WP7 : Experts working group reports on content of pilot programmes

Report on MariFish D-7.3

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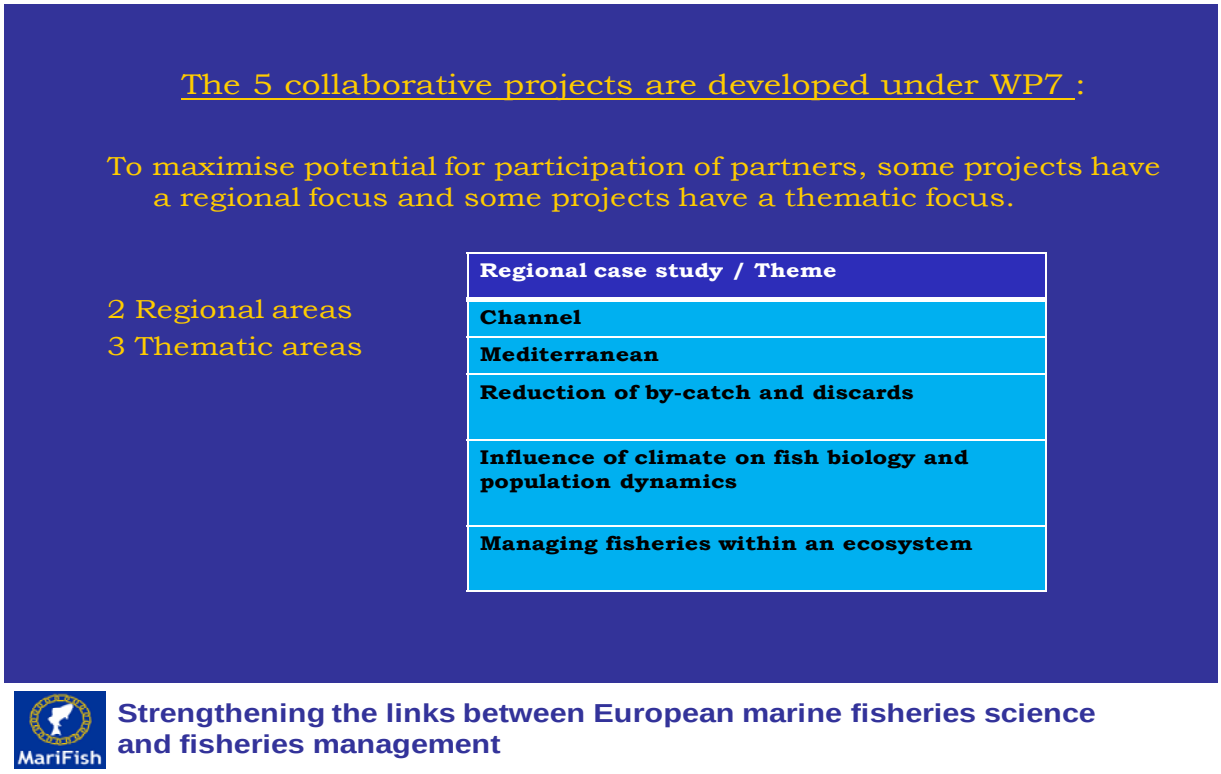
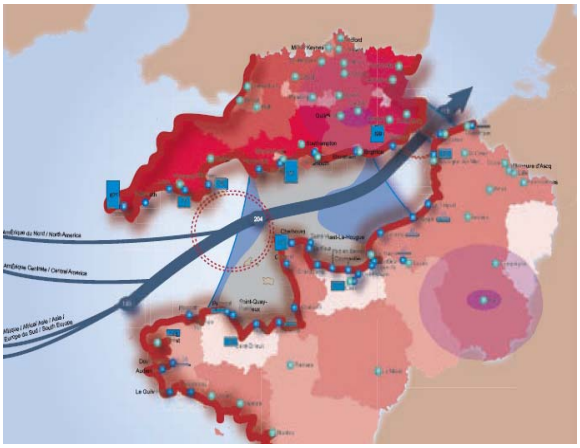
Introduction :

The 5 collaborative projects undertaken in the WP7 are now at various stages of implementation. One project has been fast tracked to help to develop successful protocols. The four others have been decided from WP6 during the 3rd Meeting of the MariFish Work Package Management Group - Athens, 6-7th February 2008.



