

November 2008

**FISHERY COMMITTEE FOR THE EASTERN CENTRAL ATLANTIC****NINETEENTH SESSION**

Cotonou, Benin, 4-6 November 2008

**MANAGEMENT OF SHARED SMALL PELAGIC STOCKS IN NORTHWEST AFRICA – RESULTS OF THE SYMPOSIUM “SCIENCE AND THE CHALLENGE OF MANAGING SMALL PELAGIC FISHERIES ON SHARED STOCKS IN NORTHWEST AFRICA”, CASABLANCA, MOROCCO, 11-14 MARCH 2008**

**SUMMARY**

*The Symposium “Science and the Challenge of Managing Small Pelagic Fisheries on Shared Stocks in Northwest Africa” took place in Casablanca, Morocco from 11 to 14 March 2008. It was attended by around 100 participants. 43 oral presentations and 30 posters were presented. The Symposium was split into four main sessions: Resources and exploitation-Biology and ecology of main resources and status of fisheries; Dynamics and variability of pelagic fish populations and environmental influences; Methods and models for assessing small pelagic fish stocks and Management of fisheries on shared resources. The Symposium ended with a general discussion aiming to identify specific problems to address as well as providing recommendations on ways forward. This paper presents a summary of the various sessions as well as on the outcomes of the discussion. Suggestions for future action are also presented for consideration of the Committee. The papers and posters presented at the Symposium are available at [www.smallpelagics2008.org](http://www.smallpelagics2008.org).*

## INTRODUCTION

The Symposium “Science and the Challenge of Managing Small Pelagic Fisheries on Shared Stocks in Northwest Africa” took place in Casablanca, Morocco from 11 to 14 March 2008. It aimed to provide a forum for presentation and discussion of a wide range of topics relevant to the study of small pelagics, their ecosystem and their fisheries management. The Symposium was split into four main sessions: Resources and exploitation-Biology and ecology of main resources and status of fisheries; Dynamics and variability of pelagic fish populations and environmental influences; Methods and models for assessing small pelagic fish stocks and Management of fisheries on shared resources. The Symposium ended with a general discussion aiming to identify specific problems to address as well as providing recommendations on ways forward.

The expected outcome of the Symposium was that it would contribute to: the synthesis of existing information; an evaluation of the potential use of this information for shared stocks fisheries management; and the provision of examples and suggestions for possible models and mechanisms for such management.

The Symposium was organized as the closing activity of the project “International Cooperation with the Nansen programme. Fisheries management and marine Environment” (GCP/INT/730/NOR) and was co-financed by the National Fisheries Research Institute (INRH) of Morocco, who was responsible for the local arrangements. This paper presents a summary of the various sessions as well as the outcomes of the general discussion. Possible future activities are also presented for consideration of the Committee.

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### 1. RESOURCES AND EXPLOITATION: BIOLOGY AND ECOLOGY OF MAIN RESOURCES AND STATUS OF FISHERIES

The keynote speaker presented an overview of the small pelagic resources in Northwest Africa. The average total annual catch in the region has fluctuated around 2 million tonnes. Presently, the main species harvested are *Sardina pilchardus* (800 000–1 000 000 t/yr), *Sardinella aurita* (300 000–400 000 t/yr), *Sardinella maderensis* (100 000–150 000 t/yr), horse mackerels (200 000–400 000 t/yr), anchovy (100 000–150 000 t/yr) and *Ethmalosa fimbriata* (30 000–50 000 t/yr). These high catches illustrate the importance of small pelagics for the West African region. The harvest is seasonal and linked to the availability of the target species and its migration pattern in the fishing zone. The fleets involved are heterogeneous and composed of domestic canoes (pirogues), traditional purse seiners and industrial pelagic trawlers.

Fourteen oral presentations and nine posters were given, describing the advances in research on the various species. They covered topics such as i) progress in stock identification of sardine including genetic and morphometric and meristic studies; ii) an analysis of length frequency for *Sardinella aurita* distributions; iii) An historical analysis of catch statistics in Mauritania, concluding that the catch of the industrial fleet was probably underreported by about 30 percent to which unrecorded discards should be added; iv) A number of presentations dealt with fisheries in Senegal, Guinea, Sierra Leone, Togo and Gabon. They all illustrated the important role of small pelagics for the local population and the artisanal fishery. They further underlined the need for more biological information on the stocks in these areas.

During the discussion that followed the presentations, it was pointed out that many of the problems discussed during the session had been present for decades. However, some major progress has been achieved in recent years, such as: (i) the establishment of the FAO Working Group on Small Pelagics in Northwest Africa; (ii) the continuation of the acoustics surveys by the R/V Dr. Fridtjof Nansen and the Atlant NIRO Institute; (iii) the joint surveys undertaken by the national research vessels of Morocco, Mauritania and Senegal; (iv) and the important progress made in genetic studies. These developments may offer the basis for a future system of international management in the area.

