

Powerpoint Presentations given at the symposium on “*Marine fisheries, ecosystems, and societies in West Africa: half a century of change*”,
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The Portuguese Industrial Fisheries in Northwest Africa during the 20th century.

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Abstract

The Portuguese historical time series on catch and effort is analysed in order to describe the evolution of Portuguese industrial fisheries in Northwest Africa since its inception, considering changes over time and space. The beginning of industrial fishing in Northwest Africa was traced to 1910 with the introduction of steam-powered trawlers and the fisheries have undergone considerable changes during the 20th century, having contributed significantly in terms of landings and economic value in the past. A general description is given of the fleet, fishing practices, target species and fishing grounds as well as catch per unit of effort in historic terms based on recently revised data. Historically, Cape Blanc was the main traditional fishing ground, but this has changed considerably over time. In recent years, the Portuguese have concentrated on fishing grounds further offshore or in international waters with target species such as scabbardfish, hake, and tuna. Also, a trawl fishery for shrimp was initiated in Guinea-Bissau in the late 80s.

Changes in the Coastal Ecosystem of the Cape Verde Archipelago over the Period 1981 to 2000: a simulation model using Ecosim.

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Abstract

Two mass-balance trophic models were constructed to describe the coastal ecosystem of the Cape Verde Archipelago for two time periods, 1981 to 1985 and 1994 to 1997. The first model for the period from 1981 to 1985, characterised by a predominantly artisanal fisheries and low level of motorisation, corresponds to the initial phase of a more intensive fishery development. It was during this initial phase that the first systematic surveys were undertaken, providing estimates of biomass for different fish stocks. The second model is based on the most recent information available, which includes biomass estimates.

A dynamic simulation model, using Ecosim, was then used to simulate from one time period to the other, based on the observed biomass estimates and fishery catches. Using this approach, it was possible to study whether the model could capture the observed changes during the study period and the possible reasons for this. In spite of this relatively short period, a general decreasing trend is observed in terms of absolute or relative biomass estimates. This appears to be related to lower productivity as fishing pressure can not account for the observed decrease in biomass estimates for demersal fish and small pelagic stocks, in particular.

Size Spectra Analysis of Demersal Fish Communities in Northwest Africa.

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Abstract

The present study is a contribution to ongoing research on size spectra analysis in a tropical setting, taking advantage of numerous surveys that have been undertaken in the north-western African region. Data on numbers and weights of fish caught during trawl surveys available for Cape Verde, Gambia, Guinea, Guinea-Bissau, and Senegal were compiled and standardized in order to construct size spectra slopes and intercepts. However, as length frequency measurements are lacking or partial in many of the surveys, the isometric growth model was used to construct size spectra for the complete data in order to compare across strata. For statistical analysis, stratification was undertaken to take into account the effect of factors such as area, depth, and time. Vessel and gear effects make it difficult to compare between countries, but the effects of depth and time were generally significant on different data subsets. Results indicate a decreasing trend in abundance over time, particularly for the longer time series available in countries such as Guinea and Senegal. However, the effect of time on the slope of the size spectra was not significant, indicating that this method may not be suitable to determine the effects of fishing in tropical regions. The curves of the size spectra were generally parallel with a common slope and not as would be expected, a decreasing slope with increasing fishing intensity.

Structure of Demersal Fish Assemblages based on Trawl Surveys in the Continental Shelf and Upper Slope off Guinea Bissau

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Abstract

The structure of demersal fish assemblages of the continental shelf and upper slope off Guinea-Bissau was analysed based on 5 trawl surveys carried out between 1988 and 1995. A total of 316 fish species and 338 stations were considered, ranging from depths of 10 to 500 meters. Depth and area had a significant effect on total abundance, in terms of standardized catch in kg per half hour. Highest abundances were found in deeper waters (>200 meters) and in the southern area (< 11°30') off Guinea-Bissau as a result of incidental large catches of species from deeper waters such as *Synagrops microlepis* and *Chlorophthamus agassizi*. Multivariate analysis, using non-parametric Multi-Dimensional Scaling (MDS), indicates that fish assemblages are strongly influenced by factors such as depth and zone. There is a clear separation in relation to bottom type, which is interpreted as the result of preferences for muddy bottom sediments in the north and sandy bottoms in the south. Depth has also an important influence on the structure of species assemblages, considering that lower depths are characterized by higher values of temperature, oxygen and chlorophyll. The species found in Guinea Bissau are similar to the results of other studies in neighbouring areas, but there are important differences in terms of abundance and pattern of aggregation. No temporal effects were found in relation to both total abundance and species assemblages, but the time period considered from 1988 to 1995 is considered limited.

