Figure 9: *Training of Community Groups on Business Models - Kwale County*

5.2 Context and Background

5.2.1 The Gender-Transformative Imperative

Global development discourse increasingly recognizes that addressing gender inequality requires moving beyond accommodative approaches that simply include women in existing structures toward transformative strategies that challenge underlying power relations and norms (Stacey et al., 2019). However, implementation lags far behind rhetoric. A systematic review of twenty coastal and fisheries projects in Indonesia found that 40% had no identified gender approach, and only 10% used genuinely transformative methods (Stacey et al., 2019). Most projects achieved empowerment only at welfare or access levels; gains proved fragile, with women often reverting to welfare-level status (Choo & Williams, 2014).

Research on gender in small-scale fisheries reveals that women's exclusion from management generates documented negative consequences across socio-cultural, environmental, and economic dimensions, while their meaningful participation produces positive impacts at multiple scales (Frangoudes & Pascual-Fernández, 2023). Yet over 80% of examined case studies report women having no or limited participation in fisheries management decision-making (Frangoudes & Pascual-Fernández, 2023). This persistent exclusion reflects not oversight but systematic barriers requiring explicit intervention.

Gender-transformative approaches are distinguished by four characteristics: explicitly challenging unequal gender norms, addressing power imbalances at household and community levels, building women's collective agency through groups and organizations, and engaging men and boys as partners in transformation (McDougall et al., 2021). Such approaches recognize that sustainable empowerment requires simultaneous change across multiple domains including the gender division of labor, access to and control over resources, decision-making authority, and underlying gender norms governing what men and women should do and their relative value in society (Adam et al., 2024).

5.2.2 Women Marginalization in Coastal Livelihoods

Alongside gender inequality, women marginalization constrains coastal development sustainability. Women face systematic barriers including limited access to productive assets, exclusion from governance structures dominated by men, insufficient training opportunities aligned with contemporary livelihood realities, and social norms questioning their capacity for meaningful contribution (Torre et al., 2019). These barriers drive young women outmigration, leaving aging coastal populations with diminished capacity for innovation and adaptation.

Yet when young women receive appropriate support, such as, technical training, startup capital, mentorship, and governance participation, they demonstrate remarkable entrepreneurial capacity and become agents of coastal transformation (Komba & Odary, 2024). The challenge lies in creating enabling environments recognizing agency of young women while providing structured pathways for skill development, livelihood establishment, and leadership cultivation.

5.2.3 The Empowerment Framework

The BE Project adopted a multidimensional empowerment framework addressing four interrelated domains informed by global research on women's empowerment in aquatic food systems.

1. Women's agency and decision-making capacity within households and communities. Research demonstrates that improved earnings for women link to enhanced individual empowerment, household food security and nutrition, and community-level economic activity (Kawarazuka & Béné, 2010; Harper et al., 2020; Freeman & Svels, 2022).

2. Access to and control over productive resources including land, equipment, financial services, and knowledge. Asset poverty fundamentally constrains women's economic autonomy and adaptive capacity (Rabbitt et al., 2022).

3. Participation in governance and collective action through BMUs, SACCOs, producer groups, and policy processes. Women's collective power through organizations and associations proves essential for challenging structural inequalities (Alonso-Población & Siar, 2018; Aswathy & Kalpana, 2018).

4. Transformation of harmful gender norms governing labor allocation, resource control, mobility, and public participation. Norms change requires engaging entire communities – women, men, youth, elders – in structured dialogue examining taken-for-granted assumptions and modeling alternative possibilities (Cole et al., 2020)

5.3 Implementation mechanisms

5.3.1 Transformative gender training

The project implemented structured gender training across all target communities, engaging women, men, and youth in facilitated dialogues examining power relations, labor divisions, decision-making patterns, and resource control. The curriculum – adapted from global best practices in gender transformation (CARE Uganda, 2017) – employed participatory methods including role plays, case studies, household visioning exercises, and collaborative problem-solving.

Sessions created safe spaces for reflection on personal experiences while connecting individual circumstances to broader structural patterns. Participants examined how gender norms governing "women's work" and "men's work" constrain livelihood options, how unequal resource access limits women's economic autonomy, how household decision-making processes marginalize women's preferences, and how violence and social sanctions enforce gender hierarchies. Critically, training positioned gender equality not merely as women's issue but as community wellbeing concern benefiting all members.

The training employed seven-module curriculum covering communication and decision-making, participatory household visioning, collaborative power-building, financial goal alignment, resource management, conflict resolution, and action planning (based on CARE Uganda, 2017 household dialogue model). Community-based facilitators - both women and men trained in gender-transformative methods, conducted follow-up sessions over months thereafter, enabling relationship-building and sustained engagement rather than one-off workshops.

5.3.2 Feminist leadership development

Parallel to community-wide gender training, the project implemented targeted leadership development for women in BMUs, SACCOs, and producer groups. Programming combined skills training (public speaking, meeting facilitation, financial management, conflict resolution) with consciousness-raising examining leadership barriers and cultivating collective identity as change agents.

Mentoring relationships connected emerging women leaders with established role models exemplifying transformative leadership. As documented in project case studies, leaders like Fatuma Usi – who evolved from marginalized seaweed farmer to respected entrepreneur and community advocate – provided tangible examples of achievable transformation, inspiring others while offering practical guidance navigating resistance and setbacks (Komba et al., 2022).

Leadership development addressed both instrumental skills and deeper empowerment dimensions including confidence, self-efficacy, collective identity, and political consciousness. Women leaders participated in exposure visits observing successful women's organizations, engaged policy dialogues at county level, received media training developing self-representation capacity, and benefited from ongoing accompaniment by project gender specialists.

5.3.3 Young women capacity-building and entrepreneurship

The project's programming integrated technical training in climate-smart aquaculture with entrepreneurship development, financial literacy, and leadership cultivation. Training targeted young women (ages 18-35) with demonstrated interest in marine livelihoods but facing barriers to entry due to limited capital, skills, or social networks.

The curriculum combined classroom learning with hands-on peer learning exchanges, and mentorship from established entrepreneurs. Young women participants received training in seaweed farming, IMTA management, fish pond development, crab fattening, business planning, financial management, marketing, and value addition. Critically, training connected technical skills with enabling resources: SACCO membership providing startup capital, BMU positions offering governance experience, and peer networks facilitating knowledge sharing and mutual support.

Entrepreneurship initiatives deliberately challenged age-based hierarchies positioning young people as dependents rather than contributors. By demonstrating economic viability and technical competence, youth entrepreneurs shifted community perceptions while modeling livelihood pathways for peers (Meali et al., 2025).

5.3.4 SACCO establishment and financial inclusion

The formation of four women-led Savings and Credit Cooperative Societies (SACCOs) represented cornerstone empowerment intervention. Village Savings and Loans Associations (VSLA) - in which members pool resources for saving and borrowing - have demonstrated significant impacts on women's empowerment, business investment, and financial inclusion across developing countries (Karlan et al., 2017). Evaluation across Ghana, Uganda, and Malawi found that VSLA access increased household businesses by 6%, extended business duration by 9%, increased monthly business profits by 24%, and importantly, boosted women's empowerment and household decision-making authority (Karlan et al., 2017).

The BE Project's SACCO model combined traditional rotating savings and credit with formal registration, institutional banking linkages, and integration with transformative gender dialogue. SACCOs provided members access to affordable credit without collateral requirements, safe savings mechanisms earning returns, emergency funds for shocks, business training and mentoring, and collective bargaining power for market negotiations.

Beyond economic functions, SACCOs operated as social infrastructure strengthening women's networks, cultivating collective identity, creating platforms for peer support, and building confidence through successful management of substantial financial resources. Regular SACCO meetings became spaces where women discussed business challenges, shared market intelligence, problem-solved collectively, and supported each other's personal and economic development (Omondi et al., 2025).

Research demonstrates that savings group impacts extend beyond immediate participants. Access to SACCOs reduces households' vulnerability to idiosyncratic shocks, channels resources toward expensive investments like housing improvements, increases female labor market participation, and in poorer areas fosters greater agricultural specialization (Galdo & Vera-Cossio, 2020). Essentially, women's increased access correlates with enhanced say in household decisions (Karlan et al., 2017).

5.4 Key Findings

5.4.1 Shifts in Agency and Decision-Making Authority

Project assessments documented measurable improvements in women's agency across multiple indicators. Women's participation in household economic decisions increased by 42% from baseline. Control over income from own work showed substantial gains, with 68% of women participants reporting sole or joint control over earnings compared to 34% at baseline. Participation in community meetings doubled, and women's willingness to voice opinions publicly increased dramatically (ACTS BE Project, 2025a).

These quantitative shifts reflected deeper qualitative transformations in women's self-perception and household dynamics. As a SACCO member explained:

"Before, I asked my husband for money like a child asking a parent. Now I contribute income, I save, I make business decisions. He still controls some things, but we discuss rather than him deciding alone. This change came gradually through our SACCO success and the gender training where we learned to communicate differently" (ACTS BE Project, 2025b).

However, research cautions that women's participation in economically demanding "male-typed" fishing tasks can paradoxically dampen the positive relationship between financial contributions and decision-making power, suggesting that violating gender norms incurs social penalties (Adjei et al., 2023). The BE Project's focus on seaweed farming and value addition - activities culturally associated with women, may have reduced such backlash, enabling economic gains to translate more directly into household authority.

5.4.2 Leadership and governance participation

Women's representation in BMU executive committees increased from minimal baseline levels (8% average) to 35% during the project. More significantly, qualitative assessments revealed that women committee members actively influenced decisions rather than merely holding symbolic positions. BMU meeting attendance by women members increased from 23% to 54%, and women's contributions to discussions became more frequent and substantive.

This governance transformation reflected combined effects of reforms mandating representation, targeted leadership training building confidence and skills, transformative gender dialogue shifting community norms, and demonstrated competence in SACCO management transferring to broader leadership contexts. As a male BMU chairperson acknowledged:

"We resisted women in leadership, thinking they lacked knowledge. But women SACCO leaders manage hundreds of thousands of shillings responsibly, resolve conflicts, make strategic decisions. This showed us their leadership capacity. Now some of our best BMU committee members are women" (ACTS BE Project, 2025c).

Youth participation in governance similarly improved, with several BMUs creating youth advisory positions following constitutional reforms. Youth representatives brought perspectives on technology adoption, climate adaptation innovations, and intergenerational knowledge transfer that enriched management discussions (Meali et al., 2025).

5.4.3 Norm change and attitude shifts

Shifts in gender norms and attitudes – while difficult to measure precisely, emerged clearly through qualitative assessments and participatory monitoring. Community members increasingly challenged norms restricting women's mobility, questioned assumptions that women lack business acumen, recognized women's knowledge about marine resources and markets, and acknowledged women's rights to control income they generated. Male participation in household tasks traditionally defined as "women's work" increased modestly but significantly. Several men reported regularly caring for children during wives' travel, and sharing domestic labor more equitably. While far from complete gender parity, these behavioral changes reflected meaningful norm shifts, particularly given deeply entrenched gender divisions (Achieng & Onyango, 2024).

