Managing Beach Seine
Impacts and Opportunities in Togo

WORLD BANK GROUP

1818 H Street NW, Washington DC 20433

Telephone: 202-473-1000 | Internet: www.worldbank.org

Managing Beach Seine
Impacts and Opportunities in Togo

WORLD BANK GROUP

Contents

Acknowledgements

This report was written by a team led by Benoit Caillart, Fisheries Management Expert and Director, F&S Fisheries/Maritime Affairs, and including Sergio Vallesi, Ecological Economist, Hydro Nexus, and Kpotivi Wilson-Bahun, Environmental Specialist, World Bank. The World Bank Task Team Leader for the report was Peter Kristensen, Lead Environmental Specialist, and the team included Koffi Hounkpe, Senior Disaster Risk Management Specialist, and Komlan Kpotor, Senior Environmental Specialist. The report was peer-reviewed by Berengere Prince, Lead Natural Resources Management Specialist; Ögmundur Knutsson, Senior Fisheries Specialist; Julien Million, Senior Fisheries Specialist; and Merete Tandstad, Coordinator, FAO EAF-Nansen Programme.

In conducting this study, the World Bank collaborated with the Food and Agriculture Organization of the United Nations (FAO), considering its work on beach seine management in Togo and other countries in the Gulf of Guinea. The World Bank acknowledges FAO support to help Togo sustainably manage beach seine fishing and prevent the significant adverse impacts this fishing technique can have on marine life, and ultimately, on fishing communities.

Abbreviations and Acronyms

CECAF	Fishery Committee for the Eastern Central Atlantic
DPA	Fisheries and Aquaculture Directorate (*Direction de la Pêche et de l'Aquaculture)*
EAF	Ecosystem Approach to Fisheries
FAO	United Nations Food and Agriculture Organization
FCWC	Fisheries Committee for the West Central Gulf of Guinea
FENUCOOPETO	National Federation of Fishing Cooperatives of Togo (*Fédération Nationale des Unions de Coopératives de Pêche du Togo*)
GDP	Gross Domestic Product
Km	Kilometer
M	Meter
Mm	Millimeters
MAEP	Ministry of Agriculture, Livestock, and Fisheries (*Ministère de l'Agriculture, de l'Élevage et de la Pêche*)
US$	United States Dollar
WACA	West Africa Coastal Areas Management Program
WACA-ResIP	West Africa Coastal Areas Resilience Investment Project

Summary

This report examines beach seine fishing in the Gulf of Guinea, with a particular focus on Togo, and analyzes how coastal erosion and coastal protection measures interact with this artisanal fishing practice. It aims to draw lessons learned for global knowledge on interaction between beach seining, coastal dynamics, and infrastructure interventions.

Context: Coastal Erosion and Fisheries under Pressure. Togo and Benin are among the countries most severely affected by coastal erosion in West Africa. Despite their relatively short coastlines, both countries experience high erosion rates—reaching up to 30 meters (m) per year in some areas—resulting in significant losses of land, infrastructure, and economic assets. In Togo, coastal erosion accounted for an estimated 6.4 percent loss of GDP in 2017, with annual losses estimated at over US$70 million by 2022. These impacts are driven by a combination of natural and anthropogenic factors, including sea-level rise, altered sediment flows due to port infrastructure and upstream dams, and sand mining.

At the same time, fisheries play a critical role in food security and livelihoods. However, domestic fish production in Togo meets less than one quarter of national demand, resulting

in a significant reliance on imports and persistent trade deficits. This dual challenge—coastal degradation and pressure on fisheries—underscores the need for integrated and sustainable coastal management approaches.

Role and Characteristics of Beach Seining. Beach seining is a traditional fishing method widely practiced across Togo, Benin, Côte d'Ivoire, and Ghana. In Togo, 68 beach seine units were recorded in 2025, with activity concentrated in specific coastal segments. While beach seining contributes only about 8 percent of total marine landings in Togo, it remains an important source of livelihoods, supporting approximately 2,000 people directly and indirectly.

The technique involves deploying large nets offshore and hauling them back to the beach using manual labor. Operations are labor-intensive, involving core fishing teams as well as a large number of occasional workers, including women, youth, and vulnerable groups. Women also play a central role in post-harvest processing and marketing and often provide pre-financing for fishing operations.

Photo Credit: Nicolas Vava, 2026

Beach seine fisheries are characterized by: (i) low selectivity, with high proportions of juvenile fish in catches; (ii) relatively low capital intensity but high labor dependence; and (iii) strong social importance, particularly for coastal communities. Despite stable production levels (around 1,200 tons annually), the economic value of beach seine catches remains modest, and post-harvest losses—estimated at around 20 percent—further reduce efficiency.

Governance and Management Challenges. The regulatory framework governing fisheries in Togo includes licensing requirements, mesh-size regulations, and seasonal closures. However, enforcement remains limited, and beach seining largely operates under open-access conditions. Although a dedicated beach seine management plan was adopted in 2013, its implementation has been constrained by institutional capacity limitations and socioeconomic considerations.

Key management challenges include: (i) non-compliance with mesh-size regulations, leading to high juvenile catch; (ii) resistance to effort reduction measures due to livelihood implications; (iii) limited enforcement capacity and data gaps; and (iv) fragmented governance across the artisanal fisheries sector.

Recent progress includes the introduction of a seasonal fishing closure (July) aligned with regional practices. However, broader reforms—such as capacity limits and gear restrictions—remain difficult to implement without adequate social support measures.

Status of Fish Stocks and Environmental Impacts. Scientific assessments indicate that key fish stocks in the region—particularly small pelagic species such as sardinella—are overexploited. While beach seining contributes to this pressure, especially through the capture of juveniles, it is not the sole driver of stock depletion. Other fishing methods, including purse seining and trawling, also exert significant pressure.

Environmental impacts of beach seining include: (i) high capture of juvenile fish, affecting stock replenishment; (ii) limited habitat disturbance in sandy environments; and (iii) occasional interactions with protected species, such as sea turtles. Beyond fishing practices, broader environmental pressures—including pollution from mining activities and plastic waste—pose growing risks to marine ecosystems and fisheries productivity.

Impacts of Coastal Protection Measures. Coastal protection interventions—particularly the construction of rock groynes—have been widely implemented in Togo and Benin to combat erosion, including within the framework of the World Bank-financed West Africa Coastal Areas (WACA) Program. These structures are now spread across approximately half of Togo's coastline.

