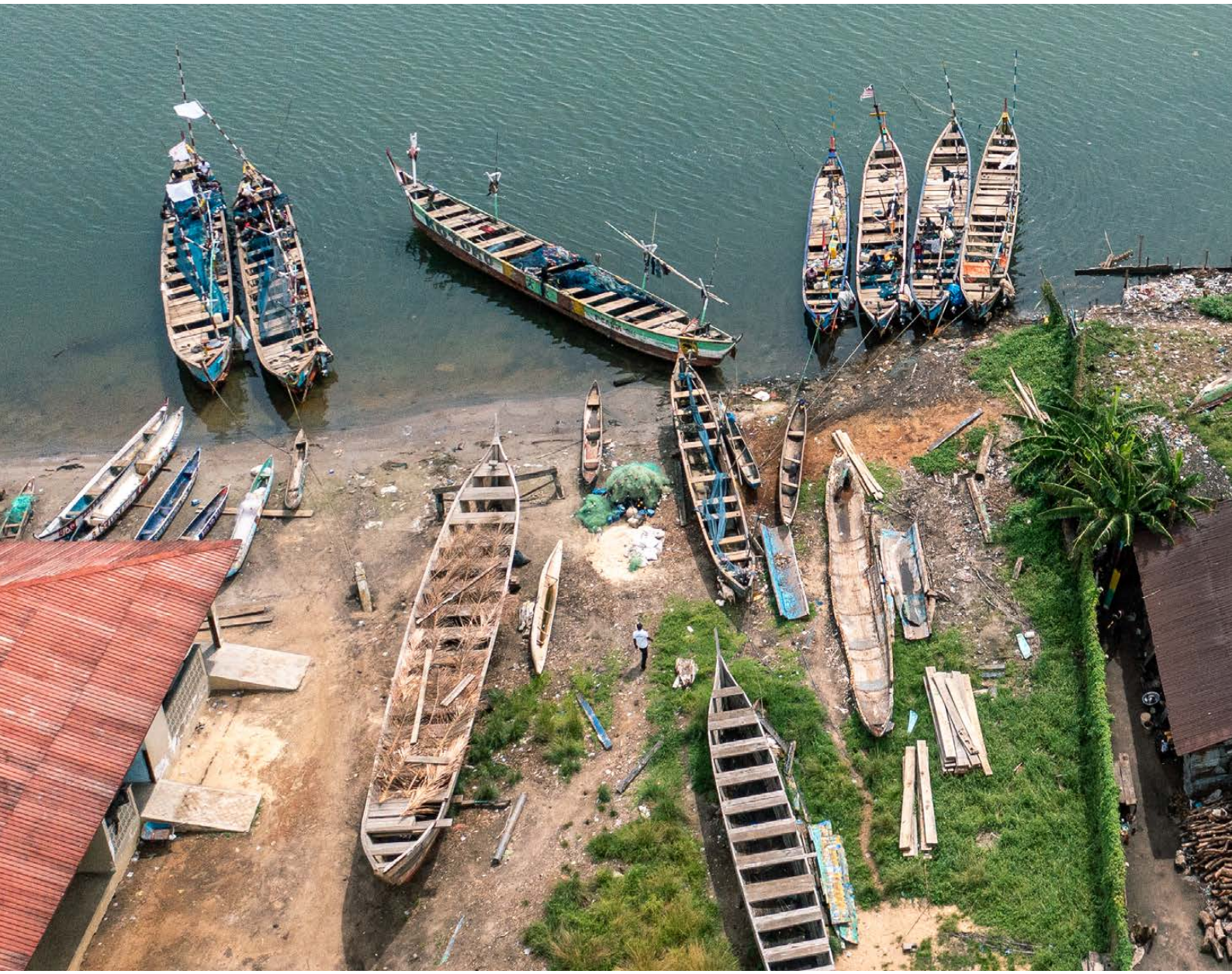
FISHERS' RIGHTS MATTER

Mapping small-scale fisheries landing and smoking sites in Liberia to assess environmental and legal risks to their tenure rights



Funded by the European Union

Implemented by Environmental Justice Foundation

In partnership with National Fisheries & Aquaculture Authority, Liberia

ENVIRONMENTAL JUSTICE FOUNDATION

Protecting People and Planet

The Environmental Justice Foundation (EJF) exists to protect the natural world and defend our basic human right to a secure environment.

EJF works internationally to inform policy and drive systemic, durable reforms to protect our environment and defend human rights. We investigate and expose abuses and support environmental defenders, Indigenous peoples, communities and independent journalists on the frontlines of environmental injustice. Our campaigns aim to secure peaceful, equitable and sustainable futures.

EJF is committed to creating effective co-management associations to secure legal and sustainable fisheries. Our investigators, researchers, filmmakers and campaigners work with grassroots partners and environmental defenders across the globe.

Our work to secure environmental justice aims to protect our global climate, ocean, forests, wetlands, wildlife and defend the fundamental human right to a secure natural environment, recognising that all other rights are contingent on this.

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The Environmental Justice Foundation (EJF) and the National Fisheries and Aquaculture Authority (NaFAA) are working in partnership on the European Union-funded Communities for Fisheries project to reduce illegal, unreported and unregulated (IUU) fishing and improve the sustainability of Liberia's fisheries.

Funded by the European Union

Contents

Acronyms

CMA	Collaborative Management Associations
DN	Digital Number
EJF	Environmental Justice Foundation
EPA	Environmental Protection Agency
EPIRBs	Emergency Position Indicating Radio Beacons
FAO	Food and Agriculture Organization of the United Nations
FTT	FAO-Thiaroye Processing Technique
GIS	Geographic Information System
GPS	Global Positioning System
IUU	Illegal, Unreported, and Unregulated (fishing)
LLA	Liberia Land Authority
MLC	Maximum Likelihood Classification
NaFAA	National Fisheries and Aquaculture Authority
PRA	Participatory Rural Appraisal
SSF	Small-scale Fisheries
TURF	Territorial Use Rights for Fisheries
USGS	United States Geological Survey
UTM	Universal Transverse Mercator

Executive summary

Collaborative Management Association's Monitoring, Control and Surveillance team out on at-sea patrol in Grand Cess, Grand Kru County.

The small-scale fisheries (SSF) sector in Liberia plays a critical role in the livelihoods of coastal communities, contributing significantly to food security, employment, and poverty alleviation. However, the sector faces mounting challenges, including illegal, unreported, and unregulated (IUU) fishing, coastal erosion, habitat degradation, and land tenure insecurity. This study, commissioned by the Environmental Justice Foundation (EJF) under the European Union-funded "Communities for Fisheries" project, aims to assess these challenges by mapping SSF fish landing and smoking sites across four coastal counties: Grand Cape Mount, Margibi, Grand Bassa, and Grand Kru.

The analysis employed a participatory rural appraisal (PRA) approach, geospatial analysis using tools such as Google Earth Pro and ArcGIS Pro, and field observations. Data were collected through group interviews, consultations with key stakeholders, and satellite imagery analysis to map fish landing and smoking sites and develop Territorial Use Rights for Fisheries (TURF) boundaries. Environmental, socio-economic, and governance-related threats were also identified and categorised.

Key fish landing and public fish smoking sites have been identified and categorised based on their risk levels depending on environmental and legal threats. Significant mangrove deforestation and coastal erosion were observed, especially in Margibi and Grand Cape Mount counties, threatening fishing livelihoods. Mangroves serve as critical breeding grounds for fish and provide natural protection against storm surges and coastal erosion. Restoring degraded mangrove areas will enhance ecological resilience and sustain fishing livelihoods. Coastal erosion, on the other hand, is worsening in Liberia due to rising sea levels, strong wave action, and human activities, leading to the loss of small-scale fish landing sites. This threatens livelihoods, fish processing facilities, and infrastructure, forcing fishers to relocate and increasing operational costs. Developing coastal erosion control measures like shoreline protection, natural barrier construction, and sustainable urban planning will help protect fish landing sites from the adverse effects of shoreline recession.

Governance issues, including land tenure insecurity and conflicts over land use, emerged as major challenges for fisherfolk. Results also show a lack of modern fishing and processing infrastructure in rural areas, creating disparities in access and opportunities between urban and rural communities.

To address the challenges identified and safeguard the future of Liberia's SSF, the following recommendations are provided:

i. Environmental sustainability

- **Mangrove restoration for ecosystem stability**: Implement mangrove restoration projects to stabilise coastal ecosystems and support marine biodiversity. Mangroves serve as critical breeding grounds for fish and provide natural protection against storm surges and coastal erosion. Restoring degraded mangrove areas will enhance ecological resilience and sustain fishing livelihoods.

- **Coastal erosion control and urban planning**: Explore appropriate coastal protection measures, including natural solutions such as vegetative barriers, to safeguard fish landing sites in highly vulnerable zones like Robertsport and Buchanan. These measures will help protect fish landing sites from the adverse effects of shoreline recession while ensuring the long-term viability of coastal infrastructure and habitats.

ii. Legal and policy advocacy

- **Formalisation and protection of rights**: Advocate for the formalisation of land ownership and tenure rights under the Land Rights Act (2018) and strengthened enforcement of laws to protect fish landing sites from privatisation and environmental degradation. This includes clarifying differences between customary and statutory rights and ensuring communities have legal and sustainable access to these resources.

- **Policy reform and inclusive collaboration**: Advocate for policy reforms prioritising fisherfolk's rights and integrating customary practices within statutory frameworks. Foster collaboration among national authorities, local communities, and international partners to promote inclusive and participatory decision-making processes.

iii. Infrastructure development

- **Expanding processing facilities**: Build more public fish smoking and processing facilities in rural and peri-urban areas to reduce post-harvest losses and enhance fish quality. These facilities can support local economies, increase the marketability of fish products, and empower communities to participate more competitively in value chains.

- **Mobile units and cold storage**: Introduce mobile processing units and cold storage facilities to improve accessibility for remote fishing communities. These innovations will help reduce post-harvest losses, enhance fish preservation, and enable fishers to transport higher-quality products to markets more efficiently.

iv. Governance and legal frameworks

- **Formalising land ownership**: Expedite the formalisation of land ownership and tenure rights under the Land Rights Act (2018). Establishing clear legal documentation for fish landing sites will reduce tenure insecurity, safeguard access for fisherfolk, and align customary and statutory rights.

- **Participatory conflict resolution**: Address land disputes through participatory approaches involving fisherfolk, private landowners, and government agencies. Open dialogue and collaboration can help resolve conflicts, build trust, and ensure fair and equitable resource management.

v. Community empowerment

- **Training for sustainable practices**: Provide training in sustainable fishing practices and modern processing techniques to enhance productivity, reduce environmental impact, and improve the livelihoods of fisherfolk through better resource use and value addition.

- **Capacity building for Collaborative Management Associations (CMAs)**: Strengthen the capacity of CMAs to effectively manage TURFs and enforce local resource management rules. Supporting CMAs will promote community-led governance and help to ensure the sustainable use of fisheries resources.

- **Provision of microcredit facility**: Support local fishmongers and processors by investing in market infrastructure, branding initiatives, and community banking schemes like the Village Savings and Loans Associations and formal credit facilities to strengthen the fisheries sector as an integrated value chain.

Kru fishermen paddling out to sea in Grand Cess, Grand Kru County.

1. Introduction

Small-scale fisheries (SSF) are integral to the livelihoods of millions worldwide, particularly in coastal countries like Liberia, where they contribute significantly to food security, employment, and poverty alleviation.[1,2] The Food and Agriculture Organization of the United Nations (FAO) emphasises that these fisheries play a crucial role in sustaining local economies and ensuring nutritional needs are met.[3] The European Union-funded "Communities for Fisheries" project, implemented by the Environmental Justice Foundation (EJF), aligns with these objectives by promoting sustainable practices and community-based co-management of marine resources in Liberia. This initiative is guided by the FAO's Voluntary Guidelines for Securing Sustainable SSF (SSF Guidelines), which advocate for participatory governance and the protection of fishers' rights.[4]

Liberia's fisheries sector faces escalating threats, including illegal, unreported, and unregulated (IUU) fishing, coastal erosion, commercial sand mining, and land privatisation, which jeopardise fishers' access to vital landing sites. Research indicates that diminishing access to fisheries resources not only disrupts livelihoods but also exacerbates socio-economic vulnerabilities within fishing communities.[5,6] In response, the co-management model adopted by the EJF project empowers communities through the establishment of Collaborative Management Associations (CMAs).[7] These associations enable fishers to actively participate in resource management, combat IUU fishing, and secure land and sea use rights. This collaborative approach reflects Liberia's commitment to participatory resource governance, as enshrined in the Land Rights Act[8] and the Fisheries and Aquaculture Management and Development Law (2019).[9]

A critical component of this initiative involves mapping fish landing sites, smoking sites, and threats to these landing sites and developing Territorial Use Rights for Fisheries (TURF) maps for the CMAs. By systematically identifying and categorising threats, the project aims to establish a robust foundation for informed decision-making, legal protection of landing sites, and sustainable fisheries governance. The anticipated outcomes are expected to enhance the resilience of SSF, thereby aligning with global sustainability and community empowerment objectives.

The study objectives are in section two, the study approach used is presented in section three, while the findings and discussion that ensued are in section four. The conclusion and recommendations are summarised in section five.

2. Objectives

This study aimed to delineate the small-scale fish landing and public fish smoking areas in Liberia's four coastal counties—Grand Cape Mount, Margibi, Grand Bassa, and Grand Kru—where the Communities for Fisheries project operates and produce maps of these sites and CMA TURFs in consultation with communities. In consultation with national, county, and community stakeholders, the study identified key threats and challenges to these sites and provided baseline information to NaFAA and partners, along with recommended actions for their protection.

2.1. Specific objectives

The study specifically considers the following objectives:

i. Identify land ownership of sites, identify imminent and potential threats to fish landing sites and public fish smoking areas and categorise sites according to threats.
ii. Develop a comprehensive map of landing and smoking sites in fishing communities.
iii. Develop TURF maps.

