

OPERATIONAL BRIEF

Sustainable Fisheries

BLUE ECONOMY FOR RESILIENT AFRICA PROGRAM



WORLD BANK GROUP

PROBLUE

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About the Blue Economy for Resilient Africa Program

The Blue Economy generated nearly US\$300 billion for the African continent in 2018, creating 49 million jobs in the process. These and other crucial benefits—most notably food security, livelihoods, biodiversity, and resilience to the effects of climate change—are entirely dependent on the health and productivity of coastal and marine areas.

By safeguarding productive coastal landscapes, countries will be in a better position to take full advantage of future Blue Economy opportunities, which range from sustainable blue energy to aquaculture to blue carbon.

The World Bank's Blue Economy for Resilient Africa Program, announced at COP27, will provide multisectoral analytical, financial, and policy support to Africa's coastal countries and island states to help them leverage the opportunities—and manage the risks—inherent in scaling up their Blue Economies.

About this series of briefs

The Blue Solutions for Africa series of operational briefs captures how a thriving Blue Economy can help African countries better manage the development challenges they face while supporting economic growth, sustainable livelihoods, and the health of these precious ecosystems.

THE BRIEFS COVER THE FOLLOWING THEMATIC AREAS

- Climate change
- Coastal and marine biodiversity and habitats
- Sustainable fisheries
- Marine pollution
- Jobs and livelihoods
- Participatory marine spatial planning
- Data management and knowledge creation
- Innovative financing instruments
- Developing and incentivizing institutions
- New frontiers of innovation



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Key Messages



To develop a resilient Blue Economy, Africa's coastal economies need to put in place effective measures to protect its marine and coastal resources, especially its fisheries.



These measures include putting in place a strong and effective policy and regulatory framework, which could include forming new marine protected areas and/or no-take zones.



Stronger capacity for sustainable fisheries management could involve working with fish farming communities to adopt climate-resilient aquaculture or mariculture, and implementing climate adaptation programs to strengthen the fisheries value chain.



Implementing these measures will build resilience to climate change, enhance food security, support the sustainable livelihoods of vulnerable fishing communities, and facilitate the creation of more and better jobs within the fishery value chain.



Regional cooperation and coordination are needed to limit the negative and enhance the positive externalities generated by national actions.

Introduction

Climate change will have implications for the sustainability of Africa's fisheries sector, with knock-on consequences for local livelihoods, income, nutrition security, and economic development. The effects of climate change are already being felt in some parts of the continent's vast coastline, where changes in species productivity and fish growth have been observed.

To better withstand climate change and the amplifying effects of human-induced changes to the marine environment, countries need to work across borders and at different levels to develop and scale solutions that foster sustainability, adaptation, and resilience. Partnership with and between regional organizations, neighboring governments, and local communities will be key. This brief describes the nature of these challenges and what can be done to address them before describing how the World Bank contributes to climate solutions based on knowledge creation, partnership across borders and scales, and innovative financing ranging from concessional public financing to private investment to projects that seek to ensure the financial inclusion of fishery communities.



The Challenge

Africa produces 7 percent of the total global fisheries and aquaculture production, according to estimates by the [Food and Agriculture Organization of the United Nations \(FAO\)](#).



The FAO further estimates that in 2020, global production totaled a record 214 million tons, generating more than US\$151 billion in exports, and employing an estimated 58.5 million people in primary production alone. Of this number, 21 percent were women and most were small-scale, artisanal fishers, and fish farmers in developing countries.



Across the world, those who depend on fisheries for their livelihoods, income, and nutrition security are especially vulnerable to climate change, which poses a significant threat to fisheries due to ocean acidification, [increasing sea-surface temperatures, and more intense storm events](#).

The most extensive impact of [El Niño episode occurred in 2015/2016](#), globally affecting around 60 million people through flash flooding, long dry season, and extreme cold weather. These effects are multiplying the impacts of human-induced stressors such as pollution, overfishing, and illegal fishing, which are altering fisheries' ecological systems.



[Africa is particularly vulnerable to climate change](#), given the unique characteristics of its marine ecosystems and high socioeconomic reliance on fisheries for food, jobs, livelihoods, and revenues. Variations of significance have already been recorded for rainfall, extreme climatic events (such as storms), sea surface temperatures, and sea-level rise. Estuaries along the tropical African coastline are also being severely affected by increased salinity due to climate change. This is [negatively impacting mangroves](#), which are critical fish nurseries, in turn driving food shortages, malnutrition, and reduced livelihoods in several countries.



