TRANSFORM BOTTOM TRAWLING

THE IMPACT OF BOTTOM TRAWLING ON FOOD SECURITY

MARCH 2026

SUMMARY

Key points

- **The evidence highlights a stark structural displacement: the efficiency of industrial trawling often comes at the cost of the nutritional stability and food sovereignty of coastal communities.**
- **This report concludes that protecting food security requires shifting the narrative from "production volume" to "nutritional equity," demanding the strict enforcement of IEZs, freezing trawling footprints and discontinuing subsidies which drive overcapacity.**

Bottom trawling accounts for approximately 26% of global marine fisheries catches, positioning it as a cornerstone of the industrial seafood supply. However, our research reveals that while bottom trawling contributes to global seafood supply, it frequently undermines local seafood availability particularly in the Global South. Through a mixed-methods approach comprising a literature review and nine detailed case studies, we identify a pattern of "negative competition." Industrial trawlers systematically encroach upon Inshore Exclusion Zones (IEZs) legally designated for Small-Scale Fisheries (SSF), displacing local fishers, damaging essential habitats, and diverting nutrient-rich catch away from coastal communities. Some bottom trawling catch is reduced to fishmeal and most are either redirected to export and/or urban markets, where higher prices make it increasingly unaffordable and inaccessible to the very coastal households that once depended on it for daily nutrition. The evidence highlights a stark structural displacement: the efficiency of industrial trawling often comes at the cost of the nutritional stability and food sovereignty of coastal communities. Case studies (e.g., in Kenya and West Bengal) reveal that trawling reduces the availability of species essential in local diets while eroding the livelihoods of women in the post-harvest sector. Conversely, the enforcement of the 12-nm ban in Southern Brazil offers a roadmap for recovery, showing that spatial exclusion if enforced properly can restore stock abundance and local access. In addition, we recommend a shift from top-down, binary policies toward participatory governance rooted in locally defined priorities for food security and community well-being. This report concludes that protecting food security requires shifting the narrative from "production volume" to "nutritional equity," demanding the strict enforcement of IEZs, freezing trawling footprints and discontinuing subsidies which drive overcapacity.

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1. INTRODUCTION

1.1. Bottom trawling

Bottom trawling represents one of the most significant and widespread methods of industrial fishing globally. Defined as the practice of towing a trawl (a large, cone-shaped net) along the seafloor to catch demersal species such as shrimp, cod, rockfish, and flounder. Currently, bottom trawling accounts for approximately 26% of global marine fisheries catches and is often seen as a cornerstone of the global seafood supply chain and a critical component of the modern ocean economy (Amoroso et al. 2018; Hilborn et al. 2023). However, the practice occupies a polarized position in marine policy and scientific discourse. While it is a primary engine for global seafood production, it is simultaneously scrutinized for its environmental footprint, particularly regarding seafloor integrity, non-target species bycatch, and carbon emissions (Hilborn et al. 2023). In addition, most bottom trawling is known to be only economically viable due to large government subsidies (Sumaila et al. 2019; Schuhbauer et al. 2020).

As the global community strives to meet the United Nations Sustainable Development Goals (SDGs), bottom trawling sits at the complex intersection of SDG 14 (Life Below Water), SDG 2 (Zero Hunger), and SDG 13 (Climate Action).

1.2. Food security and the food system

To better understand the impacts of bottom trawling this project focusses on its contribution to food-system outcomes, including food security, nutrition security, and food sovereignty (see box).

Conceptual Framework: Food, Nutrition and Sovereignty

Food Security (The 4 Pillars) (FAO 2012)

Availability: Is fish biomass physically present and accessible locally?

Access: Do communities lose access due to exports, price hikes, or spatial displacement?

Stability: Does trawling undermine the long-term productivity of small-scale stocks?

Utilization: Are high-quality food fish diverted to fishmeal or animal feed?

Food Sovereignty

The right of communities to define their own food and fisheries systems and manage their resources sustainably.

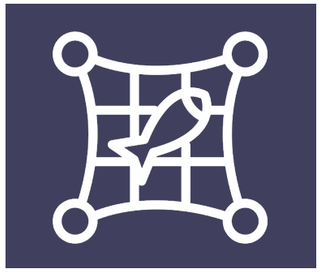
Nutrition Security

Ensuring access to the bioavailable micronutrients (Iron, Zinc, Omega-3s) that are critical for coastal health and difficult to replace with terrestrial food.

Left image: A bottom trawler with nets deployed, fishing in Madagascar's waters. Image credit: Madagascar Film and Photography.

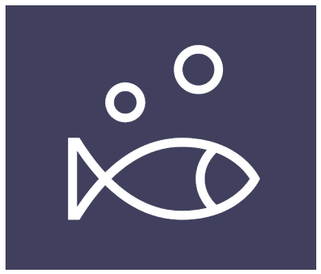
1.3. Research questions

The aim of this project is to deepen understanding of the relationship between bottom trawling and food security, responding to key research gaps concerning the pathways through which bottom trawling affects food security, nutrition, and livelihoods and the socio-political narratives surrounding the practice. Together with Coalition members[1], during our monthly meetings and through online surveys, we selected a set of four research questions to help guide our study:



A) Negative competition

Where does bottom trawling directly and indirectly detract from local food security? For example, by competing for resources that are then removed from local food systems? Which specific trawler practices (e.g., by-catch, discarding, high-grading) most affect SSF and food security?



B) Supporting food security

Does bottom trawl catch support food security? For example, which fisheries deliver local nutrition or employment benefits, and under what conditions?

C) Protein (nutrients) share and consumers

What share of fish protein originates from bottom trawling and who eats it?

- What percentage of protein production is generated by bottom-trawling?
- What is the nutritional value of bottom trawled catch?
- Who consumes bottom trawled catch?

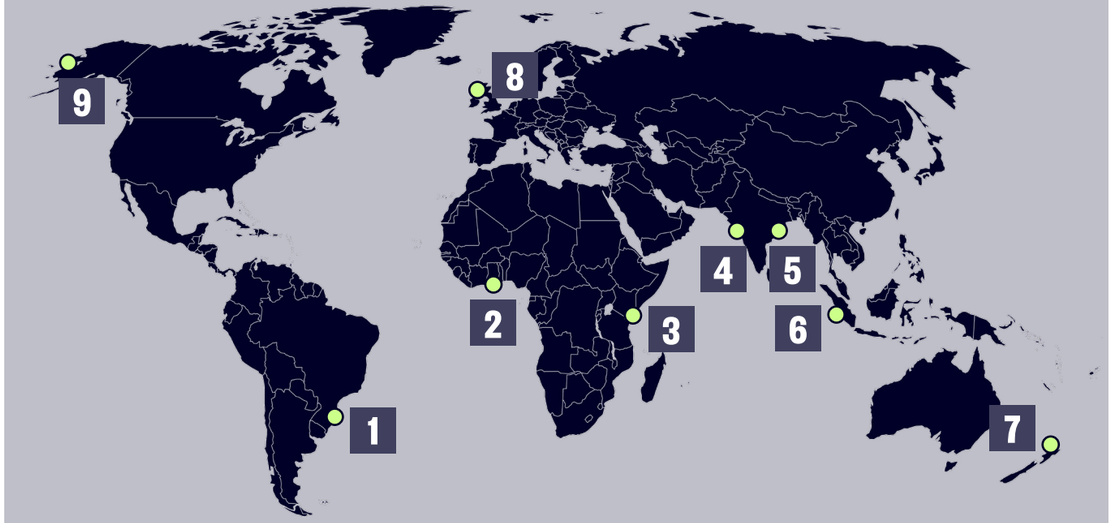
D) Industry narratives

For example, how do employment-creation narratives shape social acceptance?

[1]Members of the Transform Bottom Trawling (TBT) Coalition are civil society organizations, community representatives, researchers, and advocacy groups working collaboratively to address the ecological and social impacts of industrial bottom trawling.

Guided by these research questions, we applied a mixed-methods approach by combining a global literature review with real-world case studies to understand how bottom trawling affects food security, nutrition, and local communities. First, we reviewed scientific studies, government reports, and NGO and industry publications to identify what is already known and where evidence is missing.

Based on this, we selected nine case studies across different regions of the world (shown in Figure 1), with a focus on the Global South. We conducted 20 interviews with small-scale and industrial fishers, community members, NGOs, and researchers to gather local perspectives. All interviews followed a common framework to ensure consistency, while allowing people to share context-specific experiences. This approach helped us connect global evidence with on-the-ground realities (see details in Methods section).