3. Methodology

To achieve the objectives set out for the assignment, the consultant employed several approaches including: (i) participatory rural appraisal (PRA)[10] to gather primary data through group interviews of key stakeholders at local and national levels; (ii) use of remote sensing (ENVI 5.3, Landsat Imagery) and Geographic Information System (GIS) tools (Garmin GPS, Google Earth Pro and ArcGIS Pro) to delineate boundaries and produce maps of landing sites and fish smoking areas; and (iii) field observation of the fish smoking and landing sites in the focus counties. The study focused on SSF communities in four specific counties: Grand Cape Mount, Margibi, Grand Bassa and Grand Kru (**Figure 1**).

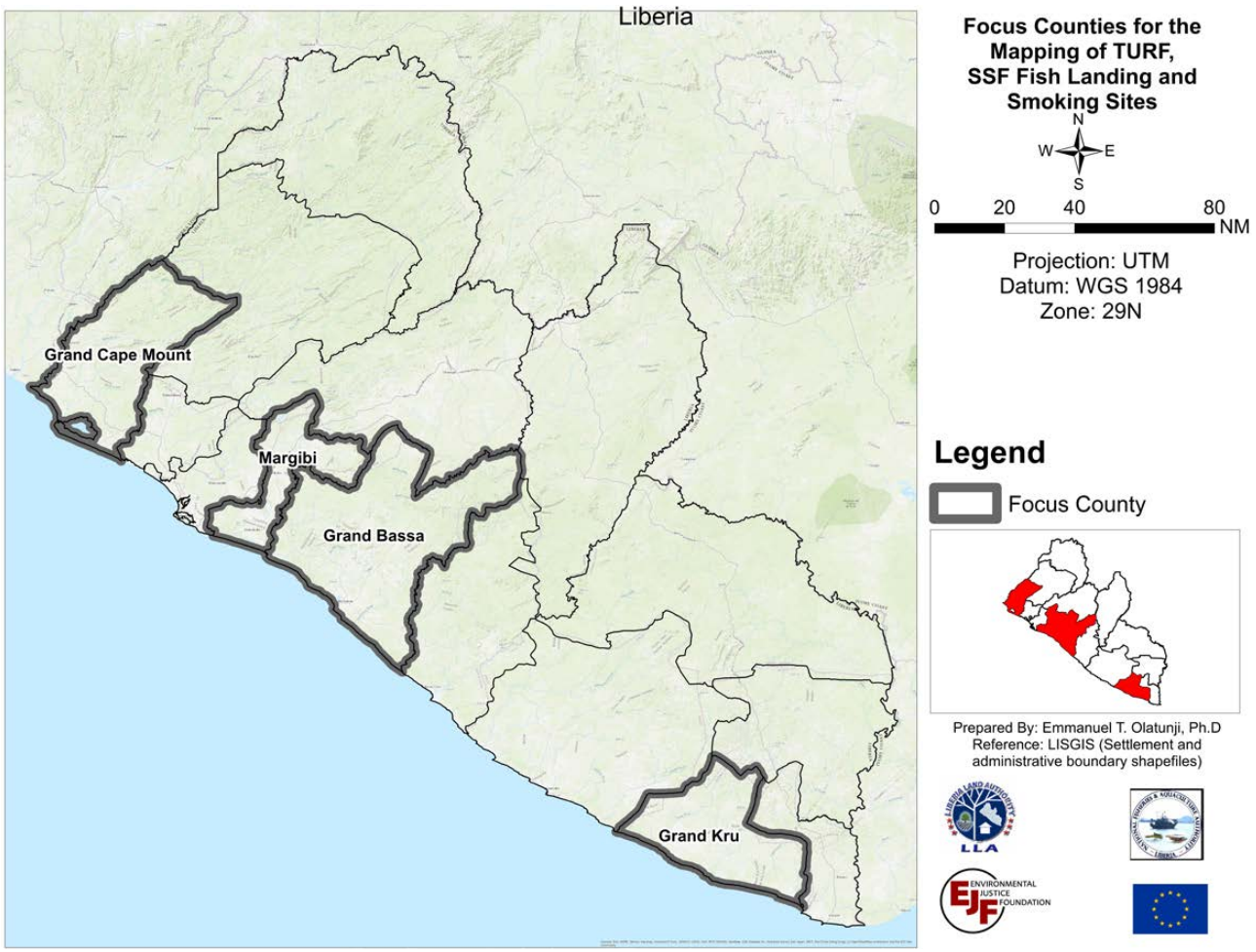


Figure 1: Focus counties for the mapping of TURFs and SSF fish landing and smoking sites.

3.1. Data collection procedures

3.1.1 Geospatial analysis

Google Earth Pro was used to generate shapefiles for fish landing sites, delineate TURF boundaries, and identify smoking sites. The outputs from Google Earth Pro were verified through field assessments conducted by the consultant, employing a Garmin GPS tool for ground-truthing. Subsequently, ArcGIS Pro was used to create the final layout, integrating the boundaries of the focus areas, TURFs, fish landing sites, and smoking sites.

To evaluate changes in critical habitats, specifically mangrove ecosystems within the focus areas, satellite imagery was acquired from the United States Geological Survey (USGS) Earth Explorer platform.[11] The selection of imagery prioritised high-quality datasets with minimal or no cloud cover. These images were georeferenced to the WGS_84 datum and transformed into the Universal Transverse Mercator (UTM) Zone 29N coordinate system. Radiometric correction was applied to convert raw digital number (DN) values into reflectance values using the radiometric calibration tool within ENVI software.

The analysis of changes in the mangrove ecosystem employed a supervised classification approach. The Maximum Likelihood Classification (MLC) algorithm, implemented in ENVI 5.3, was used to categorise land cover. This algorithm, widely recognised for its accuracy, leverages training data to compute the probability of each pixel belonging to a specific class. The MLC algorithm calculates the discriminant function for each pixel based on the equation described by Richards (1999).[12] The methodological workflow adopted for this analysis is presented in Figure 2, illustrating the sequential steps from data acquisition to change detection.

3.1.2. Visual analysis

Systematic field observations were conducted at each identified site to document physical characteristics, infrastructure conditions, and environmental factors. These observations were complemented by structured interviews with key stakeholders, including fishers, site managers, and local authorities, to gather insights on operational practices, site usage, and perceived threats. This mixed-methods approach provided a holistic understanding of each site's spatial layout and the challenges faced, facilitating the development of targeted management and conservation strategies. Pictorial evidence is presented in Annex 1.

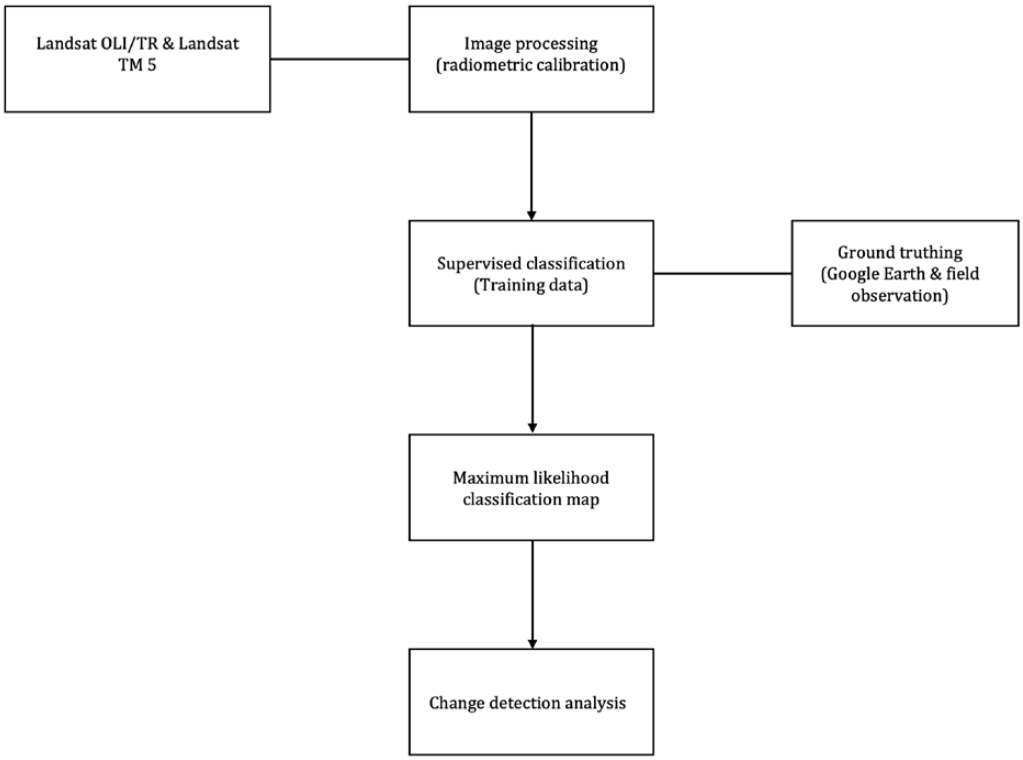


Figure 2: Methodological workflow for mangrove ecosystems change detection analysis

Fanti canoes berth on the shore of Lake Piso in Robertsport, Grand Cape Mount County.

3.1.3 Participatory rural appraisal

The study followed a PRA approach to conduct group interviews of key stakeholders, including fisherfolks, CMAs, and local leaders in the respective fishing communities and coastal counties within the scope of this assignment. The PRA aimed to ensure fisherfolks, CMAs, and local leaders participated actively in identifying and discussing issues pertaining to fish landing sites and public fish smoking areas in their respective communities and the collaborative planning of solutions. The group interviews were used to identify and document challenges and threats to small-scale fish landing sites and public fish smoking areas, supplementing the mapping activity described in section 3.1.1. Since it was impossible to obtain physical documentation (such as reports, land deeds, court records, among others) from local leaders and county authorities within the timeframe for production of this study, key informants' knowledge and experiences were aimed at filling this information gap. At the national level, the National Fisheries and Aquaculture Authority (NaFAA) and the Liberia Land Authority (LLA) were consulted, and their feedback was obtained.

An interview guide (see Annex 2) was used to elicit responses about the small-scale fish landing sites and public fish smoking areas, and the challenges and threats to access and use of both sites. The open-ended structure of the questions allowed for follow-up on the initial responses from the group. Following the completion of the interviews, the responses were transcribed and processed for further analysis. This process helped identify key topics and areas of interest relevant to the assignment.

3.1.4 Risk assessment framework

A comprehensive risk assessment framework was applied to evaluate and address the vulnerabilities associated with small-scale fish landing sites and smoking areas in Liberian coastal fishing communities.[13] This framework was designed to systematically identify, classify, and prioritise risks, enabling targeted interventions to enhance the sustainability and resilience of these critical resources.

The risk assessment process incorporated qualitative and quantitative methods, using field observations, stakeholder interviews, and geospatial analysis to develop an evidence-based understanding of the challenges facing these sites. Risks were categorised into two primary domains: environmental risks and governance and legal risks, ensuring a holistic approach to threat identification and mitigation.

Fanti canoes berth on the shore of Lake Piso in Robertsport, Grand Cape Mount County.

Environmental risks were assessed based on factors such as coastal erosion, which was measured by shoreline recession and inundation, and habitat degradation, which considered the extent of mangrove loss and ecosystem vulnerability. These risks directly impact the long-term viability of fish landing sites by reducing available space, altering coastal topography, and increasing exposure to extreme weather events.

Governance and legal risks were evaluated by examining land ownership status, security of land tenure, and conflict resolution mechanisms. The risk of displacement due to private ownership, unresolved land disputes, and the availability of legal documentation (such as deeds or lease agreements) were key considerations. These factors influence the stability of access to fish landing and smoking sites, affecting the livelihoods of local fishing communities.

Identification of key threats and challenges contributing to overall risk

The study compiled a detailed inventory of potential challenges and threats obtained from interviews and field observation, with respect to the access and use of fish landing sites and smoking areas in the coastal fishing communities. These were assigned to one of two issue categories: environmental, and governance/legal issues. The process for evaluating these challenges and threats is detailed in the following sections.

Environmental issues

For environmental issues, responses on the following were elicited from the respondents in the coastal fishing communities.

