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Minutes of the second multi stakeholder event and survey (M6.3)

Deliverable D6.3: Report on the results of the 2° stakeholders event

Scientific project coordinator: Antonello Sala (CNR)

Main contributors: José Maria Bellido, Jure Brčić, Rosa Caggiano, Giuseppe Lembo, Erika Monnati, Antonello Sala, Svjetlana Krstulović Šifner, Maria Teresa Spedicato, Celia Vassilopoulou

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General information on the DISCATCH project

Starting date: 29/12/2013; End date: 29/06/2015; Duration: 18 months

Total project costs: 624,843 Euro; Requested Union funding: 499,875 Euro

Information on the partners

Partner 1 (CNR)

Consiglio Nazionale delle Ricerche, Istituto di Scienze Marine (CNR), Largo fieria della Pesca, 2. 60125 Ancona (Italy)

Internet site: www.ismar.cnr.it

Contact person responsible for the organisation of the project's work (the coordinator): Antonello Sala

Telephone: +39 071 2078841 (+39 328 3070446). E-mail address: a.sala@ismar.cnr.it

Contact person responsible for the accounts, financial reporting, and the internal handling of EU funds and national co-financing (The financial manager): Mauro Marini

Contact person responsible for verifying the legality and regularity of the expenditure (the controller): Simona Franguelli

Partner 2 (HCMR)

Hellenic Centre for Marine Research (HCMR), Leoforos Athinon-Souniou, 46.7 km. 19013, Anavissos, Attica (Greece)

Internet site: www.hcmr.gr

Contact person responsible for the organisation of the project's work: Vassiliki Vassilopoulou

Telephone: +30 21 09856706. Fax: +30 21 09811713. E-mail address: celia@hcmr.gr

Contact person responsible for the accounts, financial reporting, and the internal handling of EU funds and national co-financing (The financial manager): S. Kastrinakis

Contact person responsible for verifying the legality and regularity of the expenditure (the controller): P. Koussoulides

Partner 3 (IEO)

Instituto Español de Oceanografía (IEO), Corazón de María, 8. 28002, Madrid (Spain)

Internet site: www.ieo.es

Contact person responsible for the organisation of the project's work: José María Bellido

Telephone: +34 96 8180500. Fax: +34 96 8184441. E-mail address: josem.bellido@mu.ieo.es

Contact person responsible for the accounts, financial reporting, and the internal handling of EU funds and national co-financing (The financial manager): Mariola Menendez Company

Contact person responsible for verifying the legality and regularity of the expenditure (the controller): Mariola Menendez Company



Partner 4 (UNIST)

University of Split, University Department of Marine Studies (UNIST), Livanjska, 5. 21000 Split (Croatia)

Internet site: www.unist.hr

Contact person responsible for the organisation of the project's work: Svjetlana Krstulović Šifner

Telephone: +385 21 558227. Fax: +385 21 558257. E-mail address: ssifner@unist.hr

Contact person responsible for the accounts, financial reporting, and the internal handling of EU funds and national co-financing (The financial manager): Jadranka Perkov

Contact person responsible for verifying the legality and regularity of the expenditure (the controller): Branka Ramljak

Partner 5 (COISPA)

COISPA Tecnologia & Ricerca (COISPA), Via dei Trulli, 18. 70126 Bari (Italy)

Internet site: www.coispa.it

Contact person responsible for the organisation of the project's work: Giuseppe Lembo

Telephone: +39 080 5433596. Fax: +39 080 5433586. E-mail address: lembo@coispa.it

Contact person responsible for the accounts, financial reporting, and the internal handling of EU funds and national co-financing (The financial manager): Giuseppe Lembo

Contact person responsible for verifying the legality and regularity of the expenditure (the controller): Achille Surico

Partner 6 (RACMED)

Associaz. Consiglio Consultivo Regionale del Mediterraneo (MEDAC), Via Nazionale 243. 00184 Rome (Italy)

Internet site: www.med-ac.eu

Contact person responsible for the organisation of the project's work: Rosa Caggiano

Telephone: +39 06 48913624. Fax: +39 06 60513259. E-mail address: r.caggiano@racmed.eu

Contact person responsible for the accounts, financial reporting, and the internal handling of EU funds and national co-financing (The financial manager): Rosa Caggiano

Contact person responsible for verifying the legality and regularity of the expenditure (the controller): Erika Monnati



Description of the DISCATCH project

Conservation standards for sustainable exploitation, within an ecosystem approach to fisheries management, increasingly urge the elimination of the wasteful practice of biomass discarding at sea. Understanding the reasons for discarding and identification of solutions to tackle the bycatches of unwanted species and specimens is essential if discards are to be eliminated, without affecting the minimum requirements of conservation standards.

