STAGES

CONNECTING SCIENCE TO POLICY FOR HEALTHY SEAS

STAGES - Science and Technology Advancing Governance of Good Environmental Status

WORKSHOP REPORT

Workshop on research needs with regard to the socio-economic analysis under MSFD

Joint Research Centre of the European Commission
9-11 October 2013

www.stagesproject.eu

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Table of Contents

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1. Introduction and background

The STAGES project is a specific support FP7 action addressed to facilitate the implementation of the Marine Strategy Framework Directive (MSFD), and specifically to assist Member States with marine territories to achieve Good Environmental Status (GES) by 2020. The STAGES project has three key objectives:

- Make the knowledge generated through EU and national research funded activities with relevance to MSFD objectives widely accessible to policy and decision makers and to MSFD stakeholders (associated with Work Package 2);
- Identify the needs for further research to improve the scientific underpinning for the implementation of the MSFD (associated with Work Package 3);
- Provide concrete, pragmatic and ready-to-use recommendations on the development of an effective European science-policy platform to support implementation of the MSFD (associated with Work Package 4).

Framed in STAGES WP3, and to support requirements for Member States established in articles 8, 11, and 13 of the Directive (assessment, determination of GES, establishment of environmental targets, monitoring and measure programmes) STAGES is organising a series of three workshops with the following aims:

1. *The identification of research needs with regard to the implementation of monitoring programmes (STAGES Task 3.3)*
2. *The identification of research needs with regard to the pressures and their impacts on marine ecosystems (STAGES Task 3.2)*
3. *The identification of research needs with regard to socio-economic analysis (STAGES Task 3.4)*

The present document reports on the outcome of the workshop dedicated to socio-economic analysis.

Under Grant agreement no 308473.

2. Objectives of the workshop and expected results

The objectives of the workshop on the identification of research needs with regard to socio-economic analysis were:

- To share the State-of-the-Art knowledge on socio-economic analysis (specifically in relation with the two MSFD 'human constructs': environmental targets and programmes of measures);

- To identify knowledge gaps and research further needs (incl. cost-benefit analysis) that would improve the assessment of the social and economic impacts of achieving GES under the MSFD.

The expected result of this workshop was a synthesis of knowledge gaps and needs for further research to support improved and more efficient socio-economic analysis under the MSFD.

The workshop report will serve as the basis for the science policy reports on needs for further research for the implementation of the MSFD that will inform future research programme managers/decision makers. The outcome of the workshop was presented at the Working Group on Economic and Social Assessment (WG ESA) meeting for further prioritisation and feedback.

3. Methodology

The workshop took place from 9-11 October 2013, with a duration of two half-days (9 and 11) and one full day (10). The venue for the workshop, was the Joint Research Centre (JRC) of the European Commission in Ispra, Italy (see Annex 1 for the workshop agenda).

Prior to the workshop, a set of questions (see box below) that would help in the identification and prioritisation of knowledge gaps and research needs was distributed to each of the invited experts, including those who couldn't attend the meeting. The outcome of this consultation process was used to orientate the workshop discussions.

Both in the questionnaire and during the workshop, effort was made to identify gaps and research needs from a scientific perspective, as well as from Member States' views after completing their initial assessment. Due to the fact that the EC-established Working Group on Economic and Social Analysis (WG ESA) had a meeting a week after this workshop, a number of Member State representatives could not come to Ispra to share their national experience. One of the participants (R. van der Veeren), however, volunteered to present a very preliminary draft of the STAGES workshop outcomes (i.e. list of research needs) to the WG ESA meeting and to collect feedback from additional Member State representatives. These additional comments have been integrated into this report.

QUESTIONNAIRE	
Q1	Please identify (on Member State or macro-regional level): in relation to the MSFD implementation what are the problems of the most immediate social and economic impact known to you (if possible link with GES descriptors)?
Q2	Please identify good practices in data architecture and storage that could enhance interoperability and recommend how to improve the collection of economic statistics for marine and maritime activities;
Q3	Please outline in your expert opinion the expected role that socio-economic analyses will play (in theory and practice) in the implementation process of the MSFD;
Q4	Please list main knowledge gaps with regard to social and economic analysis under the MSFD – if possible point their relations to the future Programmes of Measures (e.g. economic models for the selection of the most cost-effective options) or other economic elements of the MSFD (e.g. economic models to assess exemptions based on the disproportionality principle);
Q5	Please identify 3 to 5 priority needs in social and economic sciences to inform research programme managers and decision makers. If possible indicate: - Estimated time frame for expected results - Whether there is a need for legislative push - Expected potential of research fulfilling policy need (usability at the short term by Member States)