Map legend

1. Brazil, Rio Grande do Sul (2)
2. Ghana (3)
3. Kenya, Ungwana Bay (3)
4. India, Goa (3)
5. India, West Bengal (3)
6. Indonesia, Sumatra (2)
7. NZ (Aotearoa), Hauraki Gulf (2)
8. Scotland, West Coast (1)
9. USA, Alaska, Yukon-Kuskokwim Delta (1)

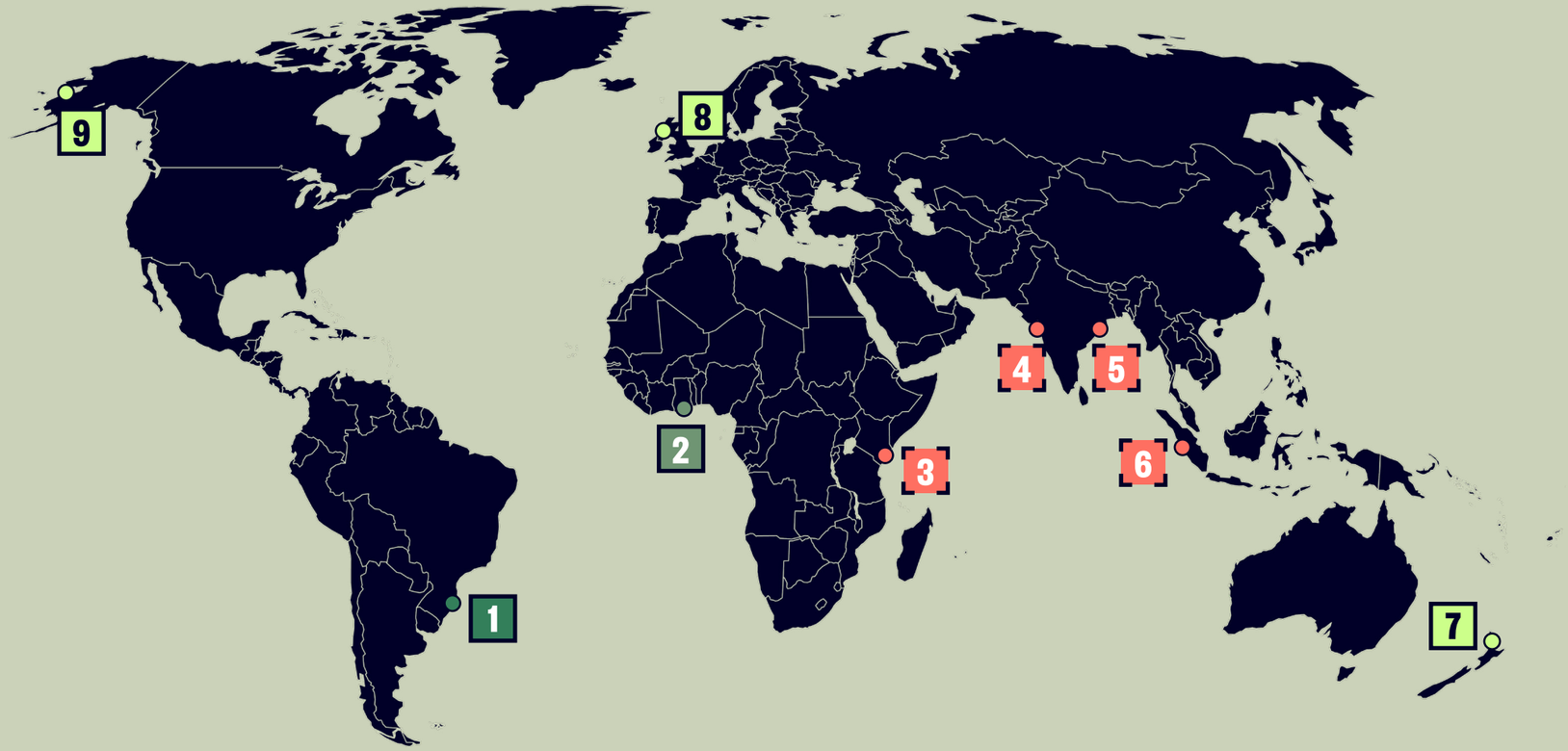
Figure 1 *Selected case-study locations for research on the relationship between bottom trawling and food security. The numbers of interviews per case study is included in brackets after each location name.*

2. RESULTS

To synthesize how bottom trawling supports global food supply while simultaneously challenging local food sovereignty and nutrition security through resource competition and environmental disturbance, we draw results from our literature review and case studies addressing our four research questions (a-d) followed by an overview highlighting the current research gaps. We have organized the evidence into four core themes: Access (addressing research questions A and D), Nutrition (addressing research questions C and A), Industry narratives (research question D) and Livelihoods (addressing research questions B and D).

2.1. Case studies overview and findings

This section summarizes interview results per case study to provide some background and an overview of each of their major findings (see Figure 2 and Table 1). It is worth mentioning that all the country summaries highlight negative impacts of bottom trawling on local diets by reducing availability, access and affordability of important species for food and damaging women's livelihood activities. A brief summary of each case study can be found in Supplementary Materials.



1 **Brazil:** Stock recovery and improved food availability following a strictly enforced 12-nm trawling ban.

4 **Goa:** Encroachment into the 5-km exclusion zone leads to decline of nutritionally central species.

7 **Aotearoa:** Legal trawling in MPAs impacts Māori customary harvests and essential habitats.

2 **Ghana:** Expansion of the 12-nm inshore zone following advocacy; competition for small pelagics persist.

5 **West Bengal:** Night-time incursions inside the 12-nm zone destroy gear and divert nutrients to feed markets.

8 **Scotland:** Industrial langoustine trawling for export prioritizes jobs over local food sovereignty of creel fishers and communities.

3 **Kenya:** Routine violation of the 5-nm limit, damaging reefs and displacing artisanal fishers.

6 **Indonesia:** Violations of the 12-nm limit drive food insecurity as landings are exported for feed.

9 **Alaska:** Industrial salmon bycatch in 'midwater' trawls undermines Indigenous food sovereignty.

Map legend

- **1 Success**
- **2 Progress**
- **3 Contested**
- **4 Crisis/illegal**
- **IEZ frequent violation**
- **Enforced protection**

Figure 2 *Global Synthesis of Bottom Trawling Impacts on Local Food Security. This map illustrates the nine case studies analysed in this report, categorized by policy status and conflict level.*

Table 1 *Summaries of our case study results highlighting overall seafood system (food and nutritional security and food sovereignty) impacts, industry narratives and key stressors (including important governance aspects).*

Case Study	Food Security & Sovereignty Impact	Industry Claims & Narratives	Governance & Key Stressors
Brazil (Rio Grande do Sul)	Success Story: 12-nm trawling ban led to rebounding demersal stocks (e.g., weakfish), providing affordable local protein.	Claims the ban was "political", threatened exports, and forced shrimp imports. Reported no significant job losses.	Spatial Protection: Demonstrates that excluding trawlers can restore local food systems.
Ghana	Small pelagics (central to diet) diverted away from artisanal fisheries to urban markets; women processors pushed into debt; low-quality landings.	Attributes stock decline to climate change, oil/gas, and SSF illegalities; disputes responsibility for declines.	Compounding Stressors: Trawling is a significant contributing factor alongside environmental and industrial pressures. Current ongoing implementation of 12-nm trawler exclusion zones.
Kenya (Ungwana Bay / Kilifi)	Sharp decline in SSF landings; destruction of coral habitats; illegal transshipment of juvenile fish bycatch.	Emphasizes local employment of crew, though artisanal fishers feel excluded from these benefits.	Enforcement Gap: Frequent violation of 5-nm limit; existing management viewed as inadequate and non-inclusive.
India (West Bengal)	Reported 60% catch loss for SSF; disappearance of highly nutritious anchovies/Bombay duck; gear destruction; erosion of women's drying sector.	Industrial fishing sector is incentivized by the government to maximize production with a rising demand for aquaculture feed.	Market Diversion: Night-time incursions in 12-nm IEZ, provide markets with low-quality fish, depressing prices for SSF.
India (Goa)	Decline in highly nutritious sardines and mackerel; households with limited mobility losing access to affordable seafood.	Industry blames mismanagement of fisheries for marine resource decline.	Systemic Conflict: Routine encroachment into 5-km SSF zones despite legal mandates; weak enforcement.
Indonesia (Sumatra)	SSF households can no longer afford fish; landings exported. Erosion of culture and traditions.	Provides low-paid "last resort" crew jobs, which displace traditional, self-sustaining SSF livelihoods.	Resource Drain: Lack of enforcement allows trawling within 0.5–5 nm of shore, far inside the legal 12-nm limit.
Aotearoa, Hauraki Gulf (New Zealand)	Damage to snapper/scallop habitats; undermines Iwi (indigenous people) customary harvests and local food fishing.	Claims minimal impact by trawling only on "muddy bottoms"; emphasizes role as a major employer and exporter.	Political Will: Legal trawling within Marine Protected Areas (MPAs) privileges industrial catch over local access.
Scotland (West Coast)	Loss of mixed-species fisheries; long-term degradation of benthic habitats that supported local diets.	Cites 1,761 jobs and export value of langoustine (Nephrops) to oppose spatial restrictions.	Contested Space: Ongoing conflict between industrial fleets and coastal communities seeking to restore habitat.
USA (Alaska, Yukon-Kuskokwim Delta)	Salmon declines due to habitat erosion, climate change and trawler bycatch destroys Indigenous food systems (which provides up to 50% of dietary protein).	Claims "midwater" status for pollock trawling; frames production as vital for national supply chains and school lunch programs.	Policy Priorities: Frameworks focused on Maximum Sustainable Yield (MSY) often ignore coastal community-level nutrition.