To strengthen the scientific basis for the ecosystem approach to fisheries management the EU requires knowledge on the impact of fishing on the structure, functioning and services of the ecosystem as well as on the socio-economic aspect of innovations in fisheries technology and management. The current project will provide this basis. The success of this multi-disciplinary project, however, will critically depend on a clear a priori understanding of how these different topics are inter-linked and fit into the overall framework of the project.

The aim of DISCATCH (Pilot project on catch and discard composition including solutions for limitation and possible elimination of unwanted by-catches in trawl net fisheries in the Mediterranean) will be to support the identification of viable solutions to address factors determining the catches of unwanted species and specimens in trawl fisheries with a view to reducing unwanted catches and eliminating discards. The main objectives of DISCATCH are:

- to provide an overall assessment of the fishing fleet discarding behaviour and to identify the main reasons for discarding in Mediterranean continental shelf demersal and small pelagic trawl fisheries.
- to identify measures, including technical ones related to fishing gear characteristics, to mitigate or eliminate bycatches of unwanted species and measures to eliminate discarding based on existing or new measures.

DISCATCH will cover seven non-adjacent Mediterranean sub-regions, as identified by the FAO Statistical Divisions, within the Western, Central and Eastern Mediterranean Basin, where relevant demersal and small pelagic trawl fisheries occur. For every Mediterranean sub region covered by this proposal, project will provide:

- a comprehensive review and analysis of scientific papers and technical reports covering fisheries for demersal and small pelagic fisheries in the selected area;
- a description of commercial yields, discard rates, selectivity parameters in relation to different mesh sizes/shapes and/or net structures through existing simulation models;
- a comprehensive analysis of the relevant data collected through the Commission Decision No 2010/93/EU adopting a multiannual Community programme for the collection, management and use of data in the fisheries sector. Where applicable, data shortcomings will be described in detail, and if needed, scientific surveys on board of commercial vessels to address such shortcomings will be performed;
- statistically significant sea trials, both for demersal and small pelagic trawls, supplemented by predictive simulation models to test the use of different mesh sizes, shapes and net structure.



Venue, date and participants of the last Stakeholders meeting

The last stakeholders meeting of the DISCATCH project took place on the 11th June, at the Ministry for Agriculture and Environment in Madrid (Spain). The event was held in the “Salon de Actos”, a theater shaped conference room equipped with a projector for presentations, and built-in interpreters booths to furnish interpretation from/into: IT, EN,FR, ES. Susana Sainz-Trapaga (WWF), members of the AC (Advisory committee) was also present. The complete lists of participants is attached to this document. Members of the following National Administration also attend the meeting: Malta, Italy and Spain.

Table 1: Agenda of the last Stakeholder meeting

Hour	Description	
09:30-09:45	Welcome and Opening Speech	RC (MEDAC)
09:45-10:15	Multi Criteria Decision Analysis (MCDA) Survey among Stakeholders - presentation	GL (COISPA)
10:15-11:00	Questions and discussion	<i>All participants</i>
11:00-11:15	Coffee break	
11:15-13:00	MCDA survey to assess multi-stakeholders experiences and perceptions on key issues for the economic and environmental sustainability, such as avoiding by catches and reducing discards, improving ecosystem state and yield in the long-terms	GL (COISPA)
13:00-14:00	Lunch	
LIMITATION AND POSSIBLE ELIMINATION OF UNWANTED BY-CATCHES IN TRAWL NET FISHERIES IN THE MEDITERRANEAN		
14:00-15:00	Discards modelling	JMB (IEO) CV (HCMR)
15:00-15:20	Experimental and theoretical size selectivity	AS/JB (CNR/UNIST)
15:20-15:40	Forecasting the effect of different mesh sizes/shapes scenario on the commercial yields, discards rates and economics	MTS (COISPA)
15:40-16:30	Questions, discussion and conclusions	<i>All participants</i>



Welcome and Opening speech

RC welcomed the participants and before starting the meeting, she reminds the channel for the language of interpretation. She also thanked the representative of the EU and National Administrations. She reminded of the aim and scope of this project and left the floor to GL the responsible for MCDA survey.

