

Climate change and small-scale fisheries

A climate risk management perspective for West Africa

This factsheet outlines the main aspects from a global study and an underlying review on the management of climate change-induced losses and damages in small-scale fisheries in West African member countries to the Sub-Regional Fisheries Commission (SRFC).¹

GLOBAL CONTEXT

Small-scale commercial and subsistence fisheries contribute significantly to income, livelihoods, and food security for hundreds of millions of people, particularly in Small Island Developing States (SIDS) and the coastal zones of Least Developed Countries (LDCs). More than two-thirds of the partner countries supported by Germany's development cooperation are island or

coastal nations. In these countries, 90 % of the people working in the fishing sector are artisanal fishers and small-scale aquaculture (including mariculture) farmers.²

Climate change presents key challenges for small-scale fisheries and mariculture and is projected to have significant impacts on the lives of people dependent on these activities. Changes in ocean temperature and chemistry are already affecting the distribution and abundance of marine organisms. In addition, **recent climate projections suggest a significant increase in the frequency and/or magnitude of extreme weather events** such as storms and floods.³

² Food and Agriculture Organization. (2021). Policy support and governance gateway.

³ Intergovernmental Panel on Climate Change. (2014). AR5 Climate Change 2014: Impacts, adaptation, and vulnerability. Part A: Global and sectoral aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. See also: Intergovernmental Panel on Climate Change. (2019). Special Report on the ocean and cryosphere in a changing climate.

¹ Cabo Verde, Gambia, Guinea, Guinea Bissau, Mauritania, Senegal, and Sierra Leone.



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The precise magnitude of future impacts of climate change on fisheries – in particular small-scale fisheries – are still poorly understood, since they involve numerous interactions with fragile and complex ecosystems that are often already affected by other stressors such as overfishing or pollution. Assessing and managing risks to increase resilience and decrease poverty, inequality, and food insecurity are thus priorities of international cooperation.

IMPORTANCE OF SMALL-SCALE FISHERIES IN WEST AFRICA

The small-scale fishing sector plays an important role in the West African region to secure income and food security, contributing about 60 % of the total catch. According to the Food and Agriculture Organization of the United Nations (FAO) the total fisheries production for the seven SRFC member countries in 2018 was 2.26 million tonnes, with a value of USD 1.96 billion.⁴ However, the data quality is low and the probability of

important non-reported catch is high. Despite its economic and social importance, the contribution of the fisheries sector to gross domestic product (GDP) is still low in West African coastal countries, ranging between 2 % and 6 % in the SRFC member countries.⁵

The role of seafood in diets varies greatly in the region, ranging from only 1.3 kg per capita in Guinea-Bissau to 27.53 kg per capita in Gambia in 2017. Given the current resource status, it is believed that the contribution of fisheries to the nutritional and protein requirements of a rapidly growing population will decline significantly in the coming decades.⁶

The total number of jobs in the production sector is unclear; however, in capture fisheries the countries combined have **approximately 500,000 fishers employed in total, with about 41,000 canoes in the**

4 Food and Agriculture Organization. (2021). [Online query panels: Fishery commodities and trade](#).

5 Sub-Regional Fisheries Commission. (2016). [Presentation](#).

6 Food and Agriculture Organization. (2018). [FAO yearbook of fishery and aquaculture statistics 2018. Section 2](#).

small-scale sector.⁷ The total number of jobs related to fisheries, including processing and trading, is much higher, and varying estimates suggest that with **30–50 %** a significant percentage **of this workforce are women.** The total employment in the sector in Senegal, for example, is estimated to be 600,000 people or 15 % of the country's labour force.⁸

NATURAL AND HUMAN STRESSORS

According to the World Bank, rigorous assessments of the impacts of climate change are increasingly demonstrating that the effects on marine ecosystems, fisheries, and the millions of people who depend on them are likely to be more severe than initially anticipated in West Africa.⁹ However, research on the potential impact of climate change on the region's fisheries and its subsequent impact on human well-being is still limited.



"Increases in the risks for seafood security associated with decreases in seafood availability are projected to elevate the risk to nutritional health in some communities highly dependent on seafood, such as those in West Africa and Small Island Developing States."

IPCC Special Report on the Ocean and Cryosphere in a Changing Climate, 2019

Coasts are threatened by sea-level rise and accompanying risks of erosion, inundation, and salinisation of land and coastal waters, impacting productive fisheries' ecosystems. Generally, it is expected that sea level can rise faster than mangroves will be able to cope with, thus posing a threat to nursery habitats of fish species.