## 2. DYNAMICS AND VARIABILITY OF PELAGIC FISH POPULATIONS AND ENVIRONMENTAL INFLUENCES

The keynote presentation indicated the key characteristics of the four most productive upwelling systems of the world, in which the variability of the Humboldt, California, Canary and Benguela currents played an important role on the dynamics of small coastal pelagic stocks. It appears that the variability is mainly seasonal in the Canary and Benguela currents systems' and inter-annual in the Humboldt and California systems.

In addition, it was stressed that a good understanding of the relations between the resources and the environment required an intense and regular monitoring of the fishery and scientific surveys. These activities are essential for obtaining indicators that can be used to manage the fisheries.

Following this introduction, 10 presentations were made covering physical oceanography, notably environmental parameters and the relations with the abundance and distribution of coastal pelagic species such as sardine (*Sardina pilchardus*) and horse mackerel (*Trachurus trachae*). They included i) an analysis of oceanographic data drawn from databases fed by satellite imagery (accessible via Internet) and from the 22 oceanographic surveys undertaken by AtlantNIRO in the EEZ of Morocco and Mauritania between 1994 and 2008; ii) scientific work undertaken in Morocco to identify spawning and nursery areas; iii) relations between the abundance of sardines and temperature; iv) relations between the abundance of horse mackerel (*Trachurus trachae*) and temperature in Mauritania; v) The analysis of catches taken by European trawlers in Mauritania and landed in Las Palmas showing the relations between landings and sea surface temperature. The existence of demersal species bycatch by pelagic trawlers was underscored; vi) An analysis of areas of concentration of ethmalosa and alosa in Senegambian waters using acoustic data.

The general discussion that followed the presentations led to the identification of the research needed by the industry, and notably the need for environmental indicators predicting rapid climatic changes which have a significant impact on the resources and the enterprises. The need to mobilise (coordinate) means and competences around common research themes and to harmonize fishery management policies was also underlined.

## 3. METHODS AND MODELS FOR ASSESSING SMALL PELAGIC FISH STOCKS

The keynote presentation reviewed the main assessment models used for the small pelagic stocks and fisheries assessment in the region. It concluded that: (i) when good data were available and the underlying assumptions were not severely violated, the assessment method used had little impact on the conclusions; (ii) when the data available was poor, the results were unreliable no matter the methods used; (iii) when the data are of variable quality, it may be worthwhile to look for the method that relies mostly on the best data.

Eleven papers were presented covering themes such as i) The acoustic methods applied off Northwest Africa with the R/V Dr. F. Nansen, the National vessels from Morocco (R/V Al Amir), Mauritania (R/V Al Awam), Senegal (R/V Itaf Deme) and Russia (R/V Atlantida); ii) The inter calibration and parallel surveys carried out since 2004 between R/V Fridtjof Nansen and the local research vessels iii) acoustic target strength experiments for Chub mackerel and statistical analyses of acoustic target identification; iv) assessment methods using length distributions, VPA and biological indicators; v) a group of more complex methods. These latter methods, still under development take into account various parameters including a wide range of environmental indexes, predation and recruitment predictions and predator - prey relationships.

In the discussions it was stressed that the assessments were critically dependent on stock indices obtained through scientific surveys and that a failure to carry out coordinated surveys in the four countries in the future would impair the work of the Assessment Working Group, affecting its management advice. The biomass estimates are dependent on the time of the year. At present, in the region, only one regional survey is carried out each year. In order to use this data for coordinated management of shared stocks, e.g. for establishing an allocation by zone, several surveys would have to

be carried out during one year to obtain a more precise average picture of the biomass distribution in the region. In addition, surveys aiming at assessing recruitment levels should be carried out to enhance the short-term forecasting of fish abundance.

#### **4. MANAGEMENT OF FISHERIES ON SHARED RESOURCES**

The keynote presentation gave a broad overview of the elements most important for shared stocks management. The participants were reminded of the reasons why the non-coordination of national management strategies, required by the UN Convention on the Law of the Sea, was a serious failure leading to considerable economic losses and, eventually, to the destruction of the production system. The presentation recalled the Precautionary Principle and its implications in this particular case. It indicated the elements essential to the negotiation process needed for the establishment of an equitable and sustainable agreement for joint management. It also illustrated the different steps in a typical process needed to put in place such an agreement with all the institutional adaptations needed for its implementation.

