Small-Pelagics

Resource, Exploitation and Fisheries

BY

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GEOGRAPHICAL LOCATION

- Sierra Leone is located in the southwestern sector of the great bulge of West Africa and lies at the southern extension of the Northwest aerobic upwelling zone.
- Geographically, it lies between 7^{o}N and 10^{o}N and is bordered on the North and East by the Republic of Guinea and on the South by Liberia (Figure 1).
- The continental shelf is about 120 km wide in the North at Yeliboya and tapers to only 13 km wide at Sulima in the South (Figure 2).
- Its coastline is about 560 km and the shelf covers an area of about 25,000 km^{2}. Extensive mangrove swamps, a number of estuaries and rivers, characterize the coastline.
- The southern shelf from Sherbro to Liberia has limited fish resources and is influenced by the Equatorial counter current.
- The northern shelf towards Guinea comprises of extensive mangrove swamps and estuaries.

CLIMATE AND FISHERIES

- The Climate is hot (about 30^{o}C) and humid (80-90%) and characterised by two distinct seasons: dry seasons (November-April) and the rainy season (May-October).
- The heaviest rainfall occurs in July, August and September. In general, rainfall tends to decrease inland and eastwards with altitude and with the intensity of the relief form (Fisheries of Sierra Leone, 1994).
- The average annual rainfall is about 311 cm. Strong south westerly winds predominate in the summer and light north or north-easterly winds during the dry season
- Estuarine salinity is reduced considerably in the rainy season. The high temperatures, high humidity and heavy rainfall affect the oceanographic conditions and the fisheries of the country.

Hydrographic regime

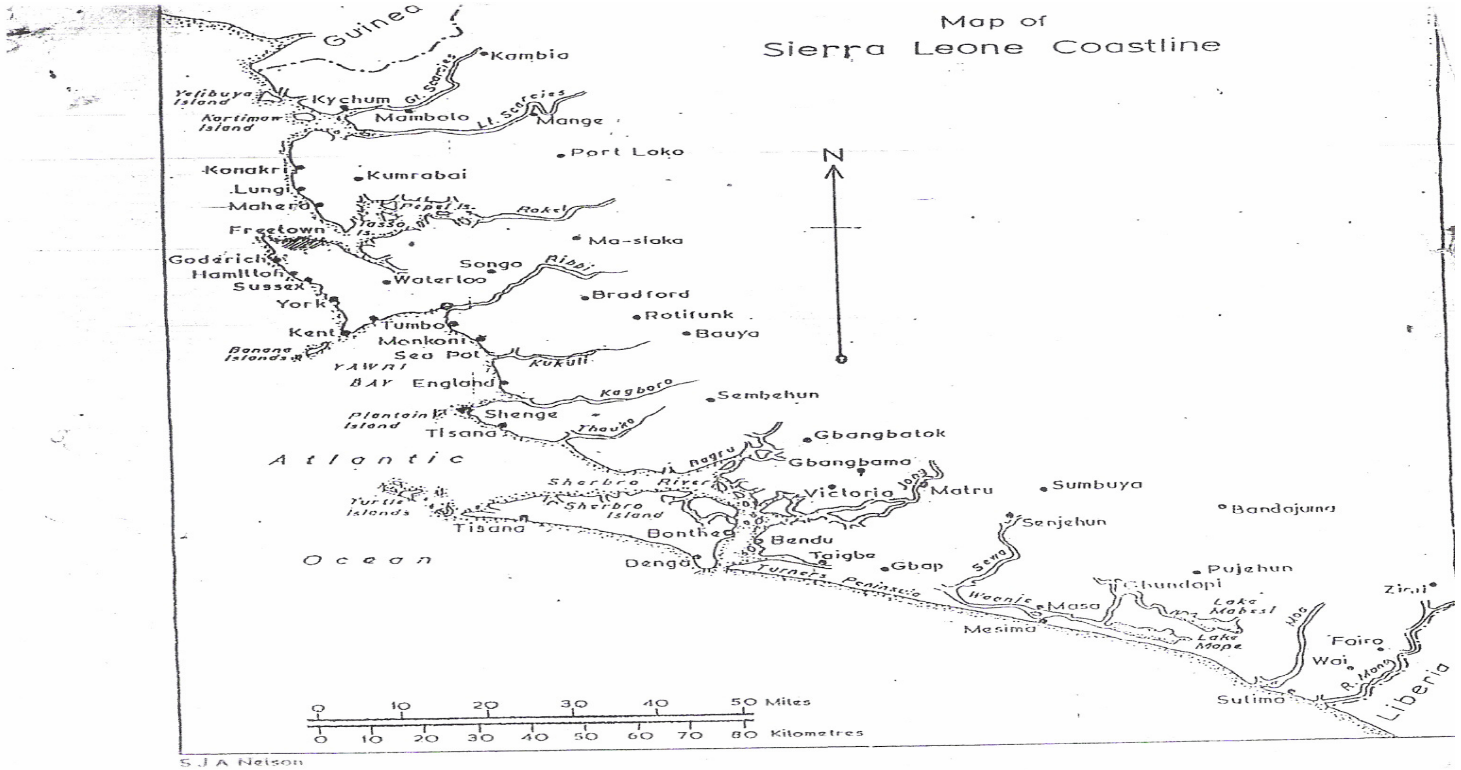
- The hydrographic regime of the Sierra Leone waters is characterised by a relatively stable, shallow thermocline lying at ‘mid-shelf’ and affecting the distribution of fish. The thermocline is located at 10 m inshore and at 20m offshore.
- There are several major rivers which influence the hydrographic conditions along the coast of Sierra Leone. These include the Scarcies River, Sierra Leone River, Sherbro River and the and Sulima Rivers
- Seasonal changes in hydrographic conditions are due to the following effects of the monsoonal wet season extending from May to October: high river discharges, reduced surface water salinities, lowered solar radiation and a dip in mixed layer temperatures (Coutin and Payne, 1988)

