Food and Agriculture Organization of the United Nations

CC4FISH POLICY BRIEF

MAY 2020 | ISSUE 1




# Climate change and fisheries

## Key messages

- **Negative impacts of climate change are already evident in the Caribbean.**
- **Reef-associated fisheries will be the hardest hit in the near-term.**
- **Negative impacts include:**
  - **reduced fish abundance**
  - **reduced catches**
  - **safety of fishers compromised**
  - **damage to fishing gear and fisheries infrastructure**
  - **threats to fisherfolk livelihoods**
- **Adaptation measures will be required at local, national and regional levels including:**
  - **use of climate smart technologies**
  - **improved fish value chains**
  - **access to affordable insurance**
  - **mainstream climate change into fisheries policy and management**

Climate change is significantly disrupting fisheries and aquaculture across the globe.

Caribbean fisherfolk are on the frontline in the battle against climate change, fighting to maintain their catches, their income and their livelihoods.

At stake is our food security, our fishing heritage, the well-being of coastal communities and an important contribution to the emerging blue economy.

This policy brief highlights the climate change impacts affecting the Caribbean fisheries sector, the existing adaptation measures, and presents supporting policy actions for adaptation.


# Climate change: marine environment impacts

Negative impacts from climate change that are already happening in this region include: damage to critical fish habitats; increasing frequency of high intensity storms; increased sea level, and sargassum influxes. These are disrupting fishing operations, fish landings and fisherfolk livelihoods.

## CORAL BLEACHING

Coral bleaching and associated mortality due to warmer sea surface temperatures is leading to degradation of coral reefs and loss of their architectural complexity and ability to support commercially important fish biomass.

## SARGASSUM INFLUX EVENTS

Sargassum is blooming under warmer conditions causing mass strandings that smother coral reefs and seagrasses, reduce oxygen and produce toxins. This results in mass mortality of nearshore fishes.

## SEA LEVEL RISE AND STORMS

Sea level rise and more intense storms and storm surges are causing coastal erosion and damage to critical fish habitats (e.g. coral reefs, mangroves and seagrass). Inundation of coastal settlements and major damage to fishery sector assets is also increasing.

## OCEAN ACIDIFICATION

Increased ocean acidity due to absorption of more carbon dioxide is affecting growth of coral reefs and shellfishes (e.g. conch) and survival of larval fishes and other plankton.

## DISSOLVED OXYGEN

Critically low oxygen is becoming more frequent with warming waters. This results in summer fish kills, expanding 'dead zones' and reduced living space for pelagic species like billfishes and tunas, because low oxygen conditions force them towards the surface.

## CHANGES TO OCEAN CURRENTS

Changes to ocean currents with warmer sea surface temperatures are affecting spawning success and replenishment of fish populations. Fish distribution ranges and species availability are also changing affecting fisheries productivity.

## FISH POISONING

Warmer sea temperatures are linked to more incidences of ciguatera fish poisoning in humans. Hazardous algal blooms are also becoming more frequent with significant human health impacts (e.g. paralytic shellfish poisoning).

## CHANGES IN SEA STATE

Fishers are reporting changes to sea conditions (wave height, water colour, tides) that are negatively affecting their safety and ability to find fish.

©FAO/Iris Monnereau

# Impact pathways on the fisheries sector

Climate change affects marine ecosystems and the many goods and services they provide that in turn support fish production in the Caribbean. Examples of pathways to potential impacts in the fisheries and aquaculture sectors are illustrated here.

