



Fisheries Management in Data Deficient Industrial Fisheries of Sierra Leone: Input Controls and Ecological Risk Assessment



Tenure and User Rights in Fisheries 2018: Achieving Sustainable Development Goals by 2030
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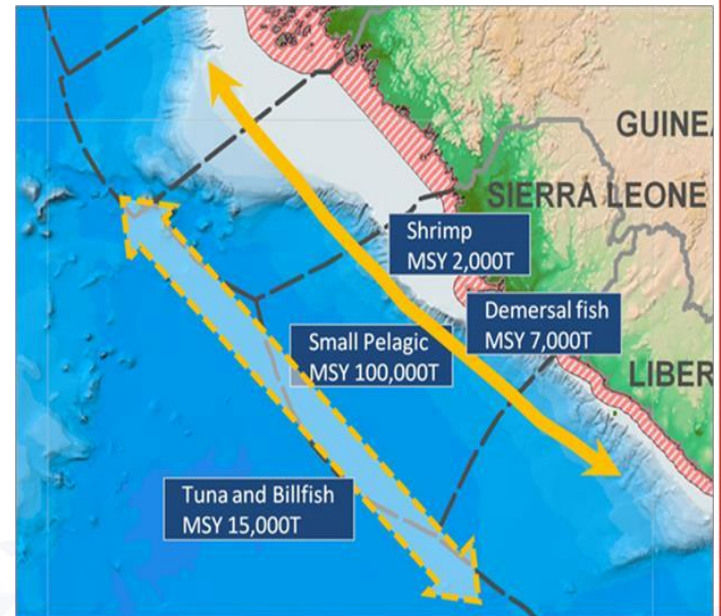
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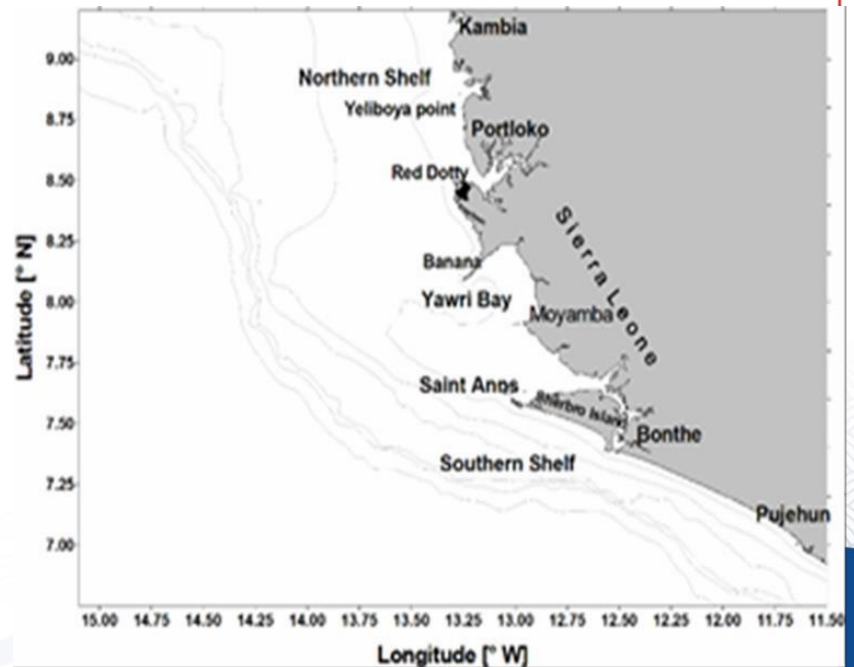
Introduction

- ✓ Sierra Leone's 300,000 Km² continental shelf comprises of estuaries, mangroves and upwelling areas that support large quantities of fish resources.
- ✓ The small pelagic, tuna, bill fish, shrimps and demersal fish biomass is put around 124,000 to 600,000mt, and potential yields around 150,000 mt.
- ✓ These ecosystems also support other rich biodiversity of migratory birds, threatened manatees, seals, monks, marine mammals, sea turtles, porpoises, sawfish and crocodiles.