Attitudes toward young women capability similarly evolved. Community elders who initially dismissed youth as inexperienced increasingly recognized their technical competence in aquaculture, business management, and technology use. This intergenerational shift created space for youth economic participation and governance contribution (Meali et al., 2025).

5.4.4 Collective action and network strength

Perhaps most significantly, the interventions strengthened women's collective action capacity and social networks. SACCO membership has created sustained platforms for peer support, information sharing, collective problem-solving, and coordinated market engagement. Women developed strong bonds through regular meetings, joint business activities, mutual assistance during crises, and shared identity as SACCO members and entrepreneurs.

This social capital proved invaluable for sustained empowerment. When individual members faced challenges, such as business failures, household conflicts, and community resistance, SACCO networks provided support enabling persistence. When market opportunities emerged, including bulk orders, new buyers, and value addition contracts, collective organization enabled capture of benefits through coordinated supply and negotiation. When policy engagement opportunities arose, such as county dialogues, media interviews, advocacy initiatives, networks mobilized participation and amplified voices.

Research on women's collective action in fisheries demonstrates that while collective organizations hold great potential for advancing women's interests, success requires dedication, accommodation, and sustained effort, and tensions among participants cannot be entirely obviated (various authors in GTD Special Issue 2020).

The BE Project's SACCOs experienced such tensions – disputes over loan defaults, conflicts regarding leadership, disagreements about business priorities – yet developed mechanisms for managing conflicts constructively through constitutions, conflict resolution training, and ongoing facilitation support.

5.5 Case Examples

5.5.1 Rehema Chome: From Trader to SACCO Chair and BMU Leader

Rehema Chome's journey exemplifies multidimensional empowerment. At baseline, Rehema operated as small-scale fish trader earning minimal income, excluded from BMU decision-making, lacking access to credit, and possessing limited confidence in her business capabilities. Through BE Project interventions, Rehema received business training, joined a newly formed SACCO, participated in transformative gender dialogue, and developed leadership skills through mentoring.

Within two years, Rehema had become SACCO chairperson managing membership of forty-five women with combined savings exceeding KES 1.2 million. Her business expanded to include seaweed value-added products alongside fish trading. She won election to BMU executive committee and began representing the BMU at county policy forums. As Rehema reflected:

"The training taught me I have capabilities I never recognized. The gender sessions helped me discuss changes with my husband. The mentoring showed me that women from similar circumstances can lead successfully. All these pieces together enabled my transformation" (ACTS BE Project, 2025d).

Importantly, Rehema's individual transformation catalyzed broader change. As SACCO chair, she is mentoring other women develope business skills and confidence. As BMU representative, she advocated for women's concerns in resource management. Her visible success challenged community assumptions about women's leadership capacity while demonstrating tangible benefits of gender equality for household and community wellbeing.

5.5.2 Fatuma Usi: Feminist Leadership in Coastal Transformation

Fatuma Usi's evolution from marginalized widow to recognized community leader illustrates feminist leadership's transformative potential. Fatuma's journey – documented extensively in project communications (Komba et al., 2022; ACTS BE Project, 2025e) – demonstrates how individual empowerment intersects with structural change to enable women's leadership reshaping community norms and opportunities.

Beyond her personal economic transformation through improved seaweed farming and value addition, Fatuma became vocal advocate for women's rights, mentor to other seaweed farmers, and champion for inclusive governance. She initiated women's caucuses within the local BMU, pressed for constitutional reforms guaranteeing gender balance, and represented women fishers at county policy forums. Her activism extended to challenging specific instances of discrimination – advocating when women were excluded from training opportunities, protesting when BMU benefits favored men, and supporting women facing household resistance to their business activities.

Fatuma's leadership style – combining assertiveness with collaborative problem-solving, grounding advocacy in practical concerns while articulating broader justice claims, maintaining cultural respect while challenging oppressive norms—resonated with community members across gender lines. As a BMU member stated:

"Fatuma doesn't just complain about problems. She proposes solutions and mobilizes women to implement them. Even men who initially opposed her leadership now respect her because she delivers results and includes everyone in planning" (Komba et al., 2022).

Fatuma's case illustrates that feminist leadership emerges not from extraordinary individual characteristics but from supportive conditions including economic empowerment enabling autonomy, collective organization providing support and amplification, skills training building confidence and capacity, and transformed norms legitimizing women's public roles (Torre et al., 2019).

5.6 Lessons Learned

5.6.1 Integration across empowerment domains is essential

The documented empowerment outcomes emerged from integrated programming simultaneously addressing economic empowerment, governance participation, social norm transformation, and collective organization. Single-dimensional interventions, such as providing credit without challenging decision-making patterns, offering skills training without addressing resource access, or promoting women's governance participation without transforming community norms, typically achieve limited sustained impact (Cole et al., 2020).

This insight aligns with global evidence emphasizing that gender equity in aquatic food systems requires integrating gender considerations into innovation development, building enabling environments for inclusive livelihoods, enhancing inclusive governance through gender-responsive policies, and employing transformative approaches addressing underlying structural barriers (WorldFish, 2021).

The BE Project's success stemmed from deliberately combining these pathways rather than pursuing any single strand.

5.6.2 Engaging men and boys is critical for sustained change

While women-focused programming proved necessary, engaging men and boys as transformation partners proved equally essential. Gender training that excluded men or positioned them as problems rather than partners generated resistance undermining other interventions. In contrast, inclusive dialogue creating space for men to examine costs of rigid masculinity, explore benefits of gender equity, and practice alternative behaviors catalyzed household and community norm shifts enabling women's empowerment (Achieng & Onyango, 2024).

This finding reflects global evidence that gender-transformative approaches must engage multiple stakeholders including women, men, youth, and governance structures to address power relations comprehensively (McDougall et al., 2021; Adam et al., 2024). However, such engagement requires skilled facilitation preventing men from dominating spaces or derailing conversations into defensive reactions.

Figure 10: *Bw. Tei Usi, Bahari CBO, holding a bundle of freshly harvested seaweed*

5.6.3 Collective organization multiplies individual empowerment

The SACCO model's effectiveness stemmed substantially from cultivating collective identity and mutual support alongside providing financial services. Women experiencing setbacks, including business failures, household conflicts, and community resistance, persisted because SACCO networks provided encouragement, practical assistance, and validation that challenges reflected structural barriers rather than individual inadequacy. This collective dimension proved as critical as economic benefits for sustained empowerment.

Research demonstrates that women's empowerment requires not only individual agency but also collective power through organizations enabling coordinated action, shared risk, amplified voice, and sustained mutual support (Alonso-Población & Siar, 2018). The BE Project confirmed this insight while revealing that cultivating such collective capacity demands ongoing facilitation, conflict resolution support, and structured governance preventing elite capture or fragmentation.

5.6.4 Measuring empowerment requires multidimensional approaches

Monitoring revealed limitations of single-indicator empowerment measures. Income changes alone inadequately captured empowerment's multidimensional nature. Women might increase earnings without gaining control over income. Asset accumulation could occur without enhanced decision-making authority. Governance participation might remain tokenistic without genuine influence. Comprehensive assessment required tracking indicators across economic, social, political, and psychological empowerment dimensions.

This methodological insight aligns with global calls for more rigorous, multidimensional approaches measuring women's empowerment in fisheries and aquaculture (Rice et al., 2024). Future programming should employ validated instruments like the Women's Empowerment in Fisheries Index (Pro-WEFI) assessing changes across multiple domains through mixed methods approaches combining surveys, focus groups, and participatory methods (WorldFish, 2021).

5.6.5 Long-term accompaniment necessary for deep transformation

Gender norm transformation and sustained empowerment require extended timeframes exceeding typical project cycles. Initial enthusiasm following training often faded when participants encountered resistance, setbacks, or structural barriers. Sustained accompaniment – ongoing mentoring, peer networks, refresher training, problem-solving support – proved essential for translating awareness into sustained behavioral change and institutional transformation.

These finding challenges project designs emphasizing rapid implementation and short timelines. Genuine gender transformation operates on different temporal scales than infrastructure installation or technical training. Supporting such transformation requires patient capital committing to multi-year engagement, adaptive programming responding to emerging challenges, and handover strategies ensuring community ownership and sustainability beyond external support (Stacey et al., 2019).

5.7 Implications for Future Work

5.7.1 Institutionalize gender transformation

The BE Project demonstrated that gender-transformative approaches achieve measurable empowerment outcomes in coastal fisheries contexts. Scaling such approaches requires moving from pilot initiatives to mainstream programming wherein gender transformation becomes standard practice rather than special intervention. This institutionalization demands several shifts including integrating gender analysis and transformative methods into all sectoral programming, building gender expertise within implementing organizations and government agencies, allocating adequate resources for intensive facilitation and long-term accompaniment, and establishing accountability mechanisms monitoring gender outcomes rigorously.

Global evidence suggests that despite policy commitments to gender equality, most fisheries and aquaculture projects implement gender elements poorly or not at all (Stacey et al., 2019). Overcoming this implementation gap requires addressing capacity constraints, organizational cultures resistant to transformation, and inadequate financing for labor-intensive gender work (Rabbitt et al., 2022).

5.7.2 Generational approaches are a resource to transformation

The youth aquaculture initiatives revealed that young people, when provided appropriate support, become powerful agents of coastal transformation bringing technological competence, innovative approaches, and openness to gender-equitable practices. Future programming should deliberately position youth as change agents rather than merely beneficiaries, creating pathways for youth leadership in governance, involving youth in designing interventions affecting their livelihoods, and facilitating intergenerational dialogue enabling knowledge exchange between elders and youth.

This generational approach aligns with emerging recognition that coastal sustainability requires engaging youth in shaping blue economy futures rather than assuming they will simply inherit and continue existing practices (Onyango & Mukubwa, 2025). Youth bring perspectives on climate adaptation, digital technologies, evolving markets, and social norms that prove increasingly essential for adaptive capacity.

5.7.3 Financial inclusion as empowerment foundation

The SACCO outcomes confirmed that financial inclusion, especially when combined with transformative gender approaches, provides powerful foundation for multidimensional empowerment. Future coastal programming should prioritize establishing sustainable community finance mechanisms providing women access to affordable credit, safe savings facilities, emergency insurance, and financial literacy training.

However, evidence cautions that financial inclusion alone proves insufficient without addressing broader structural barriers (Galdo & Vera-Cossio, 2020).

Emerging digital financial inclusion innovations offer promising opportunities for reaching remote coastal communities, reducing transaction costs, enabling flexible savings, and providing usage data for continuous improvement (Scott et al., 2017; CARE Uganda, 2017). However, gender gaps in mobile phone ownership and digital literacy require explicit attention to prevent digital financial services from exacerbating rather than reducing gender inequalities (Adam et al., 2024).

5.7.4 Intersectional approaches addressing multiple marginalization axes

While the BE Project focused primarily on gender and age, future work should adopt more explicitly intersectional approaches examining how gender intersects with wealth, ethnicity, disability, household structure, and other identity markers shaping differential vulnerabilities and opportunities (Ferguson, 2021). Intersectional analysis reveals how development interventions, including those pursuing equity objectives, can generate inequitable impacts when failing to account for multiple marginalization axes (Ferguson, 2021).

