

Evidence-based regulation for sustainable development – coastal protection in Ghana

Taking the example of the Environmental Protection Agency (EPA Ghana), our authors give an account of the coastal protection activities of an environmental authority – the research and monitoring projects it conducts, how it collaborates with other stakeholders to co-manage the environment, and their impact in environmental legislation.

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Ghana has a coastline of about 550 km which hosts several ecosystems such as mangrove stands, lagoons, estuaries and rocky and sandy beaches with high species biodiversity (see Box). Accounting for 6.5 per cent of the nation's terrestrial area and 30 per cent of its population, the coastal area is vital for the national economy, supporting the fisheries, transportation, energy and petroleum sectors. For example, ten per cent of the rural population are employed in the fisheries and aquaculture value chain, which contributed about one per cent to GDP and represented 4.9 per cent of agricultural GDP for the period 2017–2020. Women play very important roles in this sector, ranging from owning fishing vessels and financing fishing trips to managing the marketing and pricing of fish. The post-harvest sector is also largely dominated by women, who form the majority of the fish processors and fish marketers.

But like in most countries, Ghana's coast is under threat from human activities such as increasing urbanisation caused by migration and a high population growth rate, increasing infrastructure development, economic growth and industrialisation, wetland and mangrove degradation, water pollution, coastal erosion, fisheries degradation, invasive aquatic weeds, poor sanitation and plastics pollution. One example of the resultant

impacts of such challenges on coastal communities is the recent tidal waves experienced at Dzita and Fuveme in the Keta municipality, which left hundreds of people displaced and was accompanied by significant damage to personal and public property.

Coordinating environmental protection

The management of the coastal resources is distributed across several institutions: the Environmental Protection Agency (EPA), the Ghana Maritime Authority, the Fisheries Commission, Ghana National Petroleum Corporation, the National Petroleum Authority, the Petroleum Commission, the Wildlife Division of the Forestry Commission, the Ministry of Local Government, the Ghana Tourism Authority and the Coastal Development Authority. EPA's role is explained in more detail in the following.

Established in 1999 by the Environmental Protection Agency Act, EPA's mission is to co-manage, protect and enhance the country's environment and to seek common solutions to global environmental problems. To meet its mandate for positioning environmental governance and management within the broader framework of Ghana's development path and to define strategic themes and actions, the

Agency works in liaison and co-operation with government agencies, District Assemblies and other bodies. Its coordinating role has served to enhance and inform action for regulatory improvement and support efforts in all other sectors beyond that of the environment. The enforcement of the Environmental Assessment Regulations 1999, for instance, guides development activities across all national economy sectors.

Since its inception, the Agency has collaborated with numerous stakeholders to ensure the achievement of its mandate regarding coastal zone management. Several plans have been developed and implemented to protect and manage coastal and marine resources while promoting sustainable development: the Coastal Zone Management Indicative Plan (1990), the National Environment Action Plan (1994), the Integrated Coastal Zone Profile of Ghana (1998), the National Action Plan to address the depletion of marine and coastal resources (2011) and the National Oil Spill Contingency Plan (2020). In addition, the Agency coordinated the implementation of the Ghana Environmental Resources Management Project, that resulted in the delineation of the five coastal Ramsar sites: Muni-Pomadze, Densu Delta, Sakumo, Songor (a UNESCO Biosphere Reserve including the Volta Estuary) and the Keta Complex.

Coastal erosion at Ada, on the southeast coast of Ghana.

Photos: Peace Gbeckor-Kove



Institutional collaboration for research

EPA collaborates with relevant institutions for research and environmental data generation to inform policy and regulations on the environment. The research information serves to strengthen the lead role EPA plays in signing and ratifying conventions for the country. Hence, the Agency hosts the secretariat for key international conventions on desertification, climate change, marine pollution, oil spill contingency planning, biodiversity, ozone and chemicals regulation (also see Box on page 32). Some recent research activities are described below.