Field observations and stakeholder consultations indicate that: (i) beach seine fishers have largely adapted to groynes, using established techniques to pass nets over the structures; (ii) groynes do not significantly hinder fishing operations, and no major disruptions to fishing activity have been observed; (iii) fishing is not feasible without passing over closely spaced groynes due to spatial constraints; and (iv) beach rock exposed as a result of coastal erosion—rather than groynes—is the primary operational constraint. Importantly, groynes are often perceived positively by fishers, as they promote sediment accumulation, which can reduce net damage and improve fishing conditions.

However, coastal protection measures may also have broader ecological implications. Rock groynes can create artificial habitats that may alter local biodiversity and fish distribution, although these effects remain insufficiently studied. In addition, there are indications that groynes may influence the accumulation and dispersion of pollutants, with potential implications for ecosystem health.

Key Findings and Strategic Implications

The report highlights several overarching findings:

- → Beach seining remains socioeconomically important but environmentally challenging, requiring a careful balance between livelihood protection and sustainability;
- → Coastal protection measures, particularly groynes, do not significantly constrain beach seining, and fishers have demonstrated strong adaptive capacity;
- → Sustainability challenges lie in overfishing, juvenile catch, and weak governance, rather than coastal infrastructure; and
- → Pollution and broader environmental degradation are emerging risks that require greater attention.

Conclusion. Beach seining in Togo illustrates the broader challenge of balancing livelihoods, environmental sustainability, and coastal resilience in the Gulf of Guinea. Coastal erosion and fisheries pressures are deeply interconnected, necessitating integrated coastal zone management.

1. Introduction

This report aims to enhance global understanding of beach seine fishing, how it is affected by coastal erosion, and the impact of erosion control measures on the practice, as illustrated by the case of Togo, with some examples from its neighboring countries.

Togo and Benin are among the countries most severely affected by coastal erosion and flooding in the Gulf of Guinea. Despite their relatively short coastlines—121 kilometers (km) in Benin and 50 km in Togo—both countries experience some of the highest coastal erosion rates in the region, where significant economic activity is concentrated. These rates can reach up to 30 meters (m) per year, leading to the loss of urban and agricultural land, infrastructure, and natural assets. The economic impacts are substantial: in 2017, the cost of coastal erosion accounted for an estimated 2.5 percent of Gross Domestic Product (GDP) in Benin and 6.4 percent in Togo.

In Togo, approximately 56 percent of the coastline is subject to average erosion rates of around 10 m per year, particularly affecting high-value urban areas. By 2022, annual economic losses related to coastal erosion in Togo were estimated at US$71.2 million (Croitoru, Sarraf, and Montero 2019).

Coastal erosion and related impacts result from a combination of human and climate-related factors, including sediment retention by upstream dams, disrupted sediment transport from port infrastructure, and sea-level rise. These pressures are compounded by extreme weather and tidal dynamics, accelerating shoreline retreat and displacement. Sand and gravel extraction further disrupts the sediment balance. The scale and transboundary nature of these challenges underscore the need for coordinated regional responses.

This report draws on a study initiated in late 2023, combining a review of existing literature with a fact-finding and stakeholder-consultation mission conducted in Togo in December 2023. It examines beach seine fishing practices in Togo and neighboring countries, assesses the associated management framework, analyzes environmental impacts, and reviews the implications of coastal erosion control measures for fishing communities.

The study was prepared in conjunction with the World Bank-financed West Africa Coastal Areas Management – Resilience Investment Project 1 (WACA ResIP1), which aims to mitigate coastal erosion, protect infrastructure and communities from sea-level rise and extreme events, and address pollution (Box 1).[1]

Box 1. Overview of the West Africa Coastal Areas Program (WACA)

The World Bank launched the WACA ResIP1 in 2018 to enhance coastal resilience and improve regional management of shared resources. The initiative works with nine countries—Benin, Côte d'Ivoire, Gambia, Ghana, Guinea-Bissau, Mauritania, São Tomé and Príncipe, Senegal, and Togo—to address erosion, flooding, and pollution. Regional commitments extend to all 17 countries in West Africa. The program combines nature-based solutions, grey infrastructure investments, and institutional strengthening to deliver integrated coastal zone management. Key interventions include shoreline stabilization (e.g., groynes, breakwaters, beach nourishment), restoration of coastal ecosystems, improved flood-risk management, and strengthened policy and regulatory frameworks. At the regional level, WACA supports knowledge sharing, technical assistance, and coordination mechanisms to address transboundary coastal dynamics and foster collective action.

Key results achieved to date in Benin, Côte d'Ivoire, Mauritania, São Tome and Principe, Senegal, and Togo include:

- → **Coastal protection improved:** 40,800 households with reduced risks from erosion and flooding, 130 km of coastline protected against erosion and floods, 30,000 hectares of ecosystems protected or restored.
- → **Regional governance and institutions:** Coordinated coastal development planning, enhanced coastal monitoring. Establishment of Africa Center of Excellence and network of experts.
- → **Small-scale community support with potential to go to scale:** 20,000 households with increased incomes, and 11,800 jobs created.

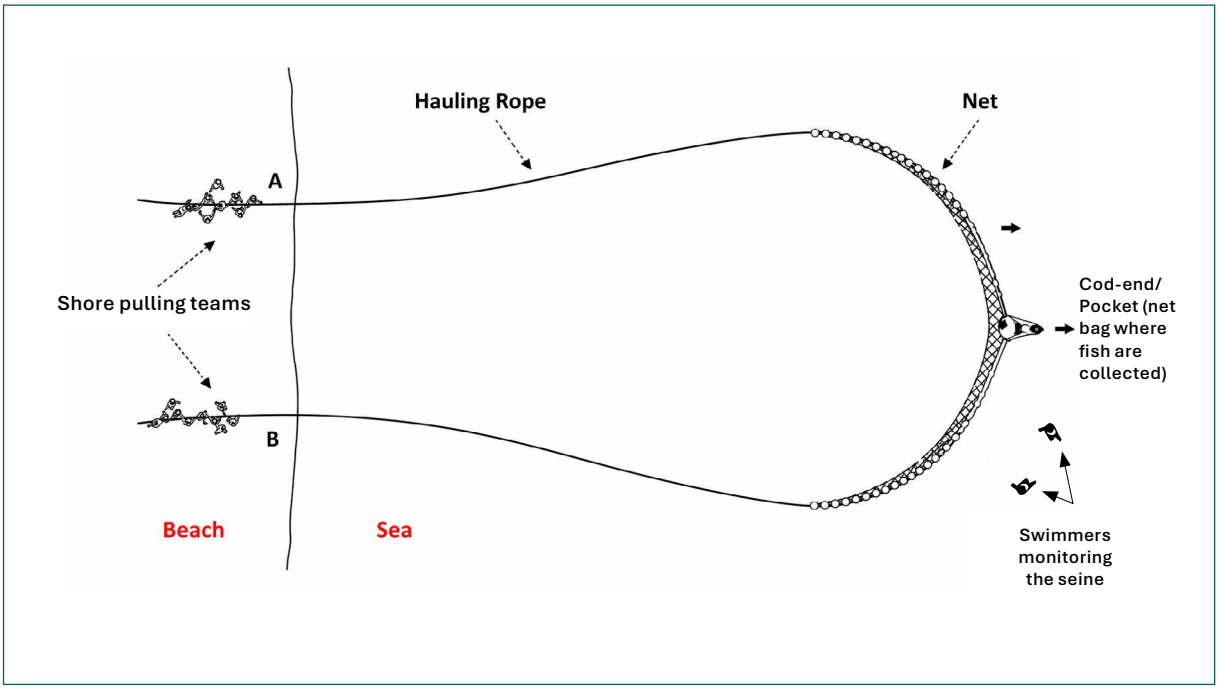
1 Further information on WACA's activities in the coastal zones of Togo and Benin is available in the WACA Impact Report. See the "WACA Impact Story" at https://www.wacaprogram.org.

