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Group of Experts on Risk Management in Regulatory Systems (GRM)

Report on the meeting of the Group of Experts on "Managing Risks in Regulatory Systems" (GRM) Geesthacht, Germany on 20-22 February 2017

"Risk management in regulatory frameworks in support of Sustainable Development Goals"

Submitted by the Rapporteur[1]

Summary

This document sets out the report on the first meeting (Geesthacht, Germany, 20-22 February 2017) of the Group of Experts in Regulatory Systems. In particular, the report provides the background, summarizes the discussions, and presents the recommendations developed by participants on the use of risk management tools within regulatory frameworks in support of the implementation of the Sustainable Development Goals of the United Nations Sustainable Development Agenda, in particular SDG 14 "Life under water" (serving as pilot study).

Proposed decision:

"GRM will start work on developing a recommendation on the use of risk management tools in support of the implementation of the Sustainable Development Goals"

I. Background: The GRM and its first face to face meeting

1. The Group of Experts on Risk Management in Regulatory Systems (GRM) wishes to thank Mr. Roland Cormier for organizing the meeting and Helmholtz-Zentrum for hosting it.

[1] At its 20th session, the Working Party established a Group of Experts on Risk Management in Regulatory Systems and adopted its terms of reference, and requested it to report on activities to the Working Party (ECE/TRADE/C/WP.6/2010/2 para.9).

2. GRM, established by the Working Party on Regulatory Cooperation and Standardization Policies in 2010, works towards an improved management of hazards that have the potential to affect the quality of products and services, and/or cause harm or damage to people, the environment, property and immaterial assets. It develops and shares best practice on how risk management tools can support regulatory and managerial activities.

3. The meeting was organized to:

   a. discuss the use of risk management tools in regulatory frameworks in the context of the implementation of the Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development[2];

   b. develop recommendations for governments related to the application of the risk management tools in regulatory frameworks in support of the SDGs, and specifically of SDG 14: "Life below Water: Conserve and sustainably use the oceans, seas and marine resources for sustainable development".

4. In addition, the workshop provided a platform for the preparations of a symposium to be held in Iceland in the autumn of 2018 and to be jointly organized by the International Council for the Exploration of the Sea (ICES) and the UNECE.

5. The meeting was attended by: members of the GRM, regulators, experts from European and North American countries. The list of participants is annexed to this report.

6. The meeting was structured as follows:

   a. The first session reviewed risk management principles and standards, relevant GRM and WP. 6 deliverables and global UN frameworks;

   b. The second session focused on fisheries and ocean management, in particular, national and international regulatory frameworks;

   c. The third session discussed how these methodologies can be applied to the sector of fisheries in support of SDG 14.

II. Summary of presentations and discussions

Risk management in regulatory frameworks

7. The Chair of the GRM and the Secretary of the UNECE Working Party 6 introduced the work of the GRM, within the broader context of the WP.6 mandate, and in particular its deliverables of relevance to the meeting, specifically Recommendation "R" "Managing Risk in Regulatory Frameworks", Recommendation "P" on "Crisis Management within a Regulatory Framework, and Recommendation "S" on "Applying Predictive Risk Management Tools for Targeted Market Surveillance", and the publication "Risk Management in Regulatory Frameworks".

8. The Secretariat also introduced relevant United Nations frameworks, in particular, the Sustainable Development Goals and targets of the 2030 Agenda with a special emphasis on SDG 14.

9. It was noted that the SDGs set broad strategic direction, while the targets set time-bound and, in some cases, numerical, objectives. Their achievement depends among others upon complex regulatory, managerial and administrative restructurings that still need, in part, to be designed and implemented.

10. Within this context, participants agreed that the goal of the meeting could be narrowed to developing recommendations on the design of regulatory systems that would help implementing the SDGs and targets within an operational context.