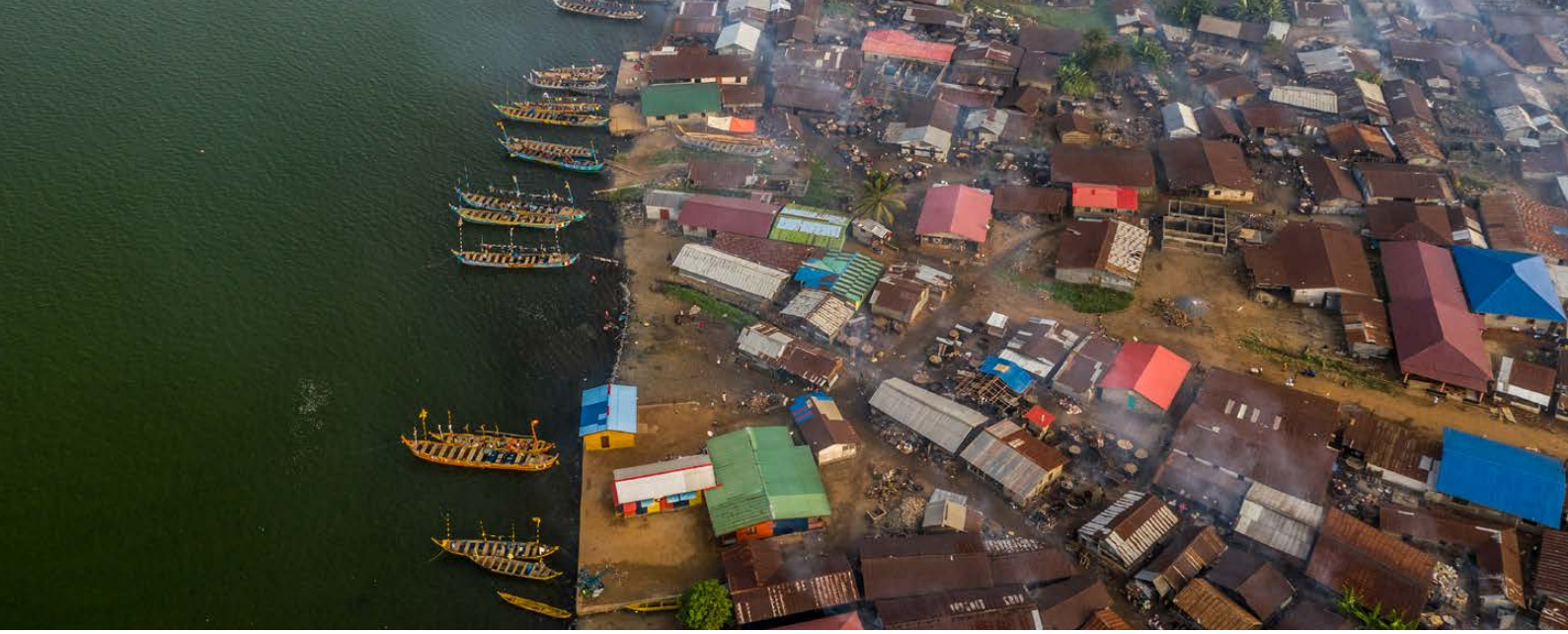
- **Coastal erosion:** Measured by shoreline recession and inundation.
- **Habitat degradation:** Evaluated by the presence of mangroves or other protective ecosystems and the extent of habitat loss.

Governance and legal issues

Governance and legal issues were assessed through consideration of the following:

- **Legal ownership status and documentation:** nature of land ownership (private, public, communal, corporate, or disputed) and community access to legal deeds, lease agreement and/or traditional land rights documentation.
- **Security of land tenure:** risk of eviction due to private ownership, existence of land tenure disputes, and length of ownership or tenure (years).
- **Conflict or disputes:** number of legal disputes over land, frequency of boundary conflicts, and existence of court cases or ongoing negotiations.

Fanti fishers preparing to cast their nets at sea in Robertsport, Grand Cape Mount County.



Artisanal fishers landing sites in Robertsport, Grand Cape Mount County.

4. Findings and discussion

4.1. Fish landing sites, smoking sites and territorial use rights for fisheries (TURFs)

The locations of the fish landing and smoking sites are presented in this section and the TURF map.

4.1.1. Fish landing and smoking sites

A total of **73 small-scale fish landing sites** have been identified across the four focus counties for data collection: Grand Cape Mount, Margibi, Grand Bassa, and Grand Kru**.** The complete list, along with their corresponding coordinates, is provided in Annex 5. The distribution of landing sites varies across the counties**,** with Grand Kru having 23, Grand Bassa 23, Grand Cape Mount 20, and Margibi with seven sites (Table 1). The landing sites are located across urban, peri-urban, and rural coastal areas, with the majority in rural settlements, where fishing remains a key livelihood activity and reflects the traditional practices of local communities

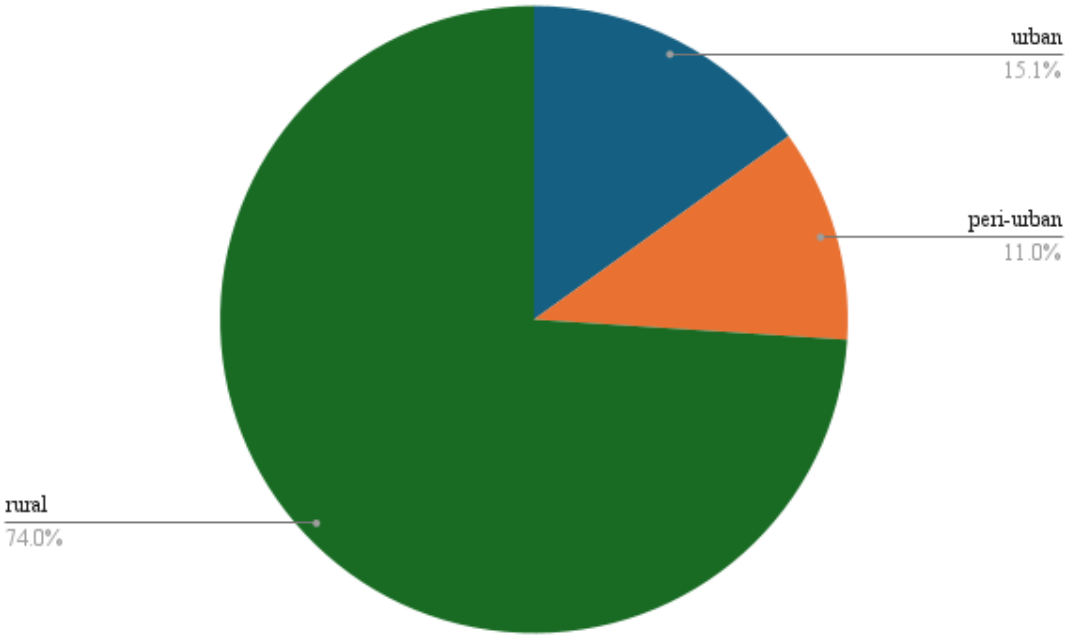


Figure 3: Percentage of landing sites located in urban, peri-urban, and rural areas

Table 1: Landing sites per county

County	No of sites	Classification		
		Urban	Peri-urban	Rural
Grand Bassa	23	6	3	14
Grand Kru	23	0	0	23
Grand Cape Mount	20	3	0	17
Margibi	7	2	5	0

Grand Cape Mount County

Cape Mount County is home to 20 fish landing sites (Table 1), organised into three distinct regions, and includes two large smoking facilities funded by the World Bank. These facilities are strategically located in Fanti Town within the urban area of Robertsport, approximately 75 meters from Lake Piso, and serve as critical infrastructure for fish processing in the region.

Region one: Commonwealth District and Robertsport

Region One encompasses fish landing sites within the Commonwealth District and is divided between urban and rural locations. Robertsport hosts three urban fish landing sites—Robertsport (Kru Town), Robertsport (Up Town), and Robertsport (Fanti Town and Grassfield). The fishing community here is composed predominantly of two groups: the Fanti people, originally from Ghana and settled in this area for over two decades, and the Kru people, a Liberian ethnic group traditionally skilled in fishing and water transport. While the Fanti fishers primarily use motorised canoes, enabling greater efficiency and catch volume, Kru fishers rely on traditional paddling canoes, a method also commonly used in the rural fishing sites of this region.

The rural landing sites in Region One are scattered along the northwest and western shores of Lake Piso. The sites include Tallah, Kebeh, Latia, Torsor, Kpallah, Weima, and Saywelor. Additionally, Sembehum is a coastal landing site situated southwest of Lake Piso. These rural sites are primarily managed by local communities, predominantly from the Vai ethnic group. The Vai fishers also depend on paddling canoes for their activities, maintaining traditional practices.

The two smoking facilities in Fanti Town cater predominantly to fishmongers within the Fanti Town and Grassfield communities in Robertsport. However, due to the distance from rural landing sites, fishers outside Robertsport often resort to drying their catch using individual kitchens or home setups.

Region Two: Rural landing sites around Lake Piso

Region Two encompasses six rural landing sites located northeast, east, and southeast of Lake Piso: Bomie, Bomojah, Falie, Manoe, Formbah, and Bendu. These areas are characterised by their remoteness and lack of centralised fish processing facilities. Most of the fishers in this region belong to the Vai ethnic group, who rely exclusively on paddling canoes for their fishing activities. The lack of motorised equipment reflects both traditional practices and limited access to modern fishing technology.

Region Three: Coastal landing sites near Sierra Leone

Region Three includes three rural fish landing sites—Tailor, Tailor Kru Town, and Sowee. These sites are located along the coastline, with Tailor and Tailor Kru Town situated near the border with Sierra Leone. Access to these sites is limited due to poor road infrastructure, further isolating them from centralised fish processing facilities. Fishers at these sites rely on traditional fishing methods.

The fish landing sites in Cape Mount County are vital to local livelihoods, particularly for the Fanti, Kru, and Vai communities, who depend on fishing for sustenance and income. However, the disparity in infrastructure and accessibility between urban and rural sites highlights several key challenges:

Fishing community in Marshall, Margibi County.

1. **Infrastructure gaps**: The World Bank-supported smoking facilities in Fanti Town provide some capacity for fish processing, however, the facility can only host about 10 women at a time, and they pay a fee to the CMA/NaFAA to access it. There are no other similar centralised facilities, resulting in reliance on traditional small-scale drying methods.

2. **Access and connectivity**: Poor road infrastructure limits the mobility of fishers and their ability to transport fish to markets or processing centres, especially in Regions Two and Three.

3. **Technology and equipment**: Inadequate safety equipment, such as life jackets, devices for issuing distress signals like Flares and Emergency Position Indicating Radio Beacons (EPIRBs) and mobile transponders, increases fishers' risks at sea. While traditional knowledge is valuable, the inability to integrate contemporary sustainable practices such as low-impact fishing gear (e.g. modified gillnets with bycatch reduction panels, increased mesh size), may lead to overfishing and reduced yields.

Addressing these challenges through improved infrastructure, improved provision of processing facilities, and investment in sustainable fishing gear and safety equipment could significantly enhance the livelihoods of fishing communities across the county.

Margibi County

Margibi County is home to seven fish landing sites (Table 1), with Marshall City serving as the county's primary fishing hub. Compared to other areas in the county, Marshall City is relatively developed and classified as an urban area. It hosts two prominent fish landing sites—Marshall (Fanti Town) and Marshall (Kru Town)—and features a significant fish processing facility employing the FAO-Thiaroye Processing Technique (FTT).[14]

The two landing sites in Marshall City are the largest and most active in Margibi County, forming the backbone of the county's fishing economy. These sites are used predominantly by fishers from the Kru, Fanti, and Bassa ethnic groups, each employing distinct fishing practices. The Fanti fishers rely on motorised canoes, which enable them to conduct larger-scale operations and access deeper waters. In contrast, the Kru and Bassa fishers primarily use paddling canoes, reflecting traditional methods and smaller-scale fishing activities. These landing sites benefit significantly from their proximity to processing facilities and markets, reinforcing their role as key economic drivers for the county.

Outside Marshall City, the county has five additional landing sites in peri-urban areas: Kpakpakon, Floko's Town, Ben's Town, Snafu Dock, and Boyce Town. Fishing operations in these locations are smaller in scale than those in Marshall City. The absence of infrastructure and processing capacity in these areas limits their contribution to the broader fishing economy.

Women using the smoking facility in Robertsport, Grand Cape Mount County.

Marshall City also has a fish smoking facility using the advanced FTT. This facility is critical in preserving and adding value to fish products, serving fishmongers primarily within the city due to their proximity to the site. The construction of a second FTT facility in the city underscores the growing importance of fish processing in the county and highlights ongoing efforts to strengthen the sector.

The fishing and processing infrastructure in Margibi County reveals a clear divide between the urban centre of Marshall City and the surrounding peri-urban areas. This disparity presents several opportunities and challenges. The concentration of resources and infrastructure in Marshall City benefits urban fishers and fishmongers but limits accessibility for those in outlying areas. The use of motorised canoes by the Fanti fishers in Marshall illustrates one approach to enhancing fishing efficiency, while the continued reliance on paddling canoes in peri-urban locations underscores the diverse fishing practices and the importance of ensuring appropriate access to equipment that aligns with fishers' needs and the goal of fisheries sustainability.

The smaller-scale operations in peri-urban landing sites represent untapped potential. Investments in infrastructure, such as cold storage, additional processing facilities, and improved transportation networks, could significantly enhance productivity and the economic contributions of these areas. The ongoing construction of a second FTT facility in Marshall City is a step in addressing fish preservation challenges, but expanding such facilities to peri-urban areas could further bolster the livelihoods of fish processors across the county.

Grand Bassa County

Grand Bassa County is home to 23 fish landing sites (Table 1) and one major fish smoking facility, constructed by the FAO, located in the port city of Buchanan. These landing sites are distributed across urban, peri-urban, and rural areas, reflecting the county's diverse geographic and socio-economic landscape.

Six of the landing sites are situated along Atlantic Street in Buchanan, an urban area that serves as the county's economic hub. These sites include Big Fanti Town, Port Beach, Umaco Beach, Custom Beach, Cold Storage Beach, and Korkorwein Beach. Buchanan's urban sites are notable for their use of larger boats, which enable more extensive fishing operations compared to other parts of the county. This advantage is attributed to the city's better infrastructure, proximity to markets, and access to the FAO-built fish smoking facility, which supports efficient processing and preservation of fish products.

Three peri-urban landing sites—Nyangba, Sarwein, and Blewein—are located within the Baconie community, approximately 1.5 to 4 kilometres east of Buchanan's port. These sites operate on a smaller scale than the urban locations and rely primarily on traditional fishing methods, such as paddling canoes. Despite their proximity to Buchanan, these peri-urban sites lack modern equipment and infrastructure, limiting their fishing capacity and economic output.

The remaining 14 landing sites are in the rural coastal areas of Grand Bassa County. These sites include Grand Kola, Little Kola, Newcess, Little Bassa, Bassa

Point, Dorr Beach, Sekepoh, Sorweah, Nimely Town, Pineapple Beach, Edina, Kotobli, Bardeh Wreh,and Upper Buchanan. In these rural areas, fishing is carried out almost exclusively using small paddling canoes.

The FAO-built fish smoking facility in Buchanan supports the county's fish processing activities. This facility serves fishers in urban areas, allowing them to preserve and add value to their catch. However, rural fishers often lack access to this facility due to its location, forcing them to rely on traditional methods of fish preservation. This disparity highlights the need for more decentralised processing infrastructure to support remote communities.