2. Beach Seining in Togo and its Neighboring Countries

2.1. Overview of the Beach Seine Fishing Technique

Beach seining is a traditional fishing method practiced for centuries in many parts of the world. In Togo and neighboring countries—Benin, Côte d'Ivoire, and Ghana—the technique involves deploying a net offshore from a pirogue (dugout canoe, usually motorized) and hauling it back to the beach using ropes attached to both ends (Figure 1). Two teams onshore manually pull the ropes to retrieve the net. A third team of swimmers remains at sea, to monitor and guide the net's movement and intervene in case of entanglement or other operational issues.

Figure 1. Schematic Representation of a Beach Seine Fishing Operation



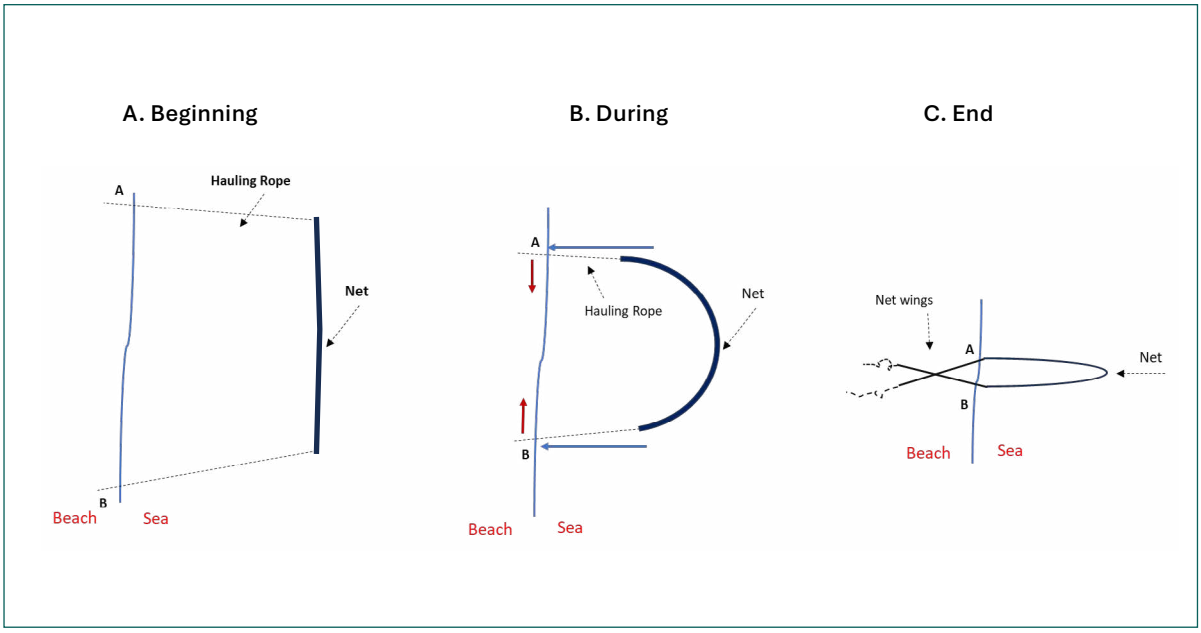
The net is maintained in a vertical position within the water column through the use of weights attached to its lower selvedge (the reinforced edge of the netting) and buoys fixed to its upper selvedge. The lower headline remains in continuous contact with the seabed throughout the operation. At the center of the net is a pocket designed to trap fish as they are drawn inward by the combined action of the ropes and net during hauling.

The motorized pirogue deploys the net parallel to the shoreline, typically 300 to 500 m offshore, depending on its length. It then returns the towing ropes to the beach, with the swimmers assisting over the final meters. At the start of the operation, the towing ropes are spread over several hundred meters (Figure 2.a). Observations indicate that the distance between the two ropes (A–B) can reach approximately 2,000 m for a large 1,000-m seine, and about 560 m for a smaller 400-m seine.

The net is gradually hauled ashore through two combined rope movements: a transverse pull (illustrated by the blue arrow), drawing the ends of the net toward the beach, and a lateral pull (illustrated by the red arrow), bringing the two ends closer together. These coordinated movements guide fish toward the center of the net, where the central pocket is located (Figure 2.b). The direction of lateral movement depends on prevailing currents, which may differ between surface (wind-driven) and bottom (tidal) flows; typically, hauling proceeds against the current. This phase is the longest and most critical, lasting up to 7 hours for a 1,000-m seine and three to four hours for a 400-m seine. During this process, fishers face several risks, including the net snagging on rocky outcrops or submerged structures, as well as clogging of the mesh due to sediment or debris.

