Reach Alliance

# Climate Resilience in Small-Scale Coastal Fisheries:

## Women Fishers in Hout Bay and Kalk Bay, Cape Town

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Center for Inclusive Growth

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*Cover photo:* Local African women fishing at tropical beach (photo by iStock)

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**FIGURE 1.** Stacked fishing nets used by small-scale fishers, supporting daily catch and livelihoods in Kalk Bay

## Executive Summary

This study examines women's climate resilience in coastal small-scale fisheries in Hout Bay and Kalk Bay in Cape Town, South Africa. We explore how climate change interacts with market structures, gendered divisions of labour, and institutional arrangements to shape women's adaptive capacity. Small-scale fisheries operate as interconnected social-ecological systems. Climate-related disruptions, such as shifting seasons, declining fish stocks, and increased frequency of extreme weather events such as storms, disrupt and reduce fishing days. Some have resulted in the physical loss of fish value-chain-related infrastructure and equipment. These changes heighten economic uncertainty across the sector. These impacts are unevenly distributed because women experience climate-related stress primarily through their ascribed gender roles and everyday experience of processing and selling the fish.

Our qualitative case study draws on semi-structured interviews, field observations, and photographic documentation collected during July 2025. Participants included fisherwomen engaged in resale, subsistence fishing, and fish cleaning. We also recruited fishermen for validation and examined how ecological, social, economic, and institutional factors shape people's adaptive capacity.

In Hout Bay, we found a highly regulated and male-dominated fisheries sector where men control licenses, vessels, and access to fish. Women are concentrated in postharvest roles such as cleaning and local selling. Climate change has shortened fishing seasons and reduced catch reliability. Fishermen increasingly prioritize international markets offering higher prices. This shift results in unstable local supply, directly undermining women's income despite their central role in sustaining household livelihoods.

In Kalk Bay, a historically entrenched gendered division of labour persists, with men controlling productive assets while women take part through resale, processing, and sometimes fishing for household consumption. While fisherwomen's adaptive strategies include diversifying sourcing networks and using digital platforms to reach customers, they remain constrained by restrictive licensing systems, high asset costs, informality, and exclusion from formal fisheries governance.

Across both sites, institutional and governance failures are a primary driver of vulnerability. Participants report no targeted government support for climate adaptation in small-scale fisheries, no financial protection during climate-related losses, and no mechanisms recognizing women's labour within official systems. The absence of gender-disaggregated data on income, licensing, and occupational roles reinforces policy invisibility and limits effective intervention.

Climate resilience in small-scale fisheries encompasses governance and equity issues in addition to the influence of deteriorating ecological systems. Adaptive capacity is shaped by asset control, market access, and recognition within decision-making structures. Without gender-responsive licensing, inclusive market regulation, targeted climate adaptation support, and improved data systems, climate change will continue to intensify gendered inequalities and undermine the long-term sustainability of coastal fishing livelihoods in Cape Town.

## Background

SDG 13 (Climate Action) calls for urgent and coordinated efforts to address climate change and its impacts, which are increasingly evident in coastal and marine ecosystems. These systems are highly interconnected and globally influenced, such that environmentally unsustainable practices in one region can generate cross-border effects. As climate change alters the distribution of species, degrades marine biodiversity, and disrupts ecosystem functioning, it directly affects the livelihoods of communities dependent on marine resources. In this way, climate impacts on oceans and coasts not only threaten progress toward SDG 14 (Life Below Water), but also undermine efforts to achieve SDG 1 (No Poverty) by eroding income sources and food security. These dynamics are further linked to SDG 10 (Reduced Inequalities) because vulnerable and marginalized communities, often most reliant on natural resources such as fish, bear a disproportionate share of these impacts. Together, these interconnections highlight the need for integrated approaches that address climate, ecological sustainability, and social equity simultaneously.

South Africa has an extensive coastline of approximately 3,900 kilometres, supporting a diverse and economically significant marine fisheries sector. In addition to a well-established commercial industry, an estimated 28,000 to over 30,000 households rely on small-scale and subsistence fishing for their livelihoods and food security. Overall, the sector supports more than 140,000 livelihoods and makes a notable contribution to the national economy.[1] However, in recent years, the fisheries sector has faced increasing pressures from overfishing, illegal fishing activities, and ecological changes associated with shifting climatic conditions.[2] These challenges have affected both the sustainability of marine resources and the communities that depend on them. At present, a large proportion of fishing activities is concentrated in the Western Cape Province, further shaping the spatial dynamics of the sector.

Kalk Bay and Hout Bay have served as foundational, small-scale fishing communities

1 "Ocean (Marine) Fisheries and Related Services Industry, 2023," Statistics South Africa.

