

Ocean Acidification in Africa

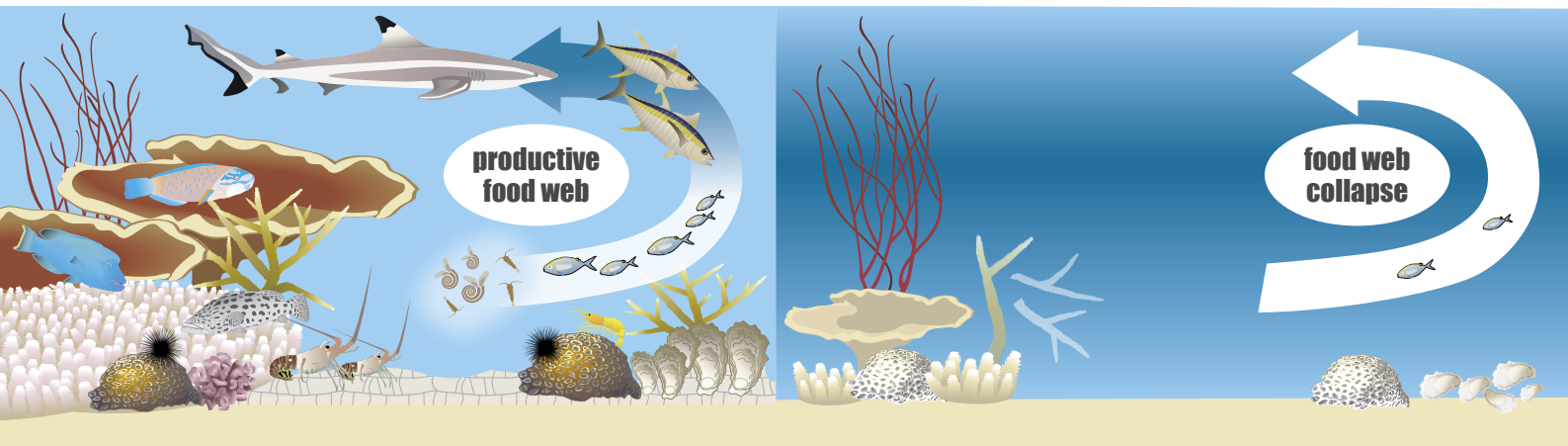
A major food fish in African coastal communities, parrotfish such as these rely on healthy coral reefs that could disappear in an acidifying ocean.



Ocean chemistry is rapidly changing

A healthy ocean provides many human services: food, medicine, cultural practices; income from commercial fisheries and tourism; and, coral reefs for coastal storm protection.

In an acidifying ocean, corals are struggling to maintain skeletons that create reefs. Lobsters, oysters, urchins, and many phyto- and zoo-plankton species that build skeletons also suffer from this stress, disrupting the marine food web.



“The other CO₂ problem”

Carbon dioxide (CO₂)—a by-product of burning fossil fuels—is being created faster than it can be absorbed by the ocean through natural processes. The ocean is the Earth’s most important carbon storage reservoir, containing about 50x more carbon than the atmosphere. Its surface layer helps regulate atmospheric CO₂ concentration and has absorbed about 1/3 of human-released CO₂. This excess of CO₂ is rapidly changing the seawater chemistry, and the rate of chemical and physical ocean changes due to the elevated CO₂ is expected to continue.

Sustained ocean acidification—now ubiquitously observed across the globe—is a serious threat to ocean health and the marine organisms that depend on a stable and nurturing environment. Fisheries, aquaculture, tourism, and biodiversity are all projected to be affected, with billions of dollars in losses anticipated by the end of the century.

**GLOBALLY,
THE OCEAN IS
ACIDIFYING IN
RESPONSE TO
ONGOING OCEAN
CARBON UPTAKE**

Coastal communities in Africa are being impacted

Many African countries rely heavily on the sea for economic, social, and nutritional services. However, ocean acidification has the potential to negatively affect those marine ecosystems. The losses would be alarming for the African continent. Fisheries and aquaculture currently contribute USD \$24 billion to the economy in Africa, employing more than 12 million people across the continent. The fisheries sector is particularly important for rural coastal African populations, which are among the most vulnerable in terms of both food and job security. Due to the growing population and per capita income, demand for fish in Africa is expected to increase 30% by 2030. Ocean acidification, combined with other climatic drivers, may make it difficult to satisfy this need.

**FOR AFRICAN
CONSUMERS, FISH
AND OTHER FISH
PRODUCTS MAKE
UP AROUND
18% OF ALL
ANIMAL PROTEIN
INTAKE**



Ocean acidification research demands unique local, national, and regional responses