I- Two regional areas

1) Fast track : Channel regional case study



Workshops :

- First meeting in June 2007 in Brussels
- Second meeting in Lowerstof in January 2008

- Research programme has been prepared between the partners
- A Memorandum of Understanding (MoU) was signed in accordance with the principles, common management, procedures described in the deliverable 7.1
- The main partners of the MoU are UK, Belgium, France, The Netherlands
- Ireland, Greece and Spain have signed the MoU as Observers

Content of pilot programme

The Partners intend to develop a joint regional programme titled : **"Towards adopting an ecosystem based approach for fisheries management in the Channel : spatial characterization and contribution to the management of fishing effects"**

The overall objective will be to identify the fishing effects on the Channel ecosystem and to propose possible management actions.
A strong regional collaboration between UK, The Netherlands, France and Belgium through their main national laboratories and Institutes: CEFAS, IMARES, IFREMER, ILVO) is achieved.
Disciplines such as ecology, population dynamics, fisheries sciences, technology and social economy are part of the consortium.

Summary of the programme

The English Channel is a remarkably rich area, from the abundance of living resources point of view and for the increase of human activities, making the marine ecosystem particularly sensitive. This area is a significant resource for fisheries because most European commercial species are abundant there, but also because of the presence of spawning and nursery areas and migratory routes linked to specific environmental characteristics. Therefore, any alteration caused by human activities of the environment may have serious consequences on living resource habitat quality, and hence on the survival of species and the functioning of the ecosystem as a whole. A recent and detailed study of habitats and their associated species becomes now essential to draw up a state of ecosystem to start evaluating the potential risks generated by such human impact.

Locations and extents of essential habitats for their high biodiversity or essential for the life cycle of species such as spawning grounds or nurseries will then be compared with the fishing effort distribution occurring at the same period in order to infer the level of pressure supported by these sensitive areas. Alternative scenarii to mitigate the impacts will be proposed by developing: i) new gear less destructive, ii) by mapping areas which need to be protected, iii) by regulating the use of the most destructive gears. Dialogue tools including scientific and empirical knowledge will be developed to contribute to sustainable management of the areas. This project will be a case study to support new European Fishery Policy, which is facing to the overexploitation of the target species, to the habitat destruction, to the biodiversity regulations and to the economic profitability in relation with the increase of the price of the energy.

General objectives of the programme

The general objectives of the project is to contribute to development of knowledge and their integrations to identify scenarii and their consequences to facilitate dialogues, to help the end users (fishermen, nature conservationist,) and the stakeholders to take the decisions to manage the common marine living resources of the common ecosystem: the channel. The objective is to build a systemic approach for the fisheries with a tentative of coupling sectorial approach in a multidisciplinary point of view which is very innovative at the international level to success to attrack scientists for the different disciplines to work together on the same case study for facilitating coupling of the different approaches and models.

The ecosystem approach puts emphasis on a management regime that maintains the health of the ecosystem alongside appropriate human use of the environment, for the benefit of current and future generations. Ecosystem approach to the fisheries is a step-by-step integration, moving from a single species management to the whole ecosystem management with the man in the center of this activity, it is a tremendous challenge to achieve to do this integration.

Sectorial objectives of the programme

The sectorial objectives are:

- to characterize and map the different benthic habitats at the regional scale and to identify crucial habitat or for life cycle of different species (spawning areas, hatcheries…) or for their richness in biomass or in diversity;
- to precise the human impacts on the marine living resources and habitats. Climate change impacts and the other anthropogenics consequences will be compared to analyse the economic values of the different ecosystem services;

- to describe, for each metiers, fishing activity and their social and economical pattern, with spatial and temporal variability analysed by satellite systems and to cross these activities with the habitat mapping to identify their impacts;
- to analyse and predict the consequences of fishing activity:
    - on the dynamic of populations of fishes with an application of multispecies approach,
    - on the benthic trophic web,
    - on the whole trophic chain;
- to define and preserve the ecosystem functionalities:
    - by an optimisation of the fishing effort,
    - by testing innovative gear to mitigate their impacts,
    - by developing a bio economic model to simulate for each metier their sustainability (profitability, employment and environmental impacts)

Added value / Scientific economic and technology

The proposed research theme through a pluridisciplinary approach should contribute to foster connections among ecosystem-oriented research teams working on the Channel:

- on line atlas of the fisheries métier,
- habitat mapping,
- report on fishing gears impacts,
- spawning grounds map,
- report on nurseries of the Seine estuary and in the Channel,
- prediction on effect of climatic change on coastal habitat
- dialogue tool for the ecosystem services with association of scientific knowledge, local knowledge and visions of the stakeholders,
- results of the model of responses of benthic and fish communities to fishing activity,
- management scenarii of demersal fisheries,
- benthic trophic functioning (new model),
- effect of fishing on the food web (new model),
- scenarii and maps for integration habitats, fishing pressure and conservation, (new model),
- development of fishing gears more environmental friendly.