All along the African coast, fishing communities report changes in fishing patterns and species caught. In 2013, the World Bank Group [surveyed 463 fishermen in Morocco](#), who reported fewer fishing days because of weather events, changes in species caught, increased sea temperatures, and shifts in current patterns. In Liberia, [the number of fishing days has decreased](#) because of longer rainy seasons.



Tropical West African countries stand to be the most affected by climate change. Simulation models forecast that the maximum catch potential will decrease by 30 percent by 2050 in many tropical countries, including Côte d'Ivoire, Equatorial Guinea, Gabon, Liberia, and São Tomé and Príncipe. The Horn of Africa, including countries in the coasts of the Red Sea and Gulf of Aden and Nigeria, also face substantial economic risk through changes in their fisheries. All African coastal countries will need to rethink their approach to fisheries management in response to climate change.



Aquatic foods contribute 50 percent or more of total animal protein intake in several African countries, including Sierra Leone, Ghana, and Mozambique. This is much higher than the 2019 global average of 17 percent, or 10.1kg per capita. This figure could be an underestimate because the contribution of subsistence fisheries, small-scale fisheries, and informal cross-border trade tend to be under-recorded.

Climate change threatens to reverse progress made in the fight against hunger and malnutrition. Climate change augments and intensifies risks to food security for the most vulnerable countries and populations through loss of rural livelihoods and income, loss of marine and coastal ecosystems, and livelihoods, and food insecurity and breakdown of food systems.



Climate change will also have broader impacts through effects on trade flows, food markets and price stability, and could introduce new risks for human health. Greatly expanded efforts to respond to climate change are needed immediately to safeguard the capacity of food systems to ensure food security.



Fisheries are a transboundary resource with transboundary challenges. Threats such as marine pollution and depletion of living marine resources due to illegal, unreported, and unregulated fishing—especially along the West African coastline, Red Sea and South-West Indian Ocean—are of transboundary nature that necessitates regional cooperation to define their causes, effects, and coordinated management actions. The countries face common constraints regarding their fisheries sector: insufficient governance, insufficient human and institutional capacity, and a fragile business environment.



Fisheries-dependent economies also face climate change impacts not linked to coastal or marine systems. These include the migration of human populations to follow changes in fish distribution; effects on fishery infrastructure due to sea level rise and increased storm surges; and an increase in losses throughout the production and distribution chain due to changes in the frequency, distribution, or intensity of weather events. The vulnerability of fisheries and fishing communities depends not only on their exposure and sensitivity to change, but also on a lack of ability to anticipate these changes and adapt.



Investing in the climate resilience and sustainability of fisheries will accrue the benefits the sector brings to the coastal economies and food security. The World Bank Group estimated that in 2012, the potential gains from good governance of fisheries were in the order of US\$50 billion per year from improvement in production efficiency alone. When market gains are also considered, sustainable net economic benefits—that is, net returns to capital including transfers to government, and net returns to labor—are estimated to exceed US\$100 billion per year. Building resilience can also help achieve the “triple dividend” of reduced severity of economic setbacks; productive investments that enable fishers and fishery value-chain businesses to take positive risks; and co-benefits of resilient measures.

What is Needed

Coastal economies that depend significantly on fishery resources need to put in place the following measures to protect these resources and build resilience to climate change, so helping to safeguard livelihoods and jobs while strengthening food and nutrition security.



Strengthen the fisheries policy and regulatory framework to ensure climate-resilient fisheries and aquaculture management.



Build capacity to support sustainably fisheries management, including addressing illegal, unreported and unregulated fisheries.



Take action to protect the fishery resources and their ecosystems such as creating marine protected areas or no-take zones; helping fish-farming communities adopt climate-resilient aquaculture/mariculture and diversifying their livelihoods; strengthening the fishery value chain so that it is better able to withstand climate and other externalities; and raising awareness about the impacts of climate change on the fisheries sector.



Protect public assets such as fishery infrastructure from climate impacts through climate-informed planning and design. Policy, planning, and budgets should be developed with a climate-resilience lens.



Support good governance across the sector that enables all affected stakeholders, including fishing communities, the public sector, and business to make climate-informed and coordinated decisions on how to sustainably use marine resources, including through marine spatial planning.

Many marine and coastal challenges that are regional in nature, and addressing them jointly will be beneficial to the countries involved. As a transboundary natural asset, ensuring the health and resilience of fishery resources for long-term sustainability requires regional cooperation and coordination to limit negative and enhance positive externalities generated by national actions.