4. Workshop dynamics and contents

The meeting was chaired by Wojciech Wawrzynski (ICES) and Manuel Lago (Ecologic Institute). After a welcome address by the JRC and presentation of the participants, the chair informed the meeting about the STAGES project by presenting its informative video (available at http://www.stagesproject.eu), as well as its deliverables and future work. The meeting was then divided into an introductory and a technical section with presentations accounting for the first half of the meeting duration:

Introductory section

- Presentation of DG Environment report (presented by JRC)
- Expected role of the socio-economic elements of MSFD to inform policy decisions or help implementation
- Presentations of the socio-economic experiences in support of European Seas Action Plan and other integrated coastal and marine management plans
- Lessons learnt from the economic analysis under the Water Framework Directive (WFD) and MSFD Initial Assessment

Technical section with presentations on the following topics:

- Socio-economic data/statistics for marine and maritime activities
- Development of baselines, methods and tools to evaluate cost of degradation (cost-based approach, ecosystem services approach)
- GES objectives and programmes of measures - implications for the economic analysis under the MSFD (cost-effectiveness, cost-benefit analysis and multi-criteria analysis)
- The use of valuation studies and exemptions – tools and implications

It is expected that all presentations will be made available on the STAGES website, http://www.stagesproject.eu.

The second half of the workshop was entirely dedicated to discussion to identify the main knowledge gaps and the most important research needs with regards to social and economic assessment under the MSFD. It was agreed that the questionnaire responses would be used as the basis for discussions. The responses on research needs were organised into thematic categories (see section 5 below) to minimise overlaps and prepare ground for further breakout group discussions on the socio-economic research needs that would best address the implementation of the Direc-

tive by individual Member States.
In each group discussion, prioritisation of the research needs was conducted according to the following criteria:

- MSFD implementation relevance (high, medium, low, None; Why?);
- Expected time line (long-, medium-, short-term; *realistic time frame to fill in knowledge gaps and deliver to policy makers?);*
- Is it required elsewhere? Is it a crosscutting research need? *(yes/no?, discuss)*;
- Is it also needed under other EU policies/strategies/actions? *(yes/no?, discuss)*

On the final day, the workshop reconvened in plenary to discuss and finalise the overall workshop output. The Rapporteur of each breakout group presented their results, followed by open discussion on the suggested outcomes and amended as appropriate for approval by plenary.

5. Results: identified main knowledge gaps and prioritised research needs

5.1 Summary of the questionnaire replies (see section 3 for questions)

A total of 12 replies were received out of 29 questionnaires sent out to all participants, as well as invited experts who couldn't attend the meeting.

Q1: *In relation to MSFD implementation, identify main issues associated with social and economic impact*

The question has been tackled under different angles: socio-economic impact of non-achievement of GES; and socio-economic impacts of the Programmes of Measures to achieve GES. In both cases, however, a precise answer to the question remains a difficult task because of too many unknowns related to both the definition of GES, and knowledge gaps in linking ecosystem issues to drivers and pressures. Nevertheless, shipping, fishing industry, oil and gas production, and tourism have an undoubtedly large impact on the environment (affecting various descriptors, incl. biodiversity) and thereby the services provided to humans. In turn, managing these activities with the objective of achieving GES will have important socio-economic impacts (e.g. reduction of fishing fleet capacity for safeguarding fish stocks or closing down fishing grounds for sea bottom protection measures resulting in unemployment in the fishery sector). Marine litter has a direct and important impact on recreational activities; measures to reduce that issue will have an economic impact (e.g. reducing micro-plastic products in cosmetic industry). For specific EU seas like the Mediterranean and Black Sea, the implementation of the MSFD in relation to the management of marine transport and ports (D10, D11, and D8) could redirect marine traffic in benefit of non EU States, with socio-economic implications in EU countries.