2 "Status of the South African Marine Fishery Resources 2023," Cape Town, Department of Forestry, Fisheries and the Environment, 2023.

in the Western Cape, South Africa, since the nineteenth century. These areas have historically functioned as hubs for local fisherfolk, although they have been subjected to significant pressures from industrial modernization, and apartheid-era and post-apartheid regulations.

Kalk Bay's identity is deeply rooted in its origin as a nineteenth-century fishing village. Historically, these two coastal settlements were established as hubs for those whose livelihoods were connected to the sea. The town's maritime heritage remains visible in its distinctive architecture, narrow streets, and working harbour, all of which reflect a long-standing relationship between the community and the sea.

Colourful wooden boats (locally known as "chukkies") still bring in fresh catch, despite significant changes in the scale and legal structure of their operations over the last two decades. Since the introduction of the *Marine Living Resources Act* (1998) and subsequent quota systems, the landscape has shifted. Multi-generational fishing families who were once "commercial" by practice have been reclassified under the Small-Scale Fisheries (SSF) Policy.[3] This moves them away from individual commercial rights toward a collective cooperative model, where the community shares a "basket" of species.

Hout Bay was named Houtbaai ("Wood Bay") by Dutch explorers in 1652 because of its historically dense forests that supplied timber for the early Cape settlement. It later became an important fishing harbour. The *Group Areas Act* later displaced many traditional fishing families and reshaped the community's social landscape.[4]

Small-scale fisheries (SSFs) are complex social-ecological systems influenced by socioeconomic conditions and market demands operating from local to global scales.[5] They are highly dependent on natural resources for survival. However, increasing environmental degradation driven by both climate and nonclimate factors has made participation in the sector more demanding, often requiring significant effort and financial resources. While some actors can absorb these pressures, others struggle to cope. Although approximately 33 million fishers are engaged in SSF globally, the economic benefits derived from the sector are unevenly distributed, reflecting persistent global inequities.[6]

Many SSF participants come from low-income communities and play a central role in sustaining the livelihoods of millions of fishing households that rely on low-capital technologies.[7] Béné identifies a positive relationship between rural poverty and SSF participation, arguing that those dependent on SSF are among the most socioeconomically vulnerable groups due to their high exposure to natural, health-related, or economic shocks.[8]

Climate change impacts marine systems, including sea-level rise, ocean acidification, and the increasing frequency of extreme weather events, resulting in habitat degradation and declining fish stock productivity. These changes challenge traditional fishing practices and threaten the livelihoods of dependent communities. Small-scale fisherwomen are particularly vulnerable because of their limited access to adaptive resources, economic precarity, and structural barriers within governance systems. Most

3 "Marine Living Resources Act 18 of 1998," South African Government.

4 "The Group Areas Act of 1950," South African History Online, 19 December 2014.

5 Luis Outeiro, Sebastian Villasante, and Rashid Sumaila, "Estimating Fishers' Net Income in Small-scale Fisheries: Minimum Wage or Average Wage?" *Ocean and Coastal Management* 165 (2018): 307–18.

6 Ussif Rashid Sumaila, Yajie Liu, and Peter Tyedmers, "Small Versus Large-scale Fishing Operations in the North Atlantic," Evaluations and Policy Explorations, *The Sea Around Us* (2001): 28–35.

7 "The State of World Fisheries and Aquaculture 2020," Sustainability in Action FAO (2020): 244; *The State of World Fisheries and Aquaculture 2024: Blue Transformation in Action* (Rome: FAO, 2024), 264.

8 Christophe Béné, "When Fishery Rhymes with Poverty: A First Step Beyond the Old Paradigm on Poverty in Small-Scale Fisheries," *World Development* 31, no. 6 (2003): 949–75.

cooperative boards or fishing networks prioritize boat owners, often overlooking postharvest activities where the majority of women participate.

Effective resilience frameworks must therefore integrate ecological, social, economic, and institutional dimensions. Marine ecosystem health, biodiversity, and sustainable access to fish stocks directly shape SSF resilience.[9] Existing research highlights that maintaining healthy fish stocks and marine habitats, alongside diversifying catch strategies, are essential for coping with climate-related stressors. Sustainable fishing practices help keep fish populations within safe biological limits, strengthening ecological resilience. Ecological sustainability, in turn, underpins the long-term viability of fisheries supply chains and associated livelihoods, mediated by social, economic, and institutional dynamics.

*Communities with strong social ties and effective knowledge-sharing mechanisms demonstrate greater adaptive capacity in the face of climate impacts.*

## SOCIAL FACTORS

Social cohesion, local knowledge, and community networks are foundational to resilience in small-scale fisheries.[10] Communities with strong social ties and effective knowledge-sharing mechanisms demonstrate greater adaptive capacity in the face of climate impacts. In Cape Town, fisherwomen draw on local ecological knowledge to adapt fishing and postharvest practices to changing environmental conditions. This is linked to deeply rooted cultural norms that position women as custodians and nurturers of the natural environment.[11] Such knowledge and practices are often transmitted intergenerationally, particularly from mothers to daughters. However, women's marginalization from decision-making processes constrains their ability to influence resource allocation and policy development.