As hauling progresses, the towing ropes—and subsequently the net wings—are drawn toward the shore, bringing the two ends of the net closer together (Figure 2.c). Eventually, only the central section containing the pocket remains in the water. The ends are then crossed to fully close the net, after which it is gradually pulled ashore until the pocket containing the catch is landed. The catch is then piled on the beach and sold immediately to waiting fishmongers

Figure 2. Main Sequences of a Beach Seine Operation in Togo



2.2. Number of Production Units and Geographical Distribution

In 2022, a census conducted by Togo's Fisheries and Aquaculture Directorate (Direction de la Pêche et de l'Aquaculture, or DPA), under the Food and Agriculture Organization (FAO) Ecosystem Approach to Fisheries (EAF) Nansen Programme, and updated in 2025, identified 68 active beach seines (Table 1), unchanged from 2019 (Sohou and Abrokwah 2025). Approximately 72 percent of these units were located along coastal stretches experiencing sediment accretion, particularly between the Ghanaian boarder and the Port of Lomé. Further east of the Port of Lomé, beach seine activity is concentrated from Agbodrafo onward, with 9 units recorded across Agbodrafo, Goumokope, and Kpémé, and an additional 10 units clustered around Aného to the border with Benin.

Table 1. Distribution of Beach Seines Along the Togolese Coastline, 2025

SEGMENTS OF THE TOGOLESE COASTLINE	NUMBER
Ghana border–Port of Lomé	49
Port of Lomé–Gbodjomé	0
Gbodjomé–Agbodrafo	0
Agbodrafo–Aného	9
Aného sector	10
TOTAL	68

Source: Based on DPA census, 2022

According to FAO data, Benin operates 68 beach seines (Hounsounou and Akpachossou 2020). Côte d'Ivoire has approximately 100 units along its coastline, and Ghana has over 1,000 in operation (FAO, personal communication). Adjusted for coastline length, Ghana has by far the highest density (1.9 beach seines per km), followed by Togo (1.2), Benin (0.6), and Côte d'Ivoire (0.2).

2.3. Beach Seine Sizes

DPA surveys (2022) indicate that beach seines in Togo range from 400 to 1,200 m in length, with a vertical drop of 20–25 m, although fishers consulted during this study reported drops closer to 12 m). Tow ropes' length typically consists of five 200 m sections on one arm and up to seven on the other.

The nets are assembled from panels with progressively smaller mesh sizes from the wings to the pocket. Mesh size ranges from 30–50 millimeters (mm) in the wings, decreasing to 10–25 mm in the body and approximately 10 mm in the pocket. The use of small mesh sizes in the pocket is standard practice across the Gulf of Guinea. Figure 2.3 provides illustrative examples of seine dimensions.

Figure 3. Final Stage of Hauling a Large Beach Seine (Kpémé, left) and a Small Beach Seine (Aného, right), December 2023

Photo credit: Benoit Caillart, 2023

2.4. Beach Seine Catches

Between 2018 and 2022, beach seine catches in Togo averaged approximately 1,200 tons per year (DPA 2022) (Table 2), representing about 8 percent of total marine fisheries landings. Pirogues using purse seines and bottom-set gillnets account for the majority of artisanal landings. Despite an overall decline in artisanal maritime catches—particularly in 2020 and 2021, likely linked to COVID-19—beach seine production has remained relatively stable.

Table 2. Marine Capture Fisheries Production in Togo (tons)

MARINE FISHING YIELD (TONS)	2018	2019	2020	2021	2022
Artisanal Marine Fishing	18,142	18,960	11,711	11,567	14,910
Of which: Beach Seine	*1,199*	*1,229*	*1,083*	*1,257*	*1,359*
Industrial Marine Fishing	118	149	85	117	93
Total Marine Production	18,260	19,109	11,796	11,684	15,003
Beach Seine Share of Total	**7%**	**6%**	**9%**	**11%**	**9%**

Source: DPA personal communication, December 2023

The annual first-sale value of beach seine catches is estimated at approximately US$450,000, with an average price of US$0.33 per kilogram. These catches account for about 5 percent of the total value of artisanal fisheries, which are largely dominated by purse-seine operations contributing around 80 percent of first-sale value (FAO 2020).

Discussions in Togo suggest that the commissioning of the Port of Lomé's new artisanal fishing harbor in 2019—financed through a US$25 million Japanese grant—has the potential

to increase artisanal production. The facility, equipped with a wave-protected wet dock and fish marketing infrastructure, is already operating at full capacity, hosting approximately 400 artisanal pirogues, many of them large Ghanaian purse-seine vessels.

Domestic demand for fish in Togo is estimated at around 74,000 tons (FAO 2023a), yet national production meets less than one quarter of this need. The resulting supply gap is filled through imports, leading to an estimated trade deficit of US$30 million. A similar pattern is observed in Benin, where reliance on imports results in a trade deficit exceeding US$100 million (FAO 2023a).

Beach seines in Togo target a diverse mix of pelagic and demersal species in roughly equal proportions (Anatovi 2021). Pelagic species include round and flat sardinella (*Sardinella aurita, S. maderensis*), anchovies (*Engraulis encrasicolus*), and various carangids, while demersal species include croakers (*Pseudotolithus spp.*), threadfinds (*Galeoides decatactylus*), grunters (*Brachydeuterus auritus*), barracudas (*Sphyraena spp.*), and largehead hairtail (*Trichiurus lepturus*). A defining characteristic of beach seine landings is the predominance of small, often juvenile fish (Figure 4). This issue is examined further in Chapter 5.

Figure 4. Example of Fish Caught Using Beach Seines (Kpémé, December 2023)

Photo credit: Benoit Caillart, 2023

2.5. Storage and Sales

Detailed data on marketing channels for beach seine catches are limited. However, field observations indicate that women fishmongers typically purchase catches in bulk and either sell them fresh in urban markets or preserve them for transport using ice-filled coolers. Alternatively, fish are processed through artisanal smoking, extending shelf life and meeting demand for smoked products.

Field visits revealed that storage conditions remain rudimentary. Coolers are often poorly insulated, and the use of block ice can result in physical damage to fish, while cooling is uneven across the container (Figure 5.a). Smoking is commonly carried out using locally constructed Chorkor-type ovens (Figure 5.b),2 which, although relatively efficient, expose workers to significant levels of smoke.

2 An oven used for fish smoking, first developed in the 1970s in Ghana and named after a fishing village and suburb of Accra.

Figure 5. Coolers and Smoking Oven Equipment Used by Women Fishmongers and Processors (Aného, December 2023)

A. Coolers used for storage

Type of cooler used by fishmongers.

Another type of cooler used, a cloth lined wicker basket.

A. Smoking ovens

Locally made smoking oven.

Chorkor-type smoking oven.

Photo credit: Benoit Caillart, 2023

FAO (2020) estimates post-harvest losses from beach seining at approximately 20 percent of landings in Togo. Losses occur primarily at landing (45 percent of total losses, equivalent to 9 percent of catch weight) and during processing (54 percent, or 11 percent of catch weight). Landing losses result from physical damage between capture and sale, while processing losses—particularly affecting small fish—arise during handling, smoking, drying, and transport. Unlike other fisheries, beach seine operations retain all catch, with no discards. Losses during fresh fish trade and distribution of processed products are minimal, reflecting rapid turnover. Overall, post-harvest losses in beach seining are lower than the national average for artisanal fisheries in Togo, estimated at 36 percent by weight.