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Q2: *Identify good practices in data architecture and storage, and how to improve collection of economic statistics for marine and maritime activities*

It is a common feeling that national statistical systems are useful but often not designed to focus on marine and maritime activities, such that it is difficult to separate coastal from land-based activities. There is also limited data availability concerning a number of sectors. Maritime companies hold and process data that are relevant to socio-economic analyses under the MSFD. However, these data remain inaccessible. Therefore, the development of a common economic database for marine and maritime industry at the European level will be very useful for the implementation of the MSFD, as well as for other fishery and maritime regulations such as Integrated Coastal Zone Management and the Common Fisheries Policy (CFP).

EUROSTAT could play a significant role by improving methods and data collection for marine and maritime activities, starting with a European-wide and harmonised definition of coastal areas. Other recommendations include a statistical nomenclature smaller than NUTS 3 regions[1] and a more distinct EU NACE (Statistical classification of economic activities in the European Community[2]) classification system such that economic activities could be clearly divided between marine, mainly marine and partially marine sectors.

At the conceptual level, the commonly adopted Driving Forces-Pressures-State-Impacts-Responses (DPSIR) framework may have serious limitations for the organisation of information including natural and social science. Alternatives for a better social-ecological accounting framework may be desired, e.g. to account for a change in human welfare (use and non-use values) following a change in the state of the environment, or to make the behaviour of various actors more visible.

Q3: *Outline expected role of socio-economic analyses in the implementation process of MSFD (theoretically and practically)*

In theory, socio-economic analyses can be used to support decision making processes by providing information on the trade-offs between positive and negative impacts of policy alternatives such as the MSFD. They are essential for the development of MSFD Programmes of Measures and their subsequent revisions, for ascertaining exemptions, as well as optimising monitoring programmes. Approaches such as cost-effectiveness and cost-benefit analyses are used to eval-

[1]Eurostat, 2011. Regions in the European Union – Nomenclature of territorial units for Statistics. NUTS 2010.EU-27 (http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-RA-11-011/EN/KS-RA-11-011-EN.PDF)

[2]http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:Statistical_classification_of_economic_activities_in_the_European_Community_(NACE)

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uate the ecological and economic consequences of past interventions and to plan future actions. In short, socio-economic analyses represent an essential component for an integrated approach to the MSFD providing a full overview of activities and their economic and social relevance.

In practice, these analyses can be difficult to achieve in full monetary terms, mainly because of data limitations. There are significant gaps in our understanding of how the marine ecosystem is functioning, making it difficult to quantify the impacts of measures on the marine environment. For some descriptors, these analyses might require use of numerical models integrating economic and ecological data and processes (ecological-economic models). These models are quite demanding and will contain several sources of uncertainties such that the results cannot be interpreted without some limitations. Therefore, it is expected that, depending on the tools available, Member States will be using a variety of different approaches and methods to meet the requirements for cost-effectiveness and cost-benefit analysis. In any case, a stronger cooperation between natural scientists and economists is highly recommended, as well as the use of alternative semi-quantitative approaches where full monetisation solutions are not possible (cost-benefit/efficiency analyses, disproportionality assessments, cost of degradation).

Q4: *Knowledge gaps with regard to social and economic analysis under the MSFD*

The MSFD requires that socio-economic analyses are carried out at each step of its implementation. These requirements can be summarised as:

- Initial Assessment: economic and social analysis of the use of marine and coastal waters and cost of degradation of the associated environment;
- Programme of Measures: economic impacts of measures, cost-benefit/cost effectiveness analyses;
- Member State exceptions: cost disproportionalities;
- Environmental targets: associated social and economic concerns.

These analyses are confronted by a number of knowledge gaps as listed below under different headings:

Conceptual gaps

- Lack of a common framework for information (integrating natural and social knowledge);
- Unclear definitions of GES (descriptor-specific);
- Sustainable ocean: How to bring about change? Production and consumption as well as economic and income possibilities;

Knowledge gaps in the cause-effect relationships

- MSFD descriptor linkages to individual drivers and pressures;
- Link between uses of the sea and the ecosystem and its services;
- Further steps to help reduce scientific uncertainties with regards to pressure/ state relationships in order to improve our understanding of the link between measures and pressures;
- Sensitivity of the quantity of ecosystem service provision in response to major stressors (e.g. climate change);
- Prediction of the ecological and economic consequences of measures (e.g. effectiveness of measures);