CURRENT SYSTEM

- Sierra Leone situated between these major ocean current systems. Alternatively influenced by the Canary Current in February-April and the Equatorial Counter Current in May-July. The influence of the Canary Current is characterised by the north-south migration of the 25^{o}C isotherm (Coutin and Payne, 1988).
- The dominant is the Guinea Current- and offshoot of the Canary Current- which flows eastward along the coast meeting the westward flowing South Equatorial Current of the coast of Liberia. The cold Canary Current, flowing towards the Equator, affect the Sierra Leone waters.
- The influence of Canary Current is greatest during February to April when its flows southward bringing cold, nutrient-rich water from the upwelling areas.

Coastal Map of Sierra Leone

Coastal Map of Sierra Leone, showing artisanal landing sites



Fisheries Resources

- Sierra Leone waters are rich in varieties of fish and shellfish resources. The resources are commonly classified into pelagic, demersal and shell-fish

- So far about 200 species have been identified in various studies

- Recent estimates gave biomass at about 300,000 mt (2007 Nansen Survey) and potential yields of about 180,000 mt (IMBO, 2000). Potential yields of pelagic species are put at 100,000 mt annually.

Carangids, Scombrids, Barracudas, Hairtail – MT
Dr. Fridjof Nansen Survey

Survey Year	Guinea Bissau	Guinea	**Sierra Leone**	Liberia	Total
2006	566000	185000	**269000**	127000	1147000
2007	45000	63000	**100000**	16000	224000