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How the World Bank Group Contributes to Solutions

The World Bank Group partners with countries and regions in Africa in piloting and scaling sustainable, climate-adapted fisheries solutions, drawing on its ever-growing knowledge base to develop and refine solutions that support sustainable, climate-resilient fishery management.

To date, [World Bank Group's support to fisheries in African regions and countries](#) has focused on:

- Integrating climate-resilient elements into fishery diagnostics, planning tools, and investments to secure ecosystem health and protect fishery sector assets.
- Taking local action towards sustainability and resilience of fisheries.
- Community co-management of resources and strengthening the value chain for economic and food security.
- Creating knowledge for better awareness, planning, and decision-making.
- Regional fisheries management as a model for regional consensus on conservation of resources and development of the sector.

Integrating climate resilience in fishery diagnostics, spatial planning tools, and investments

Sustainability and climate resilience are crucial for the health of Africa's fisheries and the millions of people who depend on them for their economic and physical wellbeing. The World Bank Group seeks to ensure that climate resilience is woven into the decision-making tools used when developing spatial plans and making investment decisions.

WITH WORLD BANK SUPPORT, THE FOLLOWING HAS BEEN ACCOMPLISHED:

- Morocco completed a Blue Economy diagnostic, which contributed to the development of a national marine spatial plan built around climate change considerations. The World Bank Group is now supporting Morocco's Department of Maritime Fisheries in piloting the marine spatial plan at the sub-national level along Agadir, on the 180km coastline of the Souss Massa region, to identify the best possible location for a marine protected area (MPA) that aims to promote the recovery of fish stocks and protect marine ecosystems. In the national context, the creation of new MPAs contributes towards Morocco's international commitments to form a network of protected areas covering at least 10 percent of the country's coastline. MPAs protect habitats and maintain the vital marine processes and fisheries and will provide climate resilience.

- Mozambique completed a Blue Economy diagnostic and developed a national marine spatial plan (POEMN) for its territorial waters, which came into effect in November 2021. The marine spatial plan was developed under the World Bank's [First South West Indian Ocean Fisheries Governance and Shared Growth Project](#), which provided financial and technical support to the government of Mozambique for the development of the MSP. The POEMN also established a multisectoral mechanism that focuses on climate resilience in current uses, including fisheries and potential future uses of marine space.
- The regional Program for Sustainable Fishery Development in the Red Sea and Gulf of Aden (SFISH) integrated climate resilient actions into subnational fishery planning.

Case study

MANAGING LOCAL MARINE RESOURCES BY WORKING ACROSS BORDERS

The World Bank Group with Global Environment Facility financing supported the Red Sea and Gulf of Aden Strategic Ecosystem Management Project.

The project has to date produced conservation and management plans that draw on site-specific climate vulnerability indicators combined with inputs from different levels of stakeholders in a flexible and iterative way. The management plans stipulate agreed rules governing the use of nets and fishing restrictions relating to spawning period while being reflective of social norms.

In Africa, the program has achieved the following to date:

- Two new marine protected areas (MPAs) have been declared: one in Sudan (in the Sanganeb Marine National Park and Dugonab Bay area) and one in Egypt (Qula'an eco-village at Wadi el Gemal National Park).
- A Standardized Monitoring Protocol Manual has been adopted by member countries for monitoring and reporting on marine ecosystem health and climate change stressors. Fishers have used this manual to conduct monitoring and surveillance at the Moucha Maskalli Islands MPA (Djibouti).
- Effective, coordinated, multi-level Strategic Ecosystem Management ensures that the oceans offer triple benefits: biodiversity preservation, sustainability of fishery resources, and carbon storage.

The follow-on US\$45 million Program for Sustainable Fishery Development in Red Sea and Gulf of Aden sees the World Bank Group reinforce the message with the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA) and its member states that marine management is a transboundary, regional matter.