11. When discussing the targets of SDG 14, it was agreed that:

[2] Transforming our world: the 2030 Agenda for Sustainable Development (A/RES/70/1)

a. There was a broad range of environmental, cultural, social and economic risks that could be effectively and efficiently managed through risk management processes and regulatory standards, to contribute to secure the achievement of the goal and targets.
b. Extensive advances had been achieved in environmental risk assessment and monitoring indicators of sustainability as well as planning and policy setting processes.
c. The implementation of risk management practices through regulatory regimes, standards and guidelines remains a challenge given the divergent use of definitions, methods, and jargon in such processes is still a key impediment to moving forward with such goals.
d. Risk management approaches that are based on standardized risk management processes and harmonized definitions would provide the needed coherence in the establishment of the sustainability context.

12. Participants also observed that the sector of fisheries was fragmented, with many partially overlapping national and international regulations, standards and policy frameworks. The fragmentation is compounded by the fact that different administrations oversee the marine environment (recreational fisheries, industrial fisheries, environmental conservation, etc.).

13. This discussion was followed by a detailed presentation of the risk management methodology, as it is described in the international standards ISO 31000:2009, IEC/ISO 31010:2009 and ISO Guide 73:2009. Specifically, the Chair of the GRM introduced the pivotal definition of risk as an effect of uncertainty on objectives and the fundamentals of the risk management process, principles, and tools. One of the participants added that in the natural sciences, hazards may be natural or anthropogenic and the term hazard refers to the possibility of a stressor adversely affecting the natural and human systems whereas the term risk refers to the probability of this occurring[3].

14. One of the GRM members then presented a model originally developed for risk-based supervision within a financial sector ("PRISM") and adapted for use in all industries. An important distinction was made between "rules-based" and "risk-based" supervision. Whereas rules-based supervision is mostly based on compliance audits, risk-based supervision aims at focused and targeted reviews, based on explicit consideration by a regulator of an impact of non-compliance of a certain company and the probability of non-compliance. The supervision system based on these principles was presented to the participants.

15. During the discussion, it was noted that risk-based supervision was considered an important dimension of a risk-based regulatory framework which is relevant for the fisheries sector. It was also mentioned that a shift from rules-based supervision to risk-based supervision in now taking places across various sectors. This approach can also be characterized as "being about spotting anomalies" – a fisheries related example provided were:
    a. a sonar that gets repeatedly lost,
    b. a catch that is far different from competition,
    c. a pattern that suggests a vessel is avoiding pings.

    Participants agreed that once non-compliance is detected then it is important for consequences to be proportionate.

16. The following presentation by another GRM member was on the Universal Conduct Risk Paradigm (UCRP) introducing a framework for establishing the right conduct and culture of integrity in any organization or company. The UCRP was introduced to participants "proposing the use of a consistent paradigm across the whole of the UN Global Compact for implementation of all 17 SDGs". The UN Global Compact Ten Principles provide tenets for upholding responsibility for people and the planet and conditions for continuous and sustainable benefit. These principles relate to the concept of "conduct risk" representing a framework for answering the following questions:

[3] Elliott, M., Cutts, N.D., Trono, A. (2014). A typology of marine and estuarine hazards and risks as vectors of change: a review for vulnerable coasts and their management. Ocean & Coastal Management, 93: 88-99.

a. How do you establish the right conduct & culture of integrity – and identify the conduct risk inherent within your organization?
b. How do the governing body/board and executive committees gain oversight of the conduct of the organization?
c. Who is responsible for managing the conduct of your organization?
d. What support mechanisms do you have to enable people to improve the conduct of their organization?
e. Are there any perverse incentives or other activities that may undermine any strategies put in place to answer the first four questions?

17. Conduct risk - within the context of the UCRP - is defined as follows:

"Conduct risk is caused by action(s) – or inaction – of an individual, organisation or whole industry that lead to (i) misalignment of the UN Global Compact Ten Principles, (ii) hindering broader societal goals by (iii) negatively impacting collaboration and innovation."