Methodological gaps

- Agreement/compromise on valuation methods, in the sense that: i) valuation methods are not commonly accepted by policy makers in the various Member States; and ii) there is a lack of information sharing and/or consensus with regards to methods that do not rely on monetary estimates;
- Identification of relevant measures available for consideration in the economic analysis;
- Common methodology for the prediction of a Business as Usual (BaU) development;
- Understanding and measuring the socio-economic impact of some descriptors (e.g. noise);
- How to account for uncertainties, risks and stochastic events in numerical cost-effectiveness and cost-benefit analysis;
- Monetary valuation of external effects on ecosystem services (loss and benefits of social welfare);
- Monetary valuation of impacts on ecosystem services;

Gaps regarding available data

- Availability of, and access to, data on marine use and non-use values;
- Data quality control mechanisms and procedures;
- Lack of data on the contribution of marine ecosystems to human welfare;
- Information on conflicts of interest between different sectors;

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Q5: *Research needs with regard to social and econmic analysis under the MSFD*

According to the knowledge gaps identified above, a number of research themes or actions have been listed as necessary to achieve/improve socio-economic analysis under the MSFD. In the same way, as for the 'knowledge gaps', these needs have been regrouped under various headings.

HEADING	RESEARCH/ACTION NEEDS
Data collection/storage/ dissemination	• There is a need for 'simplified' natural science information, in a format that would be usable for socio-economic assessments; this would imply an increased interaction between natural scientists and economists toward truely interdisciplinary MSFD-related projects; recourse to 'toy models' can be useful to identify the most urgent data needs; • Better data/information on production and costs to support the calculation of marine-related use values at policy-relevant levels, e.g. data on marine activities which may cause ecosystem deterioration or may be affected by policy; • To ensure (e.g. at EUROSTAT level) a solid data architecture for marine and maritime activities based on consistent and comparable data collection and data methodologies. This includes effort to reduce the level of aggregation in official statistics (such as to separate e.g. completely marine, mainly marine, and partially marine sectors[3]) and to provide free access to these data/statistics. • To establish a common framework for organising information, integrating natural and socio-economic scientific knowledge that highlights the cost and benefits associated with the health of the marine environment (e.g. Driver-Pressure-State-Welfare-Response (DPSWR) approach[4]); possibly develop links with global initiative such as the UN System of Environmental-Economic Accounting (SEEA[5]) for producing comparable statistics on the environment and its relationship with economy;

[3] Suris-Regueiro et al., 2013. Marine economy: a proposal for its definition in the European Union. Marine Policy, 42: 111-124.

[4] Cooper P., 2012. The DPSWR social-ecological accounting framework: notes on its definition and application. Policy brief No.3. http://www.msfd.eu/knowseas/library/dpswr_policybrief.pdf

[5] http://unstats.un.org/unsd/envaccounting/seea.asp

Ecosystem functioning	• Research is needed to get a proper understanding of the links between pressures (drivers), impact, state of the ecosystem and welfare, such that the benefits of any programmes of measures can be evaluated in quantitative terms and with an acceptable degree of uncertainty; • Investigate and map the relationships between pressures associated with economic activities and descriptors attributes – indicators – ecosystem services; • Strengthen our ability to design efficient policy instruments and programmes of measures, research is needed to better understand the indirect drivers that give raise to environmental problems; also the relation between possible measures and responses in terms of environmental state; • Develop tools to model cause–effect relationship between pressures/measures and environmental responses for a few critical issues, with the view to streamline and harmonise methodologies for economic and social assessments
Methodological issues and tools	• Research (develop, systemise, disseminate) is needed for alternative (more qualitative) reliable and transparent methods to cost-benefit or cost-effectiveness analysis in case monetary valuation is not appropriate, e.g. approaches taking into account decision procedure in water management (Procedural Approach as applied in Germany), eco-point method for biodiversity assessment (applied in the Netherlands), or multi-criteria analysis to support decision-making process involving trade-offs; • Cost-benefit and cost-effectiveness analyses are used to evaluate the ecological and economic consequences of past interventions and to plan future programmes of measures. These analyses require the development of numerical models that: i) integrate across social, economic, environmental and ecosystem dimensions; ii) cover entire regional seas; iii) are dynamic rather than static (i.e. account for delays in the impacts of measures; iv) are probabilistic rather than deterministic (i.e. account for uncertainties and missing data); v) are adequately detailed to predict long-term ecological and economic consequences of a given applied measure; and vi) quantify interactions and trade-offs among ecosystem services;