## ECONOMIC FACTORS

Economic resilience is shaped by income diversification, market access, and financial stability.[12] For small-scale fisherwomen, restricted access to markets and exposure to unfair pricing structures weaken their capacity to absorb climate-related shocks. Diversified and secure income sources provide financial buffers that enhance resilience. Strengthening economic resilience therefore requires improved access to equitable markets and the promotion of diversified livelihood strategies to reduce reliance on single income streams.

## INSTITUTIONAL FACTORS

Governance and institutional support are central to building resilience in SSF. Policy frameworks that prioritize climate adaptation, equitable resource distribution, and inclusive governance are essential.[13] Weak policy support and the under-representation of fisherwomen in governance structures reduce their adaptive capacity. As a result, many lack access to critical resources, including climate-adapted infrastructure and financial support for sustainable practices.

9 Juliette Jacquemont, Robert Blasiak, Chloé Le Cam, Maël Le Gouellec, and Joachim Claudet, "Ocean Conservation Boosts Climate Change Mitigation and Adaptation," *One Earth 5*, no. 10 (2022): 1126–1138.

10 Diego Salgueiro-Otero, Michele L. Barnes, and Elena Ojea, "Climate Adaptation Pathways and the Role of Social-Ecological Networks in Small-Scale Fisheries," *Scientific Reports* 12, no. 1 (2022): 15526.

11 Du Toit, Louisa Johanna Hannelie. "African Women Utilizing Indigenous Knowledge in Ecological Care: A Nature-based Solutions Perspective," *African Thought: A Journal of Afro-centric Knowledge* 1, no. se2 (2022): 3–37.

12 Andrew Dominguez, Brynn Rotbart, and Queenie Wei, "Understanding the Gender Dimension of Climate Change Vulnerability in Small-scale Fisheries," Master's project, Duke University, Nicholas School of the Environment, 2025.

13 Madeleine Gustavsson, Katia Frangoudes, Lars Lindström, María Catalina Álvarez Burgos, and Maricela de la Torre-Castro, "Gender and Blue Justice in Small-scale Fisheries Governance," *Marine Policy* 133, (2021): 104743.

# About Our Research

## POPULATION CONTEXT

Small-scale fisheries (SSF) generally include fishers who rely on marine resources for their livelihoods. (The word *fisher* refers to both fishermen and fisherwomen.)[14] The sector is typically male dominated: men more often engage in offshore fishing and are more visible in direct harvesting activities. In most contexts, women are primarily involved in postharvest activities such as fish processing and sales. Globally, women constitute approximately 40 per cent of the estimated 60.2 million people who are employed part-time or full-time along the SSF value chain.[15] As we mentioned earlier, close to 140,000 individuals depend on the SSF value chain in South Africa. Women's contributions to the fisheries sector are often indirect and informal, yet they are essential to sustaining the entire fisheries value chain. For instance, after harvesting, women play key roles in landing, sorting, processing, cleaning, recording, and conserving catch for small fishing communities, as well as managing accounts and payments at landing sites.[16] Despite this, their contributions remain systematically undervalued.

We conducted field research to generate gender-disaggregated data on small-scale fisherwomen living in coastal areas of Cape Town, South Africa, specifically at Hout Bay and Kalk Bay harbours. Addressing this data gap is critical for developing interventions that support climate-adapted infrastructure such as solar-powered cold storage and well-ventilated drying and processing areas enabling women fishers to store and sell fish under changing climate conditions. It may also inform the development of equitable policy frameworks aimed at compensating vulnerable communities, including early warning systems designed to match women's mobility constraints and caregiving responsibilities.

Hout Bay and Kalk Bay represent contrasting yet complementary small-scale fisheries contexts to examine gendered climate vulnerability and adaptive capacity. Hout Bay is characterized by a highly regulated and commercialized fishing sector with strong links to export markets where men dominate licensed harvesting and control access to vessels and supply. Within this setting, fisherwomen are concentrated in informal postharvest roles such as cleaning and local selling. They are particularly exposed to climate-driven fluctuations in catch availability and market diversion. Kalk Bay, by contrast, reflects a smaller-scale and historically rooted fishing community where gendered divisions of labour are deeply entrenched, and women sustain local value chains through resale, processing, and subsistence fishing.