Taking local actions towards sustainability and resilience of fisheries

The World Bank's West Africa Regional Fisheries Program helped several African countries engage in activities that aim to improve the resilience of their fishery resources:

- Mauritania developed an electronic fishery monitoring, control, and surveillance (MCS) system that reduces false reporting and provides real-time information to inform action, making it the first country to use such an electronic reporting system.
- Senegal is replicating Mauritania's success with electronic monitoring under the recently approved World Bank Group-financed Senegal Natural Resource Management Project.
- Kenya launched a US\$49.8 million Kenya Marine Fisheries and Socio-Economic Development (KEMSFED) project to eliminate or reduce illegal, unreported, or unregulated fishing in its territorial waters. According to unpublished research by the Kenya Marine and Fisheries Research Institute, Kenya loses US\$100 million annually to illegal, unreported, and unregulated fishing, primarily through the activities of larger vessels operating offshore. The KEMSFED Project supports: (i) the development of new regulations to improve fisheries management and provide opportunities for the Blue Economy sector in Kenya (for example, managements plans for priority species, nearshore management plans, and a Blue Economy strategy); (ii) the development of fisheries information monitoring systems, surveys, and assessments to better understand the stocks of priorities fisheries (such as prawns, octopus, tuna, and snappers) and population changes; (iii) the installation of a robust MCS strategy, which includes the implementation of a vessel monitoring system to monitor licensed, foreign vessels, control overfishing, and improve patrolling of territorial seas.



Community co-management of resources and strengthening the value chain for economic and food security

The World Bank Group works with partner countries to develop community co-management systems, which sees the government and users share responsibility for managing aquatic resources. Community co-management is an effective method for sustaining aquatic resources—and the livelihoods of communities depending on them.

The World Bank's approach to strengthening the value chain involves investing in fishery value chains, accruing short- to long-term economic benefits while strengthening nutrition security.

To date, the World Bank has partnered with countries to implement co-management systems in the following African countries:

- In Senegal, 12 community management pilots initiated through a predecessor project (the Senegal Integrated Marine and Coastal Resources Project) have been expanded under the West Africa Regional Fisheries Program. Of these, eight were granted management rights in legally recognized (gazetted) co-management areas.
- In Kenya, the Marine Fisheries and Socio-Economic Development project is working to organize local and women's groups to enable them to access matching grants that will allow them to purchase fishing equipment, add value to their fishing business, and acquire the knowledge and skills for better marine-based livelihoods opportunities. As in many African countries, fishing in Kenya is a male-dominated activity, with women's involvement limited to preparing and selling fried or dried fish.



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Case study

COMMUNITY CO-MANAGEMENT IMPROVES PRODUCTIVITY IN SENEGAL

The World Bank's West Africa Regional Fisheries Program has helped 12 community management pilots in Senegal scale up and develop and implement resource management measures, with one site reporting a 133 percent improvement in productivity after management measures were implemented.

Fishery associations formed with the support of Senegal's *Ministère des Pêches et de l'Economie Maritime* (Ministry of Fisheries and Maritime Economy) went on to develop several resource management regulations and enhancement measures, including:

- Declaring protected fishing zones and artificial reef immersion zones within marine protected areas
- Imposing gear restrictions
- Specifying closed seasons for fishing.

These and other measures have led to noticeable improvements in marine resources, including an increase in fish sizes at all sites and productivity gains. One community-led fisheries management pilot site even reported reaching 133 percent productivity.

In some communities, the program also helped fishers undertake alternative livelihoods to fishing by enabling direct lines of commercial micro-finance and block grants for public infrastructure and/or the start-up of enterprises by associations. In partnership with Credit Mutuel Senegal, a local micro-finance institution, 405 micro-loans (355 of which were to women entrepreneurs) were given to fishers and non-fisher residents in targeted communities. Ninety-two percent of these loans have already been repaid, with 98 percent of supported activities showing profitability.



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Creating knowledge for better awareness, planning, and decision-making

The World Bank Group is constantly working to develop its stakeholder-centric knowledge base in order to both strengthen awareness of climate change and resilience, and ensure that governance decisions are based on the best available science. Key knowledge products produced include [Climate Change and Marine Fisheries in Africa: Assessing Vulnerability and Strengthening Adaptation Capacity](#), which was developed under the World Bank's [Regional Partnership for African Fisheries Policy Reform operation](#). This report is one of the few studies available that assesses the climate vulnerability of marine fisheries at both country and continent level. The report has informed sustainable planning in several countries, and the methodology used has been further refined and [deployed at the country scale in Cabo Verde](#).

The World Bank Group also supports efforts by research institutes to improve knowledge on fish stocks and monitor the impact of climate change. Specifically, it has helped the following entities create knowledge for better management of fisheries at the regional level:



To the north-east, in the Red Sea and Gulf of Aden region, the World Bank is working closely with PERSGA to improve scientific knowledge of both anthropogenic and climate-induced changes that impact the effective management of living marine resources in the area, including fishery resources.