18. Participants discussed how these principles could be applied to the fisheries sectors. One of the participants noted that in Canada, fisheries associations were driving increasingly stringent regulations. The industry operates within a regulatory system and the certification system attests that the regulatory system is good enough for the certification. Participants discussed what the Universal Conduct Risk Paradigm adds to the UN Global Compact Ten Principles and what kind of guidance the GRM could give to companies that want to contribute to sustainable development.

19. The following presentation covered the field projects conducted by the GRM aimed at building risk-based regulatory frameworks. The GRM reference model on managing risks in regulatory frameworks and case studies of its applications in developed and developing countries, including in fisheries sector, were presented.

20. The UNECE Risk Management for Regulatory Frameworks had been extensively used in the field and have proved valuable as a tool to review regulatory systems using a participatory, bottom up approach and introduces mechanisms and incentives for accountability and responsible risk taking. In particular the UNECE approach had been used within the Fisheries sector in two national projects, undertaken with support by the European Commission in Namibia and Uganda.

21. Participants highlighted some key points related to risk management in regulatory frameworks relevant to SGD 14, that included:
    a. The lack of consistency in terminology and governance;
    b. The need to shift from rules-based to risk-based regulations, based on both bottom up and top down engagement;
    c. The need for risk-based enforcement that encourages the industry to shift to a sustainable model of consumption and production; and,
    d. The need for an organizational culture that is conducive to responsible risk taking.

Fisheries and ocean management

22. During the second session, various aspects of marine management were discussed. In the first presentation, the objective of marine management was introduced as "maintaining and protecting ecological structure and functioning while at the same time allowing the system to produce ecosystem services from which we derive societal benefits". The regulatory environment of marine management is very complex and the administrative structures that are in place to supervise their implementation very fragmented.

23. Following an overview of hazard and risk typology of marine management, a DAPSI(W)R(M) Framework was introduced as one possible tool for marine management. The acronym stands for Drivers (basic human needs), Activities (of society), Pressures (resulting from activities), State change (on the natural system), Impacts (on human Welfare), Responses (economic, legal, etc. Measures). More specifically:

a. Every step of the Framework features a series of relevant indicators (i.e. number of activities carried out, population levels, community structure, etc.).
b. The Framework applies to the traditional bow-tie model, to determine causes and consequences and to agree to responses throughout the sequence.
c. To be successful, management measures/responses to changes resulting from human activities should follow the PESTLE model – Politically expedient, Economically viable, Socially desirable, Technologically feasible, Legally permissible, and Ecologically sustainable.
d. The related Marine Strategy Framework Directive features eleven descriptors (including biodiversity, hydrography, contaminants, and energy) and a six-step structure: initial assessment, Good Environmental Status definition, targets, indicators, monitoring, and measures.
e. A related challenge is represented by the necessary mapping of core-indicators on to CBD Aichi Targets, to then determine data and compliance.

24. The National Oceanic & Atmospheric Administration of the USA presented another marine management tool that includes risk assessment - the Integrated Ecosystem Assessment, which is an analytical framework for "organizing science in order to inform decisions in marine ecosystem-based management". It is a decision-support process that synthesizes and analyses diverse data and ecosystem model outputs and provides assessments of the ecosystem across and within multiple ocean-use sectors. More specifically, through indicators, status, and trends, the framework provides a scalable and adaptable model that contributes to:
    a. Identify pressures posing risks to valued ecosystem components
    b. Evaluate trade-offs in a precautionary manner to avoid unintended outcomes
    c. Provide technical support for decision-making under uncertainty
    d. Include the full socio-ecological context in the decision-making process
    e. The framework can be applied to both fishing and marine mammals

25. The following presentation introduced the example of an input fishery/adaptive management as applied to the lobster subsector. This management regime is based on the control of type and size of lobsters as well as on the control of effort (management measures related to different Lobster Fishing Areas, windows of fishing seasons, number of license holders, and restriction concerning the gear allowed – i.e. traps). Just like the DAPSI(W)R(M) Framework, this pattern applies to the bow-tie model, to determine causes and consequences, and to elaborate agreed-upon responses. The latter include:
    a. Reduction of the effective effort.
    b. Restriction of fishing season.

