

# Assessing and Managing the Resources Available to the Senegalese Small-Scale Fisheries

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## Abstract

A brief account of the evolution and structure of the marine fisheries of Senegal, West Africa, is presented, with emphasis on the small-scale subsector and on the major recommendations of an international symposium/workshop on this topic, held on February 1993 in Dakar.

## Introduction

Senegal has abundant fish resources, making the fisheries one of its major sectors. Indeed, 25% of Senegal's export consist of fish products, contributing annually  $6 \cdot 10^{10}$  Franc CFA in foreign exchange<sup>a</sup>. Mean annual catches are near 300,000 t (Fig. 1), and annual domestic consumption is 30 kg/caput.

The sustained development of this sector is imperative; this requires a precise knowledge of the potential yields of the resource, and the implementation of appropriate management schemes for the interacting small-scale and industrial components of the fisheries sector.

<sup>a</sup>550 FCFA = US\$1

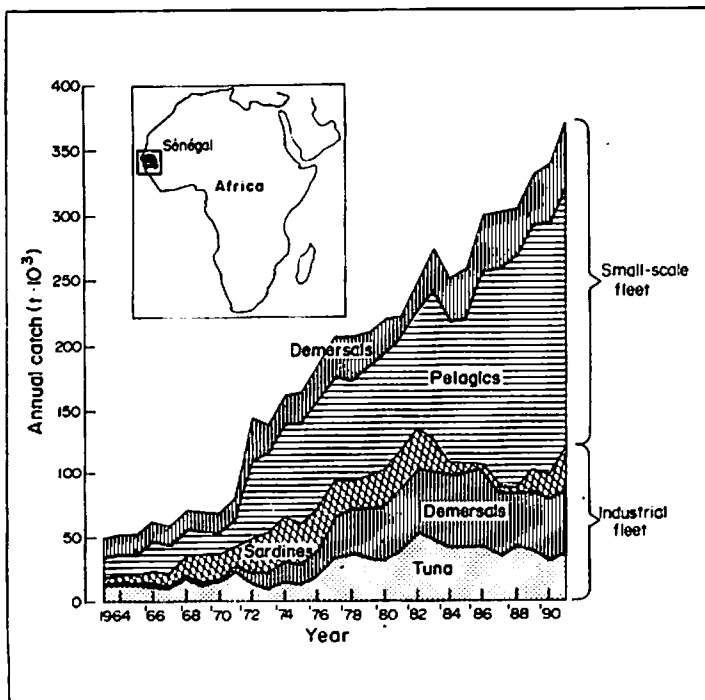
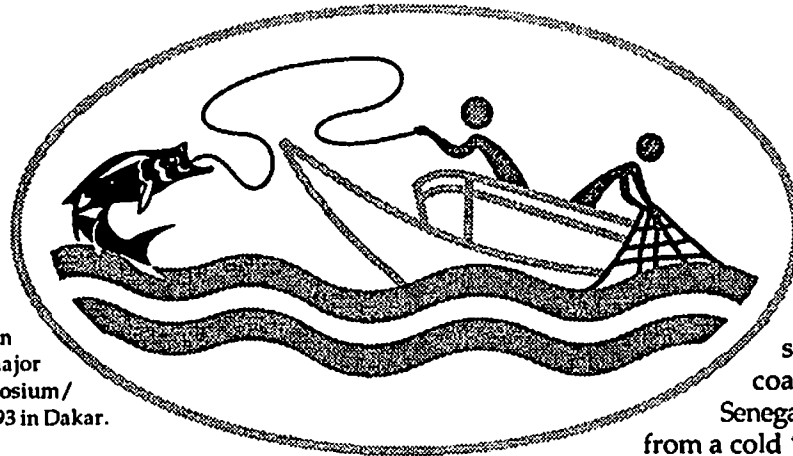


Fig. 1. Senegal's marine fish landings, 1963 to 1991 (Insert: location of Senegal in Africa).



These goals, however, are difficult to achieve; the fisheries are complex, the stocks consist of a wide variety of species, and the entire coastal ecosystem off Senegal oscillates seasonally, from a cold "upwelling" system

in November to May to a warm, "tropical" system in July to October.

The mission of the CRODT is thus complicated: ignoring this complexity leads to erroneous advice, while incorporating it into management recommendation mainly confuses the decisionmakers. To deal with this and the related issues, the CRODT organized a symposium-cum-workshop, held from 8 to 13 February, an event attended by 45 scientists, 20 of which were invited foreign experts (see photo).

Over 30 contributions, ranging from the analysis of catch statistics and length-frequency data, to the application of artificial intelligence to small-scale fisheries problems, were presented and discussed. The proceedings are presently being prepared, and these will also include working group reports.