Multi Criteria Decision Analysis (MCDA) Survey among Stakeholders - presentation

GL took the floor, while RC and EM circulated the questionnaires among participants, explaining that the MCDA is a type of analysis developed to assess multi-stakeholders experiences and perceptions on key issues for the economic and environmental sustainability of the fishery, such as avoiding by catches and reducing discards, improving ecosystem state and yield in the long-terms. In addition he pointed out that one of the aim of the MCDA is to investigate on economic and social consequences of the discarding practice as well. GL explained that one of the pillars of the new CFP is the participation of stakeholders, not only those who live by fishing but all those who have an interest in the marine environment, so he encouraged all the participants to answer the questions in the survey. To encourage a much wider participation the survey has been distributed in the Italian, French, Spanish and English version.

Before showing the structure of the questionnaire, GL clarified that the methodology used is the participatory approach one: it requires that stakeholders, i.e. fishermen and ship-owners associations, environmental organizations, labour organizations and other sectors, are enabled to express their qualitative and quantitative perception of the current situation being aware of the conceptual basis of the European scientific evaluation framework, the role of indicators, the information they are able to convey.

The survey is based upon two scenarios (n°1 and n°2) which are aimed to understand how stakeholders perceive the alternative management options, how they rank the importance of the economic, social and biological factors affecting the fishery and what level of utility they assign to the different biologic, economic and social indicators.

The **Scenario 1** is structured to understand how stakeholders regards the framework used at the EU level and the evaluation of the economic/biological consequences. The survey is carried out according to the following conceptual framework. First the common objective is defined: to contribute to the sustainable fishery management. Then, the main components are identified: the ecological state (safe level of reproductive potential, conservation of abundance and biodiversity and preservation of the size structure of the fish); the impact/pressure (monitoring the mortality, the fishing intensity and the reduction of discards); the economic component (maximize revenue and improve cost efficiency).

The objective of the **Scenario 2** is to understand the perception that stakeholders have regarding the potential effects of decisions derived by the implementation of a pool of management measures, given a set of defined ecological, economic and social criteria/factors.

GL finally explained how to fulfill the questionnaire and how the scores are calculated, by giving practical example. He then asked if more clarifications were needed and left the floor to participants



Questions and discussion

The representative of CNPMEM (France) asked whether it was deliberate not to include factors such as climate change, spillage, dumps and drillings, other than fishery in the questionnaire.

GL replied that it is well known that many factors affect the state of the stocks in addition to the fishery activities. However, this survey comes in the context of a research project on the effects derived by the application of technical measures to the commercial fishing.

The MEDAC Chairman pointed out, that although there are many other factors affecting the state of the fishing stock, this survey is a chance to quantify fishermen perceptions on the issue of discards.

The representative of CRPMEM LR (France) outlined the complexity of the questions and request few more time to think it over to avoid giving contradictory answers to questions that apparently seem similar to one another.

The representative of the Cofradías de Alicante provided an example of how fishermen had been useful to the environment, when bottom trawlers had been used to clean up the sea bed from plastic products that have been collected and recycled.

The MEDAC Chairman started to fill in the questionnaire as an example to verify that everyone understood correctly how to answer the comparative questions. In fact the scale of the answer goes from 1 to 5 so that it varies accordingly to how strong one variable is considered important respect to another one. He then gave an example: if the objective is to have no discards then the answer should be a 5 on the "reduce discards" side.

Several more request of clarification on specific parts of the questionnaire, especially on how to rank some of the questions related to Scenario 2 were raised, in particular on the "maintenance of the employment level and optimization of costs". The MEDAC Chairman clarified that Scenario2 objective is to give a set of priorities and not a comparison.

The set of question in the Scenario 2 referring to "keeping the status quo" created a lot of doubts and many participants asked for more clarifications. MTS specified that the maintenance of the status quo applies to the current management strategies.