Nine presentations and three posters were presented covering various aspects relevant to the theme. They covered: (i) the economic implications of stock sharing, including game theory; (ii) a review of the work undertaken within the Nansen programme to reinforce the regional scientific collaboration, the knowledge of stocks, and the capacity to analyse and manage shared stocks; (iii) a summary of the knowledge available on the resources and present management of sardinella; (iv) a simple analysis of the implications of setting country quotas for that species; (v) a bio-economic analysis of the Moroccan fishery; (vi) a review of the socio-economic importance of small pelagic fish for the populations of the region; (vii) a reflection on the role of small pelagic species for the development of coastal countries and their potential on the regional market in response to the new trade rules imposed by WTO; (viii) a perspective on impacts of trade, markets, and the impact of climate change and prices; and finally (ix) an analysis of the characteristics of small pelagics and their environmentally-driven variability (and instability) on the sustainability of the exploitation.

During the discussions a number of issues were addressed concerning the nature of scientific advice, the mechanism of elaboration of the advice, the sustainability of the efforts promoted by the Nansen project, the strategy to cope with variability, game theory and market perspectives.

Scientific collaboration on small pelagics had been strengthened in the sub-region in recent years through amongst others the activities of the Nansen Programme. The benefits generated by the project and the regional capacity to maintain and improve its means of observation can only be sustained in the longer term through scientific collaboration between coastal States scientific institutions.

It was stressed that scientific advice would need to be followed up with a presentation of the possible management options and an in-depth analysis of their operational implications and that the various mechanisms for elaborating advice need to become more participatory, involving more directly the main stakeholders. The importance of using an adaptive approach in dealing with the high risks inherent to small pelagic fisheries in highly dynamic regions was underscored. The potential usefulness of game theory in preparing the negotiations in shared stock management was noted.

Finally it was noted that the price of small pelagic was likely to increase substantially due to increasing demands and that the risk of further rapid growth in capacity was rather high as well as a risk to see an increase in exports at the expense of local food security.

#### **5. GENERAL DISCUSSION**

##### **1. Are stocks shared in Northwest Africa?**

Scientists largely agree that evidence of the main pelagic stocks (i.e. sardine, sardinella, anchovy, jack mackerel, horse mackerel and mackerel) being distributed across many EEZs had been available for a long time. It was agreed that in most cases, more than two countries shared the resources. This implied that agreements would need to be considered on a species-by-species basis, and at sub-regional level. It was likely that even smaller coastal stocks might be shared bilaterally.

A point of discussion was as to whether scientists had done all their best to inform the appropriate institutions of the countries of the issue and of its potential consequences. Scientists inform decision-makers and industry on the state of stocks through illustrated reports and in formal meetings at regular intervals, however few specific analyses has been made to illustrate the pros and cons of shared management, in economic and social terms, illustrating in particular the increased risks of collapse in the absence of a management agreement.

It was underlined that the fishery research staff of the region was in general trusted and listened to by both managers and industry leaders. As a consequence, all representatives of the fishery management authorities of the region indicated that they were fully convinced that large stocks of small pelagics were shared between neighbouring countries and that, considering the declining state of these resources, joint management would be useful.

Many participants stressed the fact that the existence of CECAF and the subsequent development of the SRFC and other regional agreements were proof that policy-makers, in the region, were aware of the existence of important shared resources and of the need to collaborate in their assessment and management although collaboration on management remained minimal. Nonetheless, the present efforts towards harmonization of legislation and collaborative monitoring control and surveillance are going in the right direction. At national level, the existence of Advisory Committees involving research, policy and industry was mentioned as an effective tool through which awareness is developed.

Participants also stressed that, considering the dynamics of the resources and the inter-annual changes in distribution, it might be necessary to develop dynamic sharing agreements to give the industry the necessary flexibility and resilience.

## 2. Reasons impeding agreements at present

Several arguments were put forward to explain the absence of formal management agreements in the sub-region. It was highlighted that the absence of formal agreements resulted from a lack of awareness of the risks incurred, specific political difficulties, or perceived operational difficulties and costs. The arguments presented included:

- the degree to which a stock was shared and the impact by neighbouring fleets might not be clear enough.
- there are still, in the region, some questions of sovereignty that may hamper progress towards shared stocks agreement.
- lack of a mechanism for interaction between research scientists, management, decision makers and other stakeholders.
- specific information might be needed to decide about participating or not in a sharing agreement;
- despite availability of scientific advice, the political institutions lacked the will to make the appropriate decisions, a phenomenon already recognized in many other parts of the world. It was suggested that e.g COMHAFAT could take the matter up at the highest level possible to build up the political support in the region.
- although policy-makers are aware of the fact that measures promoted on the basis of biology had also significant technological, political, social and economic dimensions that were not (or could not be) always clarified. An important issue was the awareness of the existence of overcapacity in the region and some uncertainty as to how this would be resolved in a shared agreement;
- as long as stocks were believed to be abundant and underused, the political preoccupation was minimal. The fact that most stocks are now recognized as fully exploited or under severe pressure is providing a stronger incentive for shared stocks agreements.