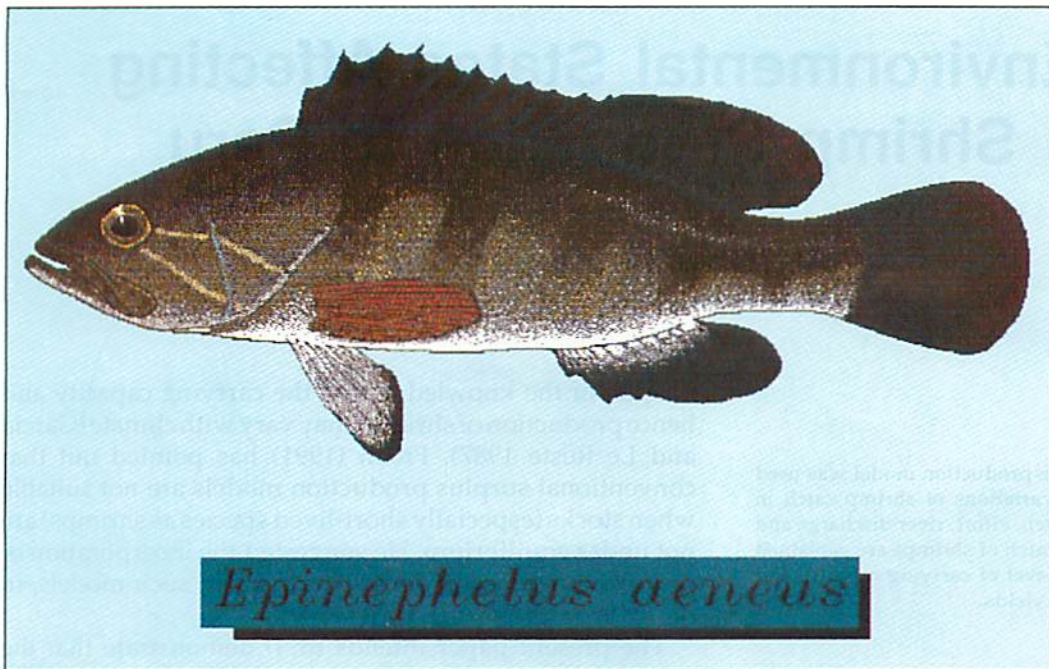
These proceedings will document a subsector - the small-scale fisheries of Senegal - that has recently experienced a tremendous expansion, with catches increasing from 50,000 t in 1970 to 250,000 t in 1992 (Fig. 1). This is the result of a steady increase of effective fishing effort which itself is the result of major changes in the structure of the fleet.

The major changes here are the widespread use of outboard engines, initially introduced in the early 1950s, introduction of small-scale purse seines in the early 1970s, and the use of ice on board larger crafts.

As a result of the large increase in fishing effort, some important traditional resource species now show strong signs of overexploitation. This is particularly true for the bluefish *Pomatomus saltator*, which has largely disappeared from the landings, and the "tiof" (*Epinephelus aeneus*) (Fig. 2), whose catch (and sizes) are now much reduced. Other resources, however, have increased, notably small pelagic fishes. Although presently not much sought, they represent an obvious potential.

The participants of our symposium/workshop dealt with these and related issues - and this led to questions on how appropriate the available stock assessment methodology actually is, which was developed largely for





**Fig. 2.** The "tiof" *Epinephelus aeneus*, Senegal's favorite fish (computer drawing by Robbie Cada, FishBase project, ICLARM).

the study of the species-poor temperate seas. This applied, for example, to bioacoustics, a relatively expensive technique whose utility was questioned by some, at least with regard to assessing the resources available to small-scale fisheries. However, the symposium/workshop went beyond such questioning, and provided constructive insights.

The major one pertains to the need, when studying the marine fisheries of Senegal to work simultaneously on the small-scale and the industrial subsectors, because they often impact on the same resources. This will require not only a merging of the CRODT data files on the small-scale and industrial fisheries, presently kept separate, but also a meeting of minds.

Detailed analyses in time and space of the size-frequency data held by the CRODT should lead to a vastly increased understanding of the dynamics of the major exploited stocks. These analyses, and complementary analyses of synthetic measures of catch per effort, will have to be conducted in close collaboration with researchers from neighboring countries — notably Mauritania, Guinea and Guinea-Bissau — to account for the effect on catch samples of the large-scale migrations undertaken by

numerous fish species.

Another set of recommendations dealt with the need to integrate socioeconomic factors (at least fishing costs and returns) into assessments. The demersal fishes most prized by small-scale fishers should be those to which such integrated approaches (including analytic and surplus-production models accounting for environmental changes and socioeconomic and regional considerations) should be applied first.

Eventually, multispecies models explicitly considering trophic relationships (i.e., predation) will also have to be applied, either in form of dynamic models, or at least in form of ECOPATH-type models, accounting for average trophic

flows during periods without major perturbations. However, these approaches require much preliminary work on the major component species, as outlined above.

Overall, the workshop presented here very much succeeded in its stated aim of refocusing CRODT researchers toward management-oriented fisheries research, for the benefit of Senegal.



**Small-scale fisheries workshop in Senegal.** Official photo of the participants of the workshop on the small-scale fisheries of Senegal held on 15-19 February 1993 in Dakar, Sénégal. From left to right (standing): Fréon (ORSTOM); Thiam (CRODT); Laløe (ORSTOM); Ly (Ministère de la Mer); Dia Abdou Daïm (RIM, CNROP); Farrugio (IFREMER); Deme (CRODT); Lévénéz (ORSTOM); Diouf (CRODT); Mbarek Ould Boueïlim (RIM, CNROP); Ninge (CRODT); Domain (ORSTOM); Cadima (Portugal); Marchal (ORSTOM); Lamine (Morocco); Lae (ORSTOM); Diouh (Ministère de la Mer); Belkhaouat (Morocco); McGlade (Univ. of Warwick, UK); Barry-Gérard (CRODT); Koranteng (Ghana); Vakily (ICLARM); Chaboud (ORSTOM); Diallo (Guinea); Cury (ORSTOM); ?; Voll (RIM, CNROP); Cherif (RIM, CNROP); Charles-Dominique (ORSTOM); Garcia (FAO); Chavance (ORSTOM); and Pauly (ICLARM). Lower row, from left to right: Sylla (CRODT); Fonteneau (ORSTOM); MacGuire (DFO, Canada); Foucault (IFREMER); Kebe (CRODT); Thiam Ismaila (RIM, CNROP); Diallo (CRODT); and Hoëniq (DFO, Canada).