Introduction to the model of the Guinea-Bissau Continental Shelf Ecosystem and an exercise on simulating the effects of fishing.

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Abstract

The model for the Guinea-Bissau continental shelf and adjacent areas is presented, aiming to provide an important tool for the understanding of ecosystem dynamics and the effects of fishing in a multi-species context. The model refers to the period between 1990 and 1993, covering an area of 40816 km² and a total of 31 ecological groups, and includes major improvements on the first “preliminary” model such as the incorporation of reliable estimates on artisanal catches and biomass estimates for benthos groups, leading to a better definition of lower trophic levels.

An exercise on simulating the effects of fishing was undertaken with Ecosim, based on a possible scenario of fishing situation in Guinea-Bissau during the last decade. We assume a gradual increase in fishing effort from 1993 until 1998, where fishing decreased as a result of the Civil War, and a recent recovery to previous levels of fishing up until 2000. This simulation exercise indicates that the artisanal fisheries have a strong impact, particularly on shallow water species as mullets. Finally, the present study is a first attempt to address spatial structure of the model, using Ecospace, considering the distribution of groups and fishing activity along a depth gradient.

Poster Presentations at the symposium on “*Marine fisheries, ecosystems, and societies in West Africa: half a century of change*”,
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**The Cape Verde Archipelago: oceanography, resources and fisheries
of an insular ecosystem.**

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Abstract

The Cape Verde Archipelago consists of ten islands of volcanic origin and very narrow continental shelves, summing up to a total of approximately 5394 km². However, the EEZ of Cape Verde covers an area of 789.400 km², most of which is not exploited by the national fisheries. Fishery landings are dominated by pelagic and/or migratory species such as tuna and various small carangid species, accounting for approximately 65% of the landings. Artisanal and semi-industrial fishery statistics are presented for 1999 by area and the evolution of total landings is shown for the period 1990 to 1999.

The archipelago is situated in the southern part of the Canary Current System with characteristic changes in sea surface temperature between seasons. During the period July to November, the currents are predominantly southwestern, thus causing warmer waters to reach these southern islands. This is also the season for the tuna pole and bait fishery. During the period January to May, the influence from upwelling areas in northern Africa is stronger, creating favourable conditions for primary production around the islands most affected by this north-eastern current.

The eastern islands Sal, Boavista, and Maio form one system with an area of 4510 km², which is the only area suitable for trawl fisheries. Data from the most recent trawl survey in 1994 are used to characterise the demersal resources in this area.

Demersal Fish Assemblages in the Cape Verde Archipelago: changes over the period 1981 to 1994.

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Abstract

The Cape Verde Archipelago consists of ten islands characterised by having very narrow continental shelves and steep slopes. Most of the islands are separated from each other by depths of around 3000 m. However, the eastern islands Sal, Boavista, and Maio form one system with an area of 1315 nm².

The structure of demersal fish assemblages was studied based on available data, which are the trawl surveys undertaken in 1981, 1985, 1988, and 1994 covering the eastern area. Multivariate analysis, using non-parametrical Multi-Dimensional Scaling, revealed a strong gradient of change over the period 1981 to 1994. The survey in 1985 does not support this entirely, but this may be a result of differences in sampling methodology. The effect of depth and area was not as clear, but this is due to the fact that the present study selected a subset of the data, ideal for the study of time effects. In spite of standardisation and strong transformation of data, a similar ordination pattern was obtained when selecting 9 predominant species, which are either commercially important species or abundant non-commercial species (*Antigonia capros* and *Dactylopterus volitans*).

The strong changes observed in demersal fish assemblages have been accompanied by decreasing biomass as observed in other studies.