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Methodological issues and tools *cont.*	• Standard and sound methodologies for aggregating benefits over space and time; • Investigate methodologies to support socio-economic assessment and the design of programme of measures when GES for a given descriptor/indicator is not clearly identified, when ecosystem knowledge is uncertain; • Explore the use of Maritime Spatial Planning for the economic analyses under the MSFD to illustrate trade-offs;
Ecosystem Services	• Research is needed to better understand the relationship between marine and coastal services and the benefits they provide (i.e. some benefits derived from services should be clarified and commonly agreed); this type of research would also include a thorough analysis of spatio-temporal lags between the production of the services and the benefit area; • Develop and harmonise better methodology for the economic valuation/monetary assessment of ecosystem services, considering issues of double-counting and cumulative effects of human uses. This research can be an integrated part of the impact assessment (cost-benefit analysis), as well as the cost-effectiveness analysis of different measures and policy instruments; • Develop a standard typology of ecosystem services such that it can be universally applied (pan-European).
Social sciences	• Research is needed on non-use and non-market values linked to the marine and coastal environment, as well as valuation studies on cultural services; quantification of benefits for the few key pressures for which non-use benefits might be large and ignoring them might impact GES assessment; • Identify relevant social indicators and guidelines/instruments to monitor and analyse social conduct and perception with respect to each of the MSFD descriptors; • Research on behavioural aspects; explore the integration of more social/behavioural components in economic modelling, i.e. more accurate and dynamic representation of actors' behaviour;

Under Grant agreement no 308473.

Communication	• Work needed to improve communication of societal benefits of marine protection in relation to economic activities; communicate the need for non-market valuation studies; • Enhance the dialogue between natural scientist and economist; communicate to natural scientist about the missing link between natural scientific projects and economic analyses or models; • Need for mechanisms to systematically review and share marine scientific knowledge, incl. socio-economic matter, possibly using existing EU platform (e.g. marine WISE-RTD); • Communicate the value of socio-economic assessment on policy decisions, i.e. how it positively influences policy development and/or implementation (success story); • A clear and common definition and terminology of marine/maritime economy should be developed so that both scientists and Member State authorities can discuss important implementation issues, based on similar grounds

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5.2 Outcome of the breakout discussion groups

Discussion and prioritisation of the research needs with respect to socio-economic analyses for the MSFD was conducted within each group according to some criteria (see section 4 above).

Breakout Group 1:

- Economic valuation with links to specific MSFD pressures (incl. a mapping exercise)
- Valuation studies need to be linked to specific pressures with focus on how to scale up values and how to map them.
- Understanding ecosystem functioning and services and how they relate to the final beneficiaries of the services;
- Assessing distribution of social welfare/actors behaviour in the commonly adopted DPSIR framework;
- Human behaviour: assessment of the distribution on social welfare, more information on social aspects should be taken into account when exploring cost and value, as well as intervention options;
  - incl. economic instruments; how to evaluate the effectiveness and efficiency of the tools used to change behaviour.
- Development of a standardised typology of ecosystem services relevant for MSFD implementation;
- Valuation of cultural aspects of ecosystem goods and services.

Breakout Group 2:

- A need to improve consistency and comparability of economic methodologies and data, including market and non-market values, such as through common standards, certifications or shared databases as well as methodologies to aggregate economic valuation over space and time;
- Study on drivers which change behaviour of different actors for implementation of programme of measures;
- Understanding social values (cultural, psychological, monetary) - studies on social perception of ecosystem services, incl. communicating this to economic WGs as it may usefully feed into cost based analysis;
- Studies on assessment methods of socio-economic analysis in the MSFD support in order to underpin selection of adaptive policies.

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Breakout Group 3:

- Sound methodologies for aggregating benefits over space and time;
- A common framework for organising information to integrate natural and social scientific knowledge that highlights the costs and benefits associated with the health of the marine environment;
- Decision support tools or systems, incl. data quality assurance procedures;
- Social analysis (development of social indicators, inclusion of consumer behaviour patterns and consequences);
- What economics can deliver when ecosystem knowledge is insufficient for decision making proposes (or too uncertain);
- Develop tools modelling cause/effect relationships between pressures and responses for critical issues in order to simplify and harmonise economic and social assessment.