Grand Bassa County's fish landing and processing infrastructure underscores key differences in fishing practices and capacity across its urban, peri-urban, and rural areas:

1. **Urban dominance**: Buchanan's urban landing sites benefit from access to larger boats and better infrastructure, resulting in higher productivity and economic activity. The presence of the FAO smoking facility further establishes Buchanan as a hub for fish processing and trade.
2. **Peri-urban and rural challenges**: In peri-urban and rural areas, the reliance on small paddling canoes can be inefficient and labour-intensive. Additionally, the absence of adequate processing facilities in these areas creates logistical challenges for preserving and marketing fish.
3. **Infrastructure gaps**: While the FAO facility in Buchanan is an asset, its centralised location leaves many fishers underserved. Expanding fish smoking facilities and introducing cold storage in rural and peri-urban areas could significantly improve fish preservation and reduce post-harvest losses.
4. **Indigenous fishing practices**: The dominance of Indigenous Grand Bassa fishers in rural areas emphasises the importance of preserving traditional fishing methods. At the same time, integrating modern technology and support systems could boost their productivity and sustainability.

By addressing these disparities and promoting equitable infrastructure development, Grand Bassa County can enhance the efficiency and inclusivity of its fishing sector.

Fishing community in Sobobo, Grand Kru County

Grand Kru County

Grand Kru County is home to 23 recorded fish landing sites (Table 1), reflecting an essential fishing industry critical to the livelihoods of its predominantly Kru population. Additionally, the county hosts a major fish smoking facility, currently under construction in Sass Town, with funding from the FAO. Once completed, this facility will serve as a key hub for fish processing in the region, utilising the FTT to improve preservation and quality control.

The fish landing sites identified in Grand Kru County are Sobobo, Togbaklee, Jlatekpor, Grandcess, Newcess, Wedabo, Solokpor, Chinaklee, Dio, Bertu, Funko, Po-River, Garraway, Pungaloken, Nifu, Karh, Sobo, Wessepo, Dioh, Dorwley, Kafee, Nemein, and Sass Town (Felokree and Jekwikpo). Among these, Grand Cess and Sass Town stand out as the largest settlements and the most active hubs for fishing activities along the county's coastline. These sites support subsistence and small-scale commercial fishing, playing a pivotal role in the county's local economy.

The FAO-funded fish smoking facility, currently under construction in Sass Town, will serve as the primary processing centre for fish caught in the county. Using the FTT, the facility will enhance preservation efficiency, significantly improving the quality and marketability of fish products. However, the centralised location of this facility will limit accessibility for fishers from more remote landing sites. Many fishers in outlying areas will continue to rely on traditional, small-scale drying methods conducted within their communities.

The fisherfolk across Grand Kru County are predominantly of Kru origin. The Kru people are recognised for their longstanding maritime traditions, which include paddling canoes and other traditional fishing methods. While these practices are deeply embedded in the cultural identity of the region, they can impose considerable physical demands on fishers and can be unsafe in rough open seas.

Furthermore, an examination of Grand Kru County's fishing sector reveals several opportunities and challenges that have implications for the development of the industry:

1. **Centralised processing infrastructure**
   The fish smoking facility in Sass Town has the potential to be a critical resource for the county once it is completed, yet its centralised location creates logistical challenges for fishers operating in remote areas. Establishing additional decentralised facilities or mobile processing units could expand access and mitigate post-harvest losses, particularly for those in outlying communities.

Fish processor at her smoking area preparing fish for smoking in Robertsport, Grand Cape Mount County.

2. **Dependence on traditional practices**
   The reliance on paddling canoes and other traditional methods of fishing highlights both cultural significance and technological limitations. However, the central government should robustly enforce the use of multifilament nets, instead of monofilament nets preferred by Kru fishers to promote sustainable fishing practices, enhance efficiency and productivity, and preserve the cultural identity of the Kru people.

3. **Potential of key settlements**
   Grand Cess and Sass Town, as the largest and most active fishing settlements, have significant potential to serve as regional hubs for fish trade and processing. Investments in supportive infrastructure, including cold storage, market facilities, and improved road access, could bolster their role in the local and regional economy.

4. **Capacity building and training**
   Training programs on sustainable fishing practices, modern fish preservation techniques, and cooperative management models could empower fishers and fish processors to improve their livelihoods while ensuring the sustainability of fish populations.

The fishing sector in Grand Kru County, while modest in scale, remains integral to the socio-economic well-being of its population. Addressing the identified challenges, such as centralised infrastructure, reliance solely on traditional practices, and limited resources in remote areas, presents an opportunity to strengthen the sector. Through targeted investments, capacity-building initiatives, and equitable infrastructure development, Grand Kru County can foster a more resilient and inclusive fishing industry, aligned with economic and cultural priorities.

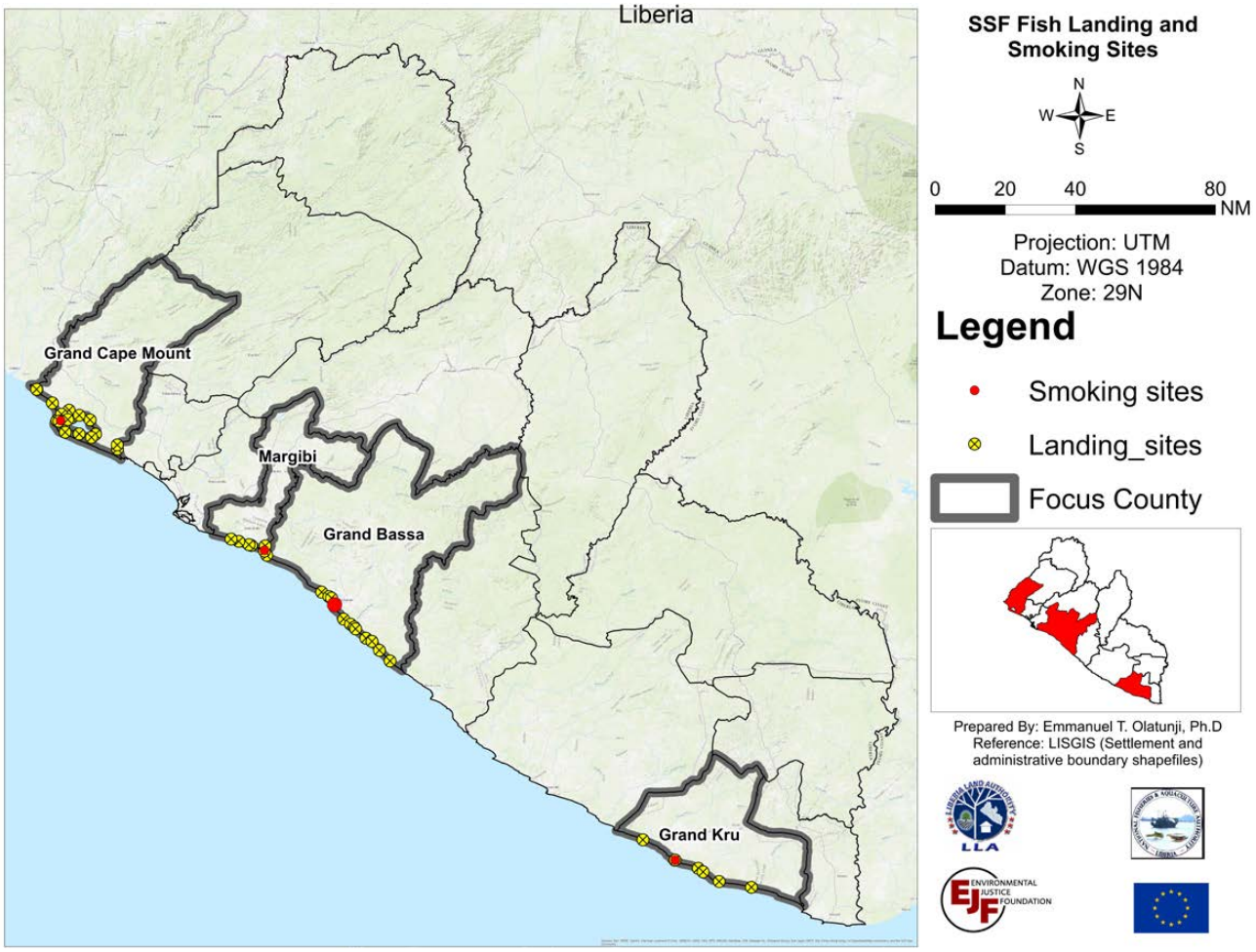


Figure 4: Fish landing and smoking sites

4.1.2. Territorial Use Rights for Fisheries

Territorial Use Rights for Fisheries (TURFs) refers to a fisheries management approach that allocates specific areas of marine or freshwater ecosystems to defined groups or communities for exclusive use and management.[15,16] TURFs are grounded in the principle of granting tenure rights to fishers, enabling them to harvest, manage, and conserve resources within a designated area.[17] These rights are typically established by governments, traditional authorities, or legal frameworks and aim to align with local ecological, economic, and social contexts. TURFs form a system which partially or totally privatises fishing areas for groups of users.[18] Resource users are capable of controlling access to the resource, the pace at which it is used, and the sale or leasing of resource rights. TURFs allow fisheries managers, through establishing well-defined property rights, to deal with the main cause of overexploitation, eliminate the "race to fish" and address its associated consequences, such as economic waste and rent dissipation.[19] In other words, TURFs, unlike conventional fisheries management tools, can incentivise fishers to manage fisheries more sustainably, addressing overfishing, habitat degradation, and conflicts over fishing grounds by fostering a sense of stewardship among fishers, as they have a direct stake in the sustainability of the resources within their allocated area .[20] The key features of TURFs are summarised below:

1. **Defined boundaries:** TURFs designate specific geographic areas where rights are granted.
2. **Exclusive access:** Only certain groups, such as cooperatives or communities, are allowed to harvest resources in the TURF area.
3. **Stewardship and management:** Fishers or local organisations are often responsible for enforcing rules, monitoring, and ensuring sustainability.
4. **Legal or customary recognition:** Rights within TURFs are recognised through legislation or traditional governance structures.

In Liberia, TURFs are primarily managed and operated through a community-based governance structure involving CMAs[21,22]. These local organisations oversee specific fishing areas and are supported by NaFAA and international partners like EJF.

Grand Bassa County TURF

The TURF boundary along the Grand Bassa County (Figure 5) coastline begins near Bassa Point, located at the western edge of the map, close to the boundary with Margibi County. Stretching southward, the TURF boundary runs parallel to the coastline, encompassing a 6 Nautical Mile (NM) offshore zone. The boundary ends near Grand Kola, situated at the southeastern tip of Grand Bassa County's coastline.

Canoe landing site in Buchanan, Grand Bassa County.

Within the TURF boundary, 49 fishing communities and 23 associated landing sites are scattered across the coastline.[23] Key communities include Owensgrove, Sand Fine, Zuah Village, Duo Village, Samuel Browne, Little Bassa, Malikor, Jah Village, Elijah Village, Marnakor Village, Paytoe, Dorr Kru Town, Kingsville Wrohdeh, Sand Village, Deagar, Plumkor Village Zinzone, Dweh Village, Edina City, City Joe Farmer. Several fishing communities are located near urban or peri-urban centres in the northern and central parts of the TURF. These include Upper Buchanan Community, Buchanan Preston/Roberts Street, Buchanan Port, and Buchanan**.** Further south, smaller and more rural communities are situated along the coast, serving as vital hubs for artisanal fishing activities. These include Neekreen, Giah, Sanwin, Borkodine, Gee's Village, Bleelay Village, Newcess, Neeter, Sweet Gaye, Goffa Village, Dugboryewh Village, Ban Village, Kpoweh, Soweah, Konnah Village, Pine Apple, Kpah Village, Koryou, Wohn Village, Dahn Tarr, Yorcee Zammie, Forkey, Grand Kola, Sekepo Kru, Giahwee Village, Pohkpa Village, and Quitzohn Village (Figure 4). The coordinates of the TURF boundary are presented in Annex 4.

About 1,232 artisanal boats, accounting for nearly 21.8% of the total artisanal fleet in Liberia[24], operate from the 23 fish landing sites within Grand Bassa TURF.[25] The total number of fishers operating in Grand Bassa TURF represents approximately 21.3% of the national total. Additionally, fish traders, fishmongers, and fish processors, involved in the fishery value chain within this TURF account for 26.6% of the total in Liberia, while their dependents make up nearly 25% of the dependents of fish traders nationwide, according to NaFAA.[26] This indicates the critical role of the Grand Bassa TURF in the provision of food and nutrition security as well as livelihoods in Grand Bassa, highlighting the need for NaFAA to legitimise (gazette) the TURF to empower the local resource users.