Review Sardinellas and Anchovies –MT
DR. Fridtjof Nansen Survey

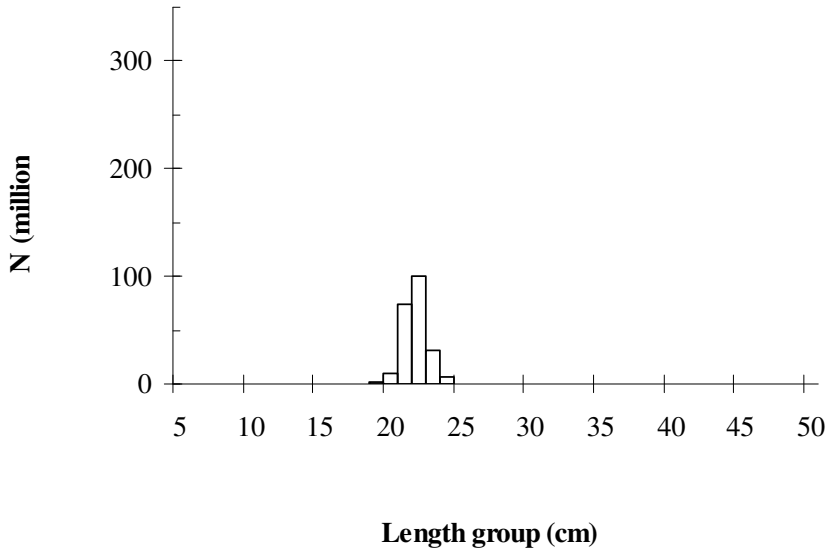
Survey Year	Guinea Bissau	Guinea	**Sierra Leone**	Liberia	Total
2006	177000	1083000	**97000**	25000	1382000
2007	197000	192000	**139000**	37000	576000

Acoustic biomass estimates pelagic fish (tonnes) – 2007
Dr. Fridtjof Nansen Survey

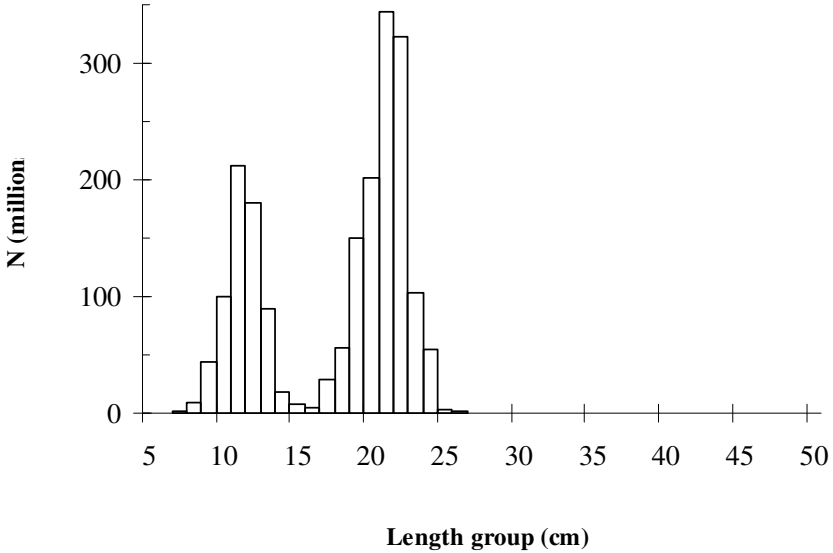
	Guinea Bissau	Guinea	**Sierra Leone**	Liberia	Total
Sardinella aurita	118000	77000	**22000**	31000	248000
S. maderensis	79000	115000	**117000**	17000	328000
Carangids etc.	45000	63000	**100000**	16000	224000

LENGTH FREQUENCY DISTRIBUTION OF SARDINELLA SPP
Dr. Fridtjof Nansen Survey 2007

- Sardinella aurita



Sardinella maderensis



Pelagic Fish stocks

- There are various categories of pelagic fish species:

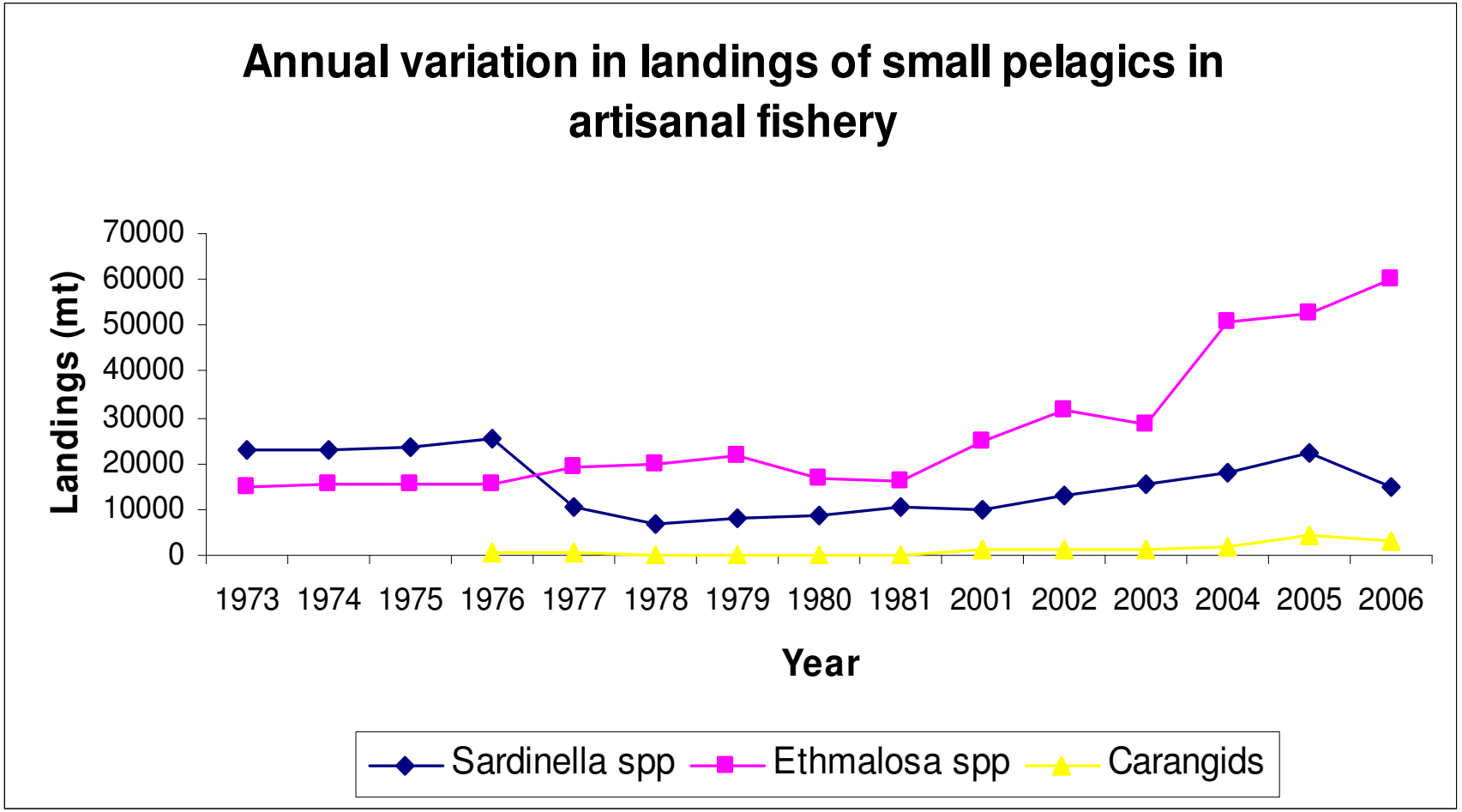
- **The clupeids (*Ethmalosa fimbriata*, *Sardinella maderensis*, *Sardinella aurita*, *Illisha africana* and E*ngraulis encrasicolus*) are the most important of the small pelagics**
- **The carangids, principally including *Choloroscombrus chrysurus*, *Decapterus rhonchos*, *D. punctatus*, *Caranx hippos* and *Trachurus trecae***
- Other true pelagics include *Sphyraena guachancho* and *S. dubia*
- *Large pelagics are found associated with upwelling zones and the important ones include Istiophorous albicans, Xiphias, Thunnus albacores, Katsuwonus pelamis, Euthynnus alleteratus and Auxis Thazard*