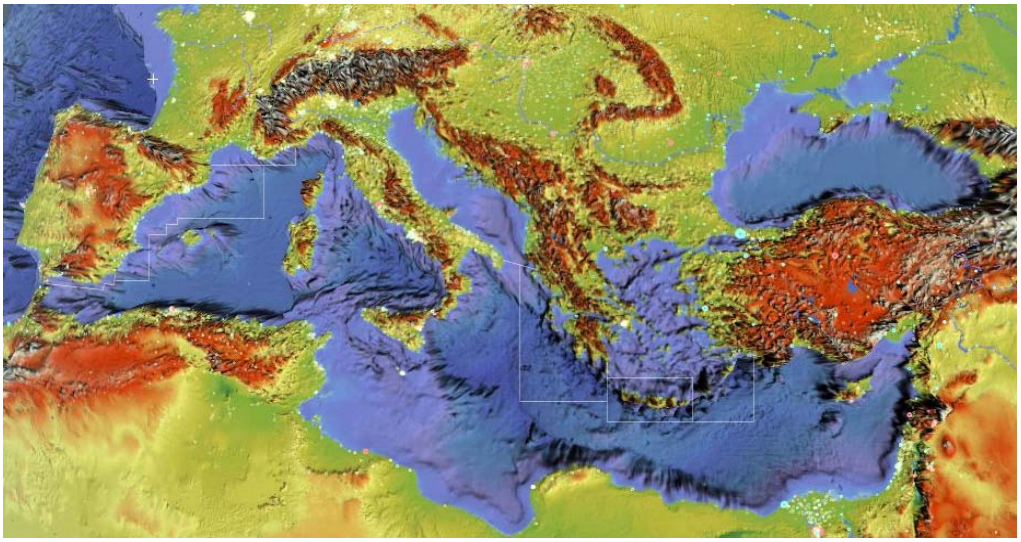
Evaluation procedure

The collaborative project is being evaluated by independent experts from UK, The Netherlands and France.

Next meeting is planned in September/October 2008 :

- To present the results of evaluations,
- to follow the scientific progress, to evaluate :
    - the exchange of data (habitat, biological communities, landings by metiers, distribution in space and time of the fishing effort…),
    - the exchange of methodology (habitat mapping, metier based approach, biodiversity indices, indicators, fishing impacts)
- and to identify selection procedures for thesis and postdoc.

2) Mediterranean regional case study



Workshops :

- First meeting in February 2008 in Athens
- Second meeting in Paris in June 2008

- A detail revision of the MoU has been previously validated by the different Partners.
- The main partners are Greece, France and Spain (maybe Cyprus)
- To participate in the study, an extension of the partnership with Italy and Croatia (not MariFish Members) is encouraged

Content of pilot programme

For the Mediterranean Sea, it appears clearly that except the common Data Collection Regulation programme, no common priorities between the national programmes were apparent. For these reasons the group developed a transversal approach to find common processes to study which can be applied to different species and different areas of the Mediterranean Sea, by merging the national programmes to a common Mediterranean ecosystem approach of fisheries.

The Partners obtained a consensus to develop a joint regional programme titled : **"Towards an ecosystem based approach for fisheries management in the Mediterranean: Essential fish habitats and their trophic interactions".** The decision of identification of the main topic is based on the existing knowledge on the subject, the latest trends in European Area research and technology and the similarities with the Channel Pilot Project so that in the future during the execution of both projects, knowledge and experience exchange will be possible to some extend.

During the second meeting, it has decided to focus more on some species, to determinate seven tasks and to identify who will coordinate each task:

1) Inventory of the programmes

It has been requested that each country will give in a table the detailed description of the national programmes addressing fisheries in the Med. Sea.

2) Fishery data

A general agreement has been obtained after a long debate on the necessity to have common access to data. Each country is in charge to certify the access to the data.
Obviously, UE data coming from the DCR are public and for all species as well as those obtained from the campaign "Medits". All the counties must make the data available to the partners of the MoU.