2.2. Access: Spatial conflict, violations of regulations and habitat loss

Globally, bottom trawling is not an activity occurring in distant or ungoverned waters: over 99% of bottom trawling takes place within national Exclusive Economic Zones (EEZs), predominantly in shallow continental shelf areas that overlap extensively with small-scale and artisanal fisheries (Steadman et al. 2021). These same coastal zones are where small-scale fisheries (SSF) operate most intensively, employing over 90% of the world's marine fishers and making major contributions to local food systems (FAO et al. 2023).

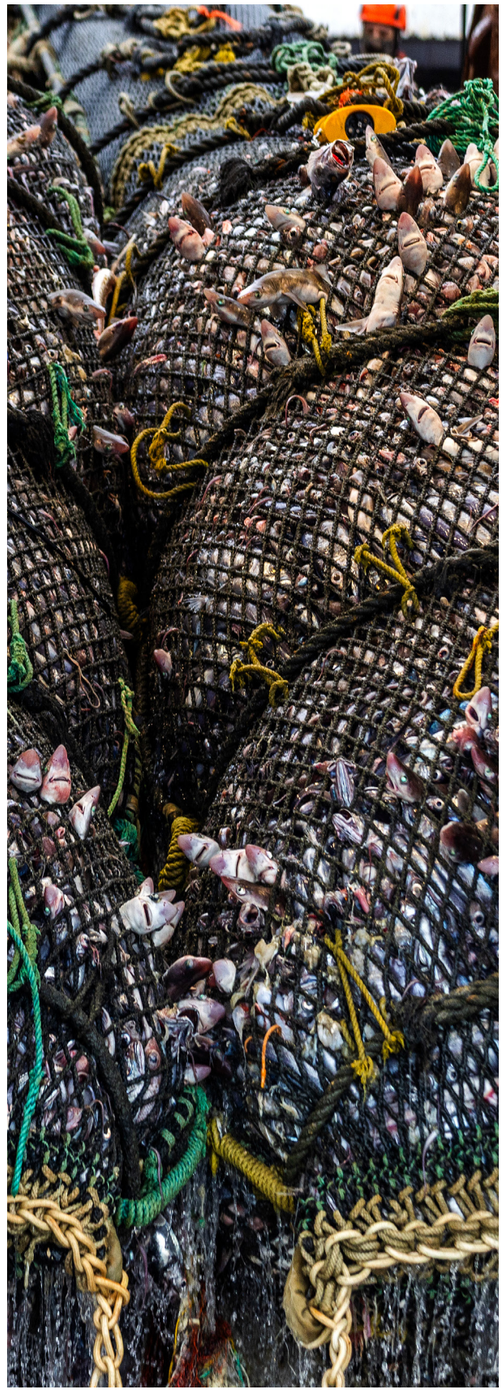
Across all case studies, negative competition between bottom trawling and SSF follows a consistent pattern. Trawlers directly remove the same species—such as sardines, anchovies, snapper, pomfret, and salmon—that SSF traditionally rely on for household consumption and local markets, reducing both subsistence catches and the supply of affordable food fish. For example, in Ghana, significant conflict has been documented where industrial trawlers operate illegally in zones reserved for SSF, leading to livelihood disruptions and market dislocations (Seto et al. 2023). In addition, interviews revealed frequent destruction of SSF nets by trawlers as well as instances of insufficient space being left for SSF boats to access their traditional fishing grounds - an issue that has also been observed in India and Indonesia.

Reports from Senegal document that bottom trawling reduces the catch of local artisanal fishers who provide up to 40% of the animal protein for local populations (EJF Senegal 2023). Based on interview results, industrial trawlers are reported to land and often target high volumes of fish (including juveniles and bycatch) that were historically caught by SSF and consumed by local communities.

Small-scale fishers in Senegal share coastal waters with industrial trawlers. Image credit: Rewild Africa.

In addition, as industrial trawling intensified and fish stocks declined, fleets progressively diversified their target catch to include species not traditionally targeted by SSF. Over time, this has resulted in a growing share of landings composed of low-trophic and previously discarded "trash fish" (Nunoo et al. 2009), which in some contexts has shifted from bycatch to an intentional target of fishing effort.

Globally increasing amounts of fish are being diverted to fishmeal plants to support global aquaculture, effectively removing affordable food fish from the plates of the food-insecure (Srinivasan et al. 2010, Cashion et al., 2017 and IUCN 2024). While most of the global evidence shows that fish diverted to fishmeal comes from pelagic trawlers (Shea et al. 2025), interview results indicated that at the local scale bottom trawled catch is often destined for non-human consumption products also.

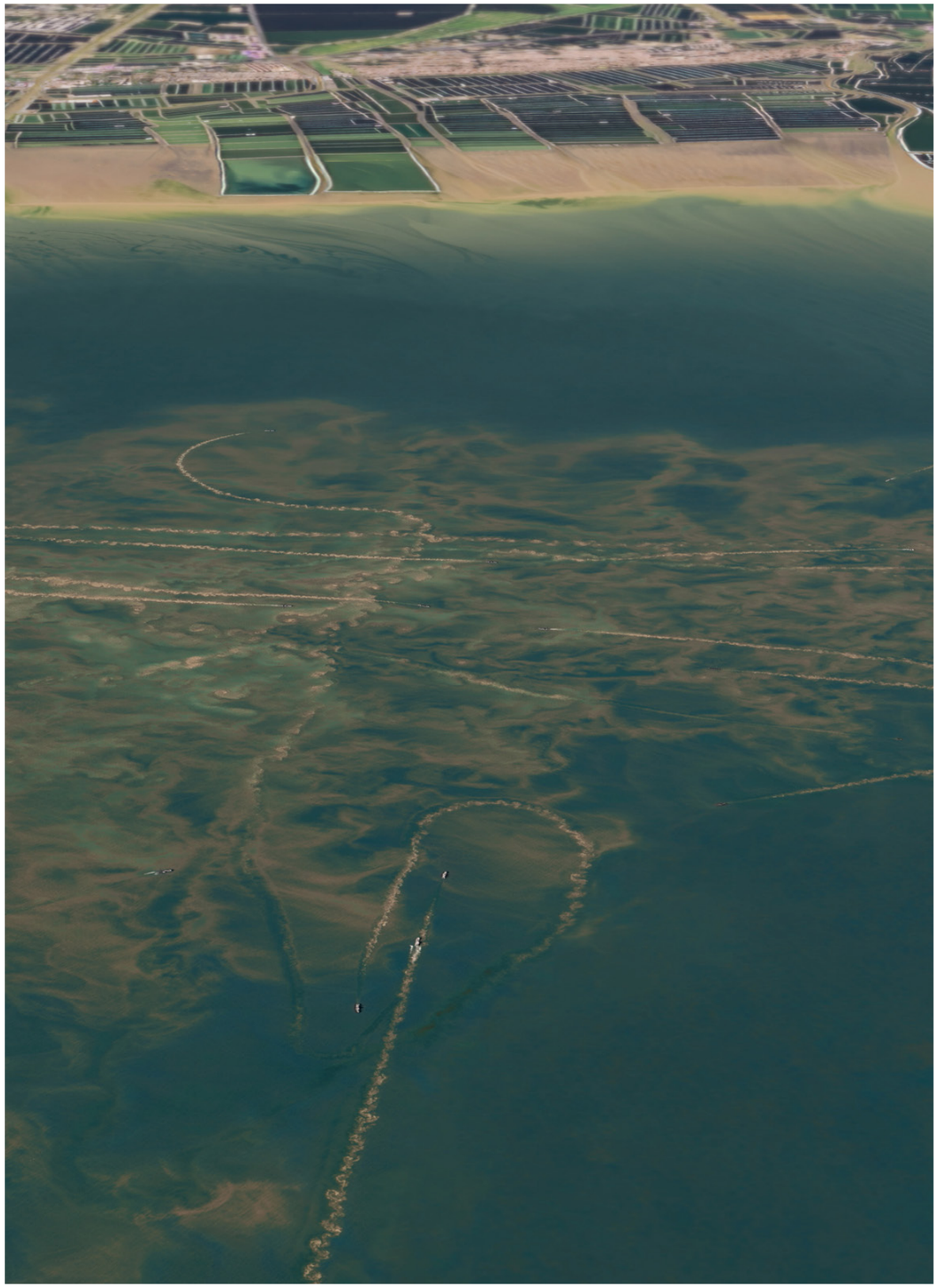


Nets filled with fish are lifted from the sea by a bottom trawler on the Chatham Rise, off the east coast of New Zealand. Image credit: Paul Hilton / Greenpeace.