Introduction.....

- ✓ Sierra Leone Fisheries is favored by the Guinea Current and the canary Current large Marine Ecosystems (GCLME and CCLME)
- ✓ Fishing grounds are located in major rivers and estuarine systems, creeks, lagoons and bays
- ✓ These river systems consist of rich mangrove forests, seagrass bed ecosystems and intertidal flats, used as breeding grounds for about 188 species of finfish, shellfish and crustaceans including shrimps and lobsters.



Economic Contributions and Social Implications of the Fishery

- ✓ The industrial fishery contributes about 10% to the gross domestic products (GDP) of Sierra Leone and accounts for over 90% of sector revenue earnings.
- ✓ Annual revenues of about US\$6 million is generated from the industrial fishing operations and related services
- ✓ Fish and shrimps caught are usually wrapped in cartons, blast frozen onboard fishing vessels and transhipped for onshore storage and export via fish carriers or containers. Refrigerated trucks are used to distribute fishery products to market outlets in the country, including in the provinces

Economic Contributions and Social Implications....

- ✓ There is battering of fish where catches of mainly the Bobo Croakers (Gwangwa) (*Pseudotolithus elongatus*) caught by artisanal fishermen are sold to industrial fishing companies in exchange of fishing gears.
- ✓ The Asian fishing companies pre-finance artisanal fishermen to purchase fishing boats and nets as incentive for the sale of Croakers to these companies
- ✓ This barter trade has increased the demand for Croaker fish stocks, attracting the establishment of several fish processing factories in fishing communities and driving overexploitation
- ✓ About 5000 fishermen are currently involved in industrial fishing operations and 100% of the fishermen are male. An additional 250,000 people including women are involved in post-industrial fishing operations in the country, mainly as retailers and fish processors. Women also serve as Local agents for foreign fishing vessel owners and companies

Economic contribution and social implications.....

- ✓ The croaker fishery products are considered valuable in Asian markets as their consumption is assumed to increase longevity of human lives
- ✓ Major Asian market destinations include China and Korea.
- ✓ Sierra Leone is currently not listed among countries allowed to export fish and fishery products to the EU markets due to the inability of the country to meet minimum EU hygiene and sanitary requirements.
- ✓ However, fish caught and processed by foreign fishing vessels including tuna vessels listed among compliance vessels are exported to EU markets
- ✓ There are also indications where illegal fish caught in Sierra Leone waters ends up in EU markets under the so called port of convenience window

Management of the Fishery

- ✓ **The Ministry of Fisheries and Marine Resources (MFMR) is the Government authority in charge of the management of the industrial fisheries of Sierra Leone,**
- ✓ **Management is mainly through the sale of fishing rights through licenses, royalties and associated levies.**
- ✓ **There are input controls on fishing gear types and mesh sizes based on the 1994 fisheries Management and development Act and the fisheries regulations of 2010**

Management of the Fishery

- ✓ 60mm and 45mm cod end mesh size is prescribed for fish and shrimp trawlers respectively
- ✓ This is a condition for fishing license
- ✓ Further restrictions require that the mesh sizes on the sides of trawl nets must not be below those at the cod end



Management Input Controls...

Conservation measures imposed on fishing rights under the current license regime include:

- ✓ No fishing without fisheries observers on board or without a Logbook for catch recording. Observers must be allowed for data collection and monitoring of fishing operations
- ✓ Observers must be allowed to collect samples from catches of vessels anywhere in the fishery waters for Scientific purposes
- ✓ Vessel operators must pay travel costs and salaries for Authorized Fisheries Observers while Government must arrange insurance for Observers and other authorized officers

Management Input Controls...