3) Large pelagic fish, such as bluefin tuna, albacore and swordfish :

Habitat mapping of the abundance of the fish will be achieved in relation with environmental condition. Evaluating catches by area needs to have access to VMS data. Tagging experiments developed by each country will be put together in the same common data base. This work will be done in strong partnership with the ICCAT secretariat.

4) Demersal fisheries :

The data will come from the Medits and it is underlined that there is no access to the data from some UE countries.
The previous coordinator of Medits will be in charge to build this common access data base. In case of difficulties, the WP7 leader will address a letter to DG MARE to facilitate this task.

5) Small pelagic fish, such as anchovy and sardine :

The abundance of small pelagics are estimated by acoustic methodology. Mapping of the habitat of small pelagics will be achieved in relation to environmental conditions. Habitat mapping will be based on a presence absence approach at different periods of the year

6) The environmental condition:

The environmental condition will be obtained using comprehensive remote sensing data's on the whole Mediterranean.
We have to contact CLS and discuss their condition in terms of funding, to give the access of satellite data's to all the Med. MariFish partners

7) Trophic relationships :

An inventory of the different laboratories or teams, very often from Universities, will be addressed with the different techniques such as stomach content, mass spectrometry, and analysis contaminants as tracers.
The modeling approach will be identified to address the following topics :

- impact of climate change on the trophic web and consequences for recruitment or juvenile survival
- effect of accumulation of pollutants from phytoplankton to top predators

The coordinators of each task should provide a draft by mid September 2008, so as to circulate among the different partners before the next Med. MariFish meeting which will be held in the IEO Center of Málaga, Spain in the week of 6-10 October.

II-Three thematic programmes

3) Reduction of by-catch and discards

Workshop :

- First meeting 12-13 June 2008 in Norwich,

- A detail revision of the MoU has been previously achieved by the different Partners,
- The main partners are Belgium, UK, Germany, France, Scotland, UK, Ireland and Poland.

Discussion on collaborative programme topics :

To develop a collaborative programme, participants discussed how the national projects could be linked and what areas would be most valuable for collaboration. Some participants favored a regional focus, whereas others viewed the thematic focus as important, to include all partners in this important research area. Existing work would form the framework of the overall programme, and any additional or new work would aim to focus on cross-cutting themes such as improving communication and dissemination to stakeholders and developing technologies for monitoring discards at sea.

- The MoU relates to research on the use of gear studies in reducing bycatch and discards
- The geographic area in which the work takes place is to be decided by the participating Partners

Thematic priorities have been identified :

- Develop innovative concepts
- Avoid duplication in research programmes
- Share unique expertise
- Contribute to enhanced fisheries management
- Increase scientific cooperation through:
  - *exchanging information on national priorities on a regular basis*
  - *mutual use of facilities and gear*
  - *sharing knowledge, data, investigative sea time*
  - *organizing workshops on topics within the theme*
- Exchange personnel where appropriate, including junior and senior scientists and technical experts

and potential topics could be:

- Predicting the implications for selectivity and discarding as a consequence of an industry shift towards more fuel-efficient fishing methods
- Addressing knowledge gaps in discard mitigation through gear modification
- Addressing knowledge gaps in fish behavioural studies related to mitigating discarding
- Facilitating knowledge transfer between industry stakeholders on discard-related issues
- Investigating the feasibility of setting up a regional discard atlas
- Developing new cod-avoidance schemes
- Developing new real-time closure schemes
- Investigating new technologies / approaches for recording discard data on board commercial fishing vessels (e.g. camera systems)
- Looking at ICES Sub-area VII Nephrops fisheries in relation to new EU initiatives on discarding
- Investigating spatial planning as a means of avoiding gear conflict

The priorities will be identified during the next meeting in autumn 2008.

4) Influence of climate on fish biology and population dynamics

On that topic a draft content of the programme has been addressed to the different MariFish members to develop the collaborative project.