5.8 Conclusion

The Blue Empowerment Project's gender transformation and social empowerment initiatives demonstrated that coastal development interventions can achieve meaningful, measurable improvements in women's agency, resource access, governance participation, and collective power when employing genuinely transformative approaches. However, these outcomes emerged not from single interventions but from integrated programming simultaneously addressing economic empowerment, governance transformation, norm change, and collective organization over sustained engagement periods. Several fundamental insights emerged.

a)Empowerment proves multidimensional rather than unitary. Economic gains without enhanced decision-making authority, governance participation without resource access, or individual advancement without collective organization achieve limited sustained impact. Effective programming must address empowerment's economic, social, political, and psychological dimensions simultaneously.

b)Gender transformation requires moving beyond accommodative approaches that simply include women in existing structures toward transformative strategies explicitly challenging unequal power relations, engaging men and boys as partners, strengthening women's collective organization, and creating enabling policy environments.

While more demanding than conventional women's programming, transformative approaches generate more sustained, equitable outcomes.

c)Youth engagement proves essential for both intergenerational equity and coastal sustainability. Young people bring technical competence, innovative thinking, and openness to gender-equitable practices that prove increasingly critical for climate adaptation and livelihood diversification. Programs positioning youth as change agents rather than merely beneficiaries unlock substantial development potential.

d)Financial inclusion – particularly through women-controlled savings and credit organizations – provides powerful foundation for multidimensional empowerment when combined with transformative gender approaches, skills development, and governance participation. SACCOs operated simultaneously as economic infrastructure providing access to credit and savings, social infrastructure cultivating collective identity and mutual support, and political infrastructure building women's organized voice and bargaining power.

As Gender Specialist Kenneth Odary reflected on the empowerment journey:

"When we began, many questioned whether gender transformation was possible in conservative coastal communities with deeply entrenched patriarchal norms. But we learned that every community contains seeds of change – women hungry for recognition and opportunity, men uncomfortable with rigid masculinity expectations, youth seeking more equitable futures. Our role was cultivating those seeds through training, organization, and accompaniment while creating enabling conditions through policy engagement and institutional strengthening. The transformation we've witnessed proves that change is possible when communities are positioned as agents of their own empowerment" (ACTS BE Project, 2025f).

5.9 References

- ACTS BE Project. (2025a). Women-Led SACCOs Training Highlights [Video]. YouTube. https://youtu.be/T_CVs7OYDwM

- ACTS BE Project. (2025b). Rosalia Neema shares her experience and takeaways from the BE Project Women-Led SACCOs Training [Video]. YouTube. https://youtu.be/BiC_RaYWxO4

- ACTS BE Project. (2025c). Voices from the community [Video]. YouTube. https://youtu.be/GX0ifEAi79M

- ACTS BE Project. (2025d). Rehema Chome shares her experience and takeaways from the BE Project Women-Led SACCOs Training [Video]. YouTube. https://youtu.be/K1Bb3eQFgNw

- ACTS BE Project. (2025e). Fatuma Usi on Championing Women's Empowerment and Sustainable Livelihoods [Video]. YouTube. https://youtu.be/rzfVuCKrjBk

- ACTS BE Project. (2025f). Gender specialist Kenneth Odary [Video]. YouTube. https://youtu.be/kfOhTdRudj8

- Adam, R., Lam, R. D., Lozano Lazo, D. P., McDougall, C., Rajaratnam, S., Ouko, K., Pasani, C., Forsythe, L., & Rossignoli, C. M. (2024). Using a sustainable food systems framework to examine gender equality and women's empowerment in aquatic food systems. Frontiers in Sustainable Food Systems, 8, 1327798. https://doi.org/10.3389/fsufs.2024.1327798

- Achieng, G. F., & Onyango, J. (2024). Transformative gender training for sustainable development (Info Note). Blue Empowerment Project, African Centre for Technology Studies. https://blueeconomy.acts-net.org/images/publications/Info_Briefs/Transformative-Gender-Training-for-Sustainable-Devt.pdf

- Adjei, P. K., Aboagye, A. S., & Osei-Tutu, B. (2023). What women do, believe in, and financially contribute—What matters more in couples' decision making? Gender inequality in Ghana's small-scale fisheries. Rural Sociology, 88(2), 397-425. https://doi.org/10.1111/ruso.12474

- Alonso-Población, E., & Siar, S. V. (2018). Women's participation and leadership in fisherfolk organizations and collective action in fisheries: A review of evidence on enablers, drivers and barriers (FAO Fisheries and Aquaculture Circular No. 1159). Rome: Food and Agriculture Organization of the United Nations.

- Aswathy, N., & Kalpana, N. (2018). Gender mainstreaming in fisheries: Insights from the artisanal fisheries sector in India. Maritime Studies, 17(3), 315-326.

- CARE Uganda. (2017). Household dialogue curriculum for gender transformation. CARE International.
- Choo, P. S., & Williams, M. J. (2014). Gender equality in the fisheries sector of the Coral Triangle. Asian Fisheries Science, 27S, 63-78.

- Cole, S. M., Kantor, P., Sarapura, S., & Rajaratnam, S. (2020). Gender-transformative approaches to address inequalities in food, nutrition and economic outcomes in aquatic agricultural systems. Gender, Technology and Development, 24(1), 1-19. https://doi.org/10.1080/09718524.2020.1729480

- Ferguson, C. E. (2021). Blue injustices: Marginalization and potential strategies toward equity within small-scale fisheries in Belize. Frontiers in Marine Science, 8, 625389. https://doi.org/10.3389/fmars.2021.625389

- Frangoudes, K., & Pascual-Fernández, J. J. (2023). A synthesis of women's participation in small-scale fisheries management: Why women's voices matter. People and Nature, 6(1), 267-282.

- Freeman, H. A., & Svels, K. (2022). Gender inclusion in ocean science and policy: The value of implementing structural reform. Marine Policy, 140, 104907. https://doi.org/10.1016/j.marpol.2021.104907

- Galdo, J., & Vera-Cossio, D. (2020). Saving toward sustained economic participation: The long-term impact of a savings group program in rural Mali. Inter-American Development Bank Working Paper Series No. IDB-WP-1206. https://doi.org/10.18235/0002910

- Harper, S., Adshade, M., Lam, V. W. Y., Pauly, D., & Sumaila, U. R. (2020). Valuing invisible catches: Estimating the global contribution by women to small-scale marine capture fisheries production. PLOS ONE, 15(3), e0228912. https://doi.org/10.1371/journal.pone.0228912

- Karlan, D., Savonitto, B., Thuysbaert, B., & Udry, C. (2017). Impact of savings groups on the lives of the poor. Proceedings of the National Academy of Sciences, 114(12), 3079-3084. https://doi.org/10.1073/pnas.1611520114

- Kawarazuka, N., & Béné, C. (2010). Linking small-scale fisheries and aquaculture to household nutritional security: An overview. Food Security, 2(4), 343-357.

- Komba, E., & Odary, K. (2024). Catalyzing agency for economic empowerment in Kwale and Kilifi counties: The peer-to-peer learning model for enterprises in Kilifi and Kwale. https://blueeconomy.acts-net.org/blog/catalyzing-agency-for-economic-empowerment-in-kwale-and-kilifi-counties-the-peer-to-peer-learning-model-for-enterprises-in-kilifi-and-kwale

- Komba, E., Odary, K., & Oduor, A. (2022). Feminist leadership: How Mama Fatuma is transforming the fortunes of women in a Kenyan coastal village. https://blueeconomy.acts-net.org/blog/feminist-leadership-how-mama-fatuma-is-transforming-the-fortunes-of-women-in-a-kenyan-coastal-village

- McDougall, C., Leder, S., Manlosa, A. O., & Meinzen-Dick, R. (2021). More equal, more sustainable: Linking gender equality and environmental sustainability. International Institute for Environment and Development (IIED) Briefing Papers.

- Meali, M., Nazi, B., Madzitsa, N., Kopa, A., Kondo, M., Onyango, J., Simiyu, B., & Wainaina, R. (2025). Field officer's perspective on women empowerment in the blue economy sector at the coast of Kenya. ACTS Press. https://blueeconomy.acts-net.org/images/publications/Booklet/Field_Officers_Perspective_on_Women_Empowerment_BE_Project.pdf

- Omondi, V., Mohe, B., Onyango, J., & Maina, A. (2025). Seaweed farming: An economic breakthrough for women in Kwale County, Kenya. https://blueeconomy.acts-net.org/blog/seaweed-farming-an-economic-breakthrough-for-women-in-kwale-county-kenya

- Onyango, J. (2023). Empowering coastal women communities in Kenya through inclusive business models. https://blueeconomy.acts-net.org/blog/empowering-coastal-women-communities-in-kenya-through-inclusive-business-models

- Onyango, J., & Mukubwa, C. (2025). Seaweed farming: Shaping the future of women, youth, and the blue economy. https://blueeconomy.acts-net.org/blog/seaweed-farming-shaping-the-future-of-women-youth-and-the-blue-economy

- Rabbitt, S., Lilley, I., Mangubhai, S., & Yakub, N. (2022). Optimizing women's participation in community-based fisheries management in Melanesia. Marine Policy, 142, 105120.

- Rice, J. C., Wichmand, J., Cohen, P. J., Hägg, S., Locke, C., Alarcón-Moscoso, D., Aswani, S., Campbell, J., Jara, B., Lawless, S., Mills, D., Ferrol-Schulte, D., Steenbergen, D., Song, A. M., Fabinyi, M., Frangoudes, K., Hill, N. A. O., Isaacs, M., Kawarazuka, N., & McDougall, C. (2024). The future of gender research in small-scale fisheries: Priorities and pathways for advancing gender equity. Fish and Fisheries, 25(1), 129-149. https://doi.org/10.1111/faf.12814

- Scott, L., Dolan, C., Johnstone-Louis, M., Sugden, K., & Wu, M. (2017). Enterprise and inequality: A study of Avon in South Africa. Entrepreneurship Theory and Practice, 41(1), 59-90.

- Stacey, N., Steenbergen, D. J., Clifton, J., Fitriana, R., & Wahyudin, Y. (2019). Transforming gender relations in a large-scale blue economy initiative in eastern Indonesia. Asian Journal of Women's Studies, 25(4), 472-493.

- Torre, J., Hernández-Velasco, A., Calvillo-Félix, S. G., & Martínez-Rincón, R. O. (2019). Looking for youth: Examining the potential role of young leaders in the sustainable development of small-scale fisheries in Mexico. Reviews in Fish Biology and Fisheries, 29(4), 803-820. https://doi.org/10.1007/s40152-019-00153-2

- WorldFish. (2021). Towards gender-equitable small-scale fisheries governance and development: A handbook in support of the implementation of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication. Penang, Malaysia: WorldFish. Program Report: 2021-19.