> **Despite official regulations for trawlers to stay within certain corridors, they regularly destroy fishers gear at night.**
>
> *— India, West Bengal*

> **Fisheries observers on the beach see 5-6 trawlers during the day close to the shore and the next morning they see broken turtle shells and corals washed up on the beach.**
>
> *— Kenya*

Across multiple case studies, small-scale fishers described inshore exclusion zones as legally defined but weakly enforced spaces. Encroachment by industrial trawlers was reported to reduce access not only through catch removal, but through gear loss, safety risks, and displacement from traditional fishing grounds.



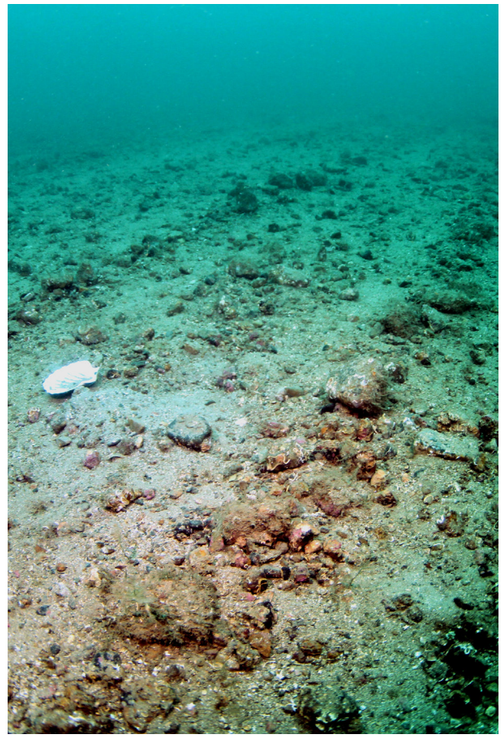
An aerial view of the impacts of bottom trawling on the ocean floor, filmed for Ocean with David Attenborough. Image credit: Silverback Films and Open Planet Studios.

In addition, one of the key mechanisms through which bottom trawling affects food security is the alteration of marine ecosystems, which underpins the long-term productivity of fish stocks. Bottom trawling is widely recognized as the most widespread source of anthropogenic physical disturbance to global seabed habitats (Jennings et al. 2001; Halpern et al. 2015; Hiddink et al. 2017; Sciberras et al. 2018). The gear drags heavily weighted nets across the seafloor, resuspending sediments and flattening topographic complexity. This habitat homogenization removes the structural refuge required by juvenile fish, potentially creating a bottleneck for stock recruitment. Research indicates that while some dynamic sedimentary habitats (especially the ones which have already been transformed by ecosystem impacts for a long time) recover relatively quickly (1–6 years), vulnerable marine ecosystems (VMEs) such as deep-water corals or other still pristine ecosystems may take decades or centuries to recover (Hiddink et al. 2017; Victorero et al. 2018). In areas of intense trawling, the seabed is kept in a permanently altered state, which may permanently suppress the carrying capacity of the ecosystem (Bradshaw et al. 2021).

Our case study results confirm the evidence on habitat destruction from the literature, as habitat degradation has been observed with bottom trawling damaging corals, scallop beds and coastal sediments reported from Kenya to the Hauraki Gulf. This results in decreased nursery productivity, forcing SSF to fish farther offshore at higher cost, often beyond the reach of most. Market displacement further amplifies food insecurity as observed in our case studies: illegal saiko[2] sales in Ghana and export-oriented bottom trawl catches in Goa, Indonesia, Aotearoa, and Scotland undercut local vendors. Furthermore, many coastal community members lose access to fish as they are unable to travel to markets outside their communities or are unable to afford fish sold in markets.

In addition, catching juvenile fish by non-selective bottom trawl nets prevents fish from reaching maturity and reproducing (Jennings et al. 2001; Velip and Rivonker 2015; Witherell et al. 2002) with the same trends reported in our case studies e.g., Ghana, Kenya and India. This directly reduces the biomass available to artisanal fishers who rely on catching adult fish in nearshore waters, thereby eroding local food sovereignty and future access to food fish for small-scale and subsistence fisheries.

As seen from interview results, the loss of affordable food fish and cultural consequences are uneven but severe, with women processors and elders losing access to customary fish transfers, diets shifting toward cheaper alternatives, and ceremonial or customary catch eroding before outright shortages emerge.



Seabed damage caused by dredging for scallops in Scotland. Image credit: Howard Wood | COAST.

[2] Saiko refers to the illegal transshipment of fish at sea, from bottom trawlers to canoes, to be sold in local markets.

2.3. Nutrition: Depleting local plates to feed global markets

This section examines how bottom trawling contributes to global fish supply while simultaneously undermining local nutrition security through diversion, degradation, and unequal distribution of nutrients. Fish are not only a source of calories, but a critical provider of bioavailable micronutrients, such as iron, zinc, calcium, vitamin A, vitamin B12, selenium, and omega-3 fatty acids, particularly for low-income populations (Golden et al. 2021; Viana et al. 2023; Bennett et al., 2018). Across Africa, Asia, and Latin America, affordable fish from mixed demersal and small pelagic fisheries plays a central role in household diets and micronutrient intake (Onumah et al., 2020; Simmance et al., 2022). While much of this literature is gear-agnostic, it underscores the importance of species groups that are frequently targeted or affected by bottom trawling, including demersal fish and small pelagics that are nutritionally dense and locally important.

Trawl fisheries account for approximately 26% of wild marine fisheries landings, equivalent to roughly 19 million tonnes per year, making them a major engine of global seafood availability (Sea Around Us, Steadman et al. 2021). Trawl-caught species such as cod, hake, pollock, shrimp, and small forage fish are nutritionally valuable and contribute significantly to global protein supply (Golden et al., 2021). Some bottom-trawl fisheries also produce animal protein more efficiently, in biophysical terms, than some terrestrial food systems, e.g., beef or Norwegian farmed salmon (Hilborn et al., 2023). From this perspective, bottom trawling somewhat supports the availability dimension of food security. However, by degrading habitats and ecosystems, bottom trawling ultimately undermines these very benefits they seek to generate.

Fish caught by small-scale fishers from local waters are cooked over a fire in a Malagasy village. Image credit: Madagascar Film and Photography.

However, while bottom trawling delivers large volumes of fish, it simultaneously generates a nutritional drain by diverting nutrient-rich species and bycatch away from local food systems and toward export markets, processing chains, or non-food uses. The literature shows that bottom-trawl fisheries dominate the fishing of globally traded demersal species—cod, hake, pollock, flatfish, shrimp—which primarily enter international value chains serving markets in the EU, USA, China, and Japan mostly in places where people are able to choose their protein (Smith et al. 2010; Aragão et al. 2022; Ospina-Alvarez et al. 2024). In contrast, SSF predominantly supply local and regional markets, where fish is consumed closer to where it is caught and plays a more direct role in household nutrition (Gibson and Sumaila 2017, Arthur et al. 2022; Basurto et al. 2025).

Resource diversion is further amplified by high discard and bycatch rates, which are generally higher in bottom trawling than in other fishing methods (Roda et al. 2019). Although historical discarding at sea has declined in some regions, bottom trawling still remains the gear with the highest bycatch (Velip and Rivonker 2015; Lively and Jonathan McKenzie 2023). In addition, the fate of non-target and low-value catch has shifted rather than disappeared, as reported from case studies in West Bengal or Sumatra. Increasing proportions of small pelagics, juveniles, and mixed bycatch are now directed to fishmeal, animal feed, or industrial uses, effectively removing micronutrient-rich food from human diets and reallocating it to global aquaculture and livestock systems (Cashion et al. 2017, Sumaila et al. 2022, Cardinaals et al. 2023, interview results).

The case studies from West Bengal and Ghana illustrate how this efficiency paradox plays out on the ground. In both contexts, bottom trawling threatens nutrition security not by eliminating fish entirely, but by degrading the quality, accessibility, and local availability of fish relied upon by coastal households. Interviewees reported that while a substantial share of bottom-trawl bycatch remains within domestic markets, it frequently arrives spoiled or heavily degraded due to long tows, poor onboard handling, and delayed landings. This reduces its suitability for human consumption and its effective nutritional value. Even when sold locally, such fish is often inaccessible to coastal communities due to distance from industrial landing sites, market structures dominated by intermediaries, or timing and price constraints.

In West Bengal, the loss and degradation of nutritionally important species such as anchovies and Bombay duck was reported to have reduced affordable sources of protein and micronutrients for low-income households. In Goa and Indonesia, similar dynamics were observed, with significant volumes of low-value or degraded catch diverted to fishmeal, animal feed, or fertilizer, rather than entering local food systems.