To try to supplement the workshop discussions with inputs from more Member State representatives, it was decided that the above list of research needs would be discussed within the WG ESA. The results of which are presented in the next section.

6. Additional research needs and knowledge gaps identified by various Member States at the WG ESA meeting of 15-16 October 2013

At the WG ESA meeting of 15-16 October 2013 in Brussels, a brief tour de table was held to collect Member States' ideas with respect to the main knowledge and research gaps that should be solved in order to be able to perform socio-economic analyses for the MSFD. In the table below the individual comments by the various Member States are presented. Based on these, a short summary is composed at the end of this document.

A draft version of this document was sent around to the various Member States to collect their comments on both the reflection of their own contribution as well as the brief summary. This document has been adjusted according to those comments, and can now be used in both the STAGES project as to and in the next draft version of the recommendations paper.

MEMBER STATE	RESEARCH NEED/KNOWLEDGE GAP
NL	• Clear understanding of the functioning of the ecosystem is of utmost importance to be able to perform (quantitative) cost-effectiveness analyses and cost-benefit analyses. We need to know what the impacts of measures are on the marine environment. - If we would have a ban on plastic bags in the Netherlands today, what will be the reduction in the amount of litter on the Dutch beaches tomorrow/next year? - Or, how important is protecting ship wrecks and other forms of artificial hard substrate on the sandy sea bottom on the Dutch continental shelf for biodiversity and ecosystem functioning in the larger North Sea, knowing that on the other side of NL-UK border, there is much more rocky environment (natural hard substrate), - Or what is the ecological benefit of additional sea bottom protection areas? We need to be able to argue why we tell fisheries to give up fishing grounds, although there is evidence (from the plaice box experiment[6]) that these benefits may not exist? • How can we illustrate ecosystem improvements using a limited number of aggregated indicators instead of 40 different ones? One option might be to use the eco-points method[7]. We applied it to marine litter. But more applications and further development of the method might be needed.
Germany	• Make official statistical data fit for MSFD purposes: E.g. Eurostat does not present data on activities in the coastal zone (and there is also no definition of what a coastal zone is). • Germany has tables with all the available information on the link between economic sectors and ecosystem goods and services. These tables are empty. This data is missing.

[6] Beare D. et al., 2010. Study for the revision of the plaice box – Final Report. Wageningen IMARES Report # C002/10, 250p.

[7] Liefveld et al., 2011. Evaluating biodiversity of the North Sea using Eco-points – testing the applicability for MSFD assessments (http://www.noordzeeloket.nl/images/Evaluating%20biodiversity%20of%20the%20North%20Sea%20using%20Eco-points_839.pdf)

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Germany *cont.*	• Given that we don't know enough about the functioning of ecosystems, we might have to think of alternative ways to perform – or even develop alternatives for – the standard cost-benefit and cost-effectiveness analyses. For this Germany has developed the procedural approach. This could be developed further. • In order to optimise the use of existing environmental knowledge, scientific information should be made available in a way it can be used in economic analyses. • Due to a lack of understanding of the functioning of the ecosystem with respect to some of the MSFD descriptors, providing a scientific basis for quantification of targets is not possible. Therefore, targets can only be set in terms of reversing negative trends, or application of the precautionary principle.
Lithuania	• Short-term advice on how to develop a programme of measures when GES is not clear. • The link between pressures by certain economic activities (or measures) and descriptors/indicators/ecosystem services is not clear yet. This makes it difficult to target measures. • Lack of joint international efforts. • Lack of detailed monitoring and mapping of ecosystem services, as well as pressures. This is particularly acute for descriptors such as D11. • Lack of common MSFD language (the same terms are interpreted differently by different countries). • Systemise and communicate methods other than monetary valuation methods. • Research on behavioural aspects, related to how marine actors may react to measures. • Methods/instruments for selection of the most cost-effective options for measures.
Latvia	• Better assessment of baseline scenario (BS) to estimate what is the gap between the expected situation and GES, which needs to be closed by additional measures. Impact of various issues needs to be accounted in the BS (e.g. the future trends in economic sectors, the effects of current policy measures, and the impact of external environmental changes (e.g. climate change)). Although there is much knowledge (research results) on various issues separately, there is lack of integrated assessment on how all these elements would impact pressures and the state of the marine environment (for specific descriptors). Uncertainties in functioning and response of the ecosystem to these changes make this even more complex.