THE ARTISANAL PELAGIC FISHERIES

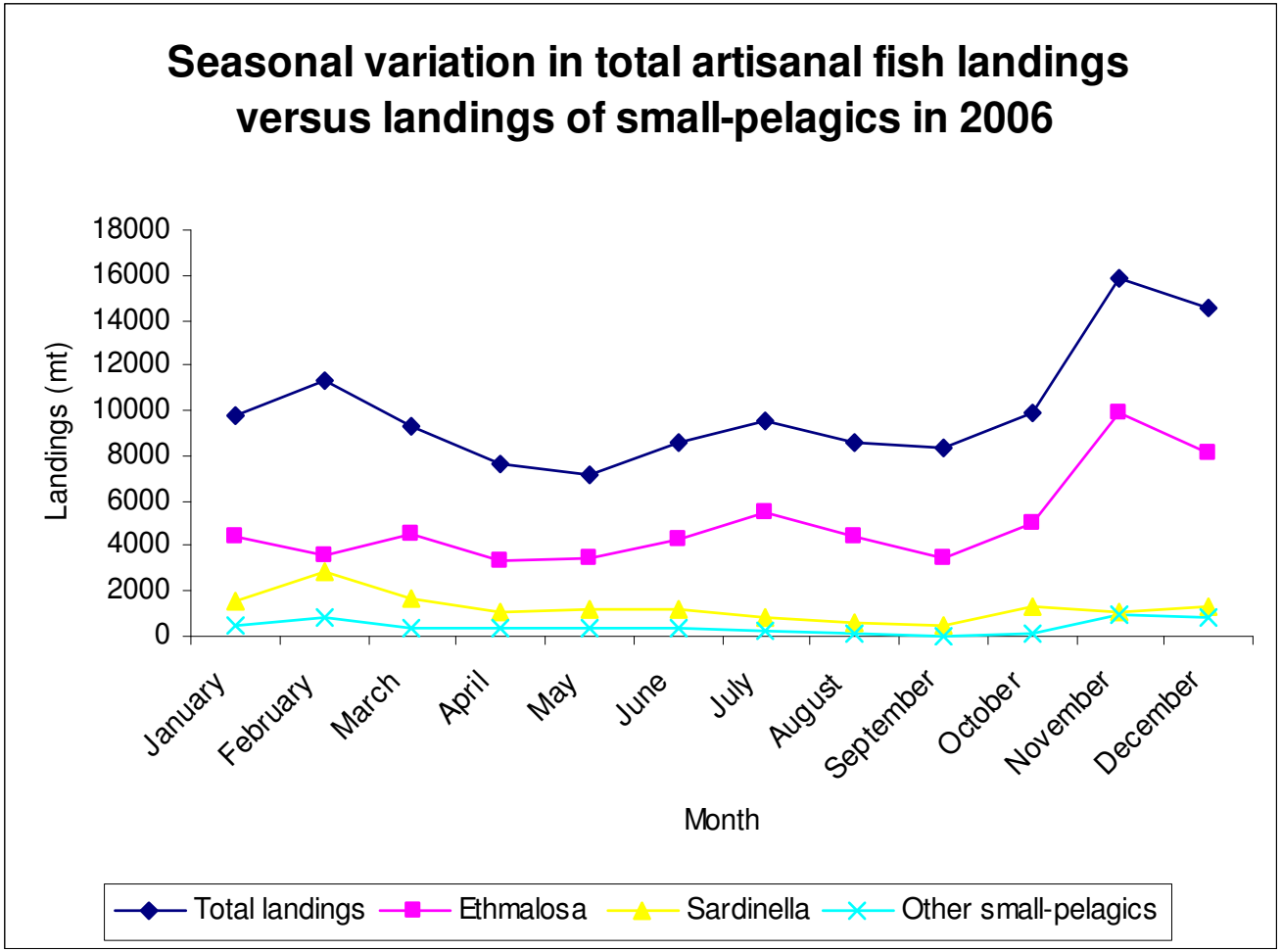
- There is a well defined target fisheries for inshore small-pelagics, principally *Ethmalosa fimbriata* and *Sardinella maderensis: Illisha Africana* and *Engraulis encrasicolus* also occur in appreciable quantities
- Artisanal fishing gears that target small pelagics are ringnet and surface driftnets and utilise large motorised canoes
- This fishery contributes 70 % to the total artisanal fish production
- The carangids, e.g. *Chloscombrus chrysurus* constitute a significant component in artisanal landings
- The