2.6. Socioeconomic Information

According to the DPA census, beach seine ownership in Togo is overwhelmingly domestic, with 96 percent (65 of 68 units) owned by Togolese nationals and the remainder by Ghanaians.

Beach seine operations rely on a core team of 7 to 8 fishers at sea responsible for deploying the net, supported by approximately a dozen permanent pullers onshore (Adabe 2023). The teams are complemented by casual labor, whose numbers vary with the size of the net and the stage of the fishing operation, typically increasing during hauling. Field observations (December 2023) recorded around 50 casual pullers for a 1,000-m seine, and about 30 for a 400-m seine. These occasional workers include women, youth, elderly individuals, and persons with disabilities. Compensation is provided either in cash or through a share of the catch.

Revenue-sharing arrangements vary but generally allocate a significant share to the owner, with the remainder distributed among crew members (Adabe 2023). While one common benchmark divides proceeds equally between the owner of the beach seine (1/3) operating expenses (1/3) and crew remuneration (1/3), alternative arrangements are frequently applied, reflecting variations in catch levels and operating conditions. These include splits such as 25 percent to the owner after expenses, or differentiated shares among owner, crew, and casual pullers (Adabe 2023). Available estimates suggest that, in 2011, approximately 1,574 individuals were directly engaged in beach seine fishing in Togo (746 main fishers and 828 helpers), with an additional 420 women involved in post-harvest processing—bringing total livelihoods dependent on this activity to nearly 2,000 (Sedzro 2011).

Women play a central role in processing and marketing and are also active within the capture segment. Evidence from value chain studies in Togo (Adabe 2023) and Benin (Gbedomon et al. 2024) shows that women often provide pre-financing for fishing operations, including expenditures on equipment maintenance, fuel, and labor.

3. Regulatory Framework Governing Beach Seining Activities

3.1. Legal Framework and Enforcement Gaps

Marine fishing in Togo is governed by Ministerial Order No. 68/10/MAEP of August 04, 2010, and Act 2016-026 of October 11, 2016, which regulate fisheries and aquaculture activities in national waters. While these and other coastal regulations exist, none specifically address beach seining (Bonnin et al. 2023). Existing provisions require registration of fishers and pirogues, annual fishing authorizations, and a minimum mesh size of 20 mm for beach seines. Also, since 2025, a time-area closure extending over the month of July has been in place. In addition, fishers observe a voluntary weekly closure (Wednesdays), rooted in local tradition. According to the DPA, enforcement remains limited due to the socioeconomic sensitivity of the artisanal fishing sector. In practice, artisanal fishing, including beach seining, operates under an open-access system, and technical regulations—particularly on mesh size—are not applied. Field observations indicate that pocket mesh sizes are typically 5–10 mm, well below the legal minimum.

3.2. Togo's Beach Seine Management Plan

Recognizing the environmental impacts of beach seining—particularly on juvenile and protected species catches—Togo adopted a beach seine management plan in 2013 under the FAO EAF-Nansen Programme. To date, this is the only national fisheries management plan; similar plans have been adopted in Benin and Côte d'Ivoire.

Togo's plan is structured around three objectives: (i) conservation of fishery resources through an ecosystem approach to fisheries (EAF); (ii) improved livelihoods for coastal communities; and (iii) strengthened sector governance. While it does not prescribe binding measures, it provides a framework for action. Key measures considered by the management plan include:

- → Biological closure: A one-month fishing ban in July to protect critical life-cycle stages;
- → Gear regulation: Increasing minimum mesh size to 25 mm to reduce juvenile catch;
- → Capacity limits: Capping the number of beach seines at 50 (numerus clausus); and
- → Effort control: Strengthening licensing, registration, and monitoring systems.

3.3. Implementation Challenges and Regional Context

Togo implemented the July closure for artisanal fishing (including beach seining) in 2025.[3] This biological closure aligns with measures already implemented in neighboring countries. Since 2016, Ghana has enforced a July closure for all artisanal fishing. And in 2023, Côte d'Ivoire[4] and Benin[5] introduced similar seasonal closures, including a June-July closure for beach seining in both countries.

In contrast, proposed gear restrictions face resistance. Trials with larger mesh sizes showed catch volumes—and associated revenues—declining by up to fourfold in the short term (Adabe 2023). While longer-term ecological benefits are expected, these remain unquantified, contributing to stakeholder opposition. Similarly, the proposed cap of 50 beach seines raises concerns, particularly regarding the livelihoods of the estimated 20 teams that would be displaced. More broadly, effective management of fishing effort will require integration of the entire artisanal sector, supported by stronger political commitment, improved registration and licensing systems, and enhanced enforcement capacity. Some municipalities, such as Aného, have already shown interest in advancing sector professionalization, potentially even in the absence of national-level reforms.

Photo Credit: Nicolas Vava, 2026

3 Arrêté N° 0007/2025/MRHART/SG/DPA portant instauration du repos biologique en mer et sur le système lagunaire

4 Communication delivered during a Cabinet meeting (ref. 226 of February 16, 2023).

5 Ministerial Order 2022/91 MAEP established a biological rest period for beach seining in marine waters under Beninese jurisdiction. Ministry of Maritime Economy, Fisheries and Coastal Protection. FAO EAF-Nansen Programme.

4. Status of Exploited Fish Stocks in the Region

The primary source of scientific guidance on fish stock status in West Africa is the FAO Committee for the Eastern Central Atlantic Fisheries (FAO-CECAF), a regional fisheries body established under Article VI of the FAO Constitution and operating on a consultative basis. The most recent assessment is based on the 9th session of its Scientific Sub-Committee, held in Nouakchott in December 2022 (FAO 2023b).

According to FAO-CECAF (2023), key small pelagic stocks—including sardinella (Sardinella aurita and S. maderensis) shared by Benin, Ghana, and Togo—are overexploited. Similar assessments apply to bonga (*Ethmalosa fimbriata*) and anchovies (*Engraulis encrasicolus*). Among demersal species, *Galeoides decatactylus* and *Pseudotolithus spp.* are also overexploited, while *Brachydeuterus auritus*, *Dentex spp.*, and *Pagellus bellottii* are considered fully exploited. Notably, data limitations remain significant, with 36 of the 60 assessed stocks classified as data deficient.