In recent years, seaweed blooms in the Atlantic have led to massive accumulation of the pelagic seaweed sargassum on the coasts of several tropical countries in West Africa. This phenomenon, which is likely linked to climate change, can result in the development of toxic hydrogen sulphide increase, oxygen depletion, and eutrophication, affecting coastal and nursery habitats.

The predicted increased risks of extreme rainfall events and flooding in the coastal zone, as well as extreme storm events and tidal waves,¹⁰ **increase the risk of loss of canoes and fishing gear.**

Post-harvest losses will increase, impacting the small-scale fisheries value chains, if conditions in processing, handling for trade, and hygiene practices remain unchanged while temperatures, precipitation, moisture, and inundations likely increase.¹¹

The areas most vulnerable to sea-level rise or extreme events (e.g. extreme tides) are those most populated or urbanised in the West African coastal zone. From Dakar to Freetown, cities with more than one million inhabitants as well as fishing communities are located on the coast.

Along the coasts of Guinea, Senegal, and The Gambia, 30 % of infrastructure including human settlements is at risk of being submerged by 2085. In economic terms the damage to infrastructure, including fisheries, is estimated at several hundred million dollars, or 1–10 % of the GDP of the countries concerned.¹²

With a West African population that will double between 2009 and 2050, and an increase in natural risk factors (rising sea levels, coastal erosion, and a downward trend in fish stocks), there will be additional pressure on West African marine and coastal ecosystems. A damaging spiral of poverty and degradation of fisheries' resources which will make fishing more vulnerable to the impacts of climate change is very likely to emerge from this. In addition, West African rural populations have always considered fishing as an alternative source of employment, income, and food when agriculture has suffered under the effect of climatic hazards. As a result, the economic and social pressure on small-scale fishing is increasing. Due to the increasing population and further challenged resources, the volume of fish available for consumption in sub-Saharan Africa is expected to drop at an annual rate of 1 % to 5.6 kg per capita per year by 2030.¹³

10 Intergovernmental Panel on Climate Change. (2007). *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.*

11 Food and Agriculture Organisation. (2018). *Impacts of climate change on fisheries and aquaculture: Synthesis of current knowledge, adaptation and mitigation options.*

12 Réseau sur les Politiques de Pêche en Afrique de l'Ouest. (2010). *Pêche et changements climatiques en Afrique de l'ouest: Etat des lieux.*

13 World Bank. (2017). *Climate impacts on African fisheries: The imperative to understand and act.*

7 Sub-Regional Fisheries Commission. (2016). *Presentation.*

8 Sub-Regional Fisheries Commission. (2016). *Senegal.*

9 World Bank. (2019). *Climate change and marine fisheries in Africa: Assessing vulnerability and strengthening adaptation capacity.*