While fisherwomen in Kalk Bay demonstrate adaptive strategies such as flexible sourcing and informal marketing, these efforts remain constrained by licensing regimes, limited asset ownership, and exclusion from formal governance structures. Across both sites, women's livelihoods are shaped less by direct environmental exposure and more by how climate change interacts with market dynamics, institutional arrangements, and gendered power relations, making these harbours critical sites for examining how climate impacts are mediated through social and economic structures within small-scale fisheries.

We wanted to understand how resilient subsistence and small-scale fisherwomen in Cape Town are to climate-related challenges, and which ecological, social, economic, and institutional factors contribute to or constrain their adaptive capacity. We aimed

- to explore how resilient small-scale fisherwomen in Cape Town are to climate change-related impacts
- to describe ecological, social, economic, and institutional factors that contribute to or

14 Stephanie Buechler, Karen Lopez-Olmedo, Claudia Rebeca Navarrete-Torices, et al. "Climate Change Perceptions and Responses of Male and Female Fishers in the Gulf of California, Mexico," *Current Research in Environmental Sustainability* 10 (2025): 100323.

15 "Illuminating Hidden Harvests: The Contributions of Small-Scale Fisheries to Sustainable Development," FAO (2023): 40.

16 Sara Harper, Marina Adshade, Vicky Lam, Daniel Pauly, and Ussif Rashid Sumaila, "Valuing Invisible Catches: Estimating the Global Contribution by Women to Small-Scale Marine Capture Fisheries Production," *PLoS One* 15, no. 3 (2020): 0228912.

hinder their adaptive capacity
- to explore gender-specific challenges small-scale fisherwomen in Cape Town face in accessing resources, markets, and decision-making processes for climate adaptation, and how these compare to those that male fishers face.

We collected data primarily from field interviews. We conducted interviews in July 2025. We used a semi-structured interview guide to elicit narratives related to our study objectives. We also used photos, field notes, and observation to complement the interviews. All data, including photos and field notes, were securely stored on an encrypted UCT OneDrive folder accessible to only authorized research team members. To ensure confidentiality, we removed personal identifiers and anonymized data with pseudonyms. Ethical approval was granted by the University of Cape Town Inter-Faculty Human Research Ethics Committee. We received informed consent prior to each engagement with participants included in this study. Table 1 shows the interviewees' demographic characteristics.

## DATA ANALYSIS

To identify key patterns and insights we coded interview transcripts, field observations, and notes using both predetermined codes (aligned with ecological, social, economic, and institutional factors) and emergent codes that arose from the data. The coding process followed an iterative cycle, allowing themes to evolve as new insights were gathered. After coding, we organized the themes to explore how small-scale fisher communities adapt to climate challenges.

**TABLE 1.** Demographic characteristics of study participants

| Participant | Age | Marital status | Role | Main livelihood activity | Fishing license | Main market |
|---|---|---|---|---|---|---|
| KB1 | 56 | Married, 3 sons | Fish reseller (Langanas) | Buys fish from fishermen, resells to public/restaurants | Yes | Public, restaurants, social media buyers |
| KB2 | 50 | Married, children | Subsistence fisher | Recreational and household fishing | No | N/A (non-commercial) |
| HB1 | 32 | Single | Fisherman | Fishing | Yes | International/ local |
| HB2 | 45 | Not disclosed | Fisherman | Fishing, maintenance of boats | Yes | International/ local |
| HB3 | 53 | Married, son | Fisherman | Fishing | Yes | International / local |
| HB4 | 40 | Married, 4 children | Fish reseller/ cleaner | Works as a seller | No | Public, retail/ wholesale |
| HB5 | 52 | | Fish reseller/ cleaner | Works as a fish seller | No | Retail selling |
| HB6 | 57 | Married | Fish reseller/ cleaner | Buys and resells | No | Retail selling |
| HB7 | 59 | Widow, no children | Fish reseller/ cleaner | Works as a seller | No | Public, retail selling |

**FIGURE 2.** Interview by the ocean, Kalk Bay 2025

## Gendered Labour, Market Challenges, Climate Impacts

### HOUT BAY

Seven respondents participated in the interview at Hout Bay harbour. We assigned unique identities starting with HB to each one of them. Thus, we named respondents HB1 to HB7. They told us how the fishing industry is predominantly led by men and heavily regulated by the government. Fishers need to obtain a license, which is issued with certain terms and conditions, including the type of fish they intend to catch and a demonstration of relevant skills, capital, and the location where the license holder is permitted to fish. According to HB2, "there are almost no fisherwomen who can participate in offshore fishing activities, at least at Hout Bay harbour." They said this is because of barriers to entry including a requirement to obtain licenses and expected relevant skills required for fishing. Fisherwomen who can fish are hard to reach in this context. Rather than actively fishing, the women involved in fisheries at this harbour work as sales personnel or fish cleaners/processers.