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Latvia *cont.*	Effects of measures are very uncertain, especially when measures are combined. - The links between the state of the ecosystem – provision level of ecosystem services – and the impact on human welfare are not sufficiently known, in particular concerning 'cultural', 'regulating' and 'supporting' ecosystem services, for instance: - How to assess foregone welfare concerning 'recreational ecosystem services' in relation to GES definition and the public perception (of what is a "good state" for these services)? - How the value of 'regulating' and 'supporting' services can be assessed and demonstrated (rather than underestimated if excluded from analyses because of potential risk of double counting in the 'final' ecosystem services)? • The link between changes in state of the ecosystem and provision level of 'regulating' and 'supporting' ecosystem services.
Ireland	• With respect to measures above baseline: Scientists often do not address the issue of uncertainty in their research, with much research leading to recommendations for further research and little thought given to the ability of policy makers to use the research as a foundation for making decisions on effective actions (whether the actions are for monitoring or to develop specific measures to achieve targets). Coping with uncertainty as an output from research would be helpful for the development of effective measures.
UK	• Links between changes in ecosystem services and sectors (linking back the impacts on the marine users). What are the trade-offs with different sectors? Identify the winners and losers, and finally draw up an overall net impact. • Links between changes in pressures and climate change - a need to understand the impacts of activities on climate change and which aspects of the marine environment are particularly vulnerable to climate change and are likely to have important consequences on welfare. There is a lack of quantification of climate change risks, which is a gap when doing any cost benefit analysis related to adaptation measures.. • More primary valuation studies need to be conducted in the marine environment, as there are a limited number available for benefits transfer.

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UK *cont.*	• It is necessary to keep updating the baseline across all marine policy areas so that it can inform future policy priorities. For example, in the UK we are currently in the process of updating our Business as Usual document for MSFD. • Valuation of marginal changes is more useful and viable in informing decision making than estimating the total value of ecosystem service. • Better communication between economists and scientists. An acceptance that current knowledge is limited but that decisions and judgements still need to be made so it is necessary to be pragmatic with the available data. Knowledge and experience sharing and ideas for alternatives to cost-benefit and cost-effectiveness analysis by groups like WG ESA would help in the short-term.

7. General conclusions

The workshop to 'identify research needs with regard to socio-economic analysis under MSFD' depicted a number of examples of scientific challenges economists are facing when implementing the Directive. According to the workshop participants and additional Member State representatives, there is a clear knowledge gap with respect to the effectiveness or impacts of measures, reflecting for several descriptors a poor understanding of the ecosystem functioning and the proper linkages between economic sectors – pressures – impacts – state, and how changes in ecosystems (and their services) affect human welfare. Research on this topic within large multi-disciplinary projects is definitely necessary to support any quantitative economic analysis.

Also, Member States use a large variety of different approaches and methods to assess the cost of degradation and to meet the requirements for cost-effectiveness and cost-benefit analysis under the MSFD. This could cause difficulties in delivering consistent and comparable socio-economic assessments. Research would thus be needed to investigate potential harmonisation of these methods and their associated protocols, as well as the development, application and communication of alternative (less quantitative) methods used when monetary valuation is not possible or appropriate.

Based on the lack of knowledge of the ecosystem functioning, the majority of EU Member States selected the marine water accounts approach to assess the use of marine waters to the detriment of the ecosystem services approach. Nevertheless, the valuation of marine/coastal ecosystem services has been discussed as an important and essential domain for research to achieve a true account of the benefits people can obtain from open ocean waters, coastal seas, and near-shore systems. In particular, research is needed on the monetary valuation of external effects on ecosystem services and how these translate to loss and benefits on social welfare. Also, a better knowledge of the relationship between each of the MSFD descriptors and ecosystem services would lead to an increasing capacity to design efficient Programmes of Measures. Under the EU Biodiversity Strategy to 2020, the on-going activities of the Working Group MAES (Mapping and Assessment on Ecosystems and their Services) are partly addressing this topic, establishing a consistent framework for ecosystem assessments through a coherent typology and mapping of ecosystem services. Based on the results of this WG, a number of challenges remain with regard to valuing ecosystem goods and services in the context of the MSFD, such as, for example, how to account for the variability in ecosystem functions, the transboundary nature of the European seas (i.e. benefits

occurring outside the national assessment region where service is provided), or less tangible benefits (e.g. ecosystem resilience).