26. During the discussion on including social and cultural aspects in regulatory standards for SDG 14 and marine planning, it was noted that social and cultural aspects were highly relevant in the ocean management context because people have attachment to the sea and the sea provides a meaning to local residents as well as tourists and some people living far away. Disregarding these aspects typically translates into mistrust and resistance against the implementation of oceans management tools. An approach on how to correctly embed such crucial aspects in process design include:
    a. embedding proper participation mechanisms within ocean planning and management processes;
    b. clearly defining mandates and roles for all groups involved;
    c. embedding Social Impact Assessments in addition to Environmental Impact Assessments as key mechanisms within ocean planning and management processes such as Marine/Maritime Spatial Planning and
    d. creating high levels of transparency by making all documents publicly available.

27. Culture and identity are important elements in Maritime Spatial Planning. It was explained that culturally significant areas should be identified using the following criteria: cultural uniqueness, community reliance, and degree of tradition.

28. The Scottish Marine Planning process at national, regional and sectoral marine level was based on the following:
    a. Promoting sustainable development and use of marine resources

b. Managing conflict in the marine environment and inform decision-making
c. Set a future vision and objectives
d. Fostering a participative process
e. Implementing a spatial and ecosystem-based approach

29. The Ministry of Industries and Innovation of Iceland presented issues related to food safety, global trade and technical standards in seafood. Risk management tools that are used in the area and their evolution were also presented along with Iceland's Responsible Fisheries Management Certification, published in 2007, based on the following principles:
    a. Do not overfish any fish stock
    b. Do not disrupt the ecosystem excessively
    c. Manage the fisheries effectively

30. Following FAO Guidelines for seafood certification, the Global Sustainable Seafood Initiative had created a Global Benchmark Tool for certification schemes, on which Iceland's Responsible Fisheries Management Certification is based upon, aiming at responding to a new, three-layered demand for sustainability (environmental, economic and social). To this purpose, the Icelandic Minister of Fisheries recently said that "the future of wild capture fisheries looks bright indeed, if all of us, take the necessary care, do what is right, based on science and sustainability."

31. In the next presentation, tools for engaging stakeholders in regulatory decision-making and for conducting cost benefit analysis were discussed. To engage stakeholders in fisheries, the proposed solution was establishing Regional Fishery Management Councils, comprised of representatives from the fishing industry, environmental and scientific community, as well as from federal and state government. It was highlighted that a cost-benefit analysis should be carried out to justify a major regulatory action, since it can be credible only as long as its benefits outweigh its costs.

32. The use of ISO 31000/31010 risk assessment in land-based cumulative effects analysis by the Canadian Forest Service, Natural Resources Canada was presented. Testing this approach in several "proof of concept" pilot studies addresses the need to move from individual projects towards regional evaluations. The approach also reflects the necessity of taking into account multiple natural resource sectors, jurisdictions, landscape attributes, users, and potentially conflicting values. There is a need for tools to examine cumulative effects of resource development, natural disturbance, and climate change at a range of scales in a dynamic and timely manner. Integrative mechanisms are sought to help determine what risks exist to sustainable natural resource development and management, who should be operating on the landscape and under what conditions, who has capacity to mitigate the risks, and who bears the costs. The analyses are incremental in examining the management systems of individual resource sectors, followed by examination of multiple resource sectors operating on the same landscape. Parallel challenges in complex terrestrial and marine systems were discussed.

Risk management and SDG 14: developing recommendations

33. The third part of the meeting was devoted to analyzing SDG 14 and to developing recommendations on risk management in support of the implementation of the sustainable development goals.

34. Out of the 169 targets that have been identified for the 17 SDGs, participants highlighted many examples of technical standards and regulatory frameworks that are currently in use that could be considered as relevant to achieving SDG Targets. There are also other UN agreements and conventions that are linked to SDG targets. At the regional level, there is also a number of organizations and their initiatives that are working in technical and regulatory fields that are linked to SDG Targets.