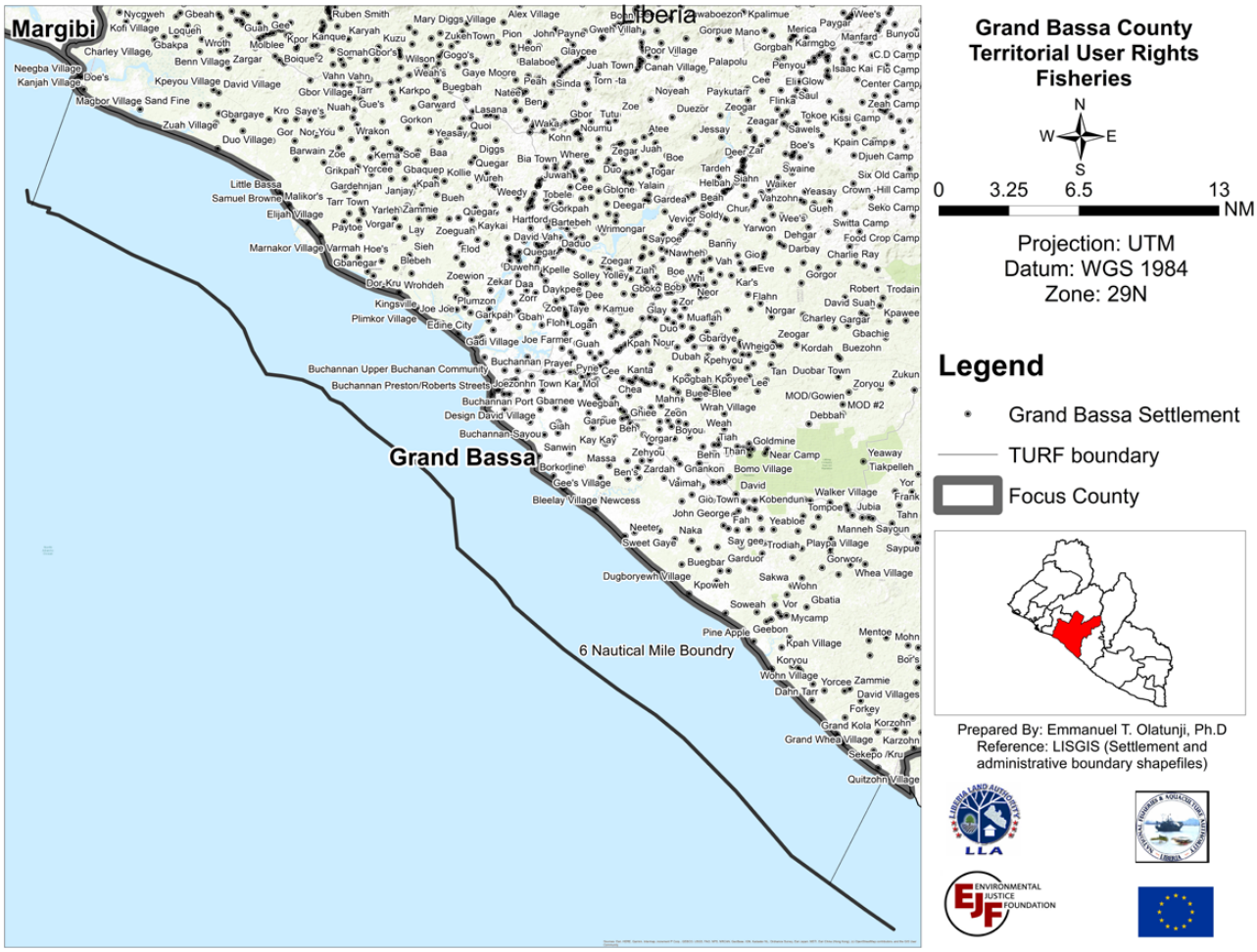


Figure 5: TURF Map of Grand Bassa County

Grand Kru County TURF

The TURF boundary for Grand Kru County (Figure 6) begins near Neroh Karh, located at the western edge of the county's coastline. It ends near Andrewville, situated at the southeastern edge of Grand Kru County, close to the border with neighbouring Maryland County. Notable communities within the TURF include Neroh Karh, Jorkokee, Paytaysobo, Wessepor, Dio (Wappi City), Butra, Nifu, Betu City, Felokree, Jekwikpo, Sobobo, Togbaklee, Solokpo, Jlotekpo, Klofueh, and Grandcess City, all of which are strategically located for the fisheries sector within the region. At the southern end of the TURF, near the border with Maryland County, key communities include Picnicess, Newcess, Gbarken and Wedado, Po-river Big Middle, Garraway C/Ghhakwenken, Garaway C/Saywonken, Nifa City Garaway, Pungalorken, and Andrewville (Figure 5). The coordinates of the TURF boundary are presented in Annex 4.

There are around 496 small-scale boats, representing about 8.8% of the artisanal fleet in Liberia[27], operating from the 23 small-scale fish landing sites within Grand Kru TURF[28]. The number of fishers operating within this TURF represents approximately 7.6% of the national total. Additionally, fishmongers and processors involved in fishery value chain activities in this TURF account for 2.3%, while their dependents make up 2.8% of the total dependents of fish traders and processors nationwide.[29]

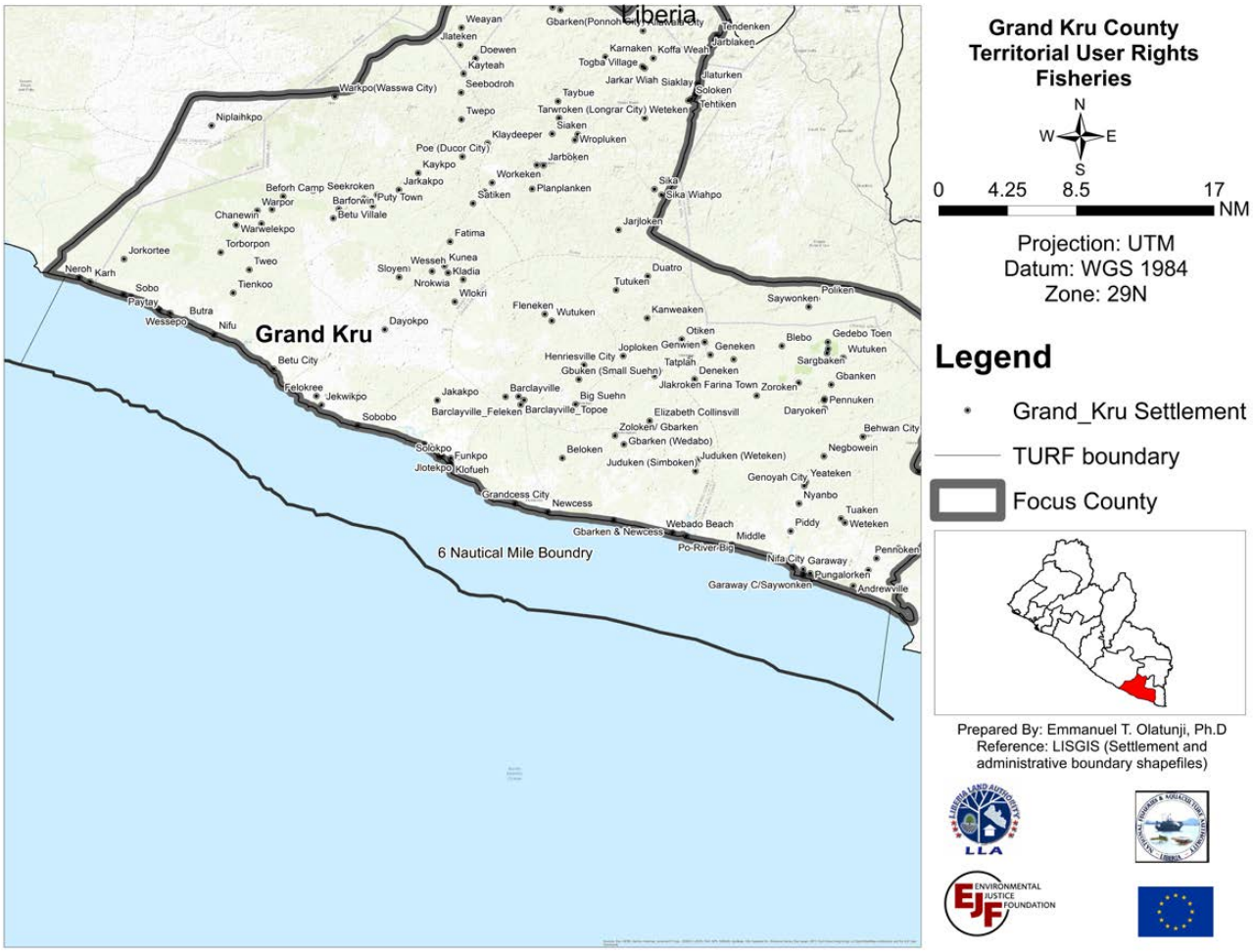


Figure 6: TURF Map of Grand Kru County

Grand Cape Mount County TURF

The TURF boundary for Grand Cape Mount County (Figure 7) begins near Kru Town Baaka, located at the northwestern edge of the county's coastline, close to the Sierra Leone border. The TURF boundary follows the curve of the coastline, encompassing key fishing areas and landing sites, and concludes near Bombojah, situated at the southeastern tip of Grand Cape Mount County near the border with Bomi County. Other key communities include Kru Town Baaka, York Island, and Tailor at the northern end, Sowee Beach, Sowee, Sayon, and Robertsport (City), which are strategically located in the central coastal region near urban centres. Moving further along the coastline, communities like Sembehum, Latia, Falie, Mandoe, and Laa surround Lake Piso. At the southeastern end, Wolala Village, Kebae Village, Morris Fehka Village, Morris Fehka Village, and Bomboja Beach represent smaller but significant fishing settlements (Figure 6). The coordinates of the TURF boundary are presented in Annex 4.

About 535 boats, accounting for nearly 9.5% of the total small-scale fleet in Liberia[30], operate across the 20 small-scale fish landing sites within Grand Cape Mount TURF.[31] The fishers operating within this TURF account for around 11.7% of the total fishers in Liberia.[32] The fishmongers and processors participating in the fishery value chain in this TURF account for 8.6% of the total number, while their dependents represent around 7.1% of the national total dependents of fish traders in Liberia.[33]

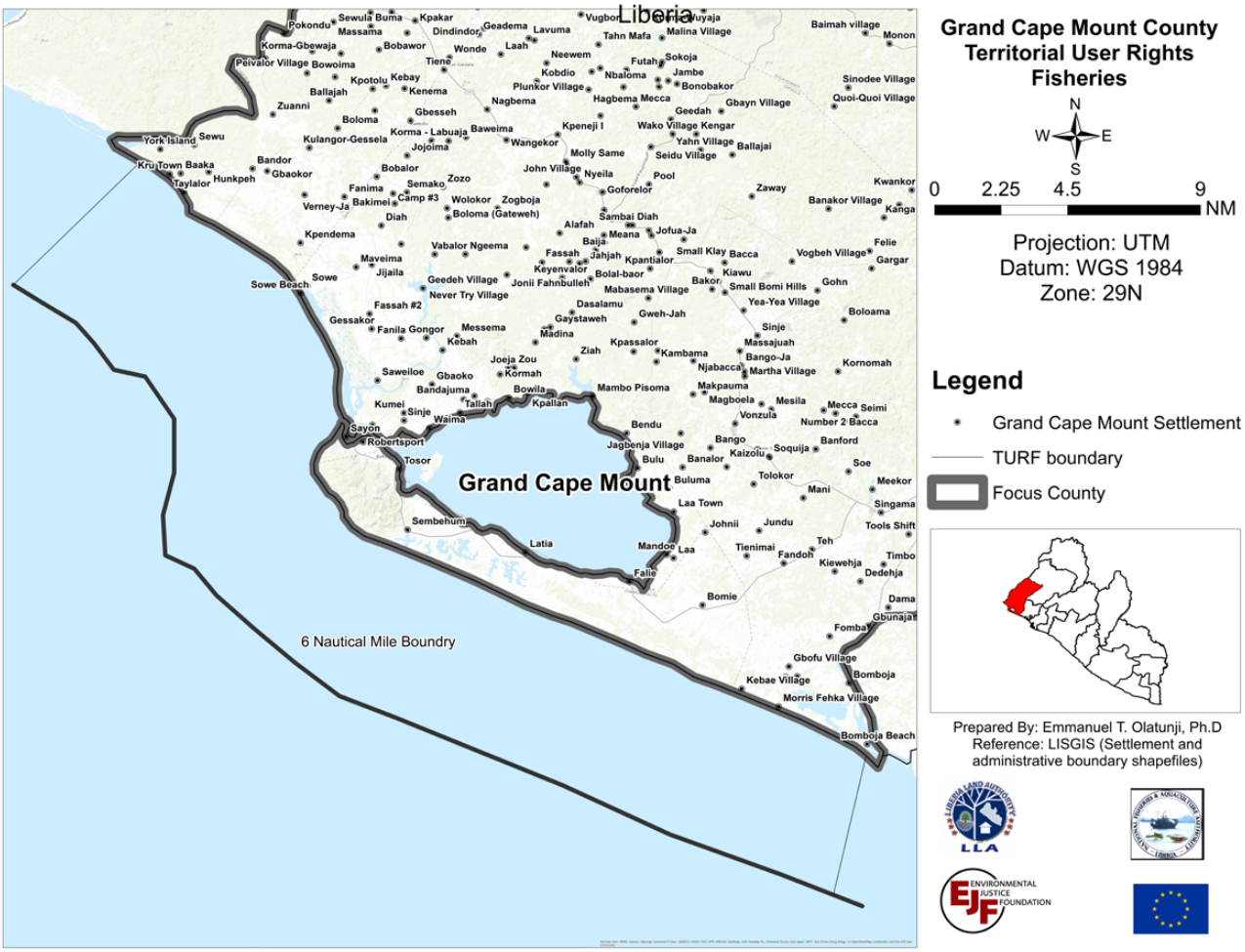


Figure 7: TURF Map of Grand Cape Mount County

Margibi County TURF

The TURF boundary for Margibi County (Figure 8) starts near the R-2 community, situated at the northwestern edge of the map along the coastline. The TURF boundary follows the natural curve of the coastline, incorporating key fishing zones and communities, and concludes near Marshall City, situated at the southeastern tip of Margibi County.

The TURF area includes 16 prominent fishing communities and seven associated fish landing sites, including Duazon Town, Boyce Town, Caribbean, Zoequillin Fanti, Kpozor, Krakpu, Hanry, Floko Town, Gai, Philip Boy, and Qui-Gbah, further along the coastline up until the central region.[34] In the southern region of the TURF, key sites include Snafu Dock, Viway, Dorzor, and Marshall City, which serve as major hubs for artisanal fishing activities (Figure 7). The coordinates of the TURF boundary are presented in Annex 4.