- while stocks are indeed shared, countries have been rather “specialized” in the past, e.g. Morocco leading on sardine and anchovy, Mauritania leading on mackerel and horse mackerel and Senegal leading on sardinella. It was indeed mentioned that if all countries would attempt to diversify their targets, the situation would become rapidly catastrophic as the *de facto* “protected areas” in the countries where the species is not exploited, will disappear.

### 3. Future challenges

It was generally agreed that urgent action was needed to assess the issue of shared stock management. It would be preferable for the countries not to wait for an eventual collapse to decide to negotiate an agreement. The cost would be very high and the damage to coastal communities very serious.

As countries in the region have reached different levels of development, some specific efforts will be needed to bring all the countries concerned (and their stakeholders) at the same level of understanding. Research and management capacity varies between countries and efforts are needed to improve and balance this capacity if a trustful negotiation is to be conducted. The role of regional organizations in that respect would be fundamental, i.e. in ensuring support to the needing countries.

A stepwise approach may help in progressively establishing a shared stocks management system, including (i) identification of shared stocks worth being managed jointly, using agreed criteria; (ii) identification and correction of information gaps for the assessment; (iii) identification of institutional gaps for joint management, (iv) elaboration of a treaty type agreement, (v) establishment of the institutions required (WGs and committees); (vi) estimation of a TAC with an agreed procedure; (vii) elaboration of an allocation scheme.

At the regional level, the regional organizations could decide to undertake a cycle of meetings aiming at promoting and facilitating the development of shared stocks agreements. A first important step in that cycle would be to bring the result of the symposium to the attention of policy-makers.

The work needed at *national level* to promote shared stocks agreements includes amongst others:

- development of management rules and processes involving industry and other stakeholders, sharing the information available, facilitating a convergence of views among all sub-sectors concerned. The importance of increased involvement of the different stakeholders in all steps of the management process was stressed.
- improvement of the capacity for providing scientific advice, validation of the scientific advice quality, and communication of such advice to the different stakeholders.
- improvement of databases and knowledge bases in support of management decisions
- harmonization of legislation and MCS across the region

In the future it will be necessary, when developing shared stocks agreements, to integrate planning with management, putting national decisions regarding long term investments or licensing decisions in perspective with the shared stock management plan.

Specific prioritised work is needed, on a stock-by-stock basis to identify key knowledge gaps, identify and resolve the uncertainties, test the impact of such uncertainties on the potential consequences of the agreement, and see how the precautionary approach might help. It would also be important to analyse worse case scenarios to figure out what might happen and what could be done if an emergency would arise from a collapsing stock. Shared stocks management require sharing of knowledge, data and information and the creation of compatible databases (covering the whole stock distribution and its ecosystem).

It was suggested that a Working Group could be formally established in the regional organizations to look at the process presently used to deliver the advice in the countries of the region. The process should involve all the main stakeholders, i.e. the scientists (multiple disciplines), decision-

makers, industry representatives, and fishers. The Working Group could be charged to elaborate criteria for sharing (avoiding too costly agreements) and elaborate proposals for further specific studies about shared stocks management.

Industry leaders indicated that they would be willing to promote the idea of joint management. It was mentioned that the industry was already moving ahead trying to develop commercial agreements that would allow a coordinated exploitation across the fish species distribution range. The question is becoming more relevant as new actors (industrial entrepreneurs and new investors) were coming into the sector.

Practical understanding of the implications (operational etc.) of shared stock agreements and pilot projects would be extremely worthwhile. It was suggested that regional projects could take up the matter, and some activities are already planned under the Canary Current Large Marine Ecosystem Project (CCLME) and the EAF-Nansen Project. Small-scale fisheries pilot projects could also be very useful to test the possibility to develop shared stocks management between small-scale fishing communities of neighbouring countries exploiting the same coastal stocks (e.g. Mulletts, ethmalosa, etc). One such pilot project is planned under the CCLME.

The conduct of a Symposium at regular intervals to address shared stock issues at various scales also received strong support.

## CONCLUSION

The Symposium has contributed to building an overview of the information and knowledge available, for use in the management of shared stocks and fisheries. The management of shared fish stocks stands as one of the greatest challenges on the way towards achieving long-term sustainable fisheries. Properly managed, these stocks could potentially make significant socio-economic and cultural contributions to human well being. In this respect all countries should take initiatives to:

- Develop stable and robust research and management approaches;
- Institutional/administrative arrangements to implement the management decisions; including a multidisciplinary Working Group.

It is important to develop initiatives both at national and regional levels in parallel. The regional level is needed to mobilize political will and to motivate and assist those countries needing help to proceed.

## 6. SUGGESTED ACTION BY THE COMMITTEE

The Committee is invited to comment upon the relevance and importance of the outcomes of the Symposium and advise on priority actions by scientists, decision-makers and industry to promote shared stocks agreement, acting at national or sub-regional levels.