6 Chapter 6: Financing the Future: The Blue Empowerment Fund and Project Legacy

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The final chapter positions the Blue Empowerment Fund (BEF) as the central sustainability mechanism emerging from the project. It situates community finance models within evolving blue finance frameworks and demonstrates how SACCOs serve as local anchors for financial inclusion, savings culture, and enterprise growth. The chapter consolidates cross-cutting lessons from all project components and outlines a strategic roadmap for scale-up. It concludes that long-term resilience in Kenya's coastal communities requires institutionalised finance mechanisms, capacity strengthening, and ecosystem-informed livelihood innovation.

6.1 Introduction

In a sunlit meeting room in Mombasa, twenty-four women SACCO leaders gathered for the formal capitalization of the Blue Empowerment Fund (BEF). Each SACCO had received seed capital from the project, allowing the SACCOs to pool resources to create a revolving fund that would provide affordable loans for climate-smart aquaculture, value addition enterprises, and emergency needs long after the BE Project concluded. As one SACCO chairperson explained while at the SACCO leadership training:

"This fund is not just the project's gift to us - it's our own money, managed by us, for our communities' futures. The project helped us organize and learn, but this capital represents our collective power to sustain transformation ourselves" (Omondi et al., 2025).

This chapter positions the Blue Empowerment Fund as the central sustainability mechanism emerging from the project's integrated interventions. It examines how community finance – combining women-led SACCOs with the BEF revolving fund, creates institutional infrastructure capable of sustaining livelihood diversification, climate adaptation, and gender equity gains beyond external support. The narrative situates these community finance innovations within evolving blue finance frameworks while consolidating cross-cutting lessons from all project components. It concludes with strategic pathways for scaling integrated approaches that center community finance as foundation for long-term coastal resilience.

6.2 Context and Background

6.2.1 Emerging Blue Finance Architectures

Blue finance – financial instruments, mechanisms, and investments targeting sustainable ocean and coastal development – has emerged as critical frontier for mobilizing capital toward marine conservation and sustainable economic development (Sumaila et al., 2021). The global ocean economy, valued at USD $1.5 trillion in 2010 and projected to reach USD $3.0 trillion by 2030, requires substantial investment to transition toward sustainability while adapting to climate pressures (Sumaila et al., 2021).

However, current blue finance flows remain inadequate and inequitably distributed. UN Sustainable Development Goal 14 (Life Below Water) represents the most underfunded SDG, receiving only 0.01% of SDG financing through 2019 (Rare, 2025). Coastal seas – hosting the ocean's highest biodiversity concentration and greatest human dependence – receive less than 15% of ocean philanthropy despite their critical importance for food security and coastal livelihoods (Rare, 2025). Financing needed to protect 30% of the ocean is estimated at USD $9-12 billion annually, yet current Marine Protected Area spending globally totals only USD $1 billion (Rare, 2025).

Blue finance mechanisms range from large-scale sovereign debt instruments to community-level savings groups. Blue bonds – debt instruments financing marine conservation and sustainable ocean activities, have attracted significant attention, with early initiatives like Seychelles' USD $15 million blue bond (2018) demonstrating feasibility (Thiele & Gerber, 2017). However, critical analysis reveals that while blue bonds can mobilize capital for conservation, they also raise concerns about equity, community participation, and whether projects genuinely benefit local populations or primarily serve creditor and investor interests (Bennett et al., 2023).

6.2.2 The Missing Middle: Community-Scale Finance

A significant gap exists between large-scale blue finance instruments and individual microcredit serving small-scale coastal entrepreneurs. This "missing middle" constrains community-led initiatives requiring capital levels beyond microfinance but below amounts attracting commercial lenders or bond investors. Community savings and credit organizations, such as SACCOs, Village Savings and Loans Associations (VSLAs), and rotating savings and credit associations, occupy this middle ground, mobilizing community capital while building financial capabilities and social infrastructure.

Research demonstrates that SACCOs generate impacts extending beyond financial inclusion. Meta-analysis of 90 empirical evaluations found that SACCO participation improves household welfare, consumption, savings rates, women's empowerment, and food security outcomes (Galdo & Vera-Cossio, 2020; Karlan et al., 2017).

Notably, these impacts persist over time, demonstrating sustainability beyond program intervention periods. However, SACCOs face persistent challenges including limited initial capitalization constraining loan capacity, weak financial management capabilities risking collapse, governance challenges including elite capture and exclusion, and minimal linkages with formal financial systems limiting growth potential. Addressing these challenges while preserving SACCOs' community-controlled character represents ongoing innovation frontier in development finance.

6.2.3 Blue Economy Financing Gaps in African Coastal Communities

African coastal communities face compounded financial exclusion. Only 43% of adults in sub-Saharan Africa have accounts at formal financial institutions, with women and rural populations experiencing even lower access rates (World Bank, 2018). Small-scale fishers and fish processors – disproportionately women – rarely qualify for commercial credit due to perceived risks, informal nature of their enterprises, lack of collateral, and limited financial literacy. This financial exclusion fundamentally constrains adaptive capacity, livelihood diversification, and climate resilience (Oduor & Makayoto, 2022).

Traditional development interventions have attempted addressing this gap through microfinance programs, often with limited success due to inappropriate loan terms, high interest rates, and failure to address underlying structural barriers. Moreover, conventional microfinance typically operates on extraction model wherein capital flows from communities to external lenders through interest payments rather than circulating within communities building local wealth.

The BE Project's finance strategy deliberately positioned community-controlled capital accumulation as alternative to extractive microfinance while creating pathways for sustainable self-financing beyond project timelines.

6.3 Implementation mechanisms

6.3.1 SACCO Formation and Institutional Development

The project supported establishment of four women-led SACCOs across target communities, providing intensive capacity-building in financial management, governance, bookkeeping, loan assessment, and conflict resolution. Unlike conventional SACCO programs emphasizing rapid formation and high membership numbers, the BE approach prioritized institutional strength, democratic governance, and integration with broader empowerment programming (Omondi et al., 2025).

SACCO formation followed structured processes beginning with community mobilization explaining cooperative finance principles and benefits. Interested members formed provisional groups developing draft constitutions, leadership structures, and operational procedures through participatory deliberation.

Following registration with county cooperative departments, SACCOs commenced operations with regular contribution cycles, building savings capital while members learned financial management through practice.
Training addressed multiple domains beyond basic bookkeeping including business planning and feasibility assessment, market analysis and value chain understanding, group dynamics and conflict management, gender equity in loan access and decision-making, and linkages with formal banking systems. This comprehensive capacity-building recognized that sustainable community finance requires sophisticated institutional capabilities rather than simply providing credit.

The project's gender-transformative approach ensured that SACCO governance genuinely empowered women rather than reproducing patriarchal patterns. Constitutional provisions mandated transparency and accountability, loan committees included diverse representation, and explicit discussion of gender dynamics in decision-making prevented male relatives from controlling women members' participation. As a SACCO member explained:

"In other groups, women join but their husbands control decisions. In our SACCO, the constitution requires that members must decide for themselves. That protection matters" (ACTS BE Project, 2025a).

6.3.2 The Blue Empowerment Fund: Design and Capitalization

The Blue Empowerment Fund emerged from recognition that individual SACCO capital, while valuable, remained insufficient for larger investments required by climate-smart aquaculture, value addition equipment, and emergency needs during climate shocks. The BEF concept involved creating pooled fund drawing capital from multiple SACCOs, generating economies of scale while maintaining community ownership and control.

Fund design involved extensive participatory deliberation addressing governance questions including contribution formulas, loan eligibility criteria, interest rates and repayment terms, default management procedures, emergency fund provisions, and representation on management committee. These deliberations generated shared ownership and institutional legitimacy that external imposition could never achieve (Maundu et al., 2023).

The capitalization strategy combined SACCO contributions with project seed funding and potential future contributions from county governments and private sector partners. However, the core principle established that SACCOs collectively owned and controlled the fund, with external contributions complementing rather than dominating community capital. This ownership structure proved essential for sustainability and accountability.

By project conclusion, the BEF had mobilized KSh 2.8 million (approximately USD $22,000) in initial capitalization, with 65% from SACCO contributions and 35% from project seed funding. While modest by commercial finance standards, this capital represented substantial sum for participating communities and demonstrated feasible pathway for continued growth through SACCO contributions, revolving loan repayments, and strategic external partnerships.

6.3.3 Business Development Services and Market Linkages

Financial access alone proves insufficient without complementary business development support. The project integrated SACCO programming with entrepreneurship training, market linkage facilitation, and value chain strengthening. Business model canvas training equipped SACCO members with analytical frameworks for assessing opportunities, identifying constraints, and designing viable enterprises (Maundu et al., 2023).

Peer-to-peer learning exchanges connected entrepreneurs across sites, enabling knowledge sharing about successful business strategies, market opportunities, and challenge mitigation. These exchanges generated invaluable practical learning while building networks that continued facilitating information exchange beyond formal project activities (Komba & Odary, 2024).

Market linkage work connected producers with buyers, reducing exploitative intermediation while improving price realization. Collective marketing through SACCO platforms enabled bulk sales, quality standards, and negotiating leverage that individual producers lacked. Some SACCOs evolved into producer cooperatives directly engaging buyers and capturing additional value chain margins.

6.3.4 Integration with Technical and Social Interventions

The finance component's effectiveness stemmed substantially from integration with technical aquaculture training, gender transformation programming, and governance strengthening. Women accessing BEF revolving fund for fish ponds had participated in technical aquaculture training and benefited from ongoing mentoring. SACCO members demonstrated enhanced business confidence because transformative gender dialogue had addressed household power dynamics constraining women's economic autonomy.

This integration reflected understanding that sustainable livelihoods require simultaneously addressing financial access, technical capacity, market opportunities, social norms, and governance systems. Siloed interventions addressing only one dimension typically achieve limited sustained impact (Onyango, 2023).

6.4 Key Observations

6.4.1 SACCO Performance and Member Outcomes

By project conclusion, the four SACCOs demonstrated strong institutional performance and member impacts. Average membership per SACCO reached 45 women, with combined membership exceeding 200 across target communities. Total SACCO savings balances reached KES 2.8 million (approximately USD $22,000) – substantial community capital accumulation representing genuine wealth-building rather than consumption smoothing.

Loan disbursement through revolving facility estimated at KES 1 million over project duration, with average loan sizes of KES 35,000 at 5% annual interest – dramatically lower than informal lenders charging 20-30% monthly rates. Loan repayment rates averaged 94%, demonstrating both member commitment and effective credit assessment processes. Loan utilization focused on productive investments including aquaculture inputs, and emergency needs during climate shocks or health crises.

Member testimonials documented multiple empowerment dimensions beyond economic benefits. Women reported enhanced household decision-making authority, increased confidence in business capabilities, stronger peer support networks, leadership skill development through SACCO governance, and recognition as legitimate economic actors within communities. As Rehema Chome reflected:

"The SACCO will give me more than loans. It will give me identity as business owner, skills as leader, and sisters who support me. These things matter as much as the money" (ACTS BE Project, 2025b).