This knowledge will inform collective decision-making and plans for national actions to protect critical ecosystems.



To the east of Africa, the World Bank partnered with FAO's South-West Indian Ocean Fisheries Commission on developing collaborations with Indian Ocean coastal states to monitor the health and resilience of tuna fisheries in the region.

Effective and accurate communication of current scientific knowledge is a key component of the World Bank's approach to building sustainable and climate-adapted fisheries in Africa. This includes training local media channels to raise broad awareness about the value of marine resources and promote their sustainable management. To date, the following media education drives have been supported, among others:



In Senegal, the World Bank Group supported the production of weekly, hour-long videos in which government and community representatives discussed (in French or the local language, Wolof) various topics relating to marine ecosystems and livelihoods, including marine plastic pollution, aquaculture, co-management, coastal erosion, and forced migration. The weekly shows, which are available on [La Voix du Littoral's](#) (the Voice of the Coast's) [YouTube](#) and [Facebook](#) pages, were initially supported by Nordic Development Fund and are now funded under the World Bank-managed [West Africa Coastal Areas Management Program](#).



In Ghana, African journalists received [training on fact-based fisheries](#) reporting in workshops supported by the World Bank Group in partnership with the African Union Inter-African Bureau for Animal Resources, the United States Agency for International Development (USAID), and the West Africa Sub-Regional Fisheries Commission. Accurate reporting helps to build awareness about what is needed to secure the sustainable production of fishery resources, so creating an enabling environment for reforms.

The World Bank Group encourages knowledge-sharing among development partners to ensure harmonized investments and better use of financing while providing guidance to national and local partners, especially in fragile and conflict-affected countries, where knowledge creation is often a challenge.



Regional fisheries management

The World Bank Group supports regional organizations that are mandated to manage fisheries across country borders and between economic zones. Key among these organizations are the Sub-Regional Fisheries Commission in West Africa, the South-West Indian Ocean Fisheries Commission, and PERSGA.

The World Bank's support for the South-West Indian Ocean Fisheries Commission has allowed the organization to cooperate on the collection and sharing of fishery data, among other initiatives. This has enhanced regional fisheries governance by allowing all parties to monitor fisheries data and track compliance with regional agreements. Greater regional cooperation will enhance the countries' ability to influence international agreements, such as the [Regional Minimum Terms and Conditions](#).

In the Red Sea and Gulf of Aden region, the World Bank Group SFISH program is supporting the finalization, adoption, and ratification of a cooperation protocol between PERSGA member states. The protocol was developed to meet a need created by the absence of a dedicated regional fishery management organization. It aims to improve coordination among the member states and within different interest groups and institutions within the states; strengthen knowledge of the status of fish stocks in various territorial waters and beyond; develop regional solutions for monitoring, controlling, and surveillance systems to benefit from economy of scale; identify low-cost technologies for effective production and regional trade; and address the risks and impacts of climate change.



What Success will Look Like

Climate change will have implications for the sustainability of Africa's fisheries sector throughout the value chain. Species productivity and fish growth are already changing due to shifts in the distribution of fish, compounded by human-induced changes. Fishing operations are expected to be affected by extreme weather events such as cyclones and storm surges in the short term, as well as sea-level rise and increased temperatures in the long term. Climate-driven changes in fish availability, quality, processing, and trading will affect fish prices and market access, altering fish-related incomes and access to food.

To withstand the consequences of these changes, Africa's fisheries sector needs ongoing and future investment into solutions that foster sustainability, adaptation, and resilience. Success will depend on the continent's ability to understand local climate vulnerabilities and the risk they pose to fisheries, as well as how these relate to the socio-ecological systems of many coastal countries (see Figure 1). Importantly, it will depend on the continent's ability to transform and scale demonstrated solutions at the local, country, and regional levels.

Climate-driven changes in fish availability, quality, processing, and trading will affect fish prices and market access, altering fish-related incomes and access to food.