About 236 boats, accounting for nearly 4.2% of the total small-scale fleet in Liberia, operate across the seven landing sites within Margibi TURF.[35] The fishers operating within this area represent around 3.9% of Liberia's total fishers, according to NaFAA.[36] Fish traders engaged in this TURF account for 6.2% of the national total, and their dependents account for about 5.9% of the total number of fish traders dependents in Liberia.[37]

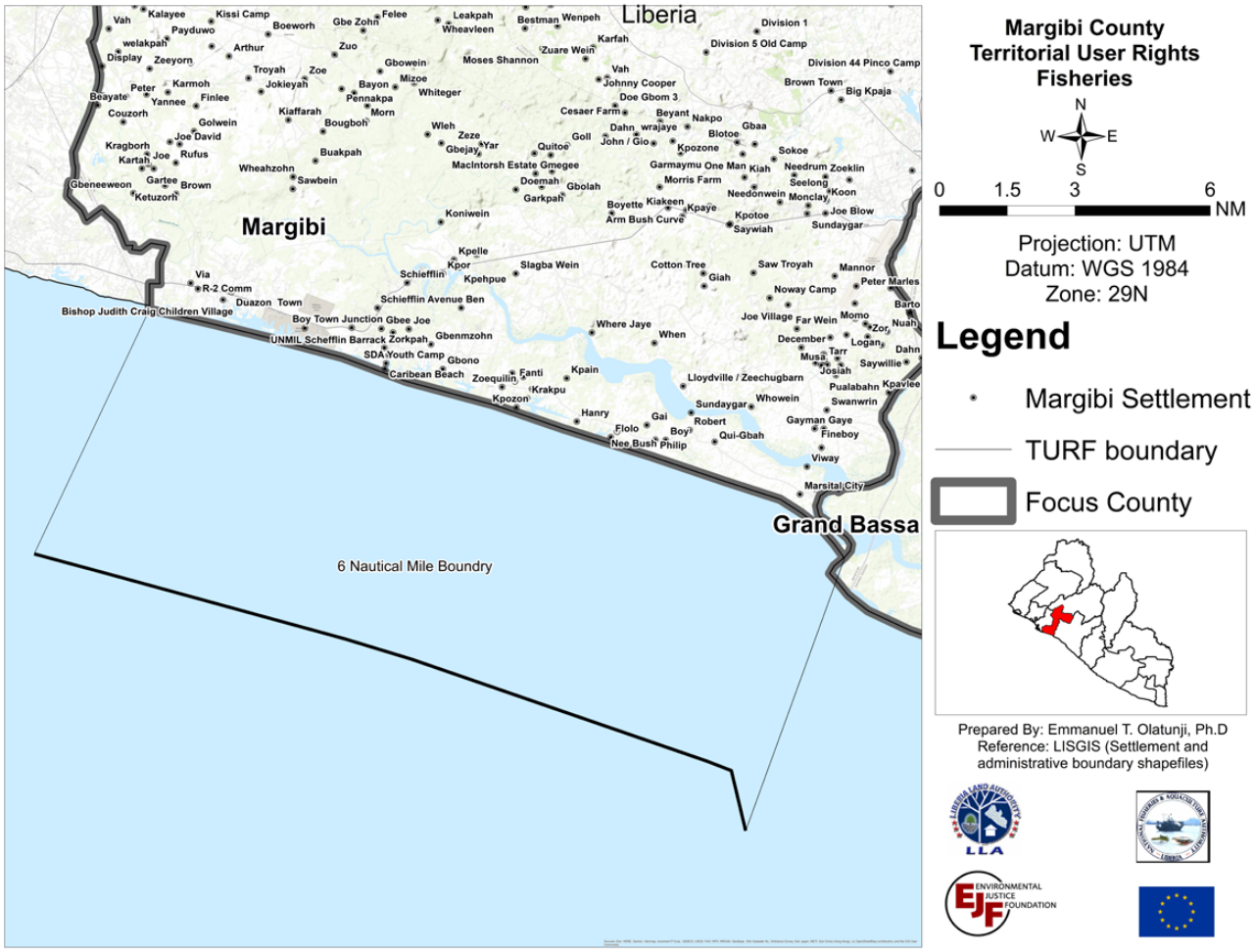


Figure 8: TURF Map of Margibi County

4.2. Challenges and threats to access and use of landing and smoking sites

The challenges and threats to access and use of landing and smoking sites were analysed under two issue categories: environmental and governance/legal. The findings with respect to each of these categories are presented below.

4.2.1. Environmental issues

Habitat degradation

Liberia's mangrove forests, though covering a modest area, play a pivotal role in coastal protection and fisheries. These ecosystems act as natural barriers against coastal erosion and provide essential spawning grounds for marine species, supporting local fisheries and safeguarding fish landing sites. However, the overharvesting of mangrove wood for activities such as fish smoking poses a significant threat to these vital habitats, leading to their decline and compromising the ecological services they offer.[38]

Liberia's mangrove forests have been experiencing significant degradation, posing a critical threat to fish landing sites and associated livelihoods. In Grand Cape Mount County, spatial analysis from 2000 to 2023 revealed a loss of approximately 830.76 hectares (representing about 53.44%) of mangroves in Grand Cape Mount County (Table 2), with degradation occurring near key fish landing sites such as Sembehum, Mambo, Sowee, Falie, Mando, and Robertsport (Fanti Town) (Figure 9). Similarly, in Margibi County, 503.09 hectares (representing about 39.89%) of mangroves in Margibi County were lost during the same period (Table 2), particularly along the Junk River and Marshall City, endangering landing sites like Marshall Fanti Town and Marshall Kru Beach (Figure 9). In Grand Bassa County, 732.43 hectares (representing about 17.49%) of mangrove forest cover was lost between 2000 and 2023 (Table 2), threatening fish landing sites such as Bakon Point, Edina, Nyangba, and Newcess (Figure 10). Grand Kru County experienced a comparatively lower loss of 339 hectares (representing about 12.06%) (Table 2 and Figure 10), but with all fish landing sites situated near mangrove ecosystems. These changes were subsequently confirmed by field observation and during focused group discussions. The cumulative mangrove loss across these counties jeopardises fish landing sites, which depend on the ecological services provided by mangroves, including nutrient cycling and shoreline stabilisation. It also reduces ecological functions, threatens the viability of fish stocks through loss of breeding sites, and impacts socio-economic activities such as fish smoking, which heavily rely on mangrove wood. This highlights the urgent need for strong collaboration between NaFAA, and the Environmental Protection Agency–the principal authority in Liberia for managing the environment[39]–to conserve and restore Liberia's mangrove forests to sustain these vital ecological and economic assets.

Table 2: Spatial analysis of mangrove loss from 2000 to 2023

County	Area of mangrove lost (hectares)	Percentage of total mangrove area in the county lost
Grand Cape Mount	830.76	53.44%
Margibi	503.09	39.89%
Grand Bassa	732.43	17.49%
Grand Kru	339.00	12.06%

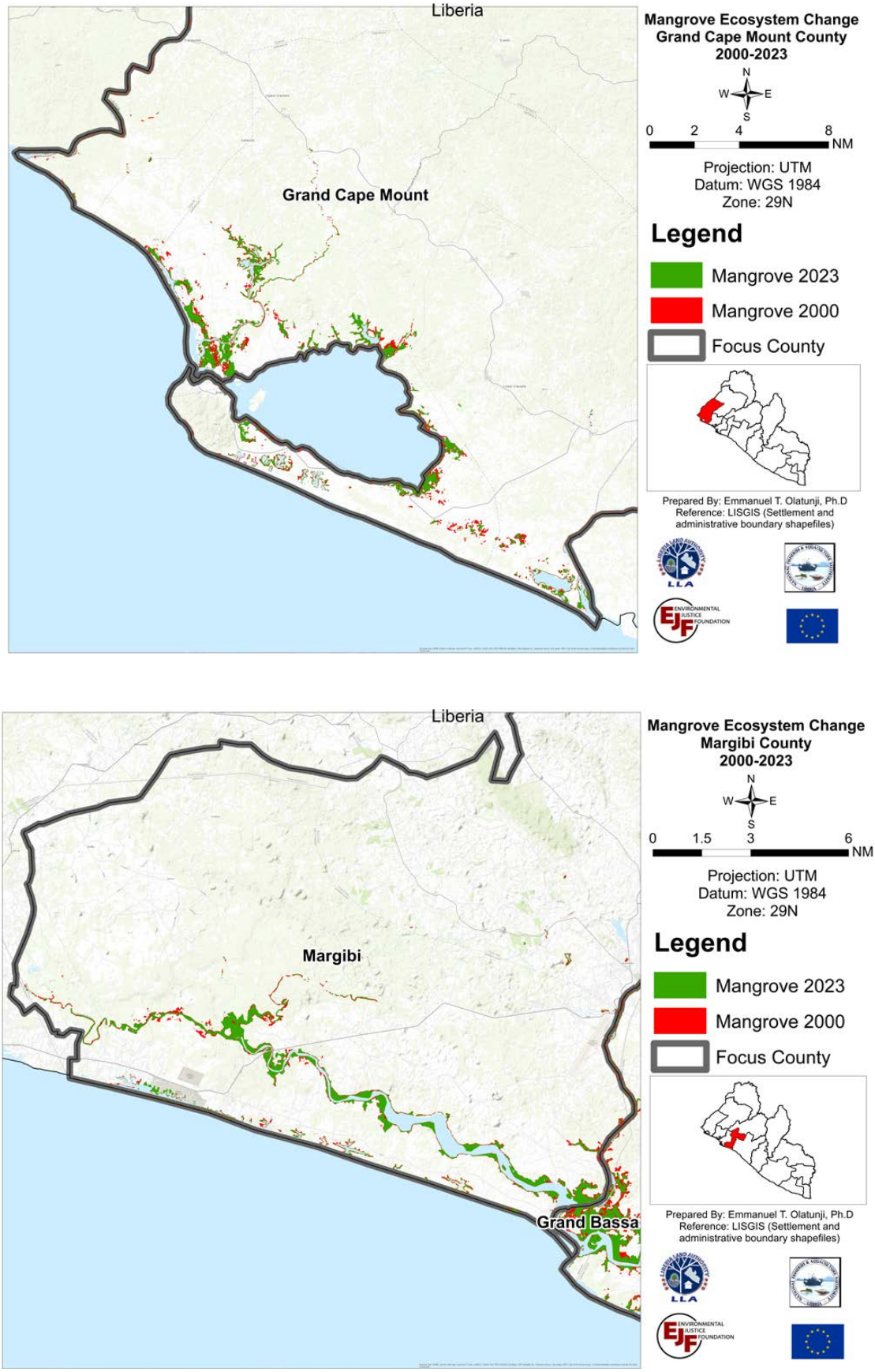
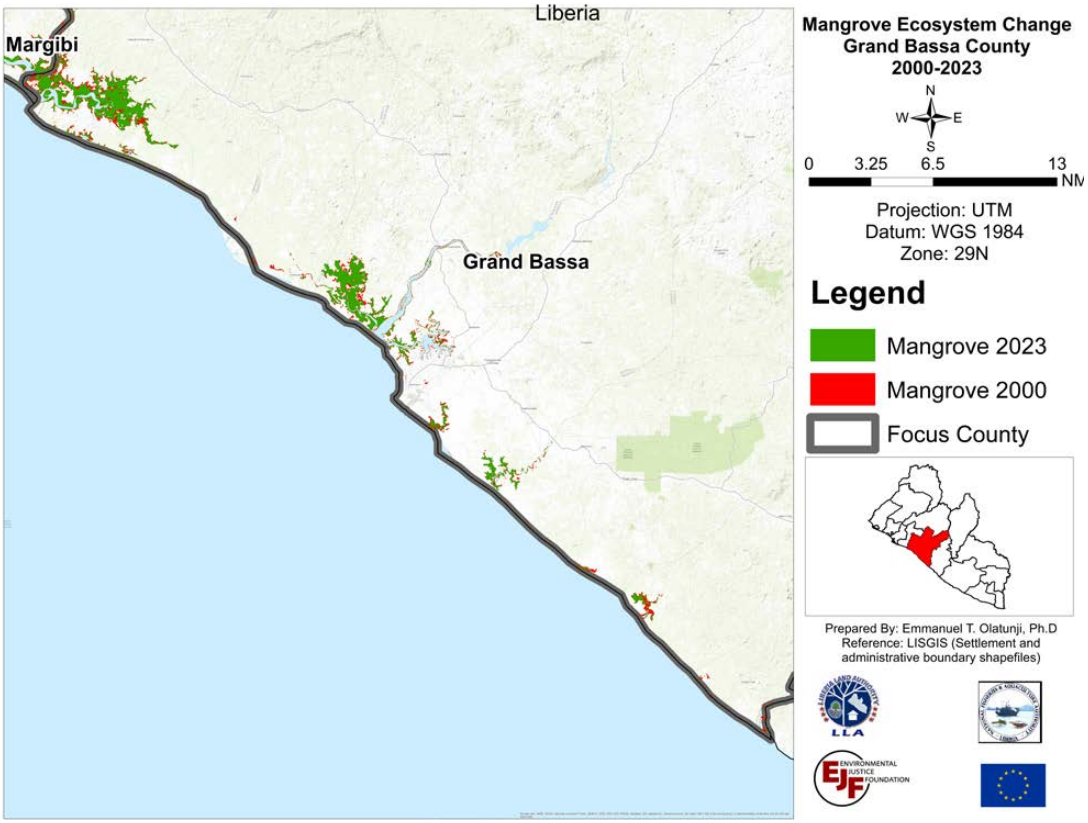


Figure 9: Maps depicting mangrove cover change in Grand Cape Mount and Margibi counties from 2000 to 2023