- ✓ Catching of marine mammals, young and gravid crustaceans including lobsters during fishing is prohibited. Markings (Call signs) must be placed and clearly visible on both sides of the vessel
- ✓ Illegal catches on board and illegal fishing gears can be confiscated for violations; VMS transponders and monitoring of vessels compulsory requirement
- ✓ Industrial trawlers and semi-industrial trawlers are prohibited from fishing in the IEZ
- ✓ No destruction of artisanal fishing gears in the IEZ by industrial vessels. No use of drift nets, explosives, poisons for fishing

Management input Controls

- ✓ Cash or in kind compensation required for destruction of artisanal fishing gears, in the IEZ and charges for loss fishing time applies
- ✓ No stowage of illegal nets onboard trawl vessels or other fishing Boats
- ✓ The use of VMS transponders and payment for air time is a requirement for licenses. Other electronic monitoring systems for vessels e.g. AIS applies

Management of the Fishery-Russia Bilateral Agreement

- ✓ The joint fishery enforcement arrangement between The Ministry and the SLNavy was weak
- ✓ The surveillance system under the bilateral arrangement was associated with the challenges of understanding and clearly defining maritime enforcement collaboration and Departmental conflicts of interest.

Management of the Fishery- Joint Venture with UK Private Foreign Company-MPS Failed

✓ In the quest for more revenues, Government amended the fisheries Act in 1990 (The fisheries amendment Act of 1990) to allow licensing of industrial vessels and delivery of MCS services by a private enterprise- The UK marine Protection Services (MPS)

✓ In 1991, an agreement was brokered between the MPS and the Sierra Leone Government under a Joint Venture Company- The maritime protection service (Sierra Leone Limited) (MPSSL)

- Government owned 51% shares and 49% shares went to MPS under the MPSSL venture.

MPSSL Joint Venture Failure Roadmap

- ✓ The MPS provided the initial costs for setting up the joint venture company and played a very key role in the decision making of the MPSSL
- ✓ The 51% share allocated to Government made the MPSSL a Government parastatal and so could be supervised by the then Ministry of State Enterprises of Sierra Leone
- ✓ The made the control by the Department of Fisheries (DOF) over the MPSSL weak.
- ✓ As a seeming Government parastatal, the interference of top Government functionaries affected revenue concentration to sustain Operations. The Company collapsed during the second year of operations without achieving the objective of increasing revenues from the fishery

Management of the Fishery- Joint patrols

- ✓ A new form of co-management arrangement now exists between the MFMR and other key institutions under a Joint Maritime Committee (JMC) under an MOU with key maritime and state institutions, including the Navy, ONS, SLMA, NRA, labor Ministry, MOHS etc.
- ✓ Some regional patrols under SRFChelped in the late 1990s and 2000s. Some success but IUU remained a menace
- ✓ Surveillance and maritime security is jointly undertaken under the JMC is helping inadequate
- ✓ Regional funding through WARFP-World Bank assisted provides funding- but still inadequate to curb IUU
- ✓ US Coastguards and NGO surveillance efforts such as Greenpeace is helping But IUU still persists with IEZ incursions by trawlers

Right Based Approach: Allocation and Characteristics

- ✓ **Fishing right allocation through licenses is regulated by law and licenses are issued for specific period of time, usually for three months, 6 months and one-year**
Maximum
- ✓ Allocation of licenses is made to local and foreign fishing vessels to operate under fishing companies owned by individual Sierra Leoneans serving as Agents.
- ✓ Sierra Leoneans serve as Agents to represent the interest of foreign partners who own fishing vessels or are associated with foreign fishing companies overseas.
- ✓ Over 90% of fishing rights is allocated to foreign vessels and Companies. Sierra Leoneans do not own fishing vessels