**Effects of climate change on the fishing industry.** Low fish harvest in specific periods influences low local fish supply. Although we didn't interview a large number of people, we heard consistent stories. People's experiences in both Hout Bay and Kalk Bay reveal a common trend. Based on the conditions applied to their licenses, fishermen at Hout Bay are permitted to catch two types of fish, longfin and yellowfin.

Longfin tuna are harvested more in the summer season, whereas the yellowfin tuna harvest is better in winter. A prolonged summer would typically yield a bumper longfin harvest relative to yellowfin. Thus, a prolonged winter leads to losses for the business.

HB3 told us that "catching of fish is highly dependent on the weather. Generally, winter is associated with fewer fishing activities relative to the summer season. Sometimes, the business is completely shut down to avoid irrecoverable costs. To be specific, June to October are the months with the lowest fish harvest. The normal to highest catch runs from September/October through December, then from February to mid-June. However, … this year's fishing period [2025] ended in May, not June as expected, because winter started earlier. January to February is associated with bad weather, so the fishing activities are mostly avoided."

**Climate change impacts contagion challenges.** Fishing as a business involves estimating profit margins. If the fish harvest is bountiful, the supply for sale is expected to be high. On the other hand, a low harvest means a low supply. Of course, the selling price responds to the levels of supply and demand. Traditionally, high demand

pushes the price up, while high supply lowers prices. As HB4 said of the two types of fish that are handled postharvest: "By its nature, yellowfin tuna must be sold quickly because it spoils easily. Otherwise, it needs to be frozen. Once it is frozen, the value decreases, and so does the price. For this reason, it is the buyer who controls the price."

Fishermen at Hout Bay either export to America when it's longfin or to Spain for yellowfin; otherwise, they supply to local fishery companies who resell locally to the public for consumption and for businesses in hotels and restaurants. They typically prioritize international over local buyers because the foreign currency used in the exchange is perceived to be stronger than the Rand. They also have the opportunity of earning extra profit if the foreign currency exchange is in their favour.

The viability of the fishing business is a well-calculated gamble based on a game of chance. Sometimes fishermen are lucky to catch more, but on other days, they harvest just a handful of fish. Either way, they still have costs, some of which are fixed. All these costs are supposed to be covered with revenue from their sales. If fishing results in a low harvest due to unfavourable weather, the quantity of fish supply is low, leading to low income generation and challenges in covering the costs.

Fishermen are also vulnerable to losses or reduced revenue when there's low demand for fish by international buyers, for example, if the country the fish is exported to already has the same type of fish in abundance. When that happens, fishers are forced to sell as soon as possible locally, where the buyer controls the price.

**Sellers' challenges due to climate change.** Fish sellers and/or cleaners are in the middle of the supply chain. They buy fish from the fishermen to resell in bulk or retail. Because fishermen prefer exporting and treat local buyers as a second priority, this makes the fish supply unpredictable for local buyers who are mostly women who buy for resale. If there is a low supply, the revenue that sellers expect to earn from fish sales is cut, and this negatively affects their household income.

Almost all the people we interviewed agreed that climate change has been exacerbating the challenges they face in their business. This is because when the fishermen experience low fish harvest due to climate change, the effect spills over to the local sellers. Thus, low fish harvest leads to low supply and less revenue. One of our respondents described how, over the past five years, the quantity of fish has been decreasing each year. When asked whether the business is good for women or men, they indicated that it is not gender sensitive. Anyone can become a fish seller. Since climate change is a global problem, it is not fair or feasible to use funds from the business to invest in climate change adaptation programs. In most cases they also don't have enough savings. Any income they generate from the sales is mostly used to support their family.

**Other related challenges in the fishing business.** This is how HB1 explained the nature of the fishing business:

> Fishing has no guarantees. Fishermen may or may not harvest enough to cover the costs, including fuel, food, and payment for workers. Sometimes it is a zero-sum game. For instance, they can invest ZAR 40,000 [approximately CAD 3,400] only to harvest 30 fish. And sometimes, they harvest more than expected. If losses are repeated, it becomes a challenge to finance the business because of the fixed costs. In addition, the maintenance of the boat may require a huge amount of money. Unfortunately, there is no organization either from the government or the nonprofit community that exists to address the challenges that fishermen are facing to date in Hout Bay.

## KALK BAY

Kalk Bay is a coastal fishing community and a residential suburb in the city of Cape Town. It has a rich history that has included the


**FIGURE 3.** The coastal mural and streetscape reflecting the fishing economy where women sell to local butcheries

Indigenous Khoekhoe, European, Indian, and Filipino populations. The early fishing population consisted primarily of enslaved people from Bengal, Indonesia, and Ceylon.