6.4.2 BEF Operations and Early Impacts

The Blue Empowerment Fund commenced operations six months before project conclusion, providing early evidence of sustainability potential. Initial loan disbursements from the BEF totaled KSh 1 million, supporting investments beyond individual SACCO capacity including IMTA cage operational costs, large-scale seaweed production, input supply, and collective value addition facilities.

Critically, BEF governance demonstrated genuine community ownership and sophisticated management. The BEF management committee – comprising SACCO representatives, and county cooperative department observers - met several times reviewing revolving funds applications, monitoring portfolio performance, and adjusting policies based on experience. This participatory governance built management capacity while ensuring accountability to community stakeholders rather than external funders.

Early BEF challenges included loan demand exceeding initial capitalization, requiring priority-setting mechanisms and phased disbursement strategies. These challenges prompted ongoing refinement of BEF policies and operational procedures, demonstrating adaptive management capacity essential for long-term sustainability (Omondi et al., 2025).

6.4.3 Institutional Sustainability Indicators

Multiple indicators suggested strong potential for post-project sustainability. SACCO operational costs were covered by member contributions and loan interest income, eliminating dependence on external subsidies. Several SACCOs had established formal banking relationships, opening institutional accounts and accessing financial services independently. Registration with county cooperative departments provided legal recognition and regulatory oversight supporting continued operation.

More fundamentally, SACCOs had evolved beyond mere financial service providers to become core community institutions hosting various functions including adult literacy classes, health insurance enrollment, peer support groups, and platforms for collective advocacy. This institutional embeddedness suggested sustainability extending beyond financial viability to social necessity within community life.

However, risks remained. External competition from predatory lenders offering quick loans without governance requirements could undermine SACCO membership. Leadership transitions risked governance challenges if succession planning proved inadequate. Macroeconomic shocks or sustained climate impacts could strain loan portfolios beyond recovery capacity. Addressing these risks required ongoing support beyond project timelines, raising questions about appropriate handover strategies and continued accompaniment models (Komba & Odary, 2024).

6.5 Case Examples

6.5.1 Women Entrepreneurship Through BEF Capital

The Kibokoni wmen fishpond collective accessed BEF support for input after demonstrating initial success. Their experience illustrated how BEF capital could catalyze women entrepreneurship when combined with technical support and mentorship. The collective's BEF revolving financing of KES 330,000 - beyond any individual SACCO's loan capacity - enabled purchasing fingerlings for stocking, and acquiring feeds.

The expanded operation generated sufficient income that collective members decided to invest in SACCO membership, viewing it as pathway to continued capital access and business development support.

This intergenerational linkage – youth entrepreneurs becoming SACCO members while SACCOs accessing BEF capital for youth initiatives – demonstrated potential for sustainable finance ecosystems emerging from integrated programming (Onyango & Mukubwa, 2025).

The women collective also began mentoring other women interested in aquaculture entrepreneurship, creating knowledge transfer mechanisms sustaining innovation beyond project support. A collective member Salim explained:

"The BEF revolving fund support showed us that the community believes in women capacity. That confidence matters as much as the money. Now we're proving that women and young people can lead profitable enterprises while helping others start their own" (Meali et al., 2025).

6.5.2 Cross-SACCO Collaboration: The Seaweed Processing Workshop

Three SACCOs in southern Kwale County collaborated establishing collective seaweed processing centre using combined BEF capital. This inter-SACCO collaboration demonstrated sophisticated institutional cooperation emerging from strong networks and trust built through project-facilitated peer exchanges.

The centre provided shared processing infrastructure serving all the two SACCOs' members, generating economies of scale unachievable by individual groups. Members contributed raw seaweed, processed value-added products during scheduled shifts, and shared revenues proportional to input contributions. The facility also offered processing services to non-member farmers for fees, generating operational income while extending benefits beyond SACCO membership.

This collaborative model illustrated potential for SACCO federations or networks pooling resources for shared infrastructure while maintaining individual SACCO autonomy. It suggested pathways for scaling community finance impacts through strategic cooperation rather than merely expanding individual organizations (Omondi et al., 2025).

Figure 11: *Soap made from seaweed, crafted by the community in Kwale*

6.6 Lessons Learned

6.6.1 Community Ownership Essential, Not Optional

The BEF's sustainability potential stems fundamentally from genuine community ownership rather than merely community management of external resources. SACCOs contributed capital, controlled governance, made lending decisions, and captured benefits through interest earnings on their own pooled savings. This ownership structure created accountability to community stakeholders rather than external donors, fundamentally altering power dynamics.

Contrast this with conventional revolving fund models where external agencies provide capital, establish rules, and monitor compliance. Such models typically collapse when external oversight withdraws because communities lack ownership incentive for sustaining operations. The BE model's emphasis on community capital mobilization – though requiring longer timeframes and more intensive capacity-building – generated institutional legitimacy and sustainability that external capitalization cannot achieve (Galdo & Vera-Cossio, 2020).

6.6.2 Integration with Empowerment Programming Multiplies Finance Impacts

The finance interventions achieved transformative outcomes because they operated within integrated programming simultaneously addressing gender relations, technical capacity, governance systems, and market access. SACCO loans enabled women to invest in productive equipment, but gender transformation programming addressed household power dynamics that otherwise would have constrained women's economic autonomy.

BEF capital supported aquaculture enterprises, but technical training enabled effective use of that capital. This integration proved essential rather than merely complementary.

Research demonstrates that financial inclusion alone – providing credit without addressing structural barriers – generates modest impacts that fade over time (Scott et al., 2017). Transformative outcomes require simultaneously addressing multiple empowerment dimensions including economic resources, social norms, governance participation, and collective organization. The BE Project's integrated approach validated this understanding while demonstrating practical pathways for operationalizing integration.

Figure 12: *A woman in Kibuyuni spreading seaweed on raised racks to dry.*

6.6.3 Patient Capital and Long-Term Accompaniment Required

Community finance institution-building demands extended timeframes exceeding typical project cycles. The BE Project's four-year engagement enabled moving beyond initial SACCO formation to institutional strengthening, crisis management experience, leadership development, and establishment of sustainable finance architecture. Yet even this timeline proved insufficient for full maturation. SACCOs required ongoing mentoring addressing governance challenges, loan portfolio management, conflict resolution, and adaptation to evolving contexts.

This reality challenges project designs emphasizing rapid implementation and short-term outputs.

Genuine institutional transformation operates on different temporal scales than infrastructure construction or technical training. Supporting such transformation requires patient capital committed to multi-year engagement, flexible programming responsive to emerging needs, and handover strategies ensuring continued support rather than abrupt withdrawal (Karlan et al., 2017).

6.6.4 Linking Community Finance with Formal Systems Enhances Sustainability

While community ownership proved essential, connections with formal financial systems enhanced SACCO sustainability. Banking relationships provided secure savings, payment systems, institutional credibility, and pathways for potential growth capital. County government linkages generated legal recognition, regulatory oversight, and possibilities for public resource allocation. These formal linkages complemented rather than threatened community control when carefully designed.

However, formal system integration risks included regulatory compliance costs, bureaucratic procedures constraining flexibility, and potential loss of community character as SACCOs professionalize. Managing these tensions required deliberate attention to preserving community governance while selectively adopting formal system elements enhancing sustainability. The BE Project's phased approach – establishing strong community foundations before pursuing formal linkages – reduced risks while enabling eventual integration benefits.

6.7 Implications for Future Direction

6.7.1 The Blue Empowerment Fund as Replicable Model

The BEF model demonstrated clear replication potential across Kenya's coastal region and throughout the global South. The core elements – community-led SACCO formation, pooled capital fund with community governance, integration with technical and empowerment programming, phased formal system linkages – could be adapted to diverse contexts and scaled across geographies. However, replication requires addressing several critical factors.

- Initial capitalization demands strategic blend of community mobilization and external seed funding. While community ownership proves essential, external catalytic capital accelerates accumulation enabling larger investments sooner. Determining appropriate balance remains context-dependent requiring careful analysis of community savings capacity and investment timelines.

- Regulatory environments must facilitate rather than obstruct community finance. Burdensome compliance requirements, restrictive lending rules, or excessive bureaucratic procedures can undermine SACCO viability. Policy advocacy ensuring appropriate regulatory frameworks proves as important as direct SACCO support.

- The BE Project's county-level policy engagement created enabling conditions that facilitated SACCO operation and growth (Kalele et al., 2025a, 2025b).

- Technical support organizations with genuine community development orientation and capacity-building expertise prove essential. Organizations prioritizing rapid membership growth over institutional strength, emphasizing financial targets over empowerment outcomes, or lacking gender-transformative approaches risk creating fragile SACCOs vulnerable to collapse. Identifying or cultivating appropriate support organizations represents critical implementation prerequisite.

6.7.2 Innovative Blue Finance Mechanisms for Community Scale

Emerging blue finance innovations present opportunities for catalyzing community-scale coastal development while building on BEF foundations. Several mechanisms warrant exploration including outcome-based finance linking payments to verified results in fisheries sustainability, climate adaptation, or gender equity; parametric insurance providing automatic payouts when predefined climate triggers occur, protecting livelihoods without requiring complex claims processes; blue carbon finance enabling communities to generate revenue from mangrove conservation or seaweed cultivation's carbon sequestration; and impact investment vehicles channeling private capital toward community enterprises demonstrating social and environmental returns alongside financial viability (Sumaila et al., 2021; Rare, 2025).

However, these innovative mechanisms must genuinely serve community interests rather than primarily benefiting investors or intermediaries. Critical questions include whether communities meaningfully participate in design and governance, how risks and returns distribute between communities and investors, what safeguards prevent predatory terms or elite capture, and how these mechanisms complement rather than displace community-controlled finance like SACCOs.

The BE Project's experience suggests that communities require support navigating complex financial instruments. Technical assistance, legal guidance, and negotiation support prove essential for ensuring that innovative finance serves community development rather than merely accessing community assets or labor on exploitative terms.

6.7.3 County Government Roles in Sustainable Coastal Finance

County governments can play catalytic roles supporting community finance sustainability and scale through allocating budget resources for SACCO capitalization and technical support, establishing county-level revolving funds complementing community mobilization, providing loan guarantees reducing risks for formal lenders willing to serve coastal communities, creating regulatory environments facilitating rather than obstructing community finance, and integrating community finance support within county development frameworks ensuring sustained commitment (Kalele et al., 2025a, 2025b).

However, realizing this potential requires shifting county government approaches from control-oriented to facilitation-oriented, from targeting rapid outputs to supporting institutional processes, and from imposing external designs to supporting community-led initiatives. The BE Project's policy engagement cultivated such shifts through sustained dialogue, capacity-building, and demonstrating community finance effectiveness. Similar accompaniment processes may prove necessary in other contexts.

6.7.4 Research Priorities for Community Blue Finance

Several research priorities emerge from BE Project experience requiring systematic investigation. Longitudinal studies tracking SACCO performance and member outcomes over 5-10 years beyond project support would reveal sustainability factors and long-term impacts. Comparative analysis of SACCO models across contexts would identify design features generating greatest resilience and empowerment outcomes. Investigation of optimal linkages between community finance and formal financial systems could inform policy and practice. Assessment of innovative blue finance mechanisms' community impacts would provide evidence for scaling decisions. Documentation of SACCO federation or network models could guide strategies for achieving scale while preserving community ownership.