Right Based Approach- Allocation and Characteristics

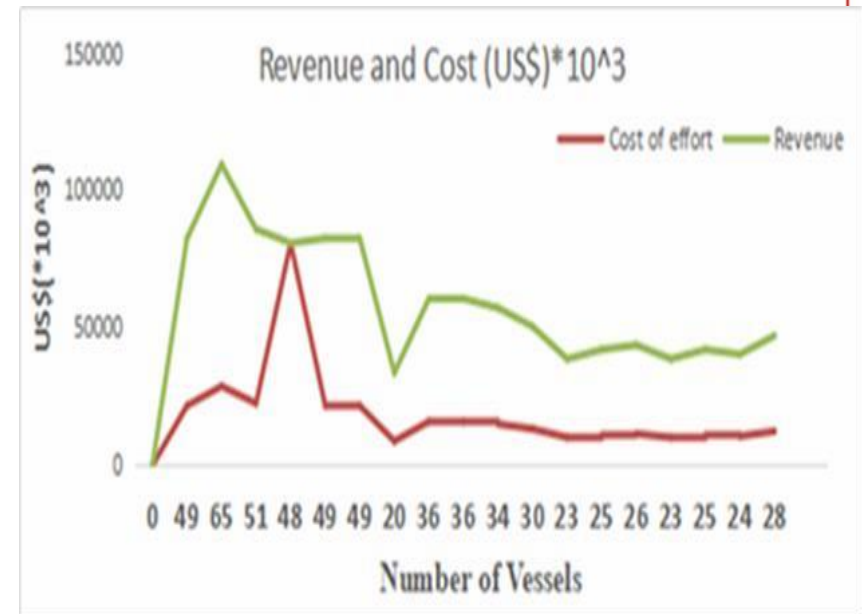
- ✓ Introducing territorial use rights in fisheries (TURFs) in the artisanal fisheries through co-managed marine protected areas is contributing towards sustaining the Resources in the IEZ
- ✓ Community regulations through co-management associations (CMAS) is blowing whistle to reduce use of illegal nets and trawler incursions into the IEZ but still not adequate. Functions of CMAs not enhanced
- ✓ The new fisheries and aquaculture bill of 2015 provides for implementation of Quota management system based on TACs as a new approach
- ✓ New bill not yet enacted and Quota system not yet implemented but preliminary studies done

Sustainable Use & Economic Viability

✓ Over 100 fishing trawlers currently operate in the industrial fisheries of Sierra Leone without quota management restrictions for catches.

✓ Revenues at maximum economic yield (REVMEY) can be maximized at levels of 1.5 (slightly over 60%) greater than the sustainable yield revenues for shrimps.

✓ A precautionary fleet limitation of 20 fishing vessels for shrimp fishery is proposed under a dual scheme of demersal fish and shrimp licenses, with fishing restricted to night hours of 6pm to 6am to minimize bycatch.



Qualitative Risk Screening Matrix

Likelihood		Consequence Level			
		Minor	Moderate	Major	Extreme
		1	2	3	4
Remote	1	1	2	3	4
Unlikely	2	2	4	6	8
Possible	3	3	6	9	12
Likely	4	4	8	12	16

The consequence levels were scored using the following criteria

1 Minor, meaning that the impact of activities on fish stocks is minimal and recovery of the fish stocks can take place within months after applying management measures

2 Moderate, meaning that the fish stock is fished near the MSY and recovery can take between months to a maximum of one year, after applying management measures

3 Major, meaning that the fish stock has been fished below the MSY and it would require years for recover to take place. Robust management measures are needed

4 Extreme, meaning that recruitment overfishing has occurred, where the ecosystem functions have been altered significantly. The fish stock (s) will require decades to recover

The following likelihoods criteria were used for the risk screening:

1 Remote, meaning that no one ever heard of the consequence of the risk. There is < 2% chance of the consequence happening within 5 years.

2 Unlikely, means consequent is not expected to occur. Chance of the consequence is 2-10%

3 Possible, means that consequence may occur, but not likely within 5 Years

4 Likely, means that the consequence level will occur within 5 years of the management plan

The screening matrix scores for major and extreme situations lies within 12 to 16 and moderate screening scores are between 6 to 8.