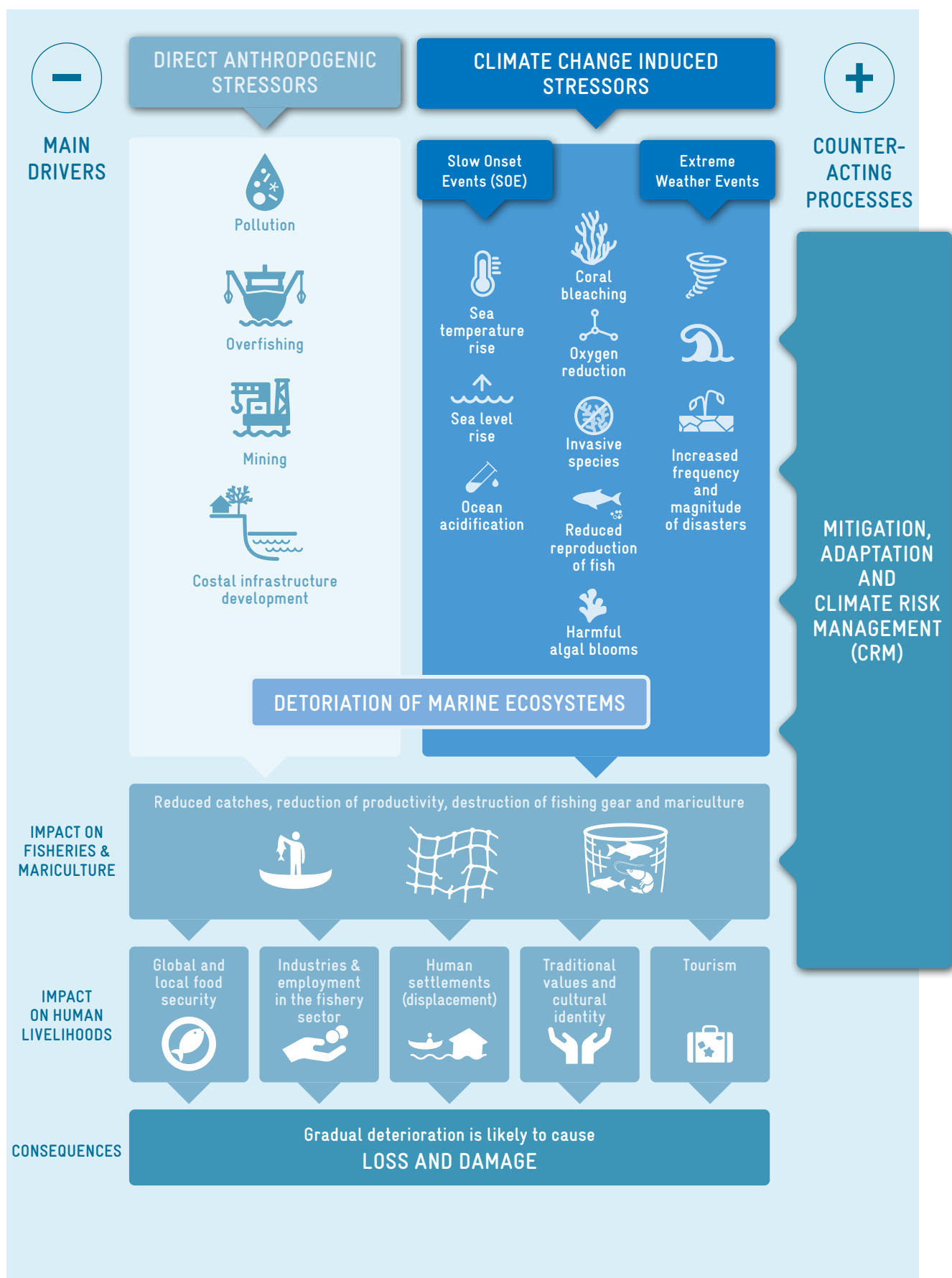


Figure 1: Impacts on fisheries and mariculture sector in the era of climate change

Source: © GIZ/Global Programme on Risk Assessment and Management for Adaptation to Climate Change (Loss and Damage)



In West Africa, it is the vulnerable and socially marginalised groups, especially women, children, and the elderly, who are most affected by global and climatic changes. Gender is a major factor of vulnerability, as men are inclined to migrate in search of economic and fisheries resources; while women, children, and the elderly remain in place, and are the most exposed to the risks linked to climate change, especially with higher susceptibility to climate change-related diseases. Women who work in the fishing sector, mainly in the small-scale processing of fish products, have less access to financial resources, and thus a low capacity to adapt to climate change by means of engaging in alternative sectors.

Fisheries management in the region is challenged by an expansion of regional fisheries activities at the same time as high illegal foreign fishing activities. Overall, from the assessed stocks, 46.5 % are fished at unsustainable levels in the Eastern Central Atlantic coastal areas.¹⁴ However, significant lack of data challenges the assessment of the state of the resources.

Figure 1 summarises the main climate change-induced and otherwise anthropogenic stressors that have the potential to seriously impact fisheries and dependent human livelihoods, leading to climate-related losses and damages. In West Africa, climate change will cause a rise in average temperature, resulting in a warmer, dryer region with an increase in extreme storm events and tidal waves, affecting the entire marine ecology and also the small-scale fisheries sector directly, with fishing becoming even more dangerous. Mitigation and adaptation measures as well as further climate risk management (CRM) are pivotal strategies to counteract resulting losses and damages.

The management of small-scale fisheries is challenged by weak institutional and management capacities for enforcement; low levels of stakeholder participation in decision-making; and a lack of fisheries, biological and environmental data, access to existing data, and the capacity to analyse the data in the region.

¹⁴ Food and Agriculture Organization. (2021). CECAF (Eastern Central Atlantic) capture production.

OPTIONS OF CLIMATE RISK MANAGEMENT (CRM)

Integrated CRM options combine measures to strengthen the adaptive capacity of fishing communities to climate change with those to foster fisheries governance reforms.¹⁵ The same measures can be justified by the need to reduce fishing overcapacity, the need to address the problems that arise from open access to the resource, and the need to adapt to climate change.