Beaching of cetaceans in Ghana's waters

There was a remarkable increase in the incidence of the beaching of cetaceans (whales and dolphins) on the coast of Ghana between 2009 and 2013. To fully understand the various causes of whale mortality, EPA convened a meeting of key stakeholders to discuss the issue, after which a study was conducted to investigate cetacean deaths. Interviews were conducted and questionnaires were administered in incident communities in the Western and Central Regions in February 2014, and interactions were held with various community assemblies. The Fisheries Commission, Ghana Navy (Western Command), the Ghana Maritime Authority, the NGO Friends of the Nation, Ghana's Western Region Development Network of NGOs (Werengo) and the NGO Hen Mpoano ("Our Coast") were also consulted. Focus group discussions were held with the Traditional Authorities, and members of the various coastal communities were visited. Photos were used to identify species and determine possible causes of mortality. The study suggested ship strikes, entanglement with fishing gear and ingestion of marine debris (polyethylene) as possible causes of cetacean mortality. It was also observed that Ghana already had extensive legislation to aid the conservation of biodiversity and protection of the environment.

Occurrence of pelagic sargassum species and assessment of their socio-economic impacts on livelihoods

Sargassum vulgare and *Sargassum filependula* are naturally occurring brown algae found in coastal waters. Given an unusual increase in the incidence of sargassum in Ghana since 2009, the EPA coordinated a project in 2015 covering species in the coastal waters of the country and assess their socio-economic impacts on 36 coastal communities in which the varieties *Sargassum natans*, *Sargassum fluitans* and *Sargas-*

Ghana's coastline

Cutting across 37 districts located in four of the country's 16 regions which have a diversity of cultures, Ghana's coastal area has, over the years, gained increasing local and national relevance for the development of settlements, industrial purposes, infrastructure, port facilities, petroleum industries and residential purposes, among others. Critical infrastructure found in this area includes the Ports of Takoradi and Tema, Ghana National Gas Company, Accra Sea Water Desalination Plant and manufacturing companies such as Ghana Cement Limited and Pioneer Food Cannery. The area has salt deposits of silica, limestone and feldspar, and holds an immense potential for tourism development.

sum vulgare were identified. All 150 individuals interviewed in the coastal fishing communities (of whom over 81 per cent were fishermen) indicated they had sighted *Sargassum* spp. washing ashore in the period. Thirty-five per cent reported that seaweeds were washed ashore seasonally, and 65 per cent that sargassum occurred all year round. A reduction in the quantity and effects of the weeds from the Western Region towards the Volta Region was observed. The main impact of the seaweeds on the coastal communities was that their accumulation on beaches impeded movement of canoes, damaged fishing nets and resulted in low fish catch and a loss of revenue for fishermen. The results of this study have been published and the recommendations duly factored into the development of the National Invasive Species Strategy and Action Plan 2020. The strategy draws on previous lessons to address invasive species through measures such as early detection and rapid response, improved control and management, capacity development and education.

State of the Marine Environment (SoME) Report for the Western Region

This study formed part of the Ecosystem Based Approach to an Integrated Marine and Coastal Environment Management in Ghana pilot project, which was co-funded by the Government of Ghana and the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) as part of the International Climate Initiative. EPA implemented the study in four coastal districts, the key stakeholders being regulators, academia, users, NGOs, fishermen, fishmongers, Traditional Authorities and District Assemblies. A desktop review was conducted of available primary and secondary information from stakeholders involved in the manage-

The coastal area also has five Ramsar sites – wetlands of international importance according to the Ramsar Convention – and important natural and cultural heritage sites. Plant and animal species include white, red and black mangroves, the baobab, the leatherback turtle, the red chin tilapia and the West African manatee.

The historically strong cultural presence and spiritual attachment of rural coastal communities is made evident in the coastal fisheries, with a significant proportion of the population unwilling to be involved in other livelihood activities taking them away from the coast. Cultural practices include weekly no-fishing days and the performance of rites at the beach during the annual festivals to invite a bumper harvest.

ment of Ghana's marine and coastal environment, and was complemented by assessment reports, the use of traditional knowledge and expert elicitation during stakeholder consultations. Fishermen and mongers gave accurate descriptions of the life cycle of key fish species.