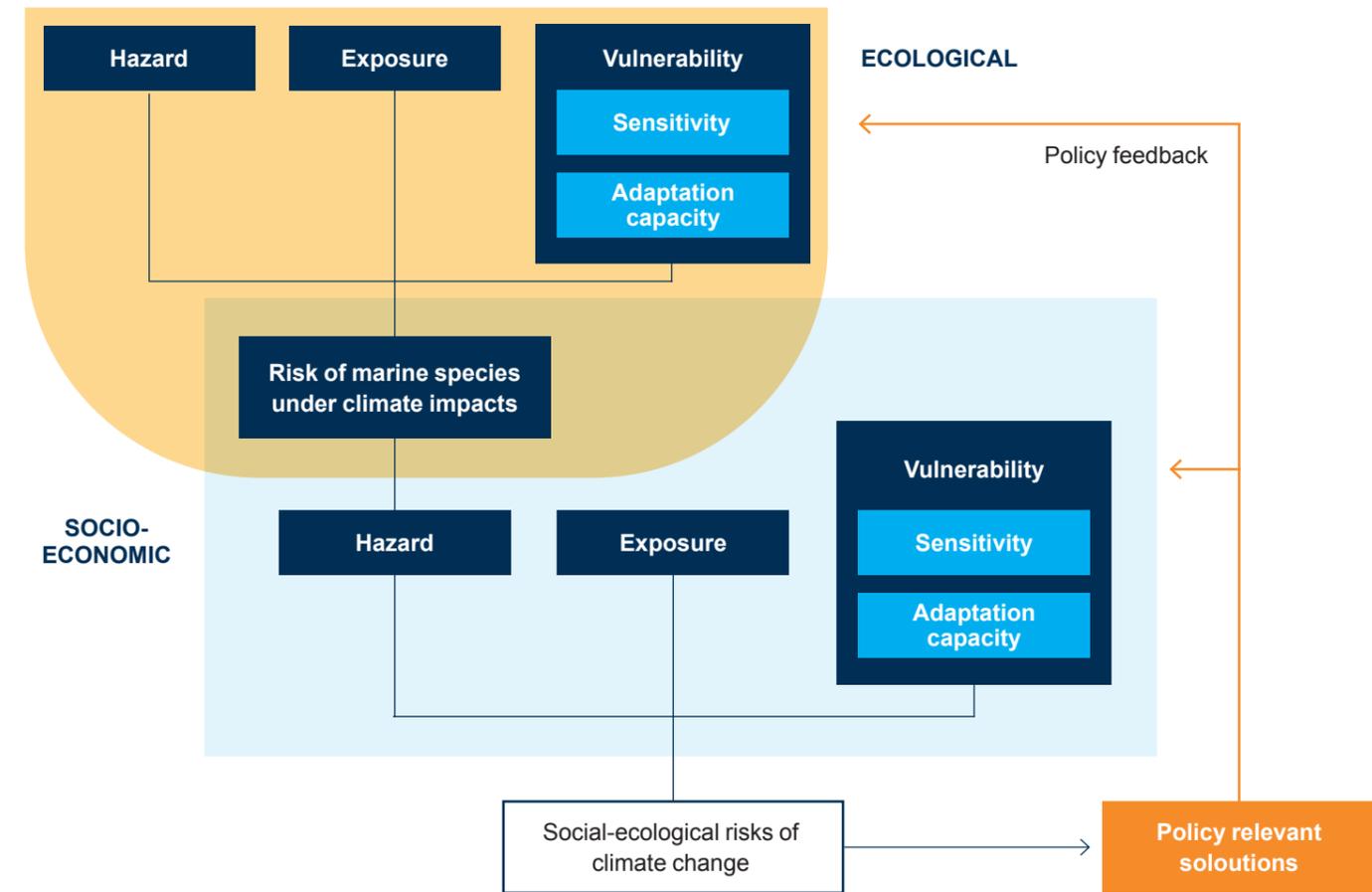


Figure 1: Linked socio-ecological risk framework
Source: Adapted from Climate Change and Marine Fisheries in Africa: Assessing Vulnerability and Strengthening Adaptation Capacity.

The continuing development of preventive community- and ecosystem-based approaches that go beyond the management of a select few commercially important species provides a better basis for addressing climate-induced changes. Tools will be required to cope and recover from impacts that cannot be avoided.

Adaptation strategies for fisheries management should be built around flexibility and the adaptability to new information, hence good decision-making and governance practices. Fishery communities, the public sector, and business all have an important role to play in fishery management. Regional cooperation to manage transboundary challenges are also essential for sustainability and climate resilience. Multiple financing mechanisms (from concessional public financing to private investment), as well as effort to ensure the financial inclusion of fishery communities, will be needed.

Acknowledging the negative consequences that climate change and other stressors have on the stability, resilience, and productivity of fisheries will enable decision-makers to make better use of climate change-related information in planning and management adaptations. By striking a balance between prevention and preparedness, coastal states can become less vulnerable to climate risks and impacts and sustain their fishery sector for economic development and food security.