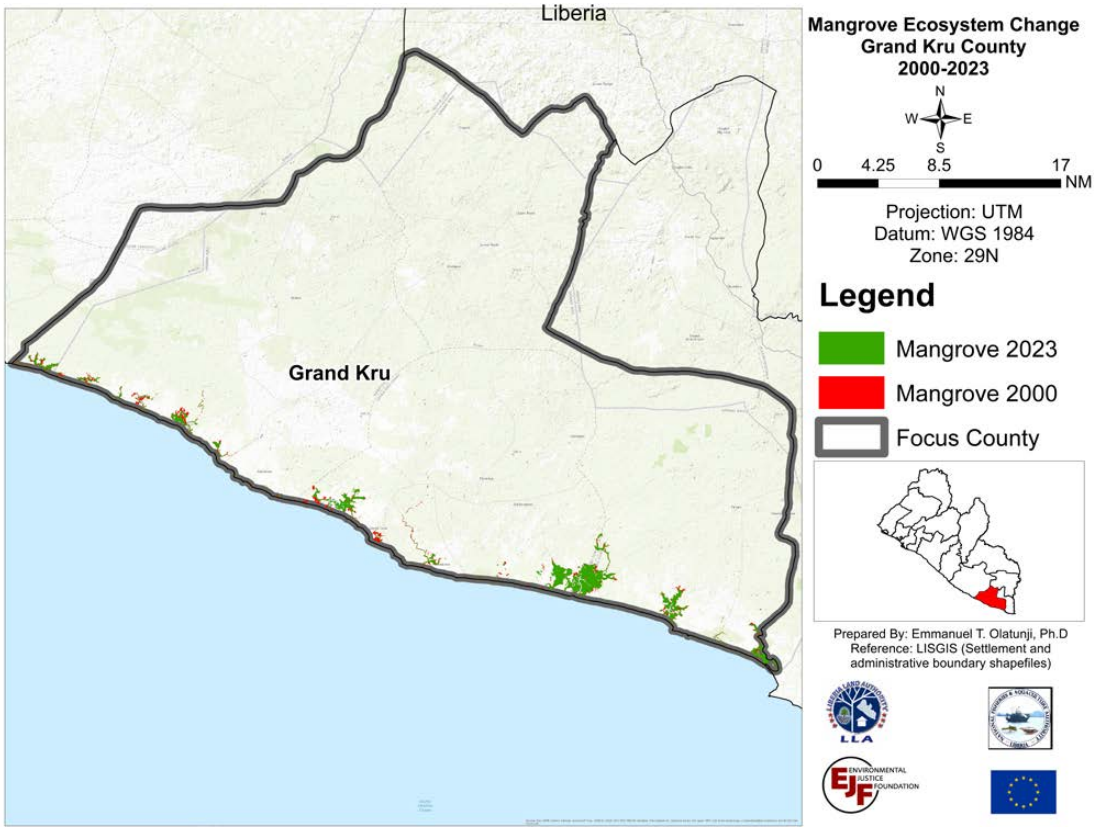


Figure 10: Maps depicting mangrove cover change in Grand Bassa and Grand Kru counties from 2000 to 2023

Coastal erosion and recession

Liberia's coastal regions are increasingly susceptible to erosion due to climate change-induced sea-level rise, intensified storm surges, and human activities like sand mining and deforestation. Awange et al. (2018)[40] analysed land use and land cover changes between 1986 and 2015, revealing significant coastline alterations, particularly during the period following the civil war of 1990–2003, indicating heightened erosion rates (Figure 11). This erosion threatens densely populated coastal areas, leading to frequent flooding and significant economic losses. The World Bank's Climate Change Knowledge Portal[41] highlights that heavily populated coastal zones in Liberia are at risk of increased waterlogging, erosion, and sea-level rise, which could result in substantial damage to infrastructure and agriculture and human casualties.

Observations across various fish landing sites indicate significant occurrences of coastal erosion and inundation, with some areas more affected than others. Field assessments identified notably impacted areas, including Robertsport Kru Beach and fish landing sites in the peri-urban areas of Margibi—such as Boyce Town, Kpakpakon, Ben Town, and Floko's Town—as well as seven landing sites in Buchanan (Figure 10). These observations are supported by focus groups held with the CMA and the key informant from NaFAA. Additionally, a report by Conservation International[42] ascertained that the most vulnerable coastal areas to erosion are in Grand Bassa, Rivercess, Sinoe, and Grand Kru Counties.

The degradation of these coastal areas poses a significant threat to fish landing sites, which are crucial for the livelihoods of local fishing communities. Erosion and inundation can lead to the loss of infrastructure, reduced access to fishing grounds, and diminished fish processing areas, thereby impacting the economic stability and food security of these communities. Addressing coastal erosion is essential to protect these vital resources and support the sustainability of Liberia's fisheries sector.

Figure 11: Ocean eroding the soil under trees along the Port Beach (Left) and Cold Storage Beach (Right) fish landing sites

Mangrove vegetation along the Robertsport road in Grand Cape Mount County.

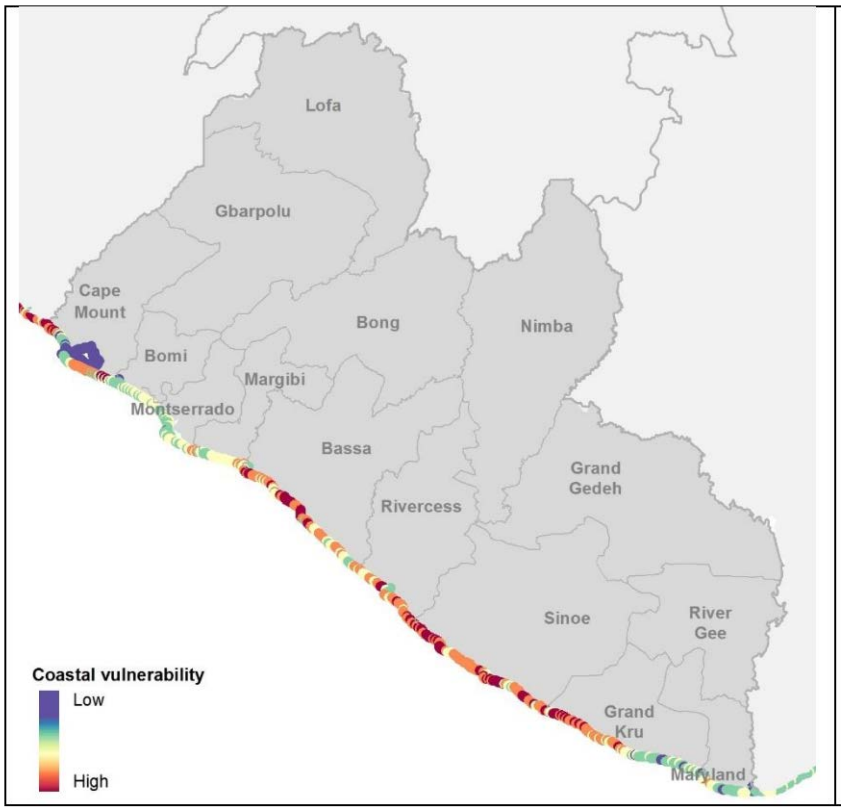


Figure 12: Coastal Vulnerability ("exposure index") to erosion and inundation, where the red areas are more vulnerable, and the blue areas are less vulnerable [43]

4.2.2. Governance and legal issues

Land tenure in Liberia presents a complex interplay of customary traditions, statutory laws, and emerging challenges. Historically, customary land tenure systems have governed land use and ownership, emphasising collective rights and community management. These systems, rooted in Indigenous traditions, have been passed down through generations, shaping social and economic structures.

The introduction of statutory laws during Liberia's establishment brought about significant changes, emphasising individual ownership and legal documentation. This divergence between customary and statutory systems has created a legal framework characterised by ambiguities and potential conflicts. This section examines the threat that land governance issues pose to fish landing sites in the four focus counties.

Tenure insecurity

In the focus counties, tenure insecurity poses a significant threat to fish landing sites, particularly in urban coastal areas such as Robertsport (Kru beach, Fanti town and Grassfield), Marshall (Fanti Town), and Buchanan (Port Beach, Cold Storage Beach etc.).

Here, private entities or families predominantly claim ownership of these sites. Fisherfolk, mainly from the Kru and Fanti ethnic groups, have resided in these areas for decades without formal ownership rights or legal documentation. Though Article 32.2 of the Land Right Act gives them the right to claim the land if it has been used or possessed exclusively or continuously by them for socio-cultural and economic purposes for more than 50 years, they have not formalised their ownership with the LLA, and are not recognised as owners.[44]

This lack of formal recognition of landing site ownership leaves them vulnerable to displacement by private landowners While some community members believe that the government has allocated 100 metres from the sea landward for fisherfolk, there is no clear regulation or law to validate this claim.

The situation is more precarious in Margibi County, particularly at fish landing sites such as Boyce Town, Kpakpakon, Ben Town, Snafu Dock, and Floko's Town. These sites are located directly at the edge of private properties, do not fall under the category of customary land, and are at high risk of eviction due to observed coastline recession landward. Conversely, in rural or peri-urban regions, many fish landing sites are situated on customary land owned collectively by the community. The Land Rights Act of 2018 recognises

Canoe at a fish landing site in Grand Cess, Grand Kru County.

such lands as customary land, even without formal documentation, due to long-term occupancy and historical use under customary practices. This legal recognition provides these communities with a degree of tenure security, as the land is not claimed by any individual or private entity.

The absence of formal documentation to support the claims of fishing communities to the spaces they use remains a critical issue. While traditional systems allow communities to collectively manage and use the land according to established norms, the lack of formal documentation for communal land rights leaves these areas susceptible to external challenges. The LRA aims to address these issues by providing a framework for formalising land ownership, but the process has been slow, leaving many communities without legal protection for their customary lands.

Tenure insecurity significantly threatens fish landing sites in both urban and rural areas of Liberia. The absence of formal ownership rights or clear legal documentation leaves fisherfolk susceptible to displacement, undermining their livelihoods and the sustainability of the fishing industry. Addressing these challenges requires clarification of land ownership laws to local communities so they understand their rights and the land formalisation procedure, acceleration of land formalisation processes, and implementation of measures to protect vulnerable communities from the impacts of coastal erosion.

Conflict and dispute

At the urban fish landing sites, particularly in Robertsport, Buchanan, and Marshall, fish landing sites have become epicentres of conflict involving private landowners, CMAs, and municipal authorities. These disputes are primarily rooted in ambiguous land ownership and exacerbated by environmental degradation due to activities such as beach sand mining.

In Robertsport and Buchanan, private individuals assert ownership over fish landing sites, often threatening fisherfolk with eviction. The fishing communities, primarily composed of Kru and Fanti ethnic groups, have occupied these areas for over two decades, relying on customary tenure systems to claim land rights. However, the absence of formal legal documentation for either party fosters ongoing conflict and heightens tenure insecurity among the fisherfolk.

In Marshall, the situation is further complicated by municipal interventions. The city government has allocated the Fanti Town fish landing site to a private company for development purposes, disregarding the longstanding use of the site by local fishing communities. This top-down allocation, devoid of community consultation, intensifies tensions between municipal authorities and fisherfolk, undermining traditional land use practices.

Robertsport is experiencing both legal and illegal beach sand mining activities. The region's beaches contain rich deposits of heavy minerals, including ilmenite, rutile, zircon, and monazite, with concentrations reaching up to 75% of heavy mineral content in certain areas. A company currently operates under a Class C mining license, with local fisherfolk reporting that these operations adversely affect their fishing activities. The degradation of the coastline due to sand mining not only disrupts marine ecosystems but also diminishes the aesthetic and functional value of the beaches, further threatening the sustainability of local fisheries.

A community chief in Sobobo, Grand Kru County. Community chiefs are responsible for resolving conflicts.

Canoe landing site in Grand Cess, Ground Kru County.

5. Conclusions and recommendations

5.1. Conclusions

The findings from the study on fish landing sites, smoking facilities, and TURFs in Liberia reveal critical challenges and opportunities for sustaining the country's small-scale fishing sector. Fish landing sites serve as vital hubs for economic activity, cultural identity, and food security across the four focus counties—Grand Cape Mount, Margibi, Grand Bassa, and Grand Kru. However, the identified issues linked to environmental degradation and tenure insecurity at these sites pose significant threats to the sector's sustainability. It is worth noting that there are differences in risk characteristics between urban, peri-urban, and rural sites, relating to environmental degradation and tenure insecurity across the sites visited.

One of the most pressing issues is the degradation of critical habitats, particularly mangrove forests, and coastal erosion. Mangrove loss and coastal erosion impact fish landing sites, reducing their ecological function and stability. Coastal erosion, driven by climate change and human activities such as sand mining, has led to the loss of vital infrastructure in areas like Robertsport, Buchanan, and Marshall City. This not only affects fishers' livelihoods but also compromises the food security of communities reliant on the fishing industry.

Tenure insecurity, particularly in urban and peri-urban landing sites, has created conflicts between fisherfolk, private landowners, and municipal authorities. The lack of formal documentation for fishing communities' customary land rights exacerbates their vulnerability to displacement.

In addition, the absence of centralised infrastructure such as fish landing and processing sites limits fishery value chain social groups' abilities to process and supply quality food fish, further marginalising these communities.

To address these challenges, a multipronged approach is required. Investments in decentralised fish processing and storage facilities and improved transportation networks can bridge the gap between urban and rural sites. Strengthening land governance through the formalisation of tenure rights, particularly under the Land Rights Act of 2018, is crucial for ensuring the security of fish landing sites. Lastly, the conservation and restoration of mangrove forests and coastal zones, coupled with community-based management of TURFs, can provide the foundation for sustainable fisheries in Liberia. Through coordinated efforts among local communities, government agencies, and international partners, Liberia can safeguard its fishery sector and the livelihoods of the people who depend on it.

