

Assessment of main coastal demersal species exploited in Senegal using surplus production models

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Abstract

In Senegal, the main coastal demersal species such as *Epinephelus aeneus*, *Pagellus bellottii*, *Sparus caeruleostictus*, *Galeoides decadactylus*, *Pseudupeneus prayensis*, *Farfantepenaeus notialis* and *Octopus vulgaris* have intensely been exploited at least since the 1970s both by industrial trawlers and especially by small scale fisheries using mainly lines. They represented 15% of total landings with an average of 29,500 tons per year over the 1980-2013 period, with a slight increasing trend since 2000 several methods were combined to assess stocks status of these species. For each species, the annual abundance indices were first estimated using the generalized linear models; then pseudo-equilibrium production models (including an environmental effect for *Octopus vulgaris*) were used. Finally a global multi-species approach was done by combining monospecific diagnoses. Our results showed that most of coastal demersal species abundance indices dropped and the cumulative landings trend is increasing with an average of 19,000 tons. The fishing effort highly increased over the 1974-2013 period (~122,000 to 600,000 trips). Surplus production models showed that fishing efforts corresponding to the Maximum Sustainable Yield (mfMSY) were exceeded for *E. aeneus* and *P. bellottii*. For *S. caeruleostictus*, *G. decadactylus* and *P. prayensis*, the current effort was just below mfMSY. The MSY for these species was 1,760 tons; 7,500 t; 4,465 t; 4,400 t and 1,800 t respectively. The MSY of short-lived species stocks (*O. vulgaris* and *F. notialis*) were around 10,500 tons and 1,400 tons respectively and highly depended on the large variations of coastal upwelling intensity. The annual dynamics of octopus and coastal shrimps stocks are highly variable, thus inducing a high interannual variability of catches. *E. aeneus* stock is severely overexploited and in danger of extinction whilst *P. bellottii* stock is fully exploited to slight overexploited. *S. caeruleostictus* and *G. decadactylus* stocks are also fully exploited whereas the stock of *P. prayensis* is under exploited. Since Senegalese demersal fisheries are multi-species, multi-gears and the artisanal effort fishing is poorly controlled and monitored, the management must be based on the control of fishing effort through a license system for sustainability of resources.

Keywords: Stock assessment, coastal demersal species, surplus production models, coastal upwelling, West Africa.



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Extended book of Abstract

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