The stories we heard from the fishing community in Kalk Bay highlight a nuanced and gendered division of labour shaped by history, identity, and access to resources. We heard varied stories with different motivations, yet they all expressed a deep respect for the ocean or the peace that being on the ocean brings. Our interviewees spoke of how the ocean had provided a livelihood inherited through generations. We learned that while men owned most of the productive assets such as boats and equipment, women were primarily relegated to postharvest activities underserved within the fisheries policy and support systems.

**Resilience and adaptation in the face of unpredictable catches.** A well-known small-scale fisher (we refer to as KB1) is an independent reseller, sourcing from licensed small-scale fishermen. She used her position in the community, word of mouth, and digital platforms including Facebook, WhatsApp, and YouTube to access markets. She explained how she sends a voice note to her private Whatsapp group, saying, for example, "I've got prime Yellowtail coming in at 11:00 a.m. Come and get it!" A chef can reply instantly, securing the best catch of the day. At the bay we witnessed a chef coming in to collect. She said "I post videos and pictures on Facebook of the 4:00 a.m. fog over Kalk Bay and chukkies coming back with the catch."

These patterns show resilience and adaption when faced with regulatory constraints. KB1 expressed pride in being "the only woman" from her immediate community actively working at the harbour, despite the stigma of "smelling like fish." She reported declining fish stocks and unpredictable catches due to colder waters and increased winter storms. This highlights her awareness of climate changes that affect her livelihood.

Another small-scale fisherwoman (KB2) participated in noncommercial fishing with her husband, primarily for household consumption and as a social activity. Although her fishing does not generate significant income, it influences other women to take on roles within the production side of the value chain and feed their families. She told a story of other women and men starring at her or coming up to her to show their admiration and say "Well done. We see you." She is breaking the patriarchal bias and opening up fishery work for younger girls to see themselves handling fishing equipment. KB2 learned her skills from her husband. She observed changes in temperature and rainfall but reported minimal direct impact on her fishing, possibly due to the small-scale, subsistence nature of her activities.

The third small-scale fisherwoman we interviewed (KB3) was a cleaner within a processing role, which is an essential yet undervalued role. Fisheries management in South Africa focuses almost exclusively on Total Allowable Catch (TAC). This is measured by what comes off the boat. Because cleaners don't *extract* the fish from the ocean, they don't appear in the Department of Forestry, Fisheries and the Environment (DFFE) databases. To the government, they don't exist as "fishers." Her reluctance to engage in the study indicated a lack of trust toward outsiders due to extractive research practices or false promises of support. KB3 asked us, "Did you get permission from the harbour master first before we talk?" in a manner that suggested that she might dismiss the interviewer.

**Equipment costs as barriers to women's participation.** The women in Kalk Bay identified the high cost of equipment, gear, and assets like boats as limiting their ability to expand their operations. This barrier to women's economic participation is exacerbated by rigid licensing regimes that do not take into consideration the gendered division of labour in fishing. For example, the *Marine Living Resources Act* (MLRA), which requires a fishing track record as a criterion for allocating fishing rights, disadvantages women engaged in postharvest activities. Because these activities are largely informal, women may struggle to produce documentation. Women's indirect contributions (processing, resale, support) remain unquantified in official records. There are also no gender-disaggregated socioeconomic data to improve these policies and interventions.

*While men dominate fishing at sea, women play critical roles in adding value, sustaining markets, and influencing community participation.*

**Climate change, income, and well-being.** Women's observations or responses relating to climate change awareness varied by how it affects their income and well-being. KB1 highlighted, "the long winters and higher temperatures affect how much time it will take for the fisher boats to come back with the harvest. And if they take longer, it means I have less time to sell and get back home to my other responsibilities." By contrast, KB2 observed the changes in climate and how this affected her husband's participation and their time together enjoying fishing for recreation. She observed the changes from a communal social cohesion perspective. "My husband's schedule becomes less predictable, and we have less time to fish just for leisure." Climate change is perceived differently based on the type of fishing activity — commercial operators like KB1 are more directly affected by stock variability than subsistence fishers like KB2.

Our interviews reinforced the literature's assertion that women's roles in fisheries are underrepresented and undervalued. While men dominate fishing at sea, women play critical roles in adding value, sustaining markets, and influencing community participation.

**FIGURE 4.** Distinct roles for men and women within the fisheries value chain

## Women's Vulnerability to Declining Fisheries

Climate change impacts the quantity of fish harvest, and this influences the level of fish to be supplied internationally or locally. Women in fisheries are more vulnerable to decreased earnings because structurally, their role depends on fish supply. Thus, if fewer fish are supplied due to low harvest, fisherwomen generate less revenues.

All of the fishers we interviewed said that they have been impacted by climate change's negative impacts in some of the following ways:

- observed changes in the duration of warm and cold seasons
- height and cycle of tides
- direction and strength of the wind which had a significant influence on the fish harvest and supply.