In both cases, this diversion represents a direct loss of nutrients from local diets, even as aggregate fish production remains high.

Evidence from the literature and case-study indicate that bottom trawling can undermine nutrition security through a number of pathways, including, resource competition, post-harvest quality loss, and diversion away from human consumption. This occurs even where domestic availability of trawl-associated fish appears substantial, highlighting that the critical question is not how much fish is caught, but who eats it, in what form, and with what nutritional consequences (Fig. 3, see next page).

> **“Trawler take bad quality and spoiled anchovies to the market”**
>
> *— India, West Bengal*

Interviewees reported that while bottom trawl-caught fish may remain within domestic markets, quality degradation, timing, and diversion to fishmeal or animal feed prevent these landings from contributing meaningfully to local nutrition. As a result, high aggregate production coexists with declining dietary quality and reduced access to nutrient-rich fish among coastal households.

2.4. Industry narratives: scale, legitimacy and responsibility

This section examines how bottom trawling is framed by industry actors from literature findings and across case studies, and how these narratives shape public and policy perceptions despite documented impacts on local food systems. These narratives shape regulatory decisions, enforcement priorities, and public perceptions of trade-offs between food security, employment, and environmental protection.

Across all case studies, industry representatives advanced a consistent set of narratives that frame bottom trawling as economically necessary, environmentally manageable, and socially beneficial. These narratives emphasise production at scale, employment generation, and comparative efficiency, and are frequently mobilised to legitimise continued access to nearshore fishing grounds.

A dominant narrative positions bottom trawling as essential for feeding a growing global population. Proponents argue that well-managed bottom trawl fisheries deliver large volumes of affordable protein and that restricting trawling could shift food production toward land-based systems with higher environmental footprints (Hilborn et al. 2023; International Coalition of Fisheries Associations 2025). Within this framing, aggregate catch volumes and global substitution effects are prioritised, while questions of local access, nutritional distribution, and food sovereignty are marginalised (Allegretti and Hicks 2023).

Industry narratives often frame bottom trawling as operating within a vast, largely unbounded ocean capable of sustaining high-volume production with limited trade-offs. In practice, however, competition often unfolds in highly constrained nearshore spaces, where industrial bottom trawlers routinely encroach illegally into IEZs legally reserved for SSF (EJF and Hen Mpoano 2019; Ayilu et al. 2023).

A small-scale fisher in Semarang, Central Java, near a Gas and Steam Power Plant. Image credit: KNTI.

Across several case studies, responsibility for declining stocks and food insecurity was frequently attributed to external drivers rather than bottom trawling itself. In Ghana, industry actors emphasised climate change, offshore oil and gas development, and illegal practices within the small-scale sector as primary causes of fish stock decline. In India, bottom trawl representatives pointed to government mismanagement, while in Indonesia bottom trawling was framed as a source of last-resort employment rather than a driver of displacement. Case-study interviews, however, consistently indicated that such narratives obscure the role that industrial bottom trawlers play by intensifying scarcity and triggering the very coping strategies of coastal communities which can sometimes lead to illegal activities.

In other contexts, narratives focused more heavily on legitimacy and environmental selectivity. In Aotearoa (New Zealand), industry actors claimed that bottom trawling is confined to “muddy bottoms” with limited ecological value, while in Alaska trawl fisheries were framed as “midwater” operations that nonetheless regularly contact the seafloor (AMCC 2023) and generate substantial bycatch of salmon central to Indigenous food systems. In Scotland, employment and export value of langoustine fisheries were emphasised to justify continued access despite long-term degradation of mixed demersal ecosystems.

All in all, these narratives perform an important political function: they normalise spatial conflict, deflect responsibility for food system impacts, and frame bottom trawling as an unavoidable trade-off between local costs and global benefits. The case studies presented in this report demonstrate that while these narratives resonate in policy and public discourse, they frequently diverge from the lived realities of coastal communities and the documented impacts on access, nutrition, and livelihoods.

Across case studies, industry narratives consistently attributed declining stocks and food insecurity to external drivers such as climate change, mismanagement, or small-scale fishing practices. Interview evidence suggests these narratives obscure the role of spatial encroachment and industrial extraction in intensifying scarcity and conflict.

Alaska pollock production is heavily promoted, presented as evidence of their importance for food security, including their incorporation into school lunch programs across the United States.

— USA, Alaska

2.5. Livelihoods and jobs

This section examines how employment benefits from bottom trawling are generated, distributed, and experienced across different contexts. In some regions, bottom trawling contributes to national employment figures and generates economic value that can indirectly support food security through wages, taxes, and community development mechanisms. In Aotearoa (New Zealand), Scotland, and the USA, relatively strong governance frameworks and labour standards enable portions of industrial fishing revenue to circulate within domestic economies. Industry actors and organisations such as Europêche and the International Coalition of Fisheries Associations (ICFA) frequently highlight these benefits, citing thousands of jobs across harvesting, processing, and ancillary services, and framing bottom trawling as a cornerstone of coastal employment. Such claims have proven influential in securing political support and social licence, particularly where alternative employment opportunities are limited.

Artisanal gillnet fishing in Rio Grande do Sul. Image credit: Oceana / Rodrigo Gorosito.

However, the literature and case-study evidence indicate that employment benefits from bottom trawling are highly uneven. Employment is typically concentrated among a small number of vessel owners and processing firms, while crew numbers remain low relative to catch volume. In Aotearoa, interviewees noted that most trawlers are owned by a small number of companies, with independent operators often tied into vertically integrated processing and export chains. In the Global South, bottom trawling is frequently controlled by foreign or distant-water interests, as observed in Ghana, Indonesia, and Kenya, further limiting local retention of economic benefits.

Comparisons with SSF highlight this disparity. While trawl fleets employ relatively few crew members, SSF support far larger numbers of livelihoods when post-harvest activities are included.

In Ghana, for example, interviewees reported that approximately 41 active trawlers employ around 1,400 crew members, compared with an estimated 50,000 small-scale fishers operating over 12,000 canoes, not including processors and traders. Similar patterns were observed across India and Indonesia. Crucially, employment narratives rarely account for displaced or invisible labour, particularly in post-harvest sectors dominated by women (Harper et al. 2017). Evidence from Ghana, Goa, and West Bengal shows that women who depend on small-scale landings for processing and trade lose income and autonomy as bottom trawling reduces nearshore catches, shifts landings to distant industrial ports, or floods markets with frozen or degraded fish. These losses are not captured in formal employment statistics, creating an "invisible employment crisis" alongside claims of job creation.

Evidence from Ghana, Goa, and West Bengal shows that women who depend on small-scale landings for processing and trade lose income and autonomy as bottom trawling reduces nearshore catches, shifts landings to distant industrial ports, or floods markets with frozen or degraded fish. These losses are not captured in formal employment statistics, creating an "invisible employment crisis" alongside claims of job creation.

Alaska is often presented as an exception due to the Community Development Quota (CDQ) program, which allocates a share of industrial fisheries quotas to eligible communities (NOAA). While industrial fisheries revenue could be redistributed under specific governance arrangements, the benefits of the CDQs are indirect and uneven (Lyons et al. 2019). Case-study evidence and existing research indicate that outcomes depend on leasing structures, partnerships, and local governance, and do not translate into widespread participation in fishing or improved local food security.

The role of subsidies further complicates employment outcomes. Capacity-enhancing subsidies continue to support the profitability of many bottom trawl fleets (Sumaila et al. 2019), favouring capital-intensive operations and placing labour-intensive SSF at a competitive disadvantage (Schuhbauer et al. 2020). As a result, jobs maintained through trawling may come at the expense of more numerous and locally embedded livelihoods elsewhere in the fishery.

The evidence suggests that bottom trawling can support livelihoods and food security through employment only under very specific governance and redistribution conditions. More commonly, employment benefits coexist with declining small-scale livelihoods, erosion of post-harvest work, and reduced food sovereignty in coastal communities.

> **Before, elders received fish even if they could no longer go to sea. Now there is nothing to share.**
>
> *— Ghana*

> **Entire Humanscape of fishers are affected - men, women, youth. Entire SSF in Goa are pushed to the margins due to mechanised fishing.**
>
> *— India, Goa*

While industrial trawling generates a limited number of wage-based jobs, interviewees described widespread loss of livelihoods in post-harvest and informal sectors dominated by women and elders. These losses are rarely reflected in employment statistics, yet they play a critical role in household food security and social support systems.

Across all case studies, bottom trawling was found to reshape food systems in consistent ways: restricting access to fishing grounds, diverting nutrients away from local diets, concentrating economic benefits, and marginalizing small-scale and post-harvest livelihoods. While industry narratives emphasize efficiency and employment, community experiences point to declining food sovereignty and increased vulnerability. These outcomes vary with governance strength, but the underlying mechanisms are widely shared.