The degraded status of fish stocks—many of which are shared across Benin, Côte d'Ivoire, Ghana, and Togo—reflects excessive fishing pressure across all fleet segments. While beach seining contributes to this overexploitation—particularly through the capture of juveniles—it is not considered the primary driver of stock depletion.

FAO-CECAF recommends reducing fishing effort on overexploited stocks and avoiding further increases elsewhere. Given the multi-species nature of regional fisheries, a broad-based reduction in fishing effort is recommended. As FAO-CECAF has no enforcement mandate, implementation of management measures rests with coastal states.

Regional cooperation could be strengthened through the Fisheries Committee for the West Central Gulf of Guinea (FCWC), which brings together six member countries, including Benin, Côte d'Ivoire, Ghana, and Togo. With support from the FAO EAF-Nansen Programme, the FCWC has initiated efforts to develop a regional management plan for small pelagic fisheries, including beach seine activities. The previous phase of the program (2019–2023) focused on improving the management of artisanal beach seine fisheries in Côte d'Ivoire, Benin, and Togo,[6] while the current phase (2024–2026) is advancing a more integrated, regionally coordinated approach to the sustainable management of shared small pelagic stocks across FCWC member countries.

6 The FCWC was established in 2007 and is headquartered in Accra. Liberia and Nigeria are the other two members of the FCWC. For more information, see https://fcwc-fish.org

5. Impact of Beach Seining on the Marine Environment

5.1. Impact on Fish Resources

A substantial body of evidence indicates that beach seines are inherently non-selective, largely due to small mesh sizes and their operation in nearshore nursery areas (République Togolaise 2011). As a result, they capture high proportions of juvenile fish, including commercially important species. Empirical studies confirm this pattern across regions (République du Bénin 2013). In Benin, for example, 65–98 percent of beach seine catches were estimated to be juveniles (Hounsounou et al. 2013). Similar findings have been reported in Australia, Ghana, Egypt, and Sri Lanka, consistently highlighting the high incidence of juvenile catch associated with this gear type (Akel et al. 2014).

5.2. Impact on Coastal Habitats

According to FAO research (Tieze et al. 2011), beach seining generally has limited impact on coastal habitats when conducted over sandy or muddy substrates, as commonly observed in Benin and Togo. This is due to the relatively light gear, which exerts minimal pressure on the seabed. Evidence from other regions (e.g., Mozambique) suggests that seagrass found in catches often consists of detached, drifting material rather than damage caused by fishing activity. However, where beach seining occurs in more sensitive environments—such as coral-reef areas—negative impacts on habitats have been observed.

5.3. Impact on Protected Species

Interactions between beach seines and protected species, particularly sea turtles, have been documented in multiple countries. In Togo, sea turtles have been observed caught in beach seine pockets during field visits (Figure 6), although they are typically released. These interactions are likely due to the overlap between fishing grounds and turtle feeding and nesting areas.

While beach seines are not commonly associated with broader impacts on protected species

(Tieze et al. 2011), other fishing methods—such as trawling, purse seining, and longlining[7] —are known to generate higher levels of bycatch, including juvenile fish and sea turtles (Tieze et al. 2011).

Figure 6. Sea Turtle Trapped in Beach Seine (Agbodrafo, December 2023).

Photo credit: Benoit Caillart, 2023
Note: The turtle was subsequently released.

7 Trawling involves dragging a large fishing net—called a trawl—through the water to catch fish. Purse seining uses a large vertical net to encircle a school of fish and then pulls tight the bottom of the net, trapping the fish inside.

6. Coastal Protection and Impact on Beach Seining

6.1. Coastal Protection in Togo and Benin

Coastal protection measures in Togo and Benin have included the construction of groynes, as well as the development of a sand engine in Benin (Box 2). In total, these interventions cover approximately 8.2 km (7 percent) of Benin's coastline and 25 km (50 percent) of Togo's coastline. The spacing of more recently constructed groynes ranges from 330 to 400 m, compared to 350–560 m for earlier structures, to optimize sediment retention while limiting shoreline retreat between structures, thereby enhancing overall coastal stability.

Box 2. Rationale for Selecting Groynes and Beach Nourishment for Coastal Protection

Togo and Benin have approached coastal protection as a shared, cross-border challenge, focusing on the coastal stretch from Agbodrafo (Togo) to Grand-Popo (Benin). Relevant technical and environmental and social studies evaluated six intervention scenarios (S1–S6).

Based on a multi-criteria analysis, both governments selected Scenario S2 in 2020, which was subsequently refined to Scenario S2b to address potential downstream erosion effects. The respective environmental and social impact assessments further assessed alternatives, confirming S2b (also referred to as the PK2.8 option) as the preferred implementation scenario.

Scenario S2b combines structural and nature-based measures, including: (i) in Togo, shortened groynes with beach nourishment, a breakwater with recharging and leveling, and the restoration of vegetated coastal dunes; and (ii) in Benin, shortened groynes with nourishment, a sand engine to support natural sediment redistribution, and the infilling of degraded lagoon channels.

The final design reflects a coordinated, transboundary approach, with decisions guided by technical, economic, and environmental considerations, as well as stakeholder consultations.

6.2. Impacts of Coastal Protection Works on Beach Seining

Impacts Identified during Preliminary Studies and Their Treatment

Environmental and social assessments identified both direct and indirect impacts, including temporary disruption of coastal access and potential ecological disturbances (e.g., turbidity).

Observed Impacts

In December 2023, a fact-finding and stakeholder-consultation mission on beach seining in Togo was conducted. Field visits covered sites with newly constructed groynes (e.g., Kpémé and Agbodrafo) as well as areas with older structures (Aného). Interviews were held with the National Federation of Fishing Cooperatives of Togo (Fédération Nationale des Coopératives de Pêche du Togo, FENUCOOPETO), local fishing communities, and women fishmongers.

As described earlier, beach seine operations involve wide distances between towing arms. In Kpémé, a 1,000-m seine reached an initial span of nearly 2,000 m between ropes, while in Agbodrafo a 400-m seine extended to approximately 560 m. Given typical groyne spacing, one or more structures frequently lie within the hauling path. Despite this, crews are able to navigate groynes with relative ease by lifting and guiding the towing ropes over the structures. Observations indicate that crossing a groyne takes only a few minutes (e.g., 4–6 minutes depending on net size), and similar practices were observed across sites. These findings suggest that groynes do not materially impede beach seine operations, and that fishing can continue along protected coastline segments without requiring groyne-free areas.