CLIMATE RISK MANAGEMENT (CRM)

Climate risk management (CRM) is a strategy to manage risk and potential impacts related to natural and climate-induced hazards. GIZ's Global Programme on Risk Assessment and Management for Adaptation to Climate Change (Loss and Damage) (GP L&D) has developed a risk-based, iterative framework to manage climate-related risks considering biophysical, social, economic, non-economic, and environmental aspects. It considers the entire spectrum of climate-related hazards and triggered risks, from short-term extreme weather events to long-term slow onset processes. To minimise losses and damages, CRM combines a smart mix of approaches from climate change adaptation and disaster risk reduction. To address residual losses and damages, these are complemented by more innovative adaptation tools such as risk finance and insurance, and transformational approaches such as livelihood diversification. Tried and tested measures are linked with innovative instruments and transformational approaches in a comprehensive and integrated way. Ultimately, CRM implies that all sectors factor risks into plans, including considering how risks may affect action across sectors.¹⁶

At the regional level, projects are being initiated to combat the degradation of the ecosystems of the Canary Current, such as the Adaptation to Climate and Coastal Change in West Africa (ACCC) project funded by the United Nations Development Programme (UNDP) and Global Environment Facility (GEF). Among the policies and actions to reduce climate change-related losses and harms, options advocated by FAO include improving the value chain, reducing post-harvest losses, empowering marketing by women, adapting to changing market conditions, improving livelihoods, and eradicating poverty.¹⁷

Regional-scale initiatives are being launched in the West African region to build coastal, fisheries, and environmental resilience and could be counted among those that contribute to climate risk reduction. The World Bank Group approved USD 210 million in 2018 to finance a West African Coastal Areas Management Programme (WACA) to build resilience for coastal residents of Benin, Côte d'Ivoire, Mauritania, São Tomé and Príncipe, Senegal, and Togo. This project aims to promote various measures to combat coastal erosion: dune fixation, restoration of wetlands and mangroves, beach nourishment, and construction of protective structures and dykes. The project will also help reduce flooding by restoring lagoons and drainage systems and improving watershed management. Interventions will also be aimed at combating pollution through better treatment of marine, industrial, and municipal waste and oil spills.

Cabo Verde, Côte d'Ivoire, and Senegal are the three countries benefiting from the Coastal Fisheries Initiative – West Africa Project, funded by GEF, Abidjan Convention/UNEP, government agencies, and other partners, worth about USD 52 million over a period of five years (September 2018– May 2022). The project is implemented by FAO, whose overall objective is to strengthen governance, management, and fisheries value chains by implementing an ecosystem approach to fisheries, relevant international instruments, and innovative governance partnerships in the three West African countries.

¹⁵ World Bank. (2019). *Climate change and marine fisheries in Africa: Assessing vulnerability and strengthening adaptation capacity*.

¹⁶ GIZ Global Programme on Risk Assessment and Management for Adaptation to Climate Change (2021). *Climate Risk Management. Promising pathways to avert, minimise, and address losses and damages*.

¹⁷ Food and Agriculture Organization. (2020). *The state of world fisheries and aquaculture 2020: Sustainability in action*.

The Sub-Regional Fisheries Commission (SRFC) or Commission Sous-Régionale des Pêches (CSRFP) is an inter-governmental fisheries cooperation organisation in Cabo Verde, The Gambia, Guinea, Guinea-Bissau, Mauritania, Senegal, and Sierra Leone. SRFC is assigned the harmonisation of national fishery laws and regulations of its member states, with the objective of sustainable governance of fisheries resources, effective fisheries supervision, and regional co-operation to enhance sustainable resource management. As one of various partners of SRFC, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) supported the SRFC from 2005 to 2010, strengthening the SRFC as a platform for information and discussion as well as assisting in setting up the committees necessary to harmonise the various national regulatory frameworks and an integrated fisheries policy and bringing together relevant stakeholders and state structures from the member states as well as from the private sector and civil society.¹⁸



Since 2017, all SRFC member countries are beneficiaries of the project **Improvement of Regional Fisheries Governance in West Africa (PESCAO), funded by the European Commission**. This project aims to strengthen the contribution of fisheries resources to sustainable development, food security, and poverty reduction in West Africa. The specific objective is to improve regional fisheries governance in the region through better coordination of national fisheries policies.

RECOMMENDATIONS

While overfishing, poor management of the resources, pollution, population growth, and poverty may have been responsible for much of the decline in the productivity of small-scale fisheries in recent decades, it is clear that climate change and its impacts such as ocean acidification and sea-level rise already have, and can potentially lead to more, devastating impacts on West African marine ecosystems and coastal communities. The science outlined by the Intergovernmental Panel on Climate Change (IPCC) in its Special Report on the ocean and cryosphere¹⁹ provides sobering projections on the magnitude of the risks, unless urgent action is taken. West African countries will require substantial investments from international partners to help them implement the necessary management measures and to strengthen scientific cooperation during the recently launched United Nations Decade of Ocean Science for Sustainable Development (2021–2030).