The MEDAC Chairman closed the debate pointing out that, in case, somebody needed more time to think it, it would be possible to send replies to MEDAC secretariat, within one week of the end of this meeting. He also reminded that on June 24, the EFCA invited MEDAC to the seminar on the implementation of the landing obligation and therefore encouraged members to send their contribution on the perception and the recordings in the logbooks, replying to the email already sent by the Secretariat.

GL closed the morning session by thanking everyone for participating and filling in the questionnaire and welcome Jose Maria Bellido from IEO to give his presentation on the results of the Work Packages (WP) 2.



Discards modelling

JMB introduced the WP2 (Data Collection Framework analysis) with its three tasks:

- Task 2.1. Analysis of the discards data in pilot GSAs of the western, central and north-eastern Mediterranean (e.g. GSA6, 5, 18, 16, 10, 22 or other). Task responsible : Ana Carbonell (IEO). Participants: Partner 2 (HCMR), Partner 3 (IEO).
- Task 2.2. Discards modelling. Task responsible: Isabella Bitetto (COISPA). Participants: Partner 2 (HCMR), Partner 5 (COISPA).
- Task 2.3. Bayesian spatial modelling of discards and by catches. Task responsible: Jose Maria Bellido (IEO). Participants: Partner 3 (IEO).

Task 2.1 and tasks 2.3 were presented by Jose M^a Bellido whilst Task 2.2 was presented by CV.

The WP objective were

- To identify gaps and weaknesses in monitoring programmes recording catches, landings and discards, and focusing particularly on those implemented through the DCF;
- To improve the understanding of the characteristics of the discards data collected through the DCF in pilot GSAs of the western, central and north-eastern Mediterranean (e.g. GSA5, 6, 10, 16, 17, 18, 22); to compare the characteristics of shelf- and upper slope-discards in the GSA16.
- To predict the effects of factors related to changes in selectivity/fishing pattern;
- To study discards in a spatial scenario by a Bayesian model which can provide estimates of discards, shifts and factors driven discards in a spatial scale;

Task 2.1 produces the deliverables D2.1. A review document on assessment of Mediterranean fishery monitoring programmes and implementation, focusing particularly in discards and bycatch issues. Submitted in Month 12 (January 2015). The main outcomes of this task is an assessment of observer coverage (days at sea), spatial coverage, and temporal coverage. Also we evaluated potential source of bias sampling frame and observer procedure by making use of a scorecard, with a traffic light criteria.

Task 2.3 produces the deliverables D2.3. Draft paper for a peer-reviewed journal on Bayesian predictive discards abundance and identification of factors driven discards in a spatial-scale in selected Mediterranean European fisheries. Submitted in Month 16 (April 2015). The main outcome of this task is to build an hierarchical Bayesian spatial-temporal model to estimate and predict the distribution of discards by incorporating the environmental and technical features of each fishing location.

CV presented the deliverable D2.2.on behalf of Isabella Bitetto. This task aimed at identifying drivers of discarding in the Italian and Greek (GSAs 18 and 22) bottom trawl fisheries based on data collected on board commercial vessels. The final analysis focused only on three species (deep water rose shrimps, hake, and horse mackerels) since the frequency of hauls with zero discards was very high for two more species (red mullet and Norway lobsters) that were initially considered.



The methodology that was applied, i.e. Generalised Additive Models, explained a satisfactory level of the deviance in the available data (50% to 85% in GSA 18 and 63% to 89% in GSA 22) and allowed to evaluate the effects of seasonal and interannual variations, spatial (depth and geographical position), technical (e.g., duration of fishing operation) and other (mean length in the catch, size of marketable and total catch) factors on fisheries discards. Both in Southern Adriatic (GSA 18) and in Aegean Sea, as expected, a decrease in discards quantities and ratios was shown to be related to an increasing mean length in the catch for all the species analysed.

According to the results obtained in GSA 18, the discard process is closely linked to the recruitment, both in a seasonal and in a spatial point of view: indeed, for all the final models for which the month resulted significant, an increasing effect on discard was detected during the recruitment period. In contrast for GSA 22 no seasonal effect linked to recruitment period was indicated. Moreover, locations with higher discards detected by the final models overlapped to some extent to the persistent hotspot detected in MEDISEH project in both areas. These results could highlight the potential importance of spatio temporal closures as a measure for minimising discarding of certain species.