TYPICAL ARTISANAL FISH LANDING SITE IN TOMBO- Ghana boat and ringnet that targets Sardinella spp and Ethmalosa spp)

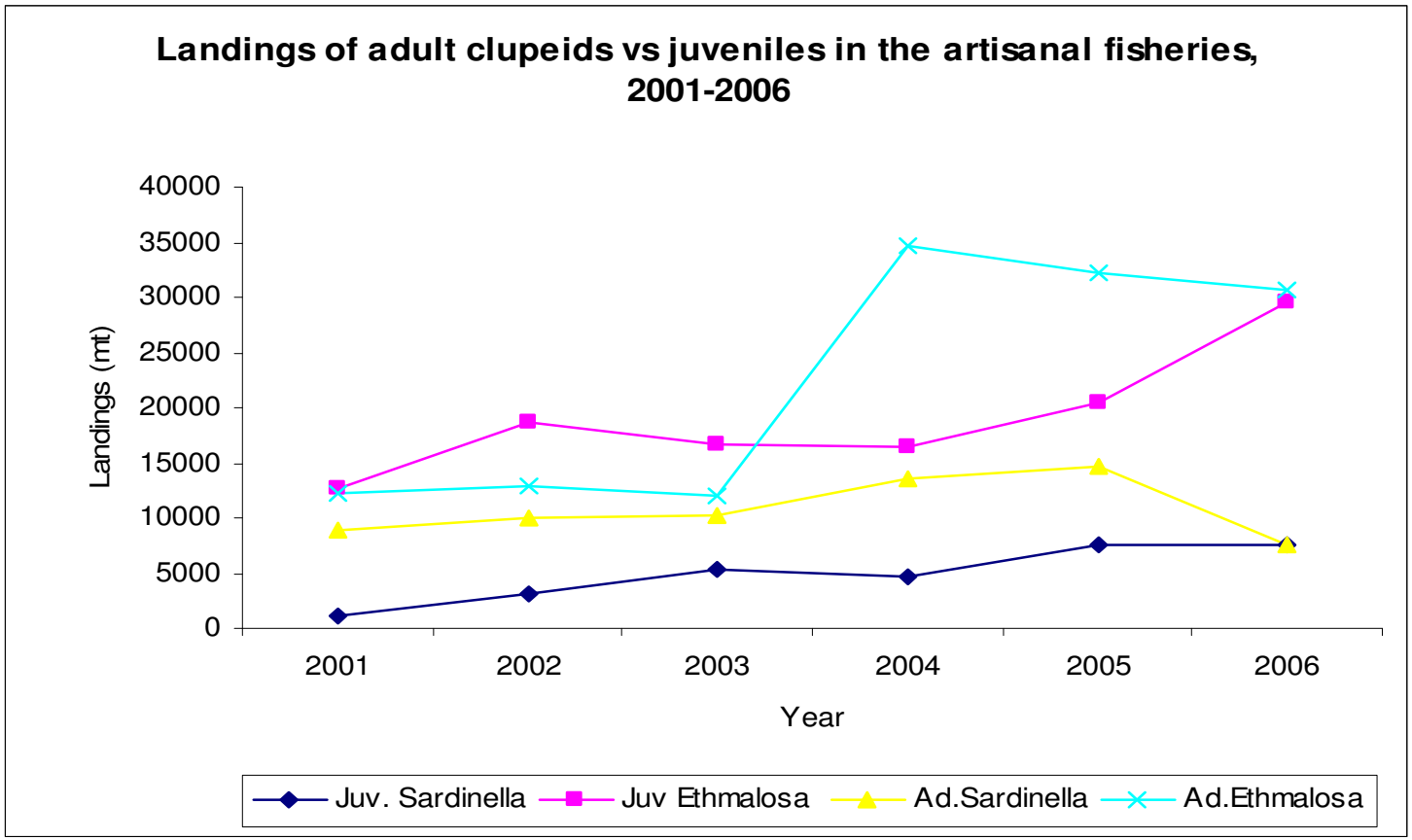
Annual variation landings of small-pelagics in artisanal fisheries