Experience from countries such as Ghana indicates that no effective technical solutions exist to facilitate lateral crossing of groynes during fishing operations. While some groynes include pedestrian access for longitudinal movement (e.g., for maintenance or recreational use), such features are not designed for, nor recommended in, active fishing contexts due to wave exposure and associated safety risks (Figure 7).

Figure 7. View of One of the Six Groynes Built Near Keta in Ghana for Longitudinal Crossing

Source: Angnuureng et al. 2013.

Feedback from Consultations with Fishers and Their Representatives

Consultations confirmed that groynes do not materially hinder beach seine operations. Fishers have adapted by passing towing arms over the structures during hauling, and up to three or four groynes may be crossed during a single operation. According to FENUCOOPETO representatives, this process does not pose significant operational challenges.

Beach seining is generally not feasible between groynes spaced 500 m or less apart, even for smaller nets (e.g., 400 m). This is due to the wide lateral deployment, driven by currents and fishing strategies that rely on extending towing arms beyond net length to concentrate fish.

Fishers in Aného and Kpémé identified exposed beach rock—resulting from coastal erosion—as the primary constraint. These rocky outcrops can damage nets and complicate handling, in some cases leading to the abandonment of beach seining. Information collected by the Ministry of Agriculture, Livestock, and Fisheries (MAEP) (Table 1 above) indicates an absence of active beach seines along sections of coastline between Lomé and Agbodrafo where such conditions prevail.

By contrast, groynes are generally viewed positively. During consultation, many stakeholders considered them beneficial in promoting sediment accumulation, which may help cover beach rock and reduce net damage. Some have called for further expansion of groyne systems for this reason. Similar experiences in Ghana confirm that fishers have largely adapted to these structures, although concerns have been raised about the potential for dislodged rocks to damage nets. No clear link was reported between groynes and changes in catch volumes. Catches instead follow seasonal patterns, with higher yields from July to November and lower yields from December to April—likely influenced by rainfall and upwelling dynamics along the Gulf of Guinea coast.[8]

Other Potential Impacts of Rock Groynes on Beach Seining

Rock groynes on sandy coastlines may create artificial reef conditions, providing habitat for marine species and attracting predatory fish. Artisanal fishing representatives noted the potential for increased presence of larger fish in catches. While this effect has not been systematically studied in the Gulf of Guinea, analogous evidence from offshore infrastructure in Europe suggests that hard structures can support species associated with rocky habitats, which are otherwise absent in soft-bottom environments (Hemery 2020). By extension, groynes may enhance local biodiversity, although this remains unconfirmed. Groyne-induced wave attenuation may also facilitate the development of seagrass beds (e.g., *Cymodocea nodosa*, *Halodule wrightii*, *Ruppia maritima*, *Zostera noltei*), which provide important ecosystem services, including habitat provision, carbon sequestration, and buffering against acidification. However, these conditions could also favor invasive species or predators of target fish species.

In the absence of context-specific studies, the net ecological effects of groynes in the Gulf of Guinea remain uncertain.

8 Upwelling refers to the rise of nutrient-rich water as a result of the combined action of ocean currents.

6.3. Impact of Human Pollution

Beach seining is affected by anthropogenic pollution, which degrades the quality of coastal fishing grounds (Sohou et al 2025). Satellite imagery of a phosphate processing site, close to Kpémé, shows a substantial sludge plume extending eastward along the coast. Images from 2016 and 2024 indicate that the plume can extend up to 8 km offshore (Figure 8). This discharge is likely to affect marine ecosystems through increased turbidity and the release of heavy metals. Available evidence suggests that impacts may extend as far as Grand Popo in Benin and could potentially affect Lake Ahémé and the Aho complex, both of high ecological importance. However, the extent of impact on ecosystems and human health remains insufficiently documented. The mining sector continues to feature prominently in Togo's development agenda, including recent agreements with foreign fertilizer manufacturers (Togo First 2023), which may further increase pressures on coastal environments.

Figure 8. Aerial View of Phosphate Sludge Discharges from Kpémé Plant in Togo (left 2024; right 2016)

Source: Google Earth images.

Plastic pollution represents an additional and growing concern. Marine debris directly affects beach seining by clogging nets during operations and indirectly through ingestion of microplastics by microfauna. Available data indicate a major pollution hotspot near Lomé (estimated at 42.7 thousand tons discharged annually), with a secondary hotspot near Aného (WACA Plastics eBook 2023).

In both cases—phosphate sludge and plastic pollution—the presence of groynes may influence the local accumulation of pollutants by altering coastal circulation patterns. This interaction remains insufficiently understood and warrants further investigation to assess its long-term implications for coastal ecosystems and fisheries.

7. Conclusion

Beach seining supports the livelihoods of approximately 2,000 people in Togo and remains essential for the socioeconomic stability of coastal communities.

Field observations, supported by feedback from fishers and their representatives, indicate that beach seine fishers have adapted to the rock groynes that have been constructed to address coastal erosion. The groynes have neither prevented fishing activities nor required structural modifications.

The introduction of rock groynes along a predominantly sandy coastline also creates new ecological conditions, potentially enabling the settlement and development of marine species. However, the impacts of these changes remain uncertain and may alter the structure of fish populations targeted by beach seine fisheries, with potential implications for ecosystem balance.

Additionally, Togo illustrates the vulnerability of beach seine fisheries to anthropogenic pollution. Discharges such as phosphate sludge and plastic waste degrade marine ecosystems over large areas, clog fishing nets, and disrupt marine food chains. These pollutants pose direct risks to both the fishery and human health. There are also concerns that groynes may influence coastal circulation patterns, potentially concentrating pollutants in certain areas.

Photo Credit: Kpotivi Wilson-Bahun, 2023

Bibliography

Adabe, K. 2023. Étude socio-économique comparée de la pêcherie de la senne de plage à poche ordinaire (10 mm) et à poche expérimentale (25 mm). FAO EAF-Nansen Programme.

Akel, E. H. K., and A. E. Philips. 2014. "Fisheries and biodiversity of the beach seine catch from the Eastern Harbor, Alexandria, Egypt." The Egyptian Journal of Aquatic Research 40 (1): 79–91. https://doi.org/10.1016/j.ejar.2014.03.001

Anatovi K. 2021. Rapport des enquêtes socio-économiques de la pêche à la senne de plage au Togo. Ministère de l'Agriculture, de l'Elevage et de la Pêche. FAO EAF-Nansen Programme.