These climate change effects are increasingly affecting the sustainability of their fishing business.

Women are affected by various socio-ecological factors, including limited credit access, restricted educational opportunities, and obstacles to participating in resource management. They also face poor working conditions, marketing challenges, and poverty. Addressing this wide range of indicators is essential for developing solutions that support both conservation and development outcomes. In the context of Cape Town, we found that fisherwomen in the two harbours' fisheries are in the industry as employees so they can earn income to support their families as long as there are fish to work with. But climate change's negative impacts affect them. If there is a low supply of fish, they have fewer fish to sell and eventually less income. A low supply of fish due to unfavourable climate change impacts deeply affects them.

No one has any control over the supply. The local fish sellers get fish from the fishermen who decide where to sell. Given which market offers the highest prices, fishermen from Hout Bay prioritize international markets before considering local buyers. If the prices are better outside the country, they can deliberately decide not to deliver locally. This means the local supply of fish is reduced. Eventually, fisherwomen have less to sell and less income.

By contrast, fishermen's challenges are different. For example, they face the inability to cover certain costs of the operation. The maintenance of fishing gear and boats can be challenging if the income from the business can't cover the costs caused by climate change's negative impacts. And some costs are fixed regardless of the catch size. For example, wages to boat assistants and fish

catchers must always be paid regardless of the harvest size. If not enough income is generated from the business due to low fish harvest caused by climate change, it would be difficult to cover these fixed costs.

Sometimes, the international market reduces an order or completely cancels the order supply from the fishermen. This disrupts the supply chain of fish that fishers intend to sell internationally. When this happens, fishermen are forced to quickly sell locally to avoid storage costs. As a result, the fish is offered at a very low price which may lead to losses as well. In this scenario, meeting their fixed costs can be even more challenging.

Despite the challenges these fishers face, the government has not yet come up with programs to financially empower small-scale fishing at Hout Bay and Kalk Bay to be resilient to climate change impacts. This is somewhat in conflict with SDG 8 which calls for "inclusive and sustainable economic growth, employment and decent work for all." However, there are a number of ways to work around these challenges. For instance, fishers can consider using financial derivatives to minimize the risk of not being supplied with fish when they need it.[17] Fishermen should still be able to sell at a normal price even when they have high supply in stock. Additionally, the government must come up with programs that aim to support the industry financially.

## Lessons Learned

Climate change intersects with gendered labour arrangements, market structures, and institutional dynamics within small-scale fisheries. Women disproportionately experience climate-related disruptions through unstable income, limited control over resources, and weak institutional support.

Shifting seasons, reduced fishing days, and lowered or destabilized fish catches directly affect income across the fisheries system. When fishermen catch fewer fish, women who depend on local supply for selling, cleaning, or processing also earn less. The interconnectedness between ecological crises such as climate change and the reduction in catch and yield explains why women feel the effects of climate change even when they do not fish offshore themselves.

*The interconnectedness between ecological crises such as climate change and the reduction in catch and yield explains why women feel the effects of climate change even when they do not fish offshore themselves.*

Economic insecurity emerged as another key concern. Women working as sellers and cleaners face reduced supply and fewer earning opportunities. Most women lack savings or alternative income sources and therefore have little capacity to absorb repeated losses. Market structures further weaken their position. Fishermen prioritize international buyers who offer higher prices, leaving local sellers with uncertain access to fish.

Gender also shapes vulnerability through roles and access to decision-making spheres. Men dominate harvesting, licensing, and decision making, while women are concentrated in resale, processing, cleaning, and subsistence fishing. These roles support households and local food systems but remain informal and undervalued. Women faced barriers to entry into higher-earning activities due to the cost of boats and gear,

17 Financial derivatives are agreements made in advance between the buyer and the seller on the commodity that is delivered later. This helps to lock in the price and quantity. Thus, when the agreed time matures, the agreement dictates the seller to deliver the commodity (i.e., tuna) at the previously agreed price and quantity to the seller.

limited licensing opportunities, and exclusion from male-dominated networks. Institutional support for them remains largely absent. Participants identified no government programs, financial mechanisms, or climate-adaptation initiatives directed at small-scale fisheries in either harbour. The lack of gender-disaggregated data on income, licensing, and roles limited women's visibility and policy responses to it. Women's contributions continue to fall outside formal records, reinforcing exclusion from decision-making and resource allocation.

Climate resilience in small-scale fisheries depends on multiple systems beyond the condition of the natural environment. Climate resilience reflects how markets operate, who controls supply and licenses, and whose labour receives recognition and support. Women in Cape Town's small-scale fisheries remain essential to the sector's functioning yet carry disproportionate risk with limited protection. Without targeted data, inclusive governance, and financial support, climate change will continue to deepen existing inequalities and undermine livelihood sustainability within coastal fishing communities.