Three mangrove species were found in the study area: the red mangrove, which is the dominant species, the white mangrove and the black mangrove. They were all found to be on the decline due to over-harvesting and habitat conversions. Also, five species of turtles were spotted, three of which (leatherback, green and olive ridley) currently nest on the sandy beaches. The dominant fish species include the sardinellas, anchovies, mackerels for the marine ecosystem and tilapia species for the fresh and brackish water systems.

Other environmental pressures identified in the area are fisheries activities, offshore hydrocarbon exploitation, plantation development and sand winning, sea defence infrastructure, shipping, submarine cables and pipeline installations, tourism/ recreation, and waste generation and disposal (marine debris and plastics). These human activities have harmed habitat conditions, reducing their ability to continually provide quality ecosystem benefits. An expert elicitation workshop found the habitats to be in good condition, although environmental quality was said to be on the decline.

Over-fishing, excessive fishing capacity, illegal, unregulated and unreported (IUU) fishing and use of unapproved fishing methods had negatively impacted on the fisheries sector, particularly with regard to the socio-economic well-being of people depending on fisheries for their livelihoods. Inappropriate waste dis-

posal, especially of plastics, was found to affect the marine and coastal environment. Offshore hydrocarbon exploitation was noted to be still in its initial stages, although the industry's environmental pressure on the marine and the coastal environment was increasing. Generally, environmental pressure from submarine cables, pipeline installations, sea defence infrastructure and plantation development is low within the study area.

The study recommended to promote effective collaboration among regulators, researchers, industry players and coastal communities for resource exploitation. Other recommended measures to address the issues identified include regular monitoring and applied research as well as sustainable financing to ensure continuous conservation education, enforcement of requisite laws and regulations by the relevant institutions, while collaborative management (co-management) of the fisheries is recommended to strengthen fishermen's resource management capacity.

The active participation of the coastal population in the workshops, data/ information collection and validation of the study results played a major role in preparing the SoME report, launched in February 2022, and policy briefs. Additional summary reports are to be developed for selected decision-makers.

Stakeholder sensitisation and promotion of International Days

As a way of creating awareness on environmental issues, EPA has carried out various activities for a range of stakeholders over the last few years. These include:

Contribution of EPA's research programmes on environmental regulation

EPA's research is geared towards generating information to inform policy and educate the public e.g. through State of the Environment Reports. Implemented programmes of relevance to the coastal area include:

- ecological baseline studies of the Keta Lagoon (1990–2000) to meet Environmental Assessment requirements and establish the pollutant status of the lagoon;
- the Lower Volta Mangrove Project (1996–1998), which aimed at sustainable management of mangrove stands;
- climate change vulnerability and adaptation assessment of water resources, agriculture and the coastal zone project (1997–1999);
- Keta Sea Defence Project work (2000–2004) aimed at protecting Keta and its environs from sea erosion and improvement of socioeconomic and environmental conditions;
- the Save the Seashore Birds Project (1985–1995) to protect the birds and raise awareness on the need for conservation; and
- the Darwin Initiative of West Africa Project, which provided training for biodiversity assessment.

- education on environmental sustainability for members of faith-based and community-based organisations;
- provision of support to environmental NGOs to undertake awareness creation at sub-national and local level;
- development of environmental education materials (flyers, booklets, wall-charts, teachers' source book, etc.) on key environmental themes for schools;
- development and distribution of supplementary readers on environmental issues for schools;
- preparation and publication of State of Environment Reports; and
- implementation of schools outreach programmes.

Moreover, the Agency collaborated with various stakeholders, including coastal communities and school environmental clubs, to cele-

brate World Environment and World Oceans Day. Starting in 2022, the International Biosphere Reserves Day will be added to the list of International Day celebrations, in which partnerships formed with waste management companies such as Zoomlion and Jekora Ventures and with the Fisheries Commission have been key to the success of activities.

In spite of the achievements outlined above, the enforcement of existing legislations still faces several challenges, and there is room for improvement, with a clear need to strengthen the capacity of the existing institutions as well as to continue stakeholder sensitisation. A dearth of information remains on the impact of plastics, presenting opportunities for research to inform recycling initiatives as well as to look at using harvested sargassum to produce compost for agriculture and possibly developing the coral reefs along the western coast for ecotourism.



Community stakeholders at a validation workshop held in Sekondi Takoradi in December 2019.

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