WGIMM REPORT 2016

ICES SSGIEA COMMITTEE

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Interim Report of the Working Group on Integrating Ecological and Economic Models

21 December 2016

via WebEx

ICES
International Council for the Exploration of the Sea

CIEM
Conseil International pour l'Exploration de la Mer

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Executive Summary

WGIMM met in December 2016 via WebEx to sum up the work done in the group so far and to discuss the work to be performed in 2017. One specific issue was the challenge to organize physical meetings with the group. Besides exploring opportunities to meet aside other meetings to increase the opportunities for physical meetings the group agreed that there is also the need for more intersessional work. The group decided to have a physical meeting in November 2017 and prepare that meeting during a WebEx in summer 2017.

In the meeting the group further:

a) followed up on the existing ToRs for WGIMM and their status,

b) discussed additional initiatives and approaches for further implementation and dissemination of integrated management models - also in the context of ICES,

c) discussed the venue, time and main issues to be covered by a physical WGIMM meeting in 2017 – potentially associated with relevant conferences or stakeholder events or similar, and

d) discussed the link to related initiatives and groups, ICES/IIFET/NAAFE/etc.

The main achievement is the white paper "Integrated Ecological-Socioeconomic Fisheries Models – Evaluation, Review and Challenges for Implementation" in which WGIMM presents a global review and comparative evaluation of 35 integrated ecological–socioeconomic fisheries models (IESFMs) applied to marine fisheries and marine ecosystem resources to identify the characteristics that determine their usefulness, effectiveness and implementation in fisheries advice. This manuscript is now accepted in a top ranking scientific peer reviewed journal and the final manuscript will be disseminated as soon as it is available (published) from the publisher.

1 Administrative details

Working Group name

Working Group on Integrating Ecological and Economic Models (WGIMM)

Year of Appointment

2014

Reporting year within current cycle (1, 2 or 3)

2

Chairs

Eric Thunberg (USA)

F. Rasmus Nielsen (Denmark)

Jörn Schmidt (Germany)

Meeting venue

WebEx

Meeting dates

21 December 2016

2 Terms of Reference a) – f)

ToR	Description	Background	Science Plan topics addressed	Duration	Expected deliverables
a	Collect globally available coupled ecological-economic models and characterize them with respect to their applicability (academic, advice, evaluation)	Serves as the basis for further work of WGIMM and provides deliverables for the wider community		1st year, will be continued over all 3 Years	Online Repository with explanation of the different models
b	Develop a framework for evaluation and comparison of these models	Models are a method to evaluate or explore specific hypotheses within systems and such need to fulfil the requirements of every other method of reproducibility		2nd year	White paper of good practice, manuscript for peer reviewed journal
c	Analyse the potential, capability and performance of the models and frameworks with respect to spatial and regional explicit bio- economic evaluation of fisheries management in context of marine spatial planning and broader cross sector marine management on regional basis	Fisheries is increasingly competing for space, especially in coastal areas, but also for the high seas marine spatial planning will become the basis for decision-making in future		3 years	White paper, manuscript for peer reviewed journal
d	Identify further the data and information required as well as expertise needed for integrated bioeconomic modelling of fisheries and application of socio-economic evaluation methods on short and long term basis enhancing the above	The models are increasingly data demanding and the collection and access needs to be harmonized. It will be of crucial importance with respect to limited resources to identify the data, which will be needed to feed the models and to serve as a sound scientific basis for decision-making	3 Years		White paper

ToR	Description	Background	Science Plan topics addressed	Duration	Expected deliverables
e	Discuss how different stakeholder groups can be incorporated in the process of model development. These participatory processes will be of increasing importance to "answer the right questions" and to make these models usable beyond the academic sphere	This is also part of ToR a, but needs to be taken explicitly, because it will influence future developments		2nd year	Nested workshops with stakeholders
f	Develop innovative ways of communicating the increasingly complex results from these models to decision-makers, but also the wider public	A transparent communication of complex results is the basis to increase literacy of fisheries related issues both for decision-makers and the public		3rd year	Schemes for decision support systems

3 Summary of Work plan

Year 1	Repository set up, general White paper
Year 2	Workshops with stakeholder involvement, peer reviewed publication, white paper on evaluation schemes
Year 3	Decision support schemes

4 Summary of work within WGIMM in 2016

WGIMM worked intersessionally on the review manuscript for Fish and Fisheries. This work followed the diverse meetings and theme sessions at a number of conferences since 2015. The extensive work on compiling material for a scientific report on "Integrated Ecological-Socioeconomic Fisheries Models – Evaluation, Review and Challenges for Implementation" has been partly presented in the last reports. This work is for a major part a product and the results of the work under ICES WGIMM. The manuscript for the white paper produced under TORs b, c, and d under WGIMM is now accepted in a top ranking scientific peer reviewed journal and the final manuscript will be disseminated as soon as it is available (published) from the publisher.