Main image: A woman tends to drying fish in Indonesia, using sunlight to preserve the catch for markets and everyday consumption. Image credit: KNTI.

3. DISCUSSION

This study set out to deepen understanding of the relationship between bottom trawling and food systems, and to critically examine prevailing narratives that frame bottom trawling as essential for global food security. Drawing on a mixed-methods approach combining literature review and case study assessment, our findings demonstrate that while bottom trawling contributes substantially to global fish biomass and commodity supply, its contribution to food security, nutrition security, and food sovereignty (the Food System) is frequently weak or negative at the local level. These negative effects are most pronounced for vulnerable coastal populations whose livelihoods, diets, and cultural practices depend directly on access to nearshore fisheries.

Our findings reveal the emergence of counter-narratives that emphasize rights, sovereignty, and local control over marine resources. Public support for restrictions on industrial bottom trawling, particularly in nearshore and small-scale fishing zones, is growing, as observed in Ghana, Brazil, and Aotearoa (New Zealand). Even in contexts where bottom trawling provides local employment or short-term economic benefits, these gains are often accompanied by diminished food sovereignty, declining dietary quality, and disproportionate impacts on women and elders, alongside poor and hazardous working conditions.

Building on these findings, the following sections examine the policy implications of bottom trawling and explore its differentiated impacts on women, cultural practices, and progress toward the Sustainable Development Goals, highlighting where current governance frameworks succeed and where structural change is needed.

Right image: Small-scale fishers in Senegal share coastal waters with industrial trawlers. Image credit: Rewild Africa.

3.1. Policy and enforcement

Where governance is strong and spatial separation between industrial and small-scale fleets is effectively enforced—as illustrated in the Brazil case study—conflicts can be reduced and local food systems can recover. However, across most contexts examined, weak enforcement and excess industrial capacity continue to drive a "race to fish" that actively undermines local food system outcomes. Across all case studies and stakeholder interviews, we found that national and regional fisheries policies rarely incorporate food security, nutrition security, or food sovereignty as explicit, operational objectives. While some policy frameworks reference coastal livelihoods or community wellbeing, interviewees overwhelmingly described these provisions as vague, weakly implemented, and largely disconnected from day-to-day fisheries management decisions. In practice, food-system considerations remain marginal, while governance continues to prioritise catch volumes, economic efficiency, and short-term revenue generation.

From Alaska and Aotearoa we learned that this disconnect is reinforced by the dominance of single-species quota systems and maximum sustainable or economic yield-based management frameworks, which regulate access to fish primarily through biological and economic metrics. Although essential for stock sustainability, these tools are largely blind to how fish contributes to local diets, cultural practices, or nutritional needs.

The literature reinforces these findings, highlighting an institutional separation between food security policy and marine resource management (Farmery et al. 2021, 2024; Arthur et al. 2022). Food security strategies are typically housed within agriculture, social welfare, or development ministries, while fisheries governance focuses on biomass, economic output, and export performance.

This fragmentation limits cross-sectoral coordination and results in policies that address food security rhetorically, but not through fisheries access, spatial planning, or allocation decisions.

Indonesia demonstrates a slightly different case, we learned that food security is a stated priority within the national policy framework, and responsibility for marine resources sits within a ministry that formally recognises food security objectives. Therefore, Indonesia's governance architecture is comparatively well positioned to integrate food security into marine resource management. However, on the ground, compliance and enforcement of IEZs are minimal. Industrial bottom trawlers routinely operate within zones reserved for SSF, undermining local livelihoods and access to fish. This gap between policy intent and lived reality underscores that institutional mandates alone are insufficient without effective compliance mechanisms and enforcement capacity.

In addition, the case studies highlight the importance of understanding compliance and enforcement. In several contexts, legal frameworks and spatial regulations formally exist, yet weak monitoring systems, limited patrol capacity, political interference, and uneven application of sanctions mean that violations rarely carry consequences. In these situations, poor outcomes are less a function of absent policy than of insufficient enforcement, creating de facto open access conditions that incentivise industrial encroachment.

> **There is no monitoring, no patrolling. Despite 4-5 decades of demanding that the government stop bottom trawling, it does not listen to SSF.**
>
> *— India, West Bengal*

> **Violations go mostly without challenge with few exceptions.**
>
> *— India, Goa*

Our case study results show that where enforcement capacity has been strengthened and applied consistently, as observed in Brazil, early signs of stock recovery and reduced conflict between industrial and small-scale fleets have been observed. By contrast, in regions such as Goa, West Bengal, Kenya, and Indonesia, weak enforcement allows bottom trawling to persist in inshore areas, accelerating the deterioration of local food systems. Importantly, however, enforcement alone does not guarantee food-security gains. In Alaska and Aotearoa, governance and enforcement are comparatively strong, yet policy priorities remain oriented toward export markets and industrial efficiency, with limited recognition of coastal food sovereignty or cultural access to fish.

Recent developments in Ghana illustrate how political momentum can begin to realign policy priorities. Growing public concern over declining artisanal catches and food insecurity has contributed to implement the 12-nautical-mile trawl exclusion zone, signalling a shift toward recognizing the role of fisheries governance in national food systems. While outcomes remain uncertain, this case demonstrates that public pressure and cross-sectoral advocacy can help bridge the gap between food security objectives and fisheries policy implementation.

Hon. Emelia Arthur, Minister of Fisheries & Aquaculture, played a key role in implementing the new Fisheries Act, extending Ghana's IEZ to 12 nm. Image credit: Narh Concepts Studio for Blue Ventures and Stefan Kleinowitz.

> **Revised act, provides IEZ extend to 12 nm... very strong voice of civil society, academia, artisanal fishers themselves, local communities... many voices and the ministry understand that they need their voices to be heard to get voted for in next election.**
>
> *— Ghana*

Taken together, these findings suggest that improving food-system outcomes linked to bottom trawling requires both institutional integration and effective enforcement. Fisheries governance must move beyond narrow yield- and revenue-based objectives to explicitly prioritise food security, nutrition, and sovereignty, while ensuring that existing regulations are meaningfully enforced. Without this dual shift, bottom trawling is likely to continue generating economic value at the global level while eroding food systems and livelihoods at the local level.

3.2. Impact on women and other marginalized groups

Across fisheries globally, women and other marginalised groups—particularly elders—play essential but often under-recognised roles in food systems. While women are underrepresented in industrial fishing fleets, they constitute a substantial proportion of the workforce in post-harvest activities, including processing, drying, smoking, trading, and retailing of fish (FAO et al. 2023). Estimates suggest that women account for approximately 40–50% of all workers in fisheries value chains when post-harvest activities are included, with particularly high participation in SSF systems in the Global South (Harper et al. 2020; Basurto et al. 2025). These roles are critical not only for household income, but also for maintaining local food availability, affordability, and cultural food practices (Harper et al. 2020).

Despite their centrality to fisheries-based food systems, women's livelihoods are highly sensitive to changes in where fish is landed, how it is distributed, and who controls access to fishing grounds. The expansion of industrial bottom trawling frequently disrupts these dynamics by shifting landings away from local beaches and small ports toward industrial landing sites, export-oriented processing facilities, or transhipment hubs. As a result, women who depend on nearshore landings for processing and trade often face declining access to raw fish, increased competition, and rising transaction costs—constraints that are rarely considered in fisheries policy or management frameworks (FAO, 2022; Bennett et al., 2021).

In Senegal, a woman salts fish by hand to preserve the catch for later sale and consumption, an essential yet often under-recognised role in fisheries. Image credit: Rewild Africa.

Evidence from this study's case studies illustrates these gendered impacts clearly. In Indonesia, Goa (India), and West Bengal (India), women involved in small-scale fish processing reported declining access to fish as bottom trawling intensified nearshore and landings shifted to more distant ports. Interviewees described women being unable to travel to alternative landing sites. As a result, losses in local fish availability translated directly into reduced income, increased food insecurity at the household level, and diminished participation in local markets.

Beyond gendered labour impacts, the erosion of SSF also affects elders and other non-fishing household members who depend on in-kind food transfers rather than market purchases. In Ghana, case study participants highlighted the importance of artisanal fisheries in supporting elders who are no longer physically able to fish. Fish distributed through kinship networks, community sharing, or informal credit arrangements forms a critical component of food security.

> **If fish is of bad quality and not enough, women ending up in debt. End up with no other opportunity and stuck in a debt cycle.**
>
> *— Ghana*

Women are also deeply involved in the financial dimensions of SSF, a role that exposes them to heightened economic risk under conditions of declining fish availability. In Ghana, women frequently act as lenders, providing capital for fuel, gear, or boat maintenance, or taking out loans themselves to finance fishing operations. When catches decline due to competition from industrial trawlers, these investments become increasingly precarious.

In Indonesia, a woman carefully arranges fish on racks to dry in the sun, helping prepare the catch for storage and sale. Image credit: KNTI.