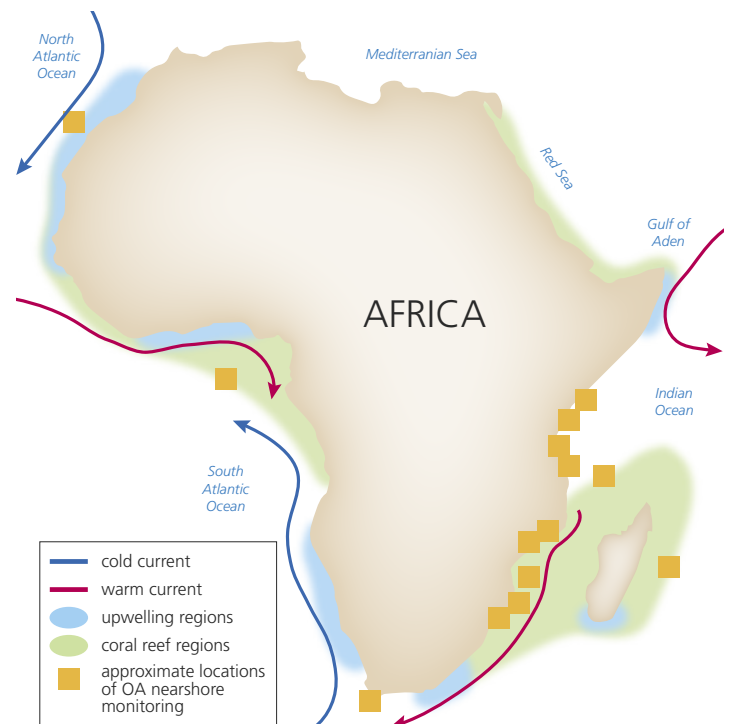
Addressing and mitigating ocean acidification will require a drastic decrease in global CO₂ emissions, but it is possible to develop local adaptive solutions to increase ecosystem resilience by addressing specific societal coastal community priorities. Strategic ocean acidification data are critical for the development and implementation of such solutions, including the identification of ocean acidification hot spots.

Better data will help identify adaption strategies and solutions

International organizations have been hard at work building ocean acidification capacity in Africa and provide excellent knowledge and resources for policy makers and resource managers. **Ocean Acidification Africa (OA-Africa)** is a group of concerned scientists seeking to advance the study of ocean acidification for the benefit of informed policy and adaptive strategies in African coastal waters. Strategic data are critical for the development and implementation of such solutions addressing the needs of coastal communities and their sustainable development.

Ambitious regional and local projects are already documenting the impacts of ocean acidification and the capacity of researchers working on ocean acidification is growing. In total, ten projects with a significant focus on ocean acidification in African coastal waters are known, with more in development. The major ocean regions being studied include the NE Atlantic, from Canary Islands to Gibraltar, the Gulf of Guinea, the Benguela current system, and the SW Indian Ocean.

Africa's upwelling regions and coral reefs—both highly productive coastal systems—are hot spots for ocean acidification research.



Map data sources: UNEP-WCMC (<http://data.unep-wcmc.org>) and Kämpf J., Chapman P. (2016) The Functioning of Coastal Upwelling Systems. In: *Upwelling Systems of the World*. Springer, Cham. https://doi.org/10.1007/978-3-319-42524-5_2, and Pidwirny M. (2006). Surface and Subsurface Ocean Currents: Ocean Current Map. In: *Fundamentals of Physical Geography*, 2nd Edition.

UN Decade of Ocean Science is an opportunity

With the start of the United Nations Decade of Ocean Science for Sustainable Development, countries have an excellent opportunity to address the Sustainable Development Goals target 14.3—“Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels”—which demonstrates the global concern about ocean acidification. Addressing this concern requires the correct tools, knowledge, and infrastructure to accurately assess and report on ocean acidification. Using emerging technologies along with commitments to maintain and shore up existing observing systems is critical.

Countries with an existing knowledge-base can establish long term monitoring stations and support biological response experimental work on organisms of cultural, commercial, and ecological value. Countries that lack such expertise may rely on their existing marine and aquatic science institutions to seek assistance from the international community to build national capacity through training and knowledge exchange.

The field of ocean acidification in Africa suffers from a lack of investment

Our understanding of the ecological and socio-economic consequences of ocean acidification in African coastal waters is still extremely limited and many countries are not yet able to engage in ocean acidification research. This is a rapidly developing field in need of support from national governments, international organizations, and global scientific collaborations. Scientific networks and capacity building efforts continue to be developed through cooperative programmes and regional convention bodies. This approach helps African Nations combine their strengths and knowledge centres to build collaborative, ambitious programmes that meet the United Nations Sustainable Development Goals targets and protect coastal communities' livelihoods.

Recommendations for a Pan-African response

POLICY-LEVEL RECOMMENDATIONS	RESEARCH	STRATEGY
<p>Support outreach and communication on ocean acidification and the vulnerability of coastal communities through educational programmes, including training and capacity development for decision-makers, national administrations, and NGOs.</p> <p>Update policies, regulations, and standards to recognize the role of human activity in affecting ocean acidification locally and globally.</p> <p>Identify and address social and ecological risks and resilience which can be used to design mitigation strategies locally through a variety of management measures.</p>	<p>Establish regional and interregional technical cooperation projects co-designed between the coastal nations of Africa and the international community.</p> <p>Create targeted environmental monitoring programmes to conduct long-term observations of ocean acidification, leveraging local areas of strength, pooling resources, and using existing water quality measurements. Develop facilities and expertise to perform experiments aimed at evaluating the biological sensitivity to ocean acidification and other combined climatic stressors.</p> <p>Strengthen the growing community of African ocean acidification researchers by creating training and research programs through a collaboration of national and international stakeholders.</p>	<p>Foster Pan-African cooperation by the establishment of a National Coordination Unit for cooperation between national authorities and stakeholders impacted by ocean acidification.</p> <p>Build regional bio-economic modelling tools that support forecasting of expected impacts on marine life and the resulting consequences for at-risk stakeholders.</p> <p>Co-design strategies identifying research and policy needs by close cooperation with local communities. Support a co-management approach between locals and government.</p>

This newsletter, *Ocean Acidification in Africa*, has been prepared in anticipation of the 26th UN Climate Change Conference of the Parties (COP26) in Glasgow, Scotland on 31 October-12 November 2021 (<https://ukcop26.org>).

For more information on OA-Africa, visit www.oa-africa.net

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