Such research should employ participatory methodologies positioning communities as co-investigators, combine quantitative outcome measurement with qualitative process documentation, examine both economic and empowerment dimensions, and maintain critical perspective questioning whose interests finance innovations ultimately serve.

6.8 Conclusion

The Blue Empowerment Fund and associated community finance infrastructure represent the project's most tangible sustainability legacy. While technical innovations, gender transformation, governance strengthening, and knowledge products generated important outcomes, sustainable community finance provides institutional foundation enabling communities to continue investing in climate adaptation, livelihood diversification, and gender equity long after external support concludes. Several fundamental insights emerged from the finance component.

Community ownership of capital and governance proves essential for sustainable finance rather than merely desirable principle. External capital provision without genuine community control generates dependency and typically collapses when external support withdraws. While slower and more demanding, approaches prioritizing community capital mobilization and democratic governance achieve sustainability that external financing cannot.
Finance interventions achieve transformative impacts only when integrated with complementary programming addressing social norms, technical capacity, governance systems, and market access. Financial inclusion alone—providing credit without transforming power relations or building capabilities—generates modest, transitory impacts. Transformative outcomes require simultaneously addressing multiple empowerment dimensions, which demands integrated rather than siloed programming.

Community finance organizations serve multiple functions extending beyond credit provision to include savings mobilization, social networking, collective action platforms, governance capacity-building, and crisis response. This multifunctionality enhances sustainability by embedding finance within broader community social infrastructure rather than operating as standalone service.

Emerging blue finance innovations present opportunities for catalyzing community coastal development but require critical scrutiny ensuring they genuinely serve community interests rather than merely accessing community assets on exploitative terms. Communities need support navigating complex financial instruments, and intermediary organizations must prioritize community empowerment over financial returns. As BEF secretariat member reflected on the finance legacy:

"The Blue Empowerment Fund represents more than money – it embodies communities' collective power to shape their own futures. When women control capital, when youth access startup resources, when communities decide investment priorities democratically, they exercise agency that no external intervention can provide. That agency – institutionalized through SACCOs and the BEF – constitutes our project's most important legacy. Long after we depart, communities will continue investing in their resilience, adaptation, and equity using institutional foundations we helped establish but they now own and govern" (ACTS BE Project, 2025d).

6.9 References

- ACTS BE Project. (2025a). Mimah Mohammed shares her experience and takeaways from the BE Project Women-Led SACCOs Training [Video]. YouTube. https://youtu.be/3CPNMYaQ874

- ACTS BE Project. (2025b). Rehema Chome shares her experience and takeaways from the BE Project Women-Led SACCOs Training [Video]. YouTube. https://youtu.be/K1Bb3eQFgNw

- ACTS BE Project. (2025c). Fatuma Usi on Championing Women's Empowerment and Sustainable Livelihoods [Video]. YouTube. https://youtu.be/rzfVuCKrjBk

- ACTS BE Project. (2025d). Dr. Catherine Kilelu on Policy and Governance [Video]. YouTube. https://youtu.be/WUOPsmfpCwo

- Bennett, N. J., Cisneros-Montemayor, A. M., Blythe, J., Silver, J. J., Singh, G., Andrews, N., Calò, A., Christie, P., Di Franco, A., Finkbeiner, E. M., Gelcich, S., Guidetti, P., Harper, S., Hotte, N., Kittinger, J. N., Le Billon, P., Lister, J., López de la Lama, R., McKinley, E., … Sumaila, U. R. (2023). Towards a sustainable and equitable blue economy. Nature Sustainability, 2, 319-329. https://doi.org/10.1016/j.marpol.2022.105319

- Galdo, J., & Vera-Cossio, D. (2020). Saving toward sustained economic participation: The long-term impact of a savings group program in rural Mali. Inter-American Development Bank Working Paper Series No. IDB-WP-1206. https://doi.org/10.18235/0002910

- Kalele, D. N., Ouma, N., Kimanga, F., Kopa, A., & Odary, K. (2025a). Institutionalizing and catalyzing gender responsive policies, and strengthening collaboration and coordination in Kenya's fisheries and aquaculture sector: Kilifi County multistakeholder policy dialogue report. ACTS Press. https://blueeconomy.acts-net.org/images/publications/Reports/Kilifi_Policy_Dialogue_Report.pdf

- Kalele, D. N., Ouma, N., Kimanga, F., Kopa, A. B., Ninyoha., & Odary, K. (2025b). Institutionalizing and catalyzing gender-responsive policies, and strengthening collaboration and coordination in Kenya's fisheries and aquaculture sector: Kwale County multistakeholder policy dialogue report. ACTS Press. https://blueeconomy.acts-net.org/images/publications/Reports/Policy_Dialogue_Report_Kwale.pdf

- Karlan, D., Savonitto, B., Thuysbaert, B., & Udry, C. (2017). Impact of savings groups on the lives of the poor. Proceedings of the National Academy of Sciences, 114(12), 3079-3084. https://doi.org/10.1073/pnas.1611520114

- Komba, E., & Odary, K. (2024). Catalyzing agency for economic empowerment in Kwale and Kilifi counties: The peer-to-peer learning model for enterprises in Kilifi and Kwale. https://blueeconomy.acts-net.org/blog/catalyzing-agency-for-economic-empowerment-in-kwale-and-kilifi-counties-the-peer-to-peer-learning-model-for-enterprises-in-kilifi-and-kwale

- Maundu, A., Obondo, J., Nazi, B., Mohamed, O., Kondo, M., Mohamed, M., Oduor, A., Makayoto, F., & Onyango, J. (2023). Business Canvas Model: Inclusive business training models for coastal fisher women in Kwale and Kilifi County (Info Brief No. 003/2023). Blue Empowerment Project, African Centre for Technology Studies. https://blueeconomy.acts-net.org/images/publications/Info_Briefs/Business-Canvas-Model.pdf

- Meali, M., Nazi, B., Madzitsa, N., Kopa, A., Kondo, M., Onyango, J., Simiyu, B., & Wainaina, R. (2025). Field officer's perspective on women empowerment in the blue economy sector at the coast of Kenya. ACTS Press. https://blueeconomy.acts-net.org/images/publications/Booklet/Field_Officers_Perspective_on_Women_Empowerment_BE_Project.pdf

- Oduor, A., & Makayoto, F. (2022). How aquaculture is shifting gender and socio-economic dynamics in coastal communities in Kenya. https://blueeconomy.acts-net.org/blog/how-aquaculture-is-shifting-gender-and-socio-economic-dynamics-in-coastal-communities-in-kenya

- Omondi, V., Simiyu, B. M., Ngule, A. M., Kakai, L. F., Mtava, B. N., Madzitsa, N. H., Maule, M. M., Karisa, M. M., Chidzuga, M. S., Mweni, R. K., Kopa, A., Mwarabu, M. K., & Onyango, J. O. (2025). Training Manual for Women-led SACCOs in the Blue Economy Sector. African Centre for Technology Studies.

- Omondi, V., Mohe, B., Onyango, J., & Maina, A. (2025). Seaweed farming: An economic breakthrough for women in Kwale County, Kenya. https://blueeconomy.acts-net.org/blog/seaweed-farming-an-economic-breakthrough-for-women-in-kwale-county-kenya

- Onyango, J. (2023). Empowering coastal women communities in Kenya through inclusive business models. https://blueeconomy.acts-net.org/blog/empowering-coastal-women-communities-in-kenya-through-inclusive-business-models

- Onyango, J., & Mukubwa, C. (2025). Seaweed farming: Shaping the future of women, youth, and the blue economy. https://blueeconomy.acts-net.org/blog/seaweed-farming-shaping-the-future-of-women-youth-and-the-blue-economy

- Rare. (2025). Blue finance: Investing in ocean solutions. Conservation Finance Alliance. https://www.conservation-finance-alliance.org/blue-finance

- Scott, L., Dolan, C., Johnstone-Louis, M., Sugden, K., & Wu, M. (2017). Enterprise and inequality: A study of Avon in South Africa. Entrepreneurship Theory and Practice, 41(1), 59-90.

- Sumaila, U. R., Walsh, M., Hoareau, K., Cox, A., Teh, L., Abdallah, P., Akpalu, W., Anna, Z., Benzaken, D., Crona, B., Derrick, B., Fakhri, M., Horneland, O., Huang, L., Khalilian, S., Mitchell, I., Nakayama, S., Pauly, D., Robinson, J., ... Zeller, D. (2021). Financing a sustainable ocean economy. Nature Communications, 12, 3259. https://doi.org/10.1038/s41893-021-00723-4

- Thiele, T., & Gerber, L. R. (2017). Innovative financing for the high seas. Aquatic Conservation: Marine and Freshwater Ecosystems, 27(S1), 89-99. https://doi.org/10.1002/aqc.2794

- Wandili, U., Omondi, V., & Simiyu, B. (2025). Riding the blue wave: Harnessing the blue economy for women empowerment and climate resilience in the coastal region of Kenya. https://blueeconomy.acts-net.org/blog/riding-the-blue-wave-harnessing-the-blue-economy-for-women-empowerment-and-climate-resilience-in-the-coastal-region-of-kenya

- World Bank. (2018). The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution. Washington, DC: World Bank.

7 Chapter 7: Conclusion

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This synthesis book will secure the legacy of the Blue Empowerment Project by presenting scientifically grounded, empirically rich, and policy-relevant insights that will guide future programming in Kenya's coastal blue economy. Through the consolidation of evidence, narratives, and strategic pathways – anchored by the Blue Empowerment Fund – the book will stand as a long-term resource for the project team, county governments, coastal communities, and the global research and practitioner community.

7.1 An Integrated Pathway to Coastal Resilience

The Blue Empowerment Project set out to demonstrate that Kenya's coastal communities could strengthen their resilience, diversify livelihoods, and advance gender equity through integrated approaches combining climate-smart aquaculture, transformative gender programming, community finance, and participatory governance. Four years of intensive implementation across Kilifi and Kwale counties have validated this proposition while revealing the complex realities, persistent challenges, and transformative possibilities inherent in coastal development work.

This closing chapter synthesizes overarching lessons emerging across all project components, consolidates evidence on what worked and why, examines sustainability mechanisms positioning communities for continued transformation beyond external support, and articulates strategic pathways for scaling integrated approaches to coastal blue economy development. It positions the BE Project not as terminus but as foundation – demonstrating principles, models, and institutional infrastructure that communities, governments, and development partners can build upon to achieve equitable, sustainable coastal futures.

7.2 What We Learned

7.2.1 Integration Proves Essential, Not Merely Desirable

Perhaps the most fundamental insight emerging from BE Project experience is that technical, economic, social, and governance interventions must operate as integrated system rather than parallel tracks. Climate-smart aquaculture innovations achieved transformative outcomes because they occurred alongside gender transformation addressing household power dynamics, community finance providing investment capital, governance strengthening ensuring inclusive decision-making, and market development enabling value capture.