Angnuureng, B. D., A. K. Appeaning, G. Wiafe. 2013. "Impact of sea defense structures on downdrift coasts: The case of Keta in Ghana." Academic Journal of Environmental Science 1(6): 104–12. https://www.researchgate.net/publication/256756000_Impact_of_sea_defense_structures_on_downdrift_coasts_The_case_of_Keta_in_Ghana

Artélia. 2020. Etudes Conjointes de Faisabilité Technique de la Protection Côtière du Segment Frontalier Togo-Bénin, Phase 1, October.

Bonnin M., M. Le Tixerant, and L. H. Efallo. 2023. Atlas cartographique du droit de l'environnement marin de la République du Togo. Rapport de recherche. December. 39 pages, 9 maps.

Croitoru, L., M. Sarraf, and J. J. Miranda Montero. 2019. The Cost of Coastal Zone Degradation in West Africa: Benin, Cote d'Ivoire, Senegal, and Togo. Washington, D.C.: World Bank Group. https://documents1.worldbank.org/curated/en/822421552504665834/pdf/The-Cost-of-Coastal-Zone-Degradation-in-West-Africa-Benin-Cote-dIvoire-Senegal-and-Togo.pdf

DPA (Direction de la Pêche et de l'Aquaculture). 2022. Rapport de recensement des propriétaires d'unités de pêche et des engins de pêche maritime artisanale sur la côte togolaise. Ministère de l'Économie Maritime, de la Pêche et de la Protection Côtière.

FAO (United Nations Food and Agriculture Organization). 2020. Évaluation des pertes après-capture dans les pêcheries maritimes artisanales du Togo. Lomé, Togo. https://doi.org/10.4060/ca8716fr

2023a. Statistiques des pêches et de l'aquaculture. Produits aquatiques: bilans alimentaires 1961–2019 (FishStatJ). In: Division des pêches et de l'aquaculture de la FAO [en ligne]. Rome. Mise à jour 2023.

2023b. Report of the Ninth Session of the Scientific Sub-Committee, Nouakchott, Mauritania, 5–9 December 2022. FAO Fisheries and Aquaculture Report, No. 1412. Rome. https://www.fao.org/3/cc7106b/cc7106b.pdf

Gbedomon, R. C., K. V. Salako, S. C. Gnansounou, et al. 2024. "Small-scale marine fishing in Benin, West Africa: A comprehensive assessment of the processed fish value chain."

Marine Policy 161, March. 106032. https://doi.org/10.1016/j.marpol.2024.106032

Gray, C. A., and S. J. Kennelly. 2003. "Catch characteristics of the commercial beach-seine fisheries in two Australian barrier estuaries." Fisheries Research 63 (3): 405–22. https://doi.org/10.1016/S0165-7836(03)00076-6

Hemery, L. G. 2020. "Changes in Benthic and Pelagic Habitats Caused by Marine Renewable Energy Devices." In A. E. Copping and L. G. Hemery (Eds.), OES-Environmental 2020 State of the Science Report: Environmental Effects of Marine Renewable Energy Development Around the World. Report for Ocean Energy Systems (OES). DOI:10.2172/1633182

Hounsounou, L. C., Z. Sohou, and G. S. Akouehou. 2013. "Pêche à la senne de plage au Bénin et durabilité des ressources halieutiques." Journal de la Recherche Scientifique de l'Université de Lomé 15 (3): 1–13. https://www.ajol.info/index.php/jrsul/article/view/121165

Hounsounou L., and O. Akpachossou. 2020. Évaluation des impacts biologiques et socio-économiques de la pêche à la senne de plage au Bénin. Ministère de l'Agriculture, de l'Elevage et de la Pêche. FAO EAF-Nansen Programme.

Nawardena, N. D. P., T. Jutagate, and U. S. Amarasinghe. 2016. "Patterns of species composition of beach seine fisheries off North-Western coast of Sri Lanka, fishers' perceptions and implications for co-management." Marine Policy 72: 131–38. https://doi.org/10.1016/j.marpol.2016.07.007

Nunoo, F., and D. Y. M. Azumah. 2015. "Selectivity studies on beach seine deployed in nearshore waters near Accra, Ghana." International Journal of Fisheries and Aquaculture 7: 111–26. DOI:10.5897/IJFA14.0458

République du Bénin. Plan de gestion de la pêche à la senne de plage. 2013.

République du Bénin, WACA, and République Togolaise. 2022. Étude d'impact environnemental et social (EIES) du projet de protection du segment de cote transfrontalière entre Agbodrafo au Togo et Grand-Popo au Bénin. Rapport final. January. ACL Consultant/Inros Lackner for governments of Bénin and Togo. https://environnement.gouv.tg/wp-content/uploads/2022/02/Rapport_EIES_Protection-Cotiere-Benin-Togo_-PARTIE-I- Sommaire-CH1-a-CH-3.pdf

République Togolaise. 2011. Rapport de référence pour l'aménagement de la pêcherie de la senne de plage au Togo. FAO EAF-Nansen Programme.

2013. Plan de gestion de la pêcherie de la senne de plage au Togo. Ministère de l'Agriculture, de l'Elevage et de la Pêche. January. https://www.fao.org/faolex/results/details/fr/c/LEX-FAOC210696

2021. Plan d'Action de Réinstallation des travaux de protection côtière d'Agbodrafo et Aného (Togo). Ministère de l'Environnement et des Ressources Forestières. December.

Sedzro, K. 2011. Rapport de référence pour l'aménagement de la senne de plage au Togo. Ministère de l'Agriculture, de l'Elevage et de la Pêche. FAO EAF-Nansen Programme.

Sohou, Z. and S. Abrokwah. 2025. The impact of marine litter on the beach seine fishery of four countries in the Gulf of Guinea: Benin, Côte d'Ivoire, Ghana and Togo – A preliminary investigation of the social and economic impacts of marine litter on fishing communities. FAO EAF-Nansen Programme. Report No. 76. Rome. https://doi.org/10.4060/cd5392b

Tieze, U., R. Lee, S. Siar, T. Moth-Poulsen, H. Bage. 2011. Fishing with beach seines. FAO Fisheries and Aquaculture Technical Paper. No. 562. Rome: FAO.
http://www.fao.org/3/a-i2117e.pdf

Togo First. 2023. "Phosphate: Togo records a significant surge in output and sales." https://www.togofirst.com/en/mining/1006-12052-phosphate-togo-records-a-significant-surge-in-output-and-sales#%3A%7E%3Atext%3D(Togo%20First)%20%2D%20Togo%27s%20phosphate%2Cin%202022%2C%20reaching%201%2C541%2C772%20tons


WORLD BANK GROUP