Some issues have been mentioned that may not directly call for extensive research programmes, but are of importance to efficiently perform the analyses. For example, the paucity and the difficulty to access maritime statistics were often mentioned during the workshop. Also the difficulty to perform socio-economic analysis when GES is not properly defined or ecosystem knowledge is missing, or the lack of standard terminology in maritime economy and the lack of joint international efforts, for this type of issues, **sharing experiences** might be very helpful, for example through WG ESA and Regional Sea Conventions. Other issues, for example on whether EuroStat could provide information that fits more to MSFD socio-economic analysis, could be discussed at the Commission level, e.g. within the Marine Strategy Coordination Group.

It was commonly agreed that financing of the MSFD implementation is also a very important topic and therefore there is an expectation that the forthcoming discussions on cost effectiveness of measures and co-financing opportunities may be useful in this regard. In general, More investments in socio-economic research specific to maritime activities (statistics, methodology development) would be essential for Member States in the next phase of MSFD reporting.

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Annex:
STAGES Workshop on research needs with regard to the socio-economic analysis under MSFD.

9th October	
14:00	**Welcome address** *Nicolas Hoepffner (EC-JRC)*
14:10	Brief overview of STAGES and the workshop ToRs by workshop chairs *Wojciech Wawrzynski (ICES) and Manuel Lago (Ecologic Institute)*
14:25	Expected role of the socio-economic elements of MSFD to inform policy decisions or help implementation *Stefan Goerlitz (InterSus)*
14:40	Socio-economic aspects in relation with coastal and marine environments *Alejandro Iglesias-Campos (IOC-UNESCO)*
15:00	**Socio-economic research in support to European Seas Action Plan** Baltic Sea Action Plan *Kari Hyytiainen (MTT)* OSPAR regional socio-economic analysis *Rob van der Veeren (NL)* Mediterranean Action Plan *Didier Sauzade (Plan Bleu)* Black Sea Strategic Plan *Daniela Toneva-Zheynova (TUV)*
16:00	Coffee Break
16:15	Collection of socio-economic data / statistics for marine and maritime activities *Benjamin Boteler (Ecologic Institute)*
16:35	Relevant lessons learnt from the economic analysis of water use under WFD *Pierre Strosser (ACTeon)*
16:55	Lessons learnt from MSFD initial assessment: an actor-oriented perspective *Anders Grimvall (SIMS)*
17:30	**Summing up the 1st day** *Chairs*

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10th October	
09:00	Collection of socio-economic data / statistics for marine and maritime activities *Benjamin Boteler (Ecologic Institute)*
09:30	Development of baselines, methods and tools to evaluate Cost of Degradation - Cost-based approach *Rob van der Veeren (NL)* - Ecosystem services approach *Denis Lanzanova (JRC)*
09:50	GES Objectives and programmes of measures (PoM): implications for the economic analysis under MSFD (cost-effectiveness, cost-benefit analysis, and multi-criteria analysis) *Ann-Kathrin Buchs (Nds. MU)*
10:10	The use of valuation studies and exemptions – tools and implications - Valuation studies and problems related to MSFD (eutrophication studies) *Katrin Rehdanz (IFW-Kiel)* - Assessing disproportionate costs under WFD: case study on Scottish Agriculture *Manuel Lago (Ecologic Institute)*
10:45	Coffee Break
11:15	Replies from questionnaire *All*
12:30	Lunch Break: Assorted sandwiches and drinks
14:00	Discussions: selection of research priorities, justification of choice, drafting of ready-to-use recommendations.
15:30	Coffee Break
16:00	Discussion continued
17:15	**Summing up the 2nd day** *Chairs*

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11th October	
09:00	Presentation of the work of WG MAES and its marine component *Francesca Somma (JRC)*
10:15	Coffee Break
10:45	Discussions: selection of research priorities, justification of choice, drafting of ready-to-use recommendations.
12:00	Discussion summary
12:30	Lunch Break: Assorted sandwiches and drinks

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Annex:
List of participants

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