Depth related patterns in discarding were also identified and seem to be linked to habitat preferences of species and their different life stages. In addition, higher (total or marketable) catches as well as increased haul duration seem to generally produce higher discards, which can be attributed to either the proportionality of discards with landings and/or the relatively worse condition of the catch in the cod-end. It is the first time that such an analysis was performed in the Mediterranean Sea, while the results were often in line with what reported in the study area and in other fisheries.

The representative of OCEANA asked in what percentage discards decrease where nursery areas were closed. CV replied that it depends on the species, for hakes, for example, it is very important to protect the nursery areas.

Experimental and theoretical size selectivity

AS gave an introduction to the presentation, where he explained how JB is going to talk about the fish selectivity in trawls, and after him he will continue with the presentation of the results for the crustacean selectivity. JB started by explaining how selectivity studies are traditionally made by conducting a series of sea trials which are economically costly and time consuming. Because of these limitations the DISCATCH project is trying to evaluate size selectivity of different species using the FISHSELECT method. This method is a combination of laboratory experiments and computer simulations. The first step is to collect the morphology of a target species, mainly cross-sectional shape of the maximum head and body girth, using the special tool called "*morphometer*".

This tool allows digitalization and approximation of different cross-sections with different parametric curves. When the shape of the cross section is determined, the relationship between maximum girth and total length of a fish is used to create virtual population. In second step of the FISHSELECT method, a range of mesh sizes and mesh openings for diamond, square and hexagonal meshes is created in order to fish previously created virtual population. The objective of this approach is to establish a morphology based model for the prediction of size selectivity for a range of netting configurations relevant to the Mediterranean bottom trawl fishery.

Simulation-based results are then compared and validated using the historical experimental selectivity from the literature. The same approach is followed in the crustacean selectivity, but since crustaceans behave differently in the net during the catch process, additional modes of escapement have been tested. The size selection predicted by FISHSELECT is used to produce design guides in the form of iso-curves for L50 values (length at which organism has 50% chance of being retained in the gear) dependent on mesh size and mesh opening. These curves can then be used by fisheries managers and other stakeholders as a scientific basis for future decision making.



Forecasting the effect of different mesh sizes/shapes scenario on the commercial yields, discards rates and economics

MTS presented the model simulation approach.

BEMTOOL is a bio-economic simulation model conceived as a platform (incorporating 6 operational modules: Biological, Pressure, Economic, Behavioral, Policy/Harvest Rules and Multi-Criteria Decision Analysis – MCDA) able to simulate the effects of management measures and/or harvesting strategies in the short, medium and long-term (e.g. fishing effort limitations, mesh size restrictions, closed season). The BEMTOOL platform allows optimal solutions in terms of fishing effort and/or catches, maximizing the sustainable production while avoiding discard and overfishing.

In order to assess the impact of different management scenarios derived from the application of recommendations from scientific advice, BEMTOOL model has been applied to several case studies in the Adriatic Sea and Mediterranean.

The main stocks identified for the GSA 17 small pelagic case study are *E. encrasicolus* and *S. pilchardus*. Both stocks are shared among the countries of GSA 17 (Italy, Croatia, Slovenia). The main fishing gears targeting anchovy and sardine are pelagic trawls and purse seines. No 8 fleet segments targeting the selected stocks were considered for this case study.

According to state of exploitation of anchovy and sardine in GSA 17, 7 forecast scenarios have been performed in order to evaluate the consequences of several management strategies in terms of costs and benefits on the stocks and on the productive and economic performances of different fleet segments.

The scenario that allow to reach the highest overall utility, for both environmental and economic purposes, is the reduction (20%) of F , towards the reference point of sardine ($E=0.4$) in 2018, of the same percentage in all the fleet segments, applied only to fishing days. While the lowest utility is given by the reduction of F , towards the reference point of sardine ($E=0.4$) in 2020, with percentages proportional to the impact of each fleet segment on the sardine stock, applied half to fishing days and half to the number of vessels withdrawn.

The MEDAC Chairman closed the meeting by thanking all the participants for their contributions and the interpreters for their precious collaboration and informed the floor that the survey is already available on the reserved area of MEDAC web site.