Taken together, these findings demonstrate that the impacts of bottom trawling on food systems are not gender-neutral. Women and elders experience disproportionate consequences through loss of access to fish, erosion of informal food-sharing systems, and increased economic insecurity. Recognising and addressing these gendered and intergenerational effects is essential for designing fisheries policies that genuinely support food security, equity, and sustainable development.

> **Catches from trawlers are taken to harbour-based auction sites where women from SSF communities cannot participate. I think women suffer more since they have lesser livelihood opportunities outside of the fisheries sector.**
>
> *— India, West Bengal*

3.3. Cultural erosion and food sovereignty

Beyond impacts on income and nutrition, the case studies reveal a consistent pattern of cultural erosion linked to the expansion of bottom trawling and the marginalisation of SSF. In multiple contexts, interviewees described how declining access to nearshore fish has disrupted culturally embedded practices of fishing, processing, sharing, and consumption that have historically structured coastal food systems. In Indonesia, Goa, and West Bengal, the loss of locally landed fish has reduced the availability of species traditionally prepared, preserved, and consumed within households, weakening intergenerational knowledge transfer around food preparation and seasonal diets. As fish is increasingly landed at distant industrial ports or diverted into export-oriented supply chains, local communities experience a gradual decoupling of fishing activity from everyday food practices, undermining the cultural dimensions of food sovereignty.

The erosion of food sovereignty was particularly evident in the breakdown of social distribution systems. In Ghana, for example, artisanal fisheries historically supplied elders, through informal sharing arrangements and in-kind transfers embedded within kinship networks. As industrial trawling reduces small-scale catches and intensifies competition, households depend increasingly on market purchases that are often less affordable, less nutritious, and culturally less appropriate. Interviewees consistently framed this shift not only as an economic loss, but as a loss of dignity, autonomy, and cultural identity tied to fishing and food.

At a busy fisheries landing in Indonesia, fishers pass baskets of fish to women, as the community comes together to process and prepare the day's haul for market. Image credit: KNTI.

> **Based on our culture we don't fish on Fridays or when somebody in our village dies, but because there is not enough fish, many of us have to go fishing during those days.**
>
> — *Indonesia*

> **Iwi (local indigenous communities) traditional gathering (marae) for meetings, weddings and funeral are traditionally a big part of their lives and part of this is to be a good host by providing food, coastal people would provide seafood but now struggle to find and afford seafood.**
>
> — *Aotearoa*

Across case studies, bottom trawling was therefore perceived not merely as a competing fishing method, but as a structural force reshaping coastal food cultures. Where communities lose the ability to determine what is fished, how it is processed, and how it is shared, food sovereignty is progressively weakened. These findings underscore that assessments of bottom trawling impacts must consider cultural and social dimensions alongside ecological and economic indicators, as the erosion of food sovereignty represents a profound but often invisible cost to coastal communities.

3.4. Sustainable Development Goals

While bottom trawling contributes significantly to global fish production and economic output, the findings of this study indicate that its current governance and deployment frequently undermine progress across some United Nations Sustainable Development Goals (SDGs), in particularly SDG 14 (Life Below Water), SDG 2 (Zero Hunger), SDG 5 (Gender Equality) and SDG 13 (Climate Action).

In relation to SDG 14, the ecological impacts of bottom trawling—habitat disturbance, bycatch, and pressure on demersal ecosystems—are well documented and shape the long-term productivity of marine food systems. However, this study highlights that ecological sustainability alone is insufficient as a metric of success. Even where bottom trawled stocks remain within biological limits, the displacement of SSF and degradation of nearshore ecosystems can erode the social and nutritional functions of fisheries, weakening the contribution of marine resources to SDG 2 targets on food security and nutrition. The case studies demonstrate that aggregate production figures can obscure declining access to fish among coastal populations most dependent on fisheries for daily sustenance.

The documented disruptions to post-harvest value chains and SSF livelihoods reveal that bottom trawling is not gender-neutral in its impacts. Because women are disproportionately represented in informal processing, trading, and local food distribution systems, shifts in landing patterns and access to raw fish translate into structural economic disadvantages. These findings suggest that fisheries governance frameworks that fail to account for gendered labour roles risk reinforcing existing inequalities and undermining progress toward SDG 5 targets related to economic empowerment, equitable access to resources, and recognition of informal work within food systems.

Non-target species and juvenile fish caught as bycatch by a bottom trawler. Image credit: Sarah Foster / Project Seahorse.

The findings also reveal important tensions with SDG 13 (Climate Action), particularly in relation to emissions intensity, ecosystem disturbance, and resilience. While Hilborn et al. (2023) demonstrate that bottom trawling can, on a per-unit-protein basis, be less environmentally impactful than some terrestrial protein systems such as beef or pork, this comparison has limited relevance for food-security-dependent coastal populations. In the contexts examined in this study, communities that rely on fish for nutrition and livelihoods are unlikely to have regular access to terrestrial animal proteins as substitutes. A more appropriate comparison is therefore between industrial bottom trawling and SSF, which represent the primary locally available alternatives for producing food.

While environmental and climate outcomes depend on gear type, stock status, management effectiveness, and supply-chain characteristics, compared with bottom trawling, many SSF operate with lower fuel intensity, less seabed disturbance, and shorter supply chains, which can translate into lower emissions per unit of locally consumed food and greater ecosystem resilience. From this perspective, bottom trawling can exacerbate climate-related risks by intensifying fuel use, disturbing seabed carbon stores, and reducing the capacity of coastal ecosystems to buffer climate shocks. These dynamics suggest that climate-efficient food production should be evaluated not only in global aggregate terms, but relative to locally viable fishing practices and food systems, particularly in regions where climate vulnerability and food insecurity overlap.

Fisheries subsidies represent a critical cross-cutting issue linking all four SDGs. Capacity-enhancing subsidies—such as fuel subsidies, vessel construction support, and preferential access arrangements—continue to disproportionately benefit industrial fleets, including bottom trawlers, by sustaining excess capacity and enabling operations that would otherwise be economically unviable (Schuhbauer et al. 2020).

The evidence from this study suggests that such subsidies indirectly undermine food security and food sovereignty by intensifying competition with SSF, accelerating resource depletion in nearshore zones, and reinforcing export-oriented production models.

In conclusion, this study finds that bottom trawling, as currently practiced and governed in many regions, presents a significant challenge to achieving integrated SDG outcomes. Addressing this challenge will require policy frameworks that prioritise food security and nutrition alongside ecological sustainability, reorient subsidy regimes away from capacity expansion, and strengthen the rights and roles of SSF within national and global food systems.

A large piece of Paragorgia coral is hauled aboard a New Zealand bottom trawler. Image credit: Malcolm Pullman / Greenpeace.

4. CONCLUSIONS

Revisiting the key questions

This study set out to examine how bottom trawling interacts with food systems through four guiding research questions.

A) Negative competition

The findings demonstrate that bottom trawling frequently competes directly with SSF in nearshore spaces where access, safety, and ecological integrity are critical. This competition operates through spatial encroachment, habitat disturbance, juvenile catch, and market displacement, ultimately constraining local access to fish and eroding food sovereignty.

B) Supporting food security

The evidence shows that while bottom trawling contributes to global fish supply, its local food-security benefits are highly context-dependent and mostly non-existent. Employment and revenue generation can support food systems under specific governance and redistribution arrangements only, primarily in high-income settings. However, in most contexts examined, benefits are unevenly distributed and coexist with declining small-scale livelihoods.

C) Protein (nutrients) share and consumers

The analysis highlights an "efficiency paradox": bottom trawling supplies significant volumes of globally traded fish, yet much of this production enters export chains or sometimes non-food uses rather than strengthening local nutrition. The critical question is not only how much fish is caught, but who consumes it, in what form, and under what conditions.

D) Industry narratives

Finally, the evidence reveals that dominant narratives emphasise scale, employment, and efficiency, often framing bottom trawling as indispensable for global food provision. Yet all of these narratives come from high income countries, mostly in the Global North where most people have a choice as to what protein to eat. Case-study evidence suggests that these narratives frequently obscure localised trade-offs and shift responsibility away from industrial encroachment. At the same time, counter-narratives centred on rights, sovereignty, and equitable access are gaining visibility.

A bottom trawler off Ireland's west coast in the North East Atlantic. Image credit: Pierre Gleizes / Greenpeace.

Our findings indicate that while bottom trawling plays a role in global seafood production, its contribution to local food systems—particularly food security, nutrition security, and food sovereignty—is frequently weak and negative especially in the absence of strong governance, spatial protections, and equitable distribution mechanisms.

5. CAMPAIGN RELEVANCE AND RECOMMENDATIONS

The findings of this report offer several strategic entry points for advocacy and policy reform. First, evidence from Brazil demonstrates that IEZs can be effective when meaningfully enforced, and that expanding protected zones to 12 nautical miles—rather than narrower 3–5 nm limits—can materially reduce spatial conflict and support stock recovery. Campaigns advocating for universal vessel monitoring systems (VMS) on all industrial vessels, alongside community-led surveillance mechanisms, can help close the enforcement gap that undermines many existing regulations.