Sustainable Use & Economic Viability: ERS for stocks

Risk Issues	L	C	ERS Score	Risk Level	Comments
Ecosystem structure Problem	2	4	8	High	Allowable catches must be set for the stocks
Environmental Pollution	2	3	6	Medium	Although pollution is not currently an alarming problem, the bloom of sea weed (brown algae) that is washed on the beaches during the rainy season calls for research to know the consequences of the bloom.
Mesh size and IEZ Incursion problem	2	5	10	High	Current MCS efforts have not kept trawlers from the IEZ. Regular surveillance patrols are needed to combat Trawler Incursions into IEZ. Communities must be empowered for coordinated fisheries patrols
Low Value Addition	2	4	8	High	Additional effort needed to construct fish harbor complex, improve standards of fish testing laboratories and conduct collaborative inspections of fishing vessels. Collaboration with fishing companies required
Weak Compliance and Benefit Sharing	2	4	8	High	Fishing right holders must improve compliance. Vessel Captains must be trained to understand the provisions of the Fisheries Act.
Data Collection Not Regular	2	4	8	High	Data collection must be improved. Quota Management Authority should be created to finance data collection and set up TACs for target

Weak MCS	2	4	8	High	Regular patrols required to achieve compliance.
Low Revenues to Govt.	3	3	9	High	Fishing right regime must be replaced by quota systems so that fishing rights are allocated based on allowable catches. This will increase revenues
Use Rights ineffective	3	3	9	High	Fishing right allocation must be based on TACs
Weak capacity	2	2	4	Medium	Additional human resource capacity needed. CMAs must be trained to collect catch and effort data
Low benefit Sharing	2	4	8	High	The fisheries development fund should be established to set aside percentages of revenues to be used to develop the fishery including support to artisanal sector
Climate Change Effects	2	3	6	High	The indications of future impacts is felt. The recent flooding and landslide event calls for climate change adaptation and mitigation initiatives.

ERS Screening for pelagic Clupeids, mainly Sardinella and Bonga Shad

	L	C	ERS Score	Risk Level	Key Measures
Ecosystem structure Problem	3	4	12	High	The problem is very serious as the main species of small pelagic Clupeids including Sardinella are overexploited
Environmental Pollution	2	3	6	Medium	Coordinated pollution regulation among key MDAs is required. Dumping of plastic at sea must be prohibited
Mesh size and IEZ Incursion	2	4	8	High	Regular surveillance patrols needed to meet objectives
Low Value Addition	2	4	8	High	This is a serious problem. Collaborative effort required by stakeholders to improve official controls
Weak Compliance	2	4	8	High	Existing effort must be improved through regular patrols in order to meet management objectives

Data Collection Not Regular	2	4	8		Data collection system must be improved through increased funding for comprehensive data collection. Annual surveys must be conducted
Weak MCS	2	4	8	High	Regular surveillance patrol is required. Fishing communities must be empowered for community surveillance
Low Revenues to Govt.	3	3	9	High	Rights must be allocated based on allowable catches
Use Rights ineffective	3	3	9	High	Use rights must be improved with quota management system
Weak capacity	2	2	4	High	Human capacity must be built and CMAs must be trained in surveillance patrols
Low benefit Sharing	2	4	8	High	The fisheries development fund must be operational
Climate Change Effects	2	3	6	High	Important and signs of future effects is felt. Climate adaptation initiatives must continue and be improved

Social Equality, Challenges & Future Sustainability

- ✓ A motion has been raised by Fishermen Unions that Government should leverage the ownership of vessels at the advantage of indigenous Sierra Leoneans, and to share revenues collected from industrial fishing right allocations with the artisanal fishing communities.
- ✓ The Key challenges impeding equity and future sustainability of the industrial fishery is the absence of a quota management system to allocate ownership of the stock to Sierra Leoneans. IUU, pollution, absence of fish harbor, EU hygiene limitations, Pollution and climate effects are risk areas to address
- ✓ Finally, a consideration for a multilateral fishing access agreement between countries under a TAC regime will help towards the control of fishing capacity, and the regulation of fishing vessels by flag states

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