This integration reflects coastal development's inherently complex, interconnected nature. Gender relations shape access to productive resources and technology adoption patterns.

Financial exclusion constrains adaptive capacity regardless of technical knowledge. Governance systems determine whose priorities guide resource management. Market structures influence whether innovations generate equitable benefits or reinforce existing inequalities. Interventions addressing only one dimension while ignoring others typically achieve limited sustained impact because change in one domain gets undermined by unchanged structures in others (Adam et al., 2024; Cole et al., 2020).

The BE Project's integrated design deliberately combined interventions across domains, ensuring that technical aquaculture training occurred alongside SACCO establishment, that gender transformation preceded governance reforms, that business development complemented market linkage facilitation. While demanding more complex programming and coordination, this integration proved essential for outcomes documented in preceding chapters.

7.2.2 Transformation Requires Challenging Power Relations

Accommodative approaches that simply include marginalized groups within existing structures without transforming underlying power relations achieve limited, fragile outcomes that often prove unsustainable (Stacey et al., 2019). The BE Project adopted explicitly transformative approaches challenging unequal gender norms, addressing household and community power dynamics, strengthening collective organization enabling coordinated action, and engaging multiple stakeholders including women, men, youth, and governance structures.

This transformative orientation manifested in multiple ways including constitutional reforms mandating women's representation rather than merely encouraging participation, transformative gender dialogue examining power relations rather than only providing skills training, SACCO governance ensuring women's decision-making authority rather than simply providing credit access, and policy engagement advocating for structural change rather than merely requesting program funding.

Research demonstrates that transformative approaches – while more demanding and sometimes generating resistance – produce more sustained empowerment outcomes than accommodative strategies (McDougall et al., 2021; Rabbitt et al., 2022). The BE Project's gender, governance, and finance outcomes validated this evidence while revealing practical strategies for operationalizing transformation in conservative contexts where resistance to change remains substantial.

7.2.3 Community Ownership Determines Sustainability

The project's most sustainable outcomes – particularly the Blue Empowerment Fund and women-led SACCOs – emerged from genuine community ownership rather than merely community management of external resources. Communities contributed majority financial capital, controlled governance structures, made strategic decisions, and captured benefits. This ownership created accountability to community stakeholders rather than external funders while building institutional legitimacy enabling sustained operation beyond project support.

Contrast this with conventional development models wherein external agencies provide resources, establish rules, implement programs, and monitor compliance. Such models often generate short-term outputs but rarely achieve sustained transformation because communities lack ownership incentive for maintaining systems once external support withdraws. The BE Project's emphasis on community mobilization, participatory decision-making, and community capital accumulation – though requiring longer timeframes and more intensive facilitation – generated ownership foundations enabling sustainability (Karlan et al., 2017; Galdo & Vera-Cossio, 2020).

7.2.4 Collective Organization Multiplies Individual Empowerment

Throughout project components, collective organization proved essential for sustained individual empowerment. Women experiencing setbacks persisted because SACCO networks provided encouragement and practical support. BMU reforms succeeded because organized women members advocated collectively rather than individually. Seaweed farmers captured better prices through collective marketing rather than individual sales. Youth entrepreneurs sustained motivation through peer networks rather than solo ventures.

This collective dimension reflects fundamental empowerment principle: individual agency requires collective power enabling coordinated action, shared risk, amplified voice, and mutual support (Alonso-Población & Siar, 2018; Torre et al., 2019). Development interventions targeting only individual empowerment without cultivating collective organization typically achieve limited sustained impact because individuals lack structural power to challenge inequitable systems or weather obstacles that inevitably emerge.

The BE Project deliberately invested in collective organization through SACCO formation, BMU strengthening, producer group development, and network facilitation across sites. These collective platforms proved as valuable as technical training or financial services for enabling sustained transformation.

7.2.5 Climate Adaptation Demands Social Transformation

The climate-smart aquaculture interventions revealed that technical innovations alone prove insufficient for building climate resilience. Communities demonstrating greatest adaptive capacity were those with strong social capital, inclusive governance, diverse livelihood portfolios, financial resources for weathering shocks, and collective problem-solving mechanisms enabling coordinated responses to changing conditions (Cinner et al., 2012; Galappaththi et al., 2021).

Climate adaptation thus requires simultaneously strengthening technical capacity for climate-smart practices, social capital through collective organization and networks, financial capacity through savings and credit mechanisms, governance capacity for inclusive decision-making and adaptive management, and knowledge systems integrating scientific understanding with community observations. Narrow technical interventions divorced from social transformation typically fail because communities lack enabling conditions for adopting, adapting, and sustaining innovations.

This insight challenges climate adaptation programming focusing primarily on technology transfer or infrastructure investment while treating social dimensions as peripheral. The BE experience demonstrates that social transformation—particularly gender equity and inclusive governance—proves prerequisite rather than consequence of climate resilience.

Figure 13: *Participants reflect on their businesses using the 10 - Step Business Model Canvas during the Training of Community Groups on Business Models in Kwale County.*

7.2.6 Long-Term Accompaniment Necessary for Deep Change

Gender norm transformation, institutional strengthening, and sustained behavioral change require extended timeframes exceeding typical project cycles. Initial enthusiasm following training often fades when participants encounter resistance, setbacks, or structural barriers requiring ongoing mentoring, peer support, refresher training, and problem-solving assistance for translating awareness into sustained action.

This temporal dimension challenges project designs emphasizing rapid implementation, short timelines, and quick exits. Genuine transformation operates on different time scales than infrastructure construction or technical training. Supporting transformation requires patient capital committed to multi-year engagement, flexible programming responding to emerging challenges, and thoughtful handover strategies ensuring continued support rather than abrupt withdrawal (Cole et al., 2020).

The BE Project's four-year implementation enabled moving beyond initial mobilization to institutional strengthening, crisis management experience, leadership development, and establishment of sustainable infrastructure. Yet even this timeline proved barely adequate for full maturation, suggesting that genuine institutional transformation may require 5-10 year commitments with phased handover to community ownership and reduced external support.

7.3 Evidence of Impact: Measuring Transformation

Across the domains documented in preceding chapters, the BE Project generated measurable improvements while acknowledging that important empowerment dimensions resist quantification.

- **Economic outcomes** included SACCO savings reaching KSh 2.8 million across four organizations, and Blue Empowerment Fund capitalization totaling KSh 1 million representing genuine community wealth-building.
- **Social empowerment outcomes** encompassed women's participation in household decisions increasing 42%, women's control over own income rising from 34% to 68% of participants, BMU meeting attendance by women more than doubling, leadership positions held by women increasing from 8% to 35% of BMU executive committees, and qualitative shifts in confidence, collective identity, and public voice documented through testimonials and participatory monitoring.
- **Technical outcomes** demonstrated IMTA system viability under community management, seaweed productivity improvements of 30-40% through infrastructure and training interventions, value addition creating new market niches and revenue streams, youth aquaculture enterprises achieving commercial viability, and adoption of climate-adaptive practices spreading beyond direct project participants through peer learning.

- **Governance transformation** generated constitutional reforms institutionalizing gender inclusion across twelve BMUs, policy commitments from both county governments advancing gender-responsive fisheries governance, participatory multi-stakeholder dialogues shifting government-community relationships, and comprehensive documentation creating knowledge resources for continued learning and replication.

However, quantitative indicators capture only partial transformation picture. Equally important but harder to measure are shifts in women's confidence and sense of entitlement to resources and opportunities, men's willingness to share domestic labor and decision-making authority, community recognition of women's and youth's capabilities and contributions, governance cultures becoming more inclusive and accountable, and collective efficacy – communities' confidence in their capacity to shape their own futures.

These qualitative empowerment dimensions emerged consistently through testimonials, focus group discussions, participatory monitoring, and field observations. They represent genuine transformation even if not easily reducible to percentage changes or statistical significance tests.

7.4 Sustainability Mechanisms: Beyond Project Closure

The BE Project invested deliberately in creating institutional infrastructure capable of sustaining transformation beyond external support. Several mechanisms position communities for continued development.

- **The Blue Empowerment Fund** provides sustainable financing mechanism owned and governed by communities, generating returns through loan interest that enable continued capital accumulation, supporting climate-smart investments and emergency needs, and demonstrating feasible pathway for community-controlled blue finance that doesn't depend on external donors.
- **Women-led SACCOs** operate as multi-functional community institutions providing financial services, social networks, governance capacity-building platforms, and collective action vehicles. With operational costs covered by member contributions and loan interest, SACCOs demonstrate financial sustainability while serving broader empowerment functions embedding them deeply in community social infrastructure.
- **Technical capacities** in climate-smart aquaculture, business management, financial literacy, and governance provide transferable skills enabling continued livelihood innovation. Peer learning networks facilitate ongoing knowledge exchange without requiring external facilitation, while community-based trainers can continue capacity-building beyond project presence.

- **Policy commitments** from county governments create enabling environments supporting continued coastal development programming, allocating county resources for BMU support and women's economic empowerment, and institutionalizing gender-responsive approaches within county fisheries departments.
- **Knowledge products** including manuals, training curricula, documentaries, info briefs, and academic publications provide accessible resources for learning, replication, and adaptation. These materials enable communities, government agencies, and development partners to build on BE innovations without starting from scratch.

However, sustainability faces ongoing risks including external competition from predatory lenders potentially undermining SACCO membership, leadership transitions risking governance challenges if succession planning proves inadequate, macroeconomic shocks or sustained climate impacts straining financial systems beyond recovery capacity, and potential policy reversals if county government priorities shift or leadership changes.

Addressing these risks requires ongoing accompaniment even after formal project closure. Models for continued support might include establishing regional resource centers providing technical assistance to SACCO networks and BMU federations, county government assuming facilitation and monitoring roles with development partner support, national-level policy advocacy ensuring continued prioritization of small-scale fisheries and gender equity, and research partnerships generating continued evidence and innovation.

7.5 Strategic Pathways Forward: Scaling Integrated Approaches

The BE Project demonstrated feasibility and effectiveness of integrated approaches to coastal development at pilot scale. Achieving transformation at scale requires strategic pathways translating lessons into broader programming, policy, and practice.

7.5.1 Pathway 1: Geographic Expansion Through Replication

The most direct scaling pathway involves replicating the BE model across additional coastal sites in Kenya and throughout the Western Indian Ocean region. Replication would adapt core elements – climate-smart aquaculture, gender transformation, SACCO establishment, BMU strengthening, policy engagement – to local contexts while maintaining integration principles and transformative approaches.

However, replication requires addressing several prerequisites including government commitment to collaborative governance and gender equity, adequate technical support capacity with genuine community development

orientation and gender expertise, sufficient financial resources for intensive programming and long-term accompaniment, and enabling policy environments facilitating community finance and inclusive governance.

Development partners and governments should establish regional learning platforms connecting implementers across sites, create resource repositories sharing curricula and tools, and invest in capacity-building for organizations leading replication efforts, particularly strengthening their gender-transformative approaches and participatory methodologies.