5.2. Recommendations

To address the challenges facing fish landing sites, smoking facilities, and TURFs in Liberia, the following recommendations are proposed to NaFAA, LLA, Environmental Protection Agency (EPA) and development partners:

Infrastructure development and accessibility

- Establish additional smoking facilities and cold storage units in rural and peri-urban areas to enhance preservation and reduce post-harvest losses. Priority areas should include Region Two (around Lake Piso) and Region Three (near Sierra Leone) in Grand Cape Mount County and rural landing sites in Grand Bassa and Margibi counties.
- Provide small-scale improved processing equipment through micro-finance or VSLAs for processors in rural areas where the dispersed location of centralised facilities limits their use.
- Upgrade road infrastructure to connect remote landing sites to urban markets and processing centres, especially in Grand Kru and Grand Cape Mount counties, where poor accessibility hinders economic activities.

Environmental conservation and habitat restoration

- Initiate mangrove restoration programs in areas with significant losses, such as Grand Cape Mount, Margibi, and Grand Bassa counties. Use community-based approaches to plant mangroves, combining restoration with public awareness campaigns about their ecological importance.
- Explore appropriate coastal protection measures, including natural solutions such as vegetative barriers, to safeguard fish landing sites in highly vulnerable zones like Robertsport and Buchanan.
- Strengthen enforcement mechanisms to mitigate sand mining activities, which exacerbates coastal erosion and disrupts ecosystems near critical fish landing sites.

Land tenure security and governance

- Expedite the implementation of the Land Rights Act (2018) to formally document customary land use for fish landing sites. This will secure the rights of communities in areas such as Robertsport, Marshall City, and Buchanan, reducing the risk of displacement.
- Engage local communities, private landowners, and municipal authorities in collaborative planning and dispute resolution to address land ownership conflicts in urban coastal areas.
- Provide capacity-building programs and resources to empower CMAs to manage TURFs effectively and oversee sustainable practices at fish landing sites.

Capacity building and livelihood diversification

- Conduct workshops on sustainable fishing techniques, modern preservation methods (e.g., FTT), and cooperative resource management to enhance long-term productivity and environmental stewardship.
- Introduce complementary income-generating activities, such as eco-tourism and alternative or supplementary livelihood opportunities[45] to reduce pressure on overexploited fish populations and enhance community resilience.
- Support local fishmongers and processors by investing in market infrastructure, branding initiatives, community banking schemes such as Village Savings and Loans Associations[46] and formal credit facilities to strengthen the fisheries sector as an integrated value chain.

Policy and institutional support

- Work with NaFAA and international partners to finalise and gazette TURFs, ensuring equitable access and management of marine resources for artisanal fishers.
- Develop a comprehensive policy framework integrating fisheries management, climate adaptation, and coastal zone protection to address overlapping challenges in Liberia's coastal regions.
- Deploy climate and disaster risk monitoring systems to provide communities with timely information on coastal erosion, storms, and flooding, minimising the impacts on fish landing sites and livelihoods.

Annexes

Annex 1: Photographic evidence of field engagements

Umaco fish landing site

Focus group discussion with Marshall CMA

Boyce town landing site

Robertsport (Kru town landing site)

Mangrove stockpile in Marshall City

FTT Facility in Marshall

Annex 2: Open ended questionnaire

1. Coastal erosion rate

- How would you describe the current rate of coastal erosion at the landing site?
- How far has the shoreline receded in the past 5 years?

2. Habitat degradation

- Has there been any degradation of local habitats (mangroves, coral reefs, wetlands) that could affect the landing site?
- What are the main causes of habitat degradation? (e.g., deforestation, overfishing, pollution)

3. Legal ownership status

- Who owns the land where the landing site is located?
- Is there any formal documentation proving the ownership of the land?
- If yes, what kind of documents are available?

4. Documentation of ownership

- Is the ownership of the landing site formally registered with any authority?
- If registered, what is the date of registration and the responsible authority?
- Are there any discrepancies in the ownership records or disputes over ownership?

5. Security of land tenure

- How secure is the land tenure for the current owners or users of the landing site?
- Have there been any recent or ongoing disputes over land ownership or tenure?
- Is there any risk of eviction or relocation of the current users of the landing site?

6. Conflict or disputes

- Are there any ongoing conflicts or disputes over the ownership or use of the landing site?
- If yes, what are the main causes of these disputes?
- Have there been any efforts to resolve these disputes, either through the legal system or through community dialogue?

Annex 3: Coordinates of the key fish landing sites in all four counties

Names of Site	N	W
Grand Cape Mount		
Robertsport (Fanti town)	6°45'32.5"	11°21'13.4"
Robertsport (Kru beach)	6°45'29.8"	11°22'17.5"
Mando	6°41'35"	11°11'17"
Falie	6°40'42"	11°12'26"
Bumie	N/A	N/A
Bendu	6°45'41"	11°12'50"
Bomojah	6°37'22"	11°05'01"
Formbah	6°38'32"	11°05'03"
Sowee	6°50'31"	11°23'35"
Tailor Kru town	6°54'20"	11°28'01"
Tailor	6°54'24"	11°28'05"
Tallah	6°46'14"	11°18'07"
Torsor	6°44'35"	11°20'11"
Kebeh	6°48'27"	11°18'49"
Saywelor	6°47'19"	11°20'58"
Kpallah	6°47'01"	11°15'54"
Weima	6°45'47"	11°19'10"
Latia	6°41'42"	11°15'56"
Robertsport (Grassfield)	6°45'18"	11°21'45"
Sembehum	6°42'10"	11°19'55"
Grand Bassa		
Bassa Point	6°07'03"	10°22'22"
Blewein	5°48'48"	10°00'25"
Nyangba	5°47'21"	9°58'27"
Nimely town	5°46'32"	9°57'23"
New Cess	5°46'01"	9°57'00"
Kotobli beach	5°43'21"	9°54'04"
Little Kola	5°39'55	9°50'12"
Grand Kola	5°36'51"	9°47'10"
Edina	5°55'15"	10°04'38"
Upper Buchanan	5°54'50"	10°03'53"
Korkorwein beach	38°34'27"	65°04'29"
Custom beach	38°34'07"	64°97'30"
Umaco	38°33'92"	64°95'50"
Big Fanti town beach	38°33'55"	64°94'07"
Little Bassa (Fanti beach)	6°01'56"	10°13'00"
Little Bassa (Kru Beach)	6°02'00"	10°13'02"
Cold Storage Beach	38°32'99"	64°91'91"
Bardeh Wreh Beach	5°52'25"	10°03'13"
Dorr Beach	5°47'22"	9°58'27"
Port Beach	38°33'77"	64°94'81"
Sarwein	5°49'57"	10°01'09"
Sekepoh	5°41'06"	9°50'58"
Pineapple Beach	6°02'04"	10°13'05"
Margibi		
Marshall (Fanti landing)	6°08'32.9"	10°23'00.3"
Marshall (Kru beach)	6°08'14.0"	10°23'00.9"
Kpakpakon	6°09'50.3"	10°26'46.3"
Floko's town beach	6°10'04.2"	10°27'27.9"
Ben's Town	6°11'00.5"	10°30'20.6"
Boyce town	6°11'39.5"	10°32'32.9"
Snafu Dock	6°09'44"	10°22'49"
Grand Kru County		
Grandcess	4°33'54"	8°13'10"
Togbaklee	4°37'41"	8°19'11"
Wedabo Beach	4°32'16"	8°03'59"
Sobobo	4°36'39"	8°17'46"
Sasstown	4°39'59"	8°25'50"
Dio	4°45'50"	8°34'58"
Funko Beach	4°36' 36.15"	8° 17' 40.90"
Solokpor	4° 37' 4.25"	8° 18' 19.70"
Bertu	4°42'22"	8°28'37"
Po-River Beach	4°3'27"	8°00'04"
Garraway	4°29'56"	7°56'10"
Pungaloken Beach	4° 29' 52.13"	7° 55' 25.98"
Nifu Beach	4° 30' 14.70"	8° 32' 13.83"
Karh	4° 47' 52.91"	8° 39' 53.47"
Sobo	4° 46' 57.46"	8° 37' 22.18"
Wessepo	4° 46' 8.42"	8° 35' 36.54"
Dioh	4° 45' 56.74"	8° 34' 57.33"
Butra	4° 45' 32.38"	8° 34' 2.38"
Jlatekpor Beach	4° 40' 15.76"	8° 25' 36.45"
Newcess	4°32'15"	8°03'54"
Chinaklee	4°31'31"	8°00'17"
Kafee Beach	4°38'58"	8°23'23"
Nemien	4°39'55"	8°25'50"

Annex 4: Coordinates of the fish smoking sites in all four counties

Names of Site	N	W
Grand Cape Mount		
Robertsport (FTT)	6°45'29.7"	11°21'14.3"
Grand Bassa		
Buchanan FTT	5°52'22"	10°03'11"
Margibi		
Marshall (FTT completed)	6°08'28.6"	10°23'02.7"
Marshall FTT under construction)	6°08'27.7"	10°23'02.5"
Grand Kru County		
Sasstown FTT	4°40'03"	8°25'48"

Annex 5: Coordinates of the TURF boundaries

Grand Cape Mount TURF_Boundary	
x_coordinate	y_coordinate
-11.5556	6.84501
-11.5467	6.83956
-11.5392	6.83493
-11.5203	6.82359
-11.5102	6.81224
-11.4989	6.79712
-11.4812	6.79334
-11.4757	6.78529
-11.4649	6.7694
-11.4649	6.75452
-11.4649	6.73915
-11.4685	6.72546
-11.4712	6.71521
-11.4699	6.69253
-11.4535	6.68497
-11.4451	6.67486
-11.4351	6.66473
-11.4195	6.65094
-11.4054	6.63916
-11.3928	6.62904
-11.3814	6.62048
-11.3716	6.61314
-11.355	6.60677
-11.3388	6.60053
-11.3241	6.59457
-11.3071	6.58769
-11.2922	6.58163
-11.2774	6.57563
-11.2629	6.56976
-11.2456	6.56273
-11.2304	6.55579
-11.2151	6.54874
-11.2025	6.54299
-11.1851	6.535
-11.1682	6.52893
-11.1501	6.52241
-11.1358	6.51724
-11.1221	6.51232
-11.1028	6.50481
-11.093	6.501

Grand Kru county_TURF Boundary	
x_coordina	y_coordnate
-8.73679	4.71263
-8.71581	4.70744
-8.70189	4.7016
-8.68737	4.69849
-8.66622	4.69274
-8.65494	4.68642
-8.63295	4.67826
-8.61683	4.67019
-8.59983	4.66446
-8.57792	4.65349
-8.55991	4.64374
-8.54083	4.63402
-8.52127	4.61963
-8.50891	4.60468
-8.48917	4.59092
-8.46956	4.57735
-8.45656	4.5683
-8.43534	4.56303
-8.42044	4.55867
-8.39505	4.54844
-8.38104	4.54566
-8.35315	4.5392
-8.33612	4.52473
-8.31977	4.50536
-8.29358	4.49114
-8.27487	4.47621
-8.25105	4.47487
-8.22655	4.46794
-8.21491	4.46072
-8.19359	4.45895
-8.17428	4.45659
-8.17428	4.45659
-8.15146	4.45379
-8.15146	4.45379
-8.13474	4.45174
-8.09902	4.44309
-8.07825	4.43722
-8.04126	4.4298
-8.02408	4.42351
-7.99952	4.4145
-7.97217	4.40797
-7.9564	4.39793
-7.93555	4.39297
-7.90538	4.3866
-7.87453	4.37461
-7.85515	4.35996
-7.85902	4.36129

Grand Bassa County	
x_coordina	y_coordinate
-10.4085	6.02357
-10.3874	6.0163
-10.3639	6.00372
-10.3311	5.98613
-10.3075	5.97557
-10.2799	5.96325
-10.256	5.94362
-10.2375	5.91129
-10.227	5.89355
-10.1991	5.88917
-10.1685	5.8705
-10.1489	5.85237
-10.1286	5.83691
-10.1005	5.81609
-10.0831	5.79705
-10.0792	5.75934
-10.0506	5.73397
-10.0356	5.71434
-10.012	5.6939
-9.99671	5.68067
-9.95484	5.64967
-9.92588	5.63011
-9.90405	5.61213
-9.88033	5.58803
-9.86378	5.57122
-9.83175	5.53388
-9.79122	5.49964
-9.79122	5.49964
-10.396	6.01865
-10.3761	6.01026
-10.3516	5.99712
-10.3421	5.99203
-10.3181	5.98033
-10.2951	5.97004
-10.267	5.95268
-10.2444	5.92858
-10.2375	5.91129
-10.214	5.89198
-10.1838	5.88248
-10.1604	5.86303
-10.1366	5.84298
-10.1141	5.82782
-10.0908	5.80548
-10.0813	5.77938
-10.0641	5.74589
-10.0393	5.7203
-10.0243	5.70455
-9.98052	5.66868
-9.96827	5.65961
-9.94313	5.64176
-9.91566	5.62169
-9.89285	5.60075
-9.87143	5.579
-9.85439	5.56027
-9.84066	5.54427
-9.82088	5.52121
-9.80595	5.51036
-9.80627	5.50992

Margibi	
x_coordinate	y_coordinate
-10.6713	6.12588
-10.663	6.12364
-10.6558	6.1217
-10.6473	6.1194
-10.639	6.1171
-10.6295	6.1145
-10.6193	6.11171
-10.611	6.10943
-10.6017	6.10688
-10.5917	6.10412
-10.5807	6.10111
-10.572	6.09872
-10.5564	6.09444
-10.546	6.09127
-10.5318	6.08693
-10.5202	6.08295
-10.51	6.07941
-10.5	6.07596
-10.4893	6.07227
-10.4769	6.06799
-10.466	6.06424
-10.4564	6.06093
-10.4456	6.05718
-10.4353	6.05363
-10.423	6.04938
-10.4138	6.0458
-10.4138	6.0458
-10.412	6.03547
-10.4085	6.02357

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