The group will work on the scope of the group and a new set of ToRs to better align with the Strategic Initiative on the Human Dimension in Integrated Ecosystem Assessments and the IEA groups.

4.1 Summary of Fish and Fisheries white paper

In the manuscript "Integrated Ecological-Socioeconomic Fisheries Models – Evaluation, Review and Challenges for Implementation" WGIMM presents a global review and comparative evaluation of 35 integrated ecological–socioeconomic fisheries models (IESFMs) applied to marine fisheries and marine ecosystem resources to identify the characteristics that determine their usefulness, effectiveness and implementation in fisheries advice. The focus is on fully integrated models that allow for feedbacks between ecological and human processes. The review covers selected IESFMs representing a range of approaches and perspectives rather than providing a comprehensive analysis of all existing models worldwide.

WGIMM provides potential users an overview of when and how IESFMs can be and have been used worldwide. The review serves to identify some common features and failings of models and hence may guide researchers in selecting existing models and further developing them rather than creating a completely new model. It also highlights modelling challenges and future directions of research especially when it comes to implementation of the models.

The analyses and evaluations of the models cover several phases. Initially, the models are listed with relevant references for their development. Second, the analysis methods and tools used for evaluation of the models are described. The tools are used to describe, categorize and evaluate the different type of models according to a set of specific criteria covering the above issues. This categorization and evaluation is summarized in semi-quantitative spider-web plots to compare the focus and capability of the different models and what main directions of development the different models represent. The review evaluates model design choices such as scope, spatial and temporal dimensions and scales, functions and processes included, level of complexity and realism, the ability to model uncertainty and stochastic process impact, and the type and robustness of advice that can be provided as well as the data and expertise needed to develop and parameterize IESFMs. Model linking, coupling and level of integration of biological-economic-social components in the models are also considered. The results of this meta-analysis are discussed with a focus on use and characteristics that contribute to effective implementation. Needs for further research are identified with emphasis on specific needs for further model implementation.

The specific objectives of the study are i) to provide a set of tools and criteria to make a comparative evaluation of IESFMs, ii) to evaluate use and implementation of differ-

ent types of IESFMs through selected examples from around the world, iii) to elucidate limitations and progressions of IESFM implementation and the governance process including necessary stakeholder involvement, iv) to provide potential users with an overview and framework that can be used to guide in selection of the most appropriate models according to their specific needs, purpose, and questions to be answered, i.e. providing guidelines for good practice in selection, use, and communication of the models according to requirements and trade-offs.

The review demonstrates that modellers face inevitable trade-offs between complexity and comprehensiveness, flexibility, and user-friendliness. These trade-offs affect model design, performance and model acceptance, and also must be considered in determining the best approach to communicate model results. No model design fits all cases and uses, but the review provides insights that may help both developers and users of models to determine the model characteristics that best suit their intended implementation, uses and how to more effectively communicate model results to ensure uptake in management advice and decisions. The results show that Modellers must invest more time to make models user friendly and to participate in management fora where models and model results can be explained and discussed. Such involvement is beneficial to all parties, leading to improvement of models and more effective implementation of advice, but demand substantial resources, which must be built into the governance process. It takes time to develop effective processes for using IESFMs requiring a long-term commitment to integrating multidisciplinary modelling advice into management decision-making.

This work was partly conducted under the ICES WGIMM (ICES Working Group for Integrated Management Modelling). The work is original and is accepted for publication in Fish and Fisheries.

Annex 1: List of participants

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Annex 2: Agenda

a) Follow up on the existing TORs for WGIMM and status,

b) Discussion on additional initiatives and approaches efficient for further implementation and dissemination of integrated management models - also in context of ICES,

c) Discussion of venue, time and main issues to be covered by a physical WGIMM meeting in 2017 – potentially associated with relevant conferences or stakeholder events or similar, and

d) Linking up to related initiatives and groups, ICES/IIFET/NAAFE/Et