7.5.2 Pathway 2: Mainstreaming Within Sectoral Programming

Rather than parallel replication projects, the BE approach could be mainstreamed within broader coastal and fisheries development programming. This would involve integrating gender analysis and transformative methods into all sectoral interventions, combining technical fisheries programming with SACCO establishment and gender transformation, ensuring that aquaculture development projects include governance strengthening and policy engagement, and allocating adequate resources for intensive facilitation and long-term accompaniment rather than quick technical fixes.

Mainstreaming requires addressing organizational cultures, capacity constraints, and bureaucratic incentives within government agencies and development organizations. It demands leadership commitment, staff capacity-building, adjusted performance metrics valuing transformation over rapid outputs, and flexible funding enabling responsive programming.

7.5.3 Pathway 3: Policy and Institutional Reform

Scaling transformative impact requires enabling policy environments and institutional frameworks supporting community-led coastal development. Priority reforms include national fisheries policies explicitly prioritizing gender equity and small-scale fisher rights, regulatory frameworks facilitating community finance without excessive compliance burdens, county-level blue economy strategies centering community empowerment and inclusive governance, budgetary allocations supporting BMU capacity-building and women's economic empowerment, and institutional mechanisms ensuring coordination across government departments addressing coastal development.

Policy advocacy should emphasize evidence from BE Project and similar initiatives demonstrating that gender equity enhances rather than compromises fisheries sustainability and economic productivity. Engaging government as partner in co-designing reforms rather than external critic increases likelihood of meaningful change.

7.5.4 Pathway 4: Financial Innovation and Blue Finance Integration

The BEF model could be scaled through establishing county-level blue empowerment funds pooling resources from multiple communities with county government and development partner co-financing, creating regional SACCO federations enabling economies of scale while maintaining community ownership, developing innovative blue finance mechanisms linking community savings with climate finance, impact investment, or payment for ecosystem services, and piloting guarantee mechanisms reducing perceived risks of lending to coastal communities thereby attracting commercial financial services.

Such financial innovations must maintain community ownership and control while accessing larger capital pools. The BE experience suggests that strong community-level foundations – functioning SACCOs with democratic governance and demonstrated financial management – prove essential before pursuing complex financial linkages. Sequencing matters: building community capacity first, then gradually linking with formal systems.

7.5.5 Pathway 5: Knowledge Mobilization and Network Strengthening

Sustaining transformation requires continued learning, innovation, and knowledge sharing across communities, implementers, researchers, and policymakers. Strategic knowledge mobilization involves establishing communities of practice connecting coastal practitioners across organizations and countries, creating accessible knowledge repositories with practical tools, training curricula, and case studies, supporting participatory action research generating context-relevant evidence, facilitating South-South learning exchanges enabling peer-to-peer knowledge transfer, and ensuring that academic research informs and learns from practice through genuine research partnerships.

Digital platforms could facilitate virtual knowledge exchange complementing in-person learning events. However, technology should enhance rather than replace face-to-face relationship-building that proves essential for trust and sustained collaboration.

7.6 The Meaning of Empowerment

As the Blue Empowerment Project concludes, it's worth reflecting on what empowerment ultimately means in coastal development contexts. Empowerment proves multidimensional – encompassing economic resources, social networks, political voice, and psychological confidence. It operates at multiple scales – individual agency, household dynamics, community institutions, and policy environments. It requires challenging power relations while building collective capacity. And it demands sustained commitment over timeframes that challenge conventional project logic.

The women seaweed farmers who now control income and participate in BMU governance, the youth aquaculture entrepreneurs creating viable coastal livelihoods, the SACCOs managing substantial community capital, the BMUs with gender-inclusive governance, the county governments implementing gender-responsive policies—these represent genuine empowerment outcomes. Not perfect transformation; persistent challenges and inequalities remain. But meaningful progress creating foundations for continued advancement.

Perhaps most significantly, communities have gained confidence in their capacity to shape their own futures rather than remaining passive recipients of external interventions. That shift from dependence to agency, from objects to subjects of development, from recipients to leaders—that transformation constitutes empowerment's deepest meaning.

As Fatuma Usi, whose journey from marginalized widow to recognized community leader exemplifies the project's transformative potential, reflected during the closing ceremony:

"This project didn't give us empowerment – it helped us claim power we always possessed but didn't know how to exercise. We learned we could farm seaweed more productively, manage money responsibly, lead organizations effectively, influence policies, and support each other through challenges. These capabilities were always within us. The project created space for recognizing and developing them. Now we continue building on these foundations, knowing that our coastal futures depend on our collective action, not on waiting for external saviors" (ACTS BE Project, 2025).

That understanding—that communities possess inherent capabilities requiring supportive conditions to flourish rather than external solutions to problems—should guide all future coastal development work. The Blue Empowerment Project demonstrated what becomes possible when interventions center community knowledge, build on existing strengths, challenge power inequalities, and create institutional infrastructure enabling sustained community-led transformation.

7.7 Conclusion

Kenya's coastal communities face compounding challenges including climate change impacts, resource pressures, economic marginalization, and persistent gender inequalities. Yet they also possess remarkable resilience, sophisticated ecological knowledge, strong social networks, entrepreneurial spirit, and hunger for equitable opportunities. The Blue Empowerment Project sought to leverage these strengths while addressing structural barriers, demonstrating that different, more equitable coastal futures prove possible.

The project's integrated approach – combining climate-smart aquaculture with gender transformation, community finance with governance strengthening, technical innovation with policy engagement – generated measurable economic, social, governance, and empowerment outcomes documented throughout this book. More fundamentally, it shifted power relations, built collective capacity, created sustainable institutional infrastructure, and cultivated confidence in communities' ability to shape their own development trajectories.

As Kenya and other coastal nations advance blue economy agendas, the BE Project offers evidence and pathways for ensuring these agendas serve community wellbeing rather than merely extracting resources or exploiting labor. Blue economy development that centers gender equity, prioritizes small-scale fisher rights, builds community institutions, and creates enabling policy environments can enhance both ecological sustainability and social justice.

The foundations established through four years of intensive collaboration among communities, government, research institutions, and development organizations create platforms for continued transformation. The Blue Empowerment Fund, women-led SACCOs, strengthened BMUs, trained community members, policy commitments, and knowledge resources position coastal communities to continue their empowerment journeys long after external support withdraws.

However, realizing this potential requires continued commitment from all stakeholders. Communities must sustain the collective organization, democratic governance, and mutual support that enabled transformation. County governments must implement policy commitments, allocate resources, and maintain facilitation roles supporting community institutions. Development partners must provide patient capital, technical assistance, and advocacy support enabling scaling while respecting community ownership. Researchers must generate continued evidence, document innovations, and ensure knowledge reaches practitioners and policymakers.

The Blue Empowerment Project concludes, but the empowerment journey continues. The women who now lead SACCOs and serve on BMU committees, the youth creating climate-smart enterprises, the communities managing sustainable finance institutions, the county officials implementing gender-responsive policies—these actors will determine whether initial transformation catalyzes lasting change or fades as external support withdraws.

Their success matters not only for Kenya's coast but for demonstrating globally that equitable, sustainable blue economy development proves possible when communities are positioned as agents rather than subjects, when gender equity is treated as essential rather than peripheral, and when short-term projects deliberately create institutional foundations enabling long-term transformation.

Empowering coastal futures requires exactly this combination – community agency, gender equity, institutional strength, enabling policies, and sustained commitment. The Blue Empowerment Project has demonstrated the pathway. Walking it toward truly transformed coastal futures remains the continuing work of all who believe in justice, sustainability, and communities' power to shape their own destinies.

Figure 14: *African Centre for Technology Studies (ACTS) Climate Resilient Economies Programme Lead and Blue Empowerment Project, PI Dr. Joel Onyango discusses the 10 - Step Business Model Canvas with Community Groups in Kilifi County during the Business Models Training.*

7.8 References

- ACTS BE Project. (2025). Voices from the community [Video]. YouTube. https://youtu.be/GX0ifEAi79M

- Adam, R., Lam, R. D., Lozano Lazo, D. P., McDougall, C., Rajaratnam, S., Ouko, K., Pasani, C., Forsythe, L., & Rossignoli, C. M. (2024). Using a sustainable food systems framework to examine gender equality and women's empowerment in aquatic food systems. Frontiers in Sustainable Food Systems, 8, 1327798. https://doi.org/10.3389/fsufs.2024.1327798

- Alonso-Población, E., & Siar, S. V. (2018). Women's participation and leadership in fisherfolk organizations and collective action in fisheries: A review of evidence on enablers, drivers and barriers (FAO Fisheries and Aquaculture Circular No. 1159). Rome: Food and Agriculture Organization of the United Nations.

- Cinner, J. E., McClanahan, T. R., Graham, N. A., Daw, T. M., Maina, J., Stead, S. M., Wamukota, A., Brown, K., & Bodin, Ö. (2012). Vulnerability of coastal communities to key impacts of climate change on coral reef fisheries. Global Environmental Change, 22(1), 12-20. https://doi.org/10.1016/j.gloenvcha.2011.09.013

- Cole, S. M., Kantor, P., Sarapura, S., & Rajaratnam, S. (2020). Gender-transformative approaches to address inequalities in food, nutrition and economic outcomes in aquatic agricultural systems. Gender, Technology and Development, 24(1), 1-19. https://doi.org/10.1080/09718524.2020.1729480

- Galappaththi, E. K., Ford, J. D., Bennett, E. M., & Berkes, F. (2021). Adapting to climate change in small-scale fisheries: Insights from Indigenous communities in the global north and south. Environmental Science & Policy, 116, 160-170. https://doi.org/10.1016/j.envsci.2020.11.009

- Galdo, J., & Vera-Cossio, D. (2020). Saving toward sustained economic participation: The long-term impact of a savings group program in rural Mali. Inter-American Development Bank Working Paper Series No. IDB-WP-1206. https://doi.org/10.18235/0002910

- Karlan, D., Savonitto, B., Thuysbaert, B., & Udry, C. (2017). Impact of savings groups on the lives of the poor. Proceedings of the National Academy of Sciences, 114(12), 3079-3084. https://doi.org/10.1073/pnas.1611520114

- McDougall, C., Leder, S., Manlosa, A. O., & Meinzen-Dick, R. (2021). More equal, more sustainable: Linking gender equality and environmental sustainability. International Institute for Environment and Development (IIED) Briefing Papers.

- Rabbitt, S., Lilley, I., Mangubhai, S., & Yakub, N. (2022). Optimizing women's participation in community-based fisheries management in Melanesia. Marine Policy, 142, 105120.
- Stacey, N., Steenbergen, D. J., Clifton, J., Fitriana, R., & Wahyudin, Y. (2019). Transforming gender relations in a large-scale blue economy initiative in eastern Indonesia. Asian Journal of Women's Studies, 25(4), 472-493.

- Torre, J., Hernández-Velasco, A., Calvillo-Félix, S. G., & Martínez-Rincón, R. O. (2019). Looking for youth: Examining the potential role of young leaders in the sustainable development of small-scale fisheries in Mexico. Reviews in Fish Biology and Fisheries, 29(4), 803-820. https://doi.org/10.1007/s40152-019-00153-2




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