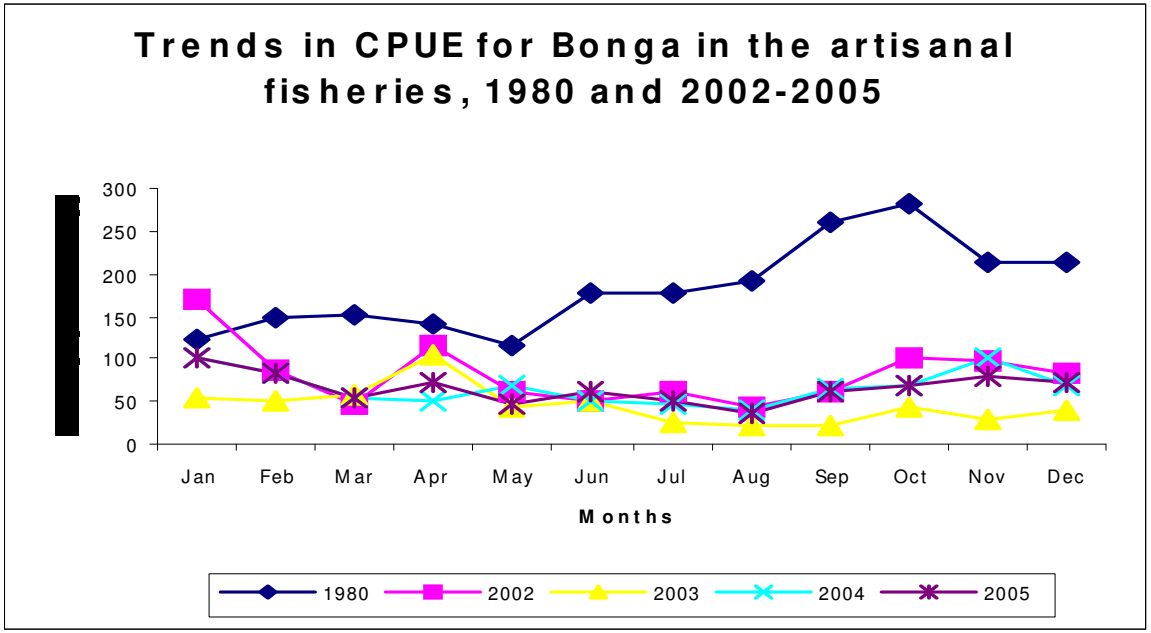
TOTAL ARTISANAL FISH LANDINGSIN 2006- (Illisha africa and Scomber spp, Chloroscombrus chrysurus mainly constitute the other small pelagics)



INDICATION OF JUVENILE MORTALITY IN ARTISANAL FISHERIES- in 2006, Juvenile Sardinella and Ethmalosa constituted about 24 % and 6 % of total artisanal landings respectively.