In both Hout Bay and Kalk Bay small-scale fishers lack financial "muscles" to sustain the business in difficult times. The local buyers in the fishing industry cannot control the supply of fish, especially when fishermen prioritize international markets. The fishermen can't control the price in a scenario where the supply of fish is unexpectedly high. These challenges could be addressed by coming up with financial support programs that aim to ease financial stress for SSF and using financial derivatives such as forward contracts to lock in prices.

## FINANCIAL SUPPORT

Livelihood activities differ by gender within fishing, and additional financial resources are needed to address gendered climate change impacts on livelihoods. These include resources that allow fishers to respond to such change by implementing diverse marketing strategies, such as restaurant and food stand creation at the point of sale or capture, that can translate into higher and more secure fisher incomes. It also includes fish processing facilities. The government could also introduce a funding program to support SSF during times of financial difficulties so that the fishing businesses remain sustainable.

## FINANCIAL DERIVATIVES

Financial derivatives are contracts designed to lock in the price of the underlying commodity, asset, or event. Primarily, there are four main types of derivatives: forwards, futures, options, and swaps. Out of the four, SSF forwards would be useful to agree on a price and quantity for the fish to be delivered in future. Both fishermen and buyers prepare to trade on the agreed date. This may work as a tool to hedge the risk of selling the fish at a very low price in the event the international buyer cancels the order. On the other hand, local buyers are certain to receive the agreed quantity and price for fish.

**FIGURE 5.** Fieldwork: observing small wooden boats called "chukkies" at Kalk Bay

# Research Team

**Muriel Malopa Makosani** is a Malawian PhD student from the Faculty of Commerce at the University of Cape Town. She recently published a book titled *Python Coding Simplified: Accessible Steps to Learn and Become a Programmer in Python* (Reach Publishers). She is a researcher, web designer, financial modeler, and programmer in Python, and R languages. Driven by the Sustainable Development Goals (SDG10, reduced inequality within and among countries), she is on a mission to bridge the technology knowledge gap that is among the "bottom billion" (coined by Paul Collier) countries by: making coding skills accessible as early as possible to all and promoting cryptocurrency market development. Her research work focuses on estimating velocities of cryptocurrency returns volatilities.

**Sidney Muchemwa** is a Zimbabwean occupational therapist and public health researcher. His research focuses on noncommunicable diseases across the lifespan, adolescent health, mental health, and the impact of ecological crises on these health outcomes in vulnerable communities. Sidney recently completed his MSc in occupational therapy at the University of Cape Town's Department of Health and Rehabilitation Sciences. His research examined the impacts of the triple planetary crises of climate change, biodiversity loss, and pollution among adults with common mental health conditions in rural and urban Zimbabwe.

**Tariro Nyimo** is a strategic leader with deep experience working at the intersection of policy, practice, and evidence. Tariro has supported governments, regulators, and development partners to advance financial inclusion, gender-responsive systems, and digital public infrastructure. Her work focuses on translating research and policy insights into scalable, context-specific solutions that strengthen inclusive economic ecosystems. Tariro holds a BSc in mathematics and statistics from the University of Zimbabwe, and an MBA from Nottingham Trent University. She is currently an MPhil candidate in inclusive innovation at the University of Cape Town.

**Darlington Sibanda** is an experienced climate adaptation and development researcher with over 15 years of working with communities to build resilience and reduce poverty. He explores innovative strategies to enhance resilience in vulnerable communities and natural systems. This includes tracking and assessing climate actions, and promoting transformative and equitable solutions that balance environmental sustainability and development. Currently, Darlington is a research fellow at the University of Cape Town and chair of the Adaptation Network of Southern Africa.

The **University of Cape Town (UCT)**, established in 1829, is South Africa's oldest university and one of Africa's leading higher education institutions. Located in Cape Town, South Africa, it is renowned for its research output, academic excellence, and picturesque campus on the slopes of Table Mountain. UCT offers a wide range of undergraduate and postgraduate programs across fields like science, humanities, engineering, commerce, law, and health sciences. The university is known for its commitment to social justice, innovation, and addressing African and global challenges, and it attracts a diverse student body from around the world.
**https://uct.ac.za**

Founded in 1827, the **University of Toronto (U of T)** is Canada's leading institution of learning, discovery, and knowledge creation. One of the world's top research-intensive universities, its students learn from and work with preeminent thought leaders through a multidisciplinary network of teaching and research faculty, alumni, and partners. Consistently ranked among the top 10 public universities worldwide, U of T has remarkable strengths in disciplines that span the humanities, social sciences, sciences, and the professions. U of T's three campuses host 93,000 undergraduate and graduate students from 159 countries, who are taught by 15,000 faculty.
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