Draft content of pilot programme

Despite current efforts and the general agreement of the scientific community on the close link between dynamics of small pelagic stocks and the pelagic ecosystem, most assessments of small pelagic fish continue to be carried out using mono-specific models that do not integrate explicit information on environment and/or spatial distribution of the target and related species. Environmental driven recruitment indexes were at the beginning of this century regarded as a way to predict recruitment and introduce environmentally driven variability in stock dynamics, but have so far proven to be most of the cases imprecise and prone to introduce bias in the assessment (e.g. failure in using recruitment indexes to predict Bay of Biscay Anchovy recruitment, ICES, 2003a; review of requirements for using environmental indexes in De Oliveira et al., 2005). Also, attempts to link small pelagic fluctuations directly with environmental indexes, using empirical studies, have provided unsatisfactory results, with relationships that can show some significance in parts of the time series, but fail in other, or after a revision of the analysis is done (see some criticism of empirically-based relationships between times series of pelagic fish abundance and environmental indexes in Freon et al., 2005). Fishery independent methods, which in some cases include some spatial and/or environmental information, are often used in assessment, but are in most of the cases assimilated in the model as mono-specific and spatially aggregated indexes, either for tunning (for example in ICA, XSA or AMCI models; Barange et al., in press; ICES, 2003b) or as the main source of information for the assessment model (for example in Bayesian' Biomass models, Ibaibarriaga et al., 2008). Finally, species interaction, including predator and prey abundance and activity, are not taken into account when assessing the evolution of abundance of a given small pelagic species, and are neglected by assuming constant natural mortality on the assessment models.

Under this framework, current techniques do not allow to integrate environmental and spatial information in the assessment, and therefore to improve the understanding of the combined effects of climate variability and fishing pressure in the fluctuations of small pelagic fish populations.

The objective of this project is to exploit the multispecific and spatially explicit information obtained by the fishery independent surveys currently being carried out around the Iberian peninsula, and to integrate this information in a coupled hydrodynamic-production-fishery model, using sardine and anchovy as key fish species in the ecosystem, but including information on the interaction with other pelagic species. The coupled model should allow to integrate the combined effect of human and environmental forcing on the stocks under different circumstances, and therefore take into account to some degree the possible effects of variations in climate in the studied populations.

Available data and state of the art

Spatial explicit estimates of abundance for sardine, anchovy, mackerel and horse mackerel can in principle be obtained from both acoustic and egg production methods. Some information on those stocks from both methods is available for the Iberian Peninsula area, although in different levels of spatial coverage and state of analysis. Advances on extracting spatial information from egg production and acoustic surveys, comparing the results and ultimately integrate them has been pursued within the ICES Working Group on Acoustic and egg production estimation of sardine and anchovy in ICES areas VIII and IX (WGACEGG). Also, information on trophic interactions between pelagic species is starting to be available from different ICES WG and in the main scientific literature. Hydrodynamics and production coupled models are currently the most promising approach to integrate environmental information and climate variability into the analysis of marine communities. Both trophodynamic (NPZ: Nutrient – phytoplankton – zooplankton + a fish module) and individual based models (IBM) of small pelagic fish have been already coupled with hydrodynamic models (e.g. a review in Werner et al., 2001, Bartsch and Coombs, 2004; Werner et al., 2007), although with different degrees of success.

The initial objectives of this project will be to evaluate the available information regarding the pelagic ecosystem around the Iberian Peninsula, especially in relation to hydrodynamics and trophic relationships, and taking sardine and anchovy as key species. Spatial analysis of the fishery independent surveys as well as the technical advances in integration of the different methods will be taken from WGACEGG and from other ICES dedicated groups. Then, a conceptual model of the goals, mechanistic hypothesis and main elements that the general pelagic model should include will be developed. The different available families of coupled models (IBM, NPZ, etc.) will them be evaluated to assess the best modeling methodology given the available data, hypothesis and objectives. Finally, an operational model will be implemented for the case of the Iberian Peninsula pelagic ecosystem, with sardine and anchovy as key species.

- Potential partners for this project include:
  - Institutes which are locally interested in the Iberian Peninsula and surrounding waters, and in the pelagic stocks in this area, such as IPIMAR, AZTI and IFREMER.
  - Institutes which are interested in coupled models of the pelagic ecosystem, with special regard to small pelagic fish: DEFRA, IMARES, IMR, etc.
  - Non EU institutes/universities specialized in coupled models: IMCS - Rutgers University (NJ)

The views of MariFish members are expected before the 20th July.
The first meeting is planned in November 2008.

5) Influence of climate on fish biology and population dynamics

For the fifth programme, a draft version of the collaborative programme has been proposed by Ireland at the Steering Committee. The actual presented version is not yet finalized and the concepts are too general to be addressed as a base for future actions of research in MariFish.