| Stressors | Pathway | Potential Impacts |
|---|---|---|
| Warmer seas<br>Sea level rise<br>Stronger hurricanes<br>Less predictable sea conditions<br>Changes to ocean currents<br>Extreme weather<br>Ocean acidification | Biological productivity | • Disruption of marine food webs<br>• Damage to critical habitats<br>• Reduced growth and productivity of fish stocks<br>• Change in distribution of fish stocks<br>• Fish kills from low oxygen |
| | Capture fisheries | • Lower yield<br>• Change in species caught<br>• Reduced safety at sea<br>• More damage to infrastructure, gear and boats<br>• Increased operational costs |
| | Aquaculture | • Increase in disease incidences<br>• Reduced freshwater supply<br>• More damage to infrastructure and gear<br>• Increased operational costs |
| | Communities & livelihoods | • Loss of income<br>• Reduced wellbeing<br>• Reduced health and safety<br>• Loss of physical assets<br>• Threat to cultural identity |
| | Governance | • Changes to appropriate geographical scales for governance ( e.g. shared stocks, marine protected area networks)<br>• Importance of fisherfolk and scientific knowledge<br>• Greater need for ecosystem-based management |
| | Wider society & economy | • Increased poverty and reliance on social services<br>• Reduced food security and nutrition<br>• Loss of gross domestic product (GDP) and foreign exchange (exports)<br>• Disruption of fish supply and value chain<br>• Adaptation and mitigation costs |


©FAO/Recardo Mieux


©FAO/Hazel Oxenford


©FAO/Hazel Oxenford

## ONGOING ADAPTATION MEASURES

**Early warning:** Development of mobile apps for improved communication, early warning and vessel tracking. Use of very high frequency (VHF) radios and increase in range of radio repeater systems.

**Safety at Sea:** Fisherfolk training and implementation of safety measures for small-scale fishing vessels. Provision and appropriate use of safety equipment

**Certification and product traceability:** Fishery improvement programmes that support access to higher priced markets and improve sustainability of the fishery resource.

**Market diversification:** Fisherfolk catching and marketing newly available or non-traditional species, and adding value along new and existing value chains.

**Capacity building:** Training to build capacity and improve resilience of fisherfolk and aquaculturists including: business skills, product development, sea moss farming etc.

**Climate-proof infrastructure:** New and improved safe harbours and fish processing facilities designed to prevent inundation by rising sea levels and withstand coastal erosion and severe hurricanes.

**Energy efficiency:** Use of renewable energy technology to improve efficiency and reduce emissions from fisheries infrastructure and fleets.

**Forecasting:** Strengthening ocean and climate forecasting and communication for emergency planning and informed decision making.

**Insurance schemes:** Improved access to affordable insurance and development of parametric insurance for the fisheries sector.

**Building knowledge and awareness:** Improving awareness and understanding of climate change vulnerabilities and adaptation pathways in the fisheries sector.

## SUPPORTING POLICY ACTIONS

**Mainstreaming:** Revise policy formulation and fisheries management plans at the regional and national level to integrate disaster risk management and climate change mitigation and adaptation.

**Governance flexibility:** National and regional level agreements and management arrangements should be responsive to rapid changes in the fish resources (including species shifts, distribution, productivity, seasonality) and to associated changes in fisher practices.

**Stakeholder engagement:** Improve engagement of fisherfolk to co-produce adaptation strategies to ensure appropriate adaptation measures and complement locally established coping strategies.

**Public-private partnerships:** Improve engagement and support of the private sector to facilitate investment and innovation in the fisheries sector.

**Gender and youth:** Ensure adaptation measures account for gender differences and capitalize on the specific skill sets and roles of men, women and youth in fisheries.

**Social protection:** Improve participation of fisherfolk in social protection schemes to provide a social safety net for the fisheries sector.

**Sustainable livelihoods:** Facilitate additional livelihood opportunities to improve fisherfolk incomes and resilience to climate change.

## ACKNOWLEDGEMENTS

This information product has benefited from the generous support of the Climate Change Adaption in the Eastern Caribbean Fisheries Sector (CC4FISH) project of the Food and Agriculture Organization (FAO) and the Global Environment Facility (GEF).

Authors: Shelly-Ann Cox, Hazel A. Oxenford (UWI-CERMES) and Iris Monnereau (FAO).





© FAO, 2020
CB1471EN/1/11.20