The management of climate-related risks in West African fisheries is extremely complex and needs a multi-faceted approach, with a wide range of interventions focusing on protection, sustainable management, and improving the resilience of ecosystems, while simultaneously addressing the economic needs and adaptive capacity of fishing communities. Recommendations have been identified in consultations with regional experts and can be broadly categorised into the following four fields of action.

→ Capacity-building at all levels to improve fisheries management and reduce risk

It is important to build on international and regional legal instruments covering climate change and small-scale fisheries to aim for the development of a Sub-Regional Adaptation Plan in the SRFC area and the formulation of

18 GIZ: Support for Fishery Management in West Africa.

19 Intergovernmental Panel on Climate Change. (2019). Special report on the ocean and cryosphere in a changing climate.

national strategies, also addressing the risk of climate-induced human migration. This needs to be done by strengthening institutional and organisational capacities on an SRFC and national scale, strengthening synergies and cooperation between countries.

The participation of fishing communities in fisheries management must be actively strengthened to improve compliance with and enforcement of laws and regulations. This will require better communication and awareness, as well as policies for rights-based fisheries to create greater ownership of the resources. Capacity development needs to strengthen the agency of local fisherfolk and the ability to take ownership of adaptation options, including the ability to raise funding for local measures. In addition, any transformation from fisheries to alternative incomes will need a strictly participatory approach as well as substantial financial and organisational support from national, regional, and international development partners as well as the private sector.

Regional coordination could be strengthened through the establishment of a sub-regional framework for dialogue on climate change, under the leadership of the SRFC.

→ Closing data gaps

The SRFC should be strengthened as a regional data collection institution to improve data management and sharing of fisheries information.

More data is required on the status of fish stocks and ecosystems to increase the understanding and building the evidence base for an ecosystem-based fisheries management. Information on fish biomass as an indicator of ecosystem health is particularly important and best obtained with the participation of local stakeholders and fishers.

Data on the cultural, social, nutritional, and health values of fisheries are needed to increase recognition from governments of the importance of small-scale fisheries.

Social and economic data, including gender-specific considerations, are needed for a better understanding of the factors associated with social resilience and opportunities for livelihood diversification.

Advances in weather forecasting and early warning systems that meet the demands of small-scale fisheries will be essential to reduce risks and increase profitability. Higher resolution biophysical models for national and local climate projections are also required for locally specific vulnerability assessments and adaptation plans.

→ Instruments and tools

National fisheries management plans need to strengthen the implementation of transboundary ecosystem-based approach to fisheries management and increase the use of tools for integrated coastal zone management and marine spatial planning. This will contribute to reducing local stressors on marine habitats, such as sedimentation and pollution.



It is important to establish a financing mechanism, including insurance schemes, adapted to address the issue of climate change and small-scale fisheries, which needs to include measures directly addressing the needs of women.

The creation of a portal on climate change and small-scale fisheries at the level of existing sites of sub-regional organisations – such as the SRFC, Association Ouest Africaine pour le Développement de la Pêche Artisanale (ADEPA), Confédération Africaine des Organisations Professionnelles de la Pêche Artisanale (CAOPA), Partenariat Régional pour la Conservation de la zone côtière et Marine en Afrique de l'Ouest (PRCM), or Réseau sur les Politiques de Pêche en Afrique de l'Ouest (REPAO) – that includes scientific evidence as well as traditional knowledge and local practices will support communication and exchange of good practices on adaptation measures. The participation of local communities is key to define criteria for the choice of interventions and areas for new initiatives.

→ Scientific cooperation

The establishment of a sub-regional network between research institutions, universities and all persons or institutions concerned to address the issues of climate change and small-scale fisheries will strengthen the scientific capacity in the region and will facilitate coordinated funding options.

The lack of data requires better regional and national coordination of data collection efforts and a build-up of human and infrastructural capacity. At the same time, the management needs to better incorporate the scientific evidence base to develop management measures, following an ecosystem-based approach to management.

Inter- and trans-disciplinary research is required to better understand the vulnerability of small-scale commercial and subsistence fisheries, in particular the complex interactions between socio-economic and ecological systems. This includes collaborative research approaches to increase stakeholder and community participation in fisheries science, management, and decision-making.

It is important to strengthen existing platforms and create new ones where institutional gaps will be identified, to support an effective management of the issue of climate change and small-scale fisheries with the sub-regional organisations – ADEPA, CAOPA, PRCM, and REPAO – under the leadership of the SRFC.

This will support the development of appropriate tools to translate scientific results into advice for policy and decision-making.

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