

Ghana's fishing industry has a 'golden seaweed' problem—how citizen science can help

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The Western shores of Ghana are struggling with a seaweed influx. Credit: Prosper Amihere

[Sargassum](#) is a genus of brown seaweed. Over [300 species](#) are distributed across the world in both temperate and tropical climates. The

species fluitans and natans are unique because they spend their life cycle floating on the ocean, never attaching to the sea floor. [Other](#) seaweed species reproduce and begin life on the ocean floor .

Pelagic (open sea) sargassum has been [described](#) as the "golden rainforest of the ocean" because of the floating ecosystem it supports in the Sargasso Sea, in the western Atlantic Ocean. Pelagic sargassum also occurs naturally in the [Gulf of Mexico](#) and the [Caribbean](#).

Floating sargassum first began arriving en masse on shores across the tropical Atlantic in 2011. Up to [10,000 tons](#) arrived daily during a particularly severe peak season. Severe years since then include 2015, 2018 and 2022—but every year there is a significant influx. In the Caribbean, there has been good progress in understanding the pelagic sargassum seaweed. We now [have a better idea](#) of where it's coming from: likely a new southern area of growth.

In 2009 the [first reports emerged](#) of pelagic sargassum sightings off the coast of Ghana. Densities have increased annually ever since. In early March 2023, large quantities have again arrived on the shores of the Western Region of the country.

Pelagic sargassum is beneficial in lots of ways. Marine species such as eels, white marlin and dolphin fish depend on it for spawning grounds in the Sargasso Sea. Commercial fish species including tuna depend on it for food.

But problems arise when large quantities are experienced near and on the shorelines of coastal communities. Algal and seaweed blooms are becoming more common in seas and oceans worldwide, both far offshore and nearshore. There is only [limited evidence](#) of a link between pelagic sargassum blooms and [climate change](#), but warming oceans do seem to be one cause of the [rise in other harmful algal blooms](#) in coastal

areas.

The pelagic sargassum off Ghana's coast is affecting communities' ability to fish and use their beaches.

Importance of fishing in Ghana

More than [60% of Ghana's citizens](#) live within 200km of the coast and 42% within 100km. The artisanal or small-scale fisheries sector [employs an estimated](#) 80% of the country's fishers.

Around 2.4 million people, about 10% of the population, work in the fisheries sector. Small-scale fisheries contribute about [4.5% to Ghana's gross domestic product \(GDP\)](#). The coastal regions of the country are particularly dependent on fisheries for their livelihoods.

Marine fisheries are the primary source of income for more than [200 coastal villages](#), including about 200,000 fishers with approximately 2 million dependents .

Impacts of pelagic sargassum on fishing communities

In a recent [study](#) we assessed the impact of pelagic sargassum on the livelihoods of fishers on Ghana's coast. Through group discussions, surveys, field observations and photographs, we documented the experiences of fishers. Most (70%) of those we spoke to across three sites in the region—Sanzule, Beyin and Newtown—depended on fishing for their sustenance and livelihood.

The seaweed had significantly affected the livelihoods of fishing dependent communities in the western region. Pelagic sargassum had reduced their fish catch by getting tangled in nets. It made up most of

the catch instead of fish.

Pelagic sargassum also inhibits fishing by:

- breaking nets and filling nets
- clogging outboard motors on boats
- creating seaweed mats that are impossible to navigate boats through
- causing skin irritations
- causing unbearable discomfort from the smell.

These initial results highlight the urgency of finding ways to manage pelagic sargassum in western Africa. But to achieve this, we also need more data and an improved understanding of what is happening.

Solutions

To identify solutions, it is important to know what types of seaweed are arriving, their origins, uses and how to monitor them. It is possible that the answers are the same for west Africa as in the Caribbean. But this is an assumption. Very little is known about pelagic sargassum in West Africa.

What we do know, as scientists, is that answering some of these questions for places like Ghana might be even trickier than it was for the Caribbean.

Take [forecasting and early warning](#), for example. These processes rely

on sufficient cloud-free satellite imagery in combination with an understanding of ocean processes and weather systems. That means detecting where the pelagic sargassum is at any given moment, in combination with ocean process models, to forecast where it will be later.

But west African coasts tend to have significant cloud cover. Methods that worked well in the Caribbean may not work in Ghana.

[Recently](#), a team from universities in Ghana, the UK and Jamaica came together to explore how ground-based photography might create a useful dataset to better understand the seasonality and volumes of pelagic sargassum arriving in Ghana, using [citizen science](#) methods.

[Citizen science](#) recognizes the important role that the public can play in research, and invites non-researchers to be part of data collection and analysis.

Citizen science is now applied worldwide for coastal monitoring but focuses almost exclusively on coastal erosion. Coastal erosion work, such as the [CoastSnap platform](#), documents how the physical structure of coastlines changes across days, months and years. The citizen science monitoring is achieved by installing a simple metal pole and some signage requesting that a passersby take a quick photo with their mobile phone and share it online or via an app.

In our [work](#), we have come together with schools and community members from Beyin, Esiana and Sanzule in the western region of Ghana to apply CoastSnap to study pelagic sargassum. Together, we have installed three of these metal monitoring posts. Teachers and [community members](#) are now photographing the impacts that the seaweed has on people's lives when it arrives.

Gradually, we will learn more about pelagic [sargassum](#) impacts and adaptation options in west Africa.

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