Trend in CPUE (kg/trip) of Bonga in Sierra Leone Artisanal Fishery



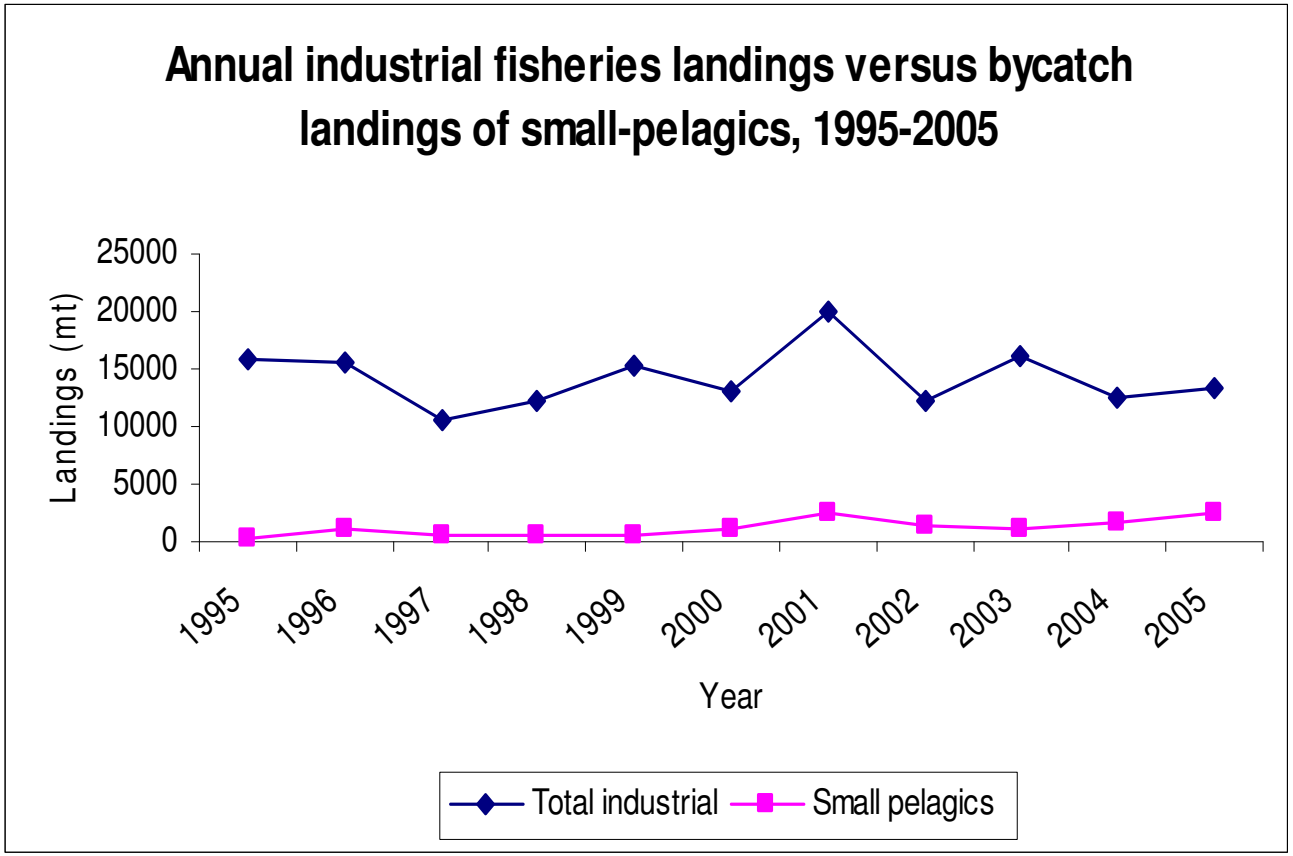
SIERRA LEONE FISHERIES CON'T

Industrial fishery

- There is currently no target industrial fishery for small pelagics
- They are taken as bycatches in demersal trawl fishery and principal species include Decapterus spp, Caranx spp, etc. Currently, these species constitute about 6 % of total catch of demersal finfish trawler.
- In the past, there was a huge target fishery for small pelagics, mainly by the then USSR Fleet. Sierra Leone industrial fishery production reached record levels between 1986-1990, with production varying between 150,000 mt and 184,000 mt: small pelagics (mainly *Decapterus spp*, *trachurus trecae* etc) constituted over 60 % of this total production.
- Total industrial fleet levels peaked between 1987 and 1990, with level of 308 in 1987. Industrial purse seiners (targeting pelagic resources) also peaked in 1987, with 59 in number

Industrial fishing vessels – take carangids (e.g. Decapterus spp) as bycatch

INDUSTRIAL LANDINGS- pelagic bycatch component comprises principally of Decapterus spp



FUTURE RESEARCH

- The Ministry is currently implementing an EU funded stock assessment project- INSTITUTIONAL SUPPORT TO FISHERIES MANAGEMENT PROJECT
- The project will conduct surveys on the distribution and abundance of pelagic stocks
- This will provide further opportunities for detailed assessment of the small-pelagic fisheries

- THANK YOU FOR THE ATTENTION