Beyond enforcement, the findings underscore the importance of strengthening national implementation of international commitments. Many countries are signatories to global frameworks related to SSF, biodiversity, human rights, and sustainable development. However, the case studies reveal persistent gaps between formal commitments and domestic fisheries governance. Campaign efforts can therefore focus not only on new policies, but on ensuring that existing international conventions—particularly those protecting SSF, gender equity, and ecosystem integrity—are fully implemented at national level.

A central lesson emerging from the analysis is the need to centre SSF in fisheries policy. This includes revisiting democratic inclusion mechanisms to ensure that SSF representatives meaningfully participate in decision-making processes, quota allocations, and spatial planning. In many contexts examined, policy design remains disproportionately influenced by industrial actors, despite SSF employing far more people and contributing more directly to local food systems.

The findings also point to the importance of gender-sensitive fisheries policies and budgets. Women's roles in processing, trading, and informal distribution are critical to local food security yet remain structurally undervalued. Budget allocations and support mechanisms that explicitly recognise and strengthen women's participation in fisheries value chains can help prevent the erosion of income, autonomy, and food access linked to industrial expansion.

Finally, effective campaigning requires broad public engagement. Advocating for SSF rights within the wider public sphere—by highlighting connections between bottom trawling, food insecurity, loss of local autonomy, and environmental degradation—can reframe the debate. Rather than presenting trawling as a technical fisheries management issue, campaigns can position it as a question of equitable food systems, community sovereignty, and ecological stewardship.

These strategic directions move beyond narrow gear-based debates and toward a more systemic approach: one that prioritizes rights, equity, enforcement, and democratic governance within marine food systems.

A small-scale fisher speaks at the UN Ocean Conference in Lisbon, advocating for the rights of artisanal fishers. Image credit: Blue Ventures.

6. LIMITATIONS AND POTENTIAL NEXT STEPS

Although the research design aimed to engage a broad range of stakeholders across each case study—spanning SSF, industrial trawling, processing, and government—practical constraints limited the scope of interviews resulting in a stronger emphasis on representatives of SSF organizations and scientists. Engagement with government officials and actors in the fish processing sector was not achieved, and only one interview was conducted with a representative from the bottom trawling industry. To mitigate potential bias arising from this imbalance, interview findings were triangulated with peer-reviewed literature, official reports, policy documents, and industry position statements where available. The study therefore relies on a mixed-evidence approach that combines primary qualitative insights with extensive secondary data to ensure that interpretations reflect a broad range of documented perspectives, while acknowledging gaps in direct stakeholder representation.

With additional time and resources, future research could benefit from more in-depth, in-person engagement with stakeholders, particularly within government agencies, processing sectors, and industrial fleets. Local partnerships and small, targeted grants to support on-the-ground engagement could help improve access, trust, and participation, enabling a more balanced representation of perspectives and a deeper understanding of context-specific dynamics.

Crew at work on the deck of a Spanish bottom trawler in the North Atlantic Ocean. Image credit: Kate Davison / Greenpeace.

In addition, a deep global analysis will be a useful next step, especially by looking at nutrients and trade flows. Most studies assess species or value chains rather than gear types, implying the need for case-study approaches (e.g., hake, shrimp, cod) to understand who consumes trawled products and under what conditions they support nutrition locally. Furthermore, there is a lack of quantitative data specifically measuring the loss of micronutrients at the local community level caused by trawling. Most studies focus on biomass (tonnage) rather than nutritional quality (e.g., loss of access to Omega-3s and Vitamin A for coastal populations). Environmental impact assessments of trawling (e.g., carbon footprint, benthic recovery) are mostly based on data from temperate regions. There is a significant data gap regarding the recovery rates of tropical benthic ecosystems and the carbon footprint of trawl fleets operating in the Global South.

7. CENTRING COMMUNITY PRIORITIES IN FISHERIES GOVERNANCE

A key implication of this research is the need to move beyond binary debates over whether bottom trawling should be permitted or prohibited. Instead, governance approaches must be grounded in locally defined priorities and community participation. Rather than treating bottom trawling as uniformly beneficial or harmful, decision-making should assess the extent to which local people participate in, benefit from, or are excluded from bottom trawl fisheries—and how these dynamics align with community goals.

This means identifying a set of priorities—such as food provisioning, nutritional contribution, employment, cultural value, and economic linkages—through participatory processes. These locally ranked criteria can serve as a baseline to determine an appropriate degree of regulation, guiding decisions on where, when, and how bottom trawling should be restricted, spatially separated, or phased out in favour of fishing practices that better support food security and sovereignty.

By centering affected communities in governance, fisheries management can shift from externally imposed rules to context-specific, socially legitimate strategies that reflect both ecological realities and lived experiences.

Linda Behnken of the Alaska Longline Fishermen's Association. Image credit: Josh Roper Photography.

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9. ETHICS STATEMENT

This project was carried out in accordance with recognized ethical standards for participatory and socio-economic research. All participants were provided with clear information about the purpose of the study, the intended use of their input, and their right to withdraw at any stage without consequence. Prior informed consent was obtained before collecting contributions via surveys, interviews, and workshops. No personally identifiable information (PII) was collected beyond what was necessary for the analysis, and data were anonymized or aggregated to ensure confidentiality.

10. USE OF GENERATIVE ARTIFICIAL INTELLIGENCE AND LARGE LANGUAGE MODELS

Artificial intelligence (AI) tools were used in a supportive and assistive role throughout this research. AI was employed to help design and refine systematic literature search strategies, including the development of Boolean search terms aligned with the study's research questions, and to support the drafting, editing, and structuring of text. AI-assisted coding support was used to facilitate global-scale data processing and exploratory analysis, and to help summarize qualitative information from interviews and documentary sources. Importantly, AI outputs were used only as an aid to efficiency and synthesis: all results, interpretations, and references were subject to intensive manual review, fact-checking, and validation by the authors. No findings, conclusions, or analyses were produced or reported without human oversight and verification, and responsibility for the accuracy and integrity of the work rests entirely with the research team.

11. METHODS

11.1. Literature review

We conducted a systematic but flexible literature review to map current knowledge on bottom trawling and its implications for food security, including nutritional, economic, and sovereignty dimensions and guided by our 4 research questions. The review also examined how industry and policy actors frame bottom trawling as essential for global food provision. Sources included peer-reviewed journal articles, government and international agency reports, NGO and industry publications, and other grey literature.

Search strategies, inclusion criteria, and database queries are presented in detail in the Supplementary Materials, along with the final curated Zotero library. This process enabled the identification of major evidence gaps, which subsequently informed case-study selection and interview design.

Community members of Mariners for Action in Kenya. Image credit: Mariners for Action.

11.2. Case study analysis and stakeholder engagement

Case studies were used to generate context-specific insights from regions where bottom trawling is prevalent and understudied—particularly in the Global South. Selection was informed by (a) the literature review, (b) an internal survey, and (c) discussions with TBT Coalition members. A transparent set of criteria guided the selection process:

- Ability to address all four research questions;
- Geographic diversity;
- Emphasis on Global South contexts, without excluding relevant Global North examples;
- Feasibility within available time and resources;
- Political or strategic relevance for current campaigns.

A standardized assessment framework was developed to ensure comparability across case studies. This framework included stakeholder identification, a focus on overarching research questions and a set of detailed sub-questions used to guide semi-structured key informant interviews (see complete framework in supplementary materials).

Stakeholders were identified collaboratively with local Coalition members and included small-scale and industrial fishers, community representatives, NGOs, researchers, and other actors involved in or affected by bottom trawling. The engagement process prioritised inclusivity, attention to power dynamics, gender and geographic representation, and cultural sensitivity. A Free, Prior and Informed Consent (FPIC) protocol was developed and implemented prior to all data collection (see supplementary materials).

Fishing boats moored in Ghana, one of nine case-study sites. Image credit: CaFGOAG Secretariat.

11.3. Data collection and analysis

To ensure rigor and contextual relevance, all aspects of the research approach—including interview protocols, data needs, and cultural considerations—were discussed in advance with Coalition partners.

Interviews constituted the primary data source for case studies. Depending on context and accessibility, interviews were conducted virtually by the lead researcher or in person by local coalition partners, particularly where language, time zones, or cultural appropriateness made local facilitation preferable.

Interviews followed a semi-structured guide aligned with the analytical framework, allowing both comparability across sites and flexibility to capture local nuances.

We selected nine case-studies across all continents with a focus on the Global South (Fig 1). A total of 20 interviews were carried out between Nov 2025 and Jan 2026 with 1-3 interviews per case study.

Supplementary material

- **Free, prior and informed consent protocol**
- **Case study interview framework**
- **Nine case study briefs (each 2-3 pages) available at transformbottomtrawling.org**

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