

Golden coast - tarnished sea

by Jennifer Jacquet and Jackie Alder

In West Africa, where the warm Sahara winds travel south to meet the easterly Guinea current, is Ghana. Fed by a biannual ocean upwelling, her waters attract droves of small silver fish to the surf and draw thousands of men to the sea.

One of these men was Dr. Daniel Pauly. Long before he envisioned the *Sea Around Us* project, Daniel did his Master's fieldwork in a coastal lagoon where he waded the shallow waters studying the fish inhabitants and their relationships. He would eventually model the lagoon's ecology. Thirty-five years later, we visited Ghana as part of the *Sea Around Us* project with the intention of modelling the relationship between poverty and marine fisheries for the Biodiversity International Project of the Netherlands.

Across from this lagoon, a large, brightly painted wooden canoe bobs at sea. The men aboard pull in their blue nets with mesh sizes small enough to catch the



*A Ghanaian canoe, dug out from the wawa tree, sets sail in the early morning.
Photo by J. Jacquet*

smallest sardines. This dugout canoe is one of more than 10,000 in Ghana. Its story is rich in tradition but its future is decidedly insecure.

Unlike most West African nations, Ghana has a deep-rooted tradition of fishing that parallels a heavy reliance on fish for food security. Members of the Fanti tribe were found to be freshwater fishing upon the arrival of the first European explorers in the 15th Century. Ghana's marine fishing sector emerged during the 19th Century

when river canoes were modified for ocean travel to transport European explorers along the coastline [1].

Over the last half-century, Ghana's population has grown significantly, as has the number of fishermen (the number of canoes, however, has oscillated between eight and ten thousand). The canoe sector hauls

in 70% of the country's catch, comprised mainly of small, low-value fish that are consumed domestically. The remainder of the catch is accounted for by the semi-industrial and industrial sectors.

With heavy government assistance, the local industrial fleets developed from the mid-1960s to the mid-1970s. Most of the industrial boats operate on Ghana's continental shelf and have had a history of

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conflict with the canoe sector. Since the introduction of industrial trawling in the 1960s, Ghana has faced declining catch rates and reduction in specimen size, and has witnessed a high proportion of non-targeted fish in catch [2]. For instance, Ghana's shrimp industry has been identified as having a large by-catch problem - shrimp sometimes account for only 4% of the catch [3]. This by-catch consists of the very fish the canoe sector would have caught.

Our model recognizes competition for marine resources by the artisanal and the industrial fleets. It also accounts for the differences in motivation for fishing between the two sectors. The industrial sectors are driven by profit and, therefore, fish prices. The canoe fishermen are also motivated by

profit but will fish even at a loss to feed themselves and their families. The drivers of artisanal effort are, therefore, strongly linked to population and fish demand.

Ghanaians derive nearly 20% of their total protein from fish, which is more than three times the world average. But with population growth and the added competition with the industrial sectors, the canoe fleet has been unable to meet Ghana's annual demand for fish, which exceeds 600,000 tonnes annually. In the mid-1990s, imports increased more than five-fold from the previous decade as domestic supply further failed to meet domestic demand. Erosion of domestic supply has obvious implications for nutritional well-being in coastal communities but is also a symptom indicative of reduced fish stocks and harvests.

Because biodiversity is the primary concern of our model, we have been unable to capture the entirety of the Ghanaian dependence on fish for food security or the social welfare issues of the marine fisheries. The canoe sector employs



Jackie Alder, A.K. Armah and Jennifer Jacquet at work at the University of Ghana.

roughly 80% of all fishermen and it faces challenges not only internally (e.g., population growth) but also externally from the industrial sectors and an increasingly global fish market.

In a sense, the canoe is a subtle emblem for the growing conflict, in fisheries and beyond, between a traditional, localized economy and a rapidly growing, profit-driven global market. This dichotomy is evidenced in Ghana's shark fishery, the details of which were shared with us by some of our collaborators at the University of Ghana.

Just before the end of the 19th Century, a small wall net was introduced in Ghana for catching sharks [4]. Though the eastern region fishing communities abstain from shark fishing due to traditional beliefs, the western fishing communities do

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The *Sea Around Us* website may be found at saup.fisheries.ubc.ca and contains up-to-date information on the project.

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A Ghanaian lagoon fisherman and his scanty catch. Photo by J. Jacquet

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consume shark. In recent years, the shark fishery in Ghana has grown considerably with a new export market opening in response to the Asian market demand for shark fin soup. Aquatic mammal ecologist Patrick Ofori-Danson reports that artisanal fishing communities in western Ghana now use drift gillnets to catch dolphins (adults and calves) to use as bait for the growing shark fishery.

The shark fishery and use of marine mammals as bait are

unregulated by a government flooded with fisheries dilemmas. Over the last decade, Ghana's national fisheries policy has focused on resolving conflicts between the canoe and industrial sectors and eliminating inequitable access agreements with foreign fleets. The government initiated an Inshore Exclusion Zone that reserves two to four miles of the continental shelf for the canoe fishermen, built a port in Tema for exclusive use by the canoe fleet, and began charging a fee for industrial boat licenses. The problems in the shrimp industry, with only one remaining active vessel, have been resolved with the virtual collapse of shrimping in the area.

But many detrimental activities continue, such as uncontrolled trawling, illegal fishing by foreign fleets, the use of dynamite or poisons and the use of dolphins as bait. The tribulations of population growth and food insecurity likewise escalate. Once called the Gold Coast due to its abundant gold resources, most of the gold was depleted before Ghana gained independence in 1958. Left with poverty, limited regulatory funds,

and an absence of marine-focused NGOs, history will repeat itself in terms of fisheries resources unless Ghana is able to combat food insecurity, fund fisheries management and foster partnerships with researchers and NGOs.

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Ghana's fish mummies await the arrival of the fishermen and their catch at the bustling canoe port in Tema. Photo by J. Jacquet



Canoes land their catch at Tema. Photo by J. Jacquet

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*Please note that Fisheries Centre Working papers are available at www.fisheries.ubc.ca/publications/working/index.php