35. Goal 14 targets cover a very broad range of environmental issues from pollution, to fisheries and biodiversity that are currently managed under very different legislative and regulatory systems and jurisdictions.

36. The participants conducted an analysis of the targets related to the SDG 14 to confirm whether or not they were Specific, Measurable, Action-oriented, Realistic and Time-bound, or "SMART". The results of the analysis can be found in Annex II.

37. One of the presentations of the third session addressed issues related to sustainable development and regulation, as well as to risks to sustainable development goals. It was noted that the right regulation is hard to deliver promptly, because of two main reasons:
    a. It is often decided by bodies focused on other issues, usually economic.
    b. It usually involves overlapping, sometimes competing, bodies, together with lengthy, complex decision-making.

38. It was also observed that commercial fishing represents a high-risk occupation, with increasingly burdensome financial pressures leading to depletion of fish stocks, more accidents to seafarers, and higher rates of poverty in coastal areas.

39. Maritime pollution, safety of fishing crews and nuclear risks – controlled by multiple bodies driven by different priorities – constitute some of the greatest risks to the achievement of SDG 14. The following ideas could be considered when developing GRM recommendations:
    a. Not looking at risk in isolation from the bodies that make decisions.
    b. Avoiding focusing on smaller risks that we know how to control, but focus instead on the big risks that threaten several SDG outcomes.
    c. Using the SDGs as an opportunity to press for a more coherent and high-impact approach – by getting the right international bodies in charge.

40. In the presentation, "Technical Standards in Support of Risk Management Approach to Goal 14" an important distinction between policymaking and management was made. It was noted that policymaking, based on stakeholders' engagement and concerns, scientific research and trends, establishes goals. Management includes identifying the course of action, implementing operational controls to achieve the outcomes, and conformity assessment of the operational controls.

41. It was stressed that a lot of the attention is on policy-making rather than on management. The challenge is to move down to the mechanisms of implementation: what is going to drive a change in the behaviour of the industry. Stakeholders urge more regulations – while the need may be standards, guidelines, or controls.

42. It was also mentioned that stakeholder involvement is key in risk identification. Choosing criteria for risk assessment – importance of the policy-maker or manager decision – is the point where the right balance between over and under regulation can be found.

43. The next presentation focused on using predictive algorithms and data analysis tools in regulatory frameworks. It was stated that in most cases, implementation of the SDGs require building balanced risk-based regulatory frameworks, as it is in case of SDG 14. A regulatory framework is proportionate to risks when:
    a. Regulatory requirements are proportionate to the risks they aim at addressing
    b. Conformity assessment provisions are adequate
    c. Risk-based compliance framework is in place, so that non-compliant products are identified and removed from the market.

44. Predictive algorithms can be developed and used as a prioritization tool that would allow enforcement authorities and regulators to focus their attention on products that are 1) most dangerous when non-compliant and 2) most likely to be non-compliant (with the highest probability of non-compliance). Probability of non-compliance can be evaluated based on a set of parameters like: a shipment that comes from a supplier that has a history of non-compliance, or with a country that is not typically an exporter of the product in question; in combination with historical data and machine learning techniques.

45. It was stressed that similar tools can be developed for prioritizing areas that need regulatory intervention in the context of regulatory frameworks relevant to SDGs.

III. Conclusions and proposed decisions

Risk management in marine management

46. Elements of risk management approaches are found in current fisheries and oceans management. However, there is the lack of coherence and consistency in conceptual frameworks and methodologies with respect to management of risks in regulatory systems of the sector.

47. The UNECE GRM approach is well suited to examining the proportionality and effectiveness of regulatory systems with respect to risks they were set out to address. Risk management approaches used in other sectors can also be adapted to regulatory frameworks relevant ocean management and SDG 14.

SDG targets

48. SDG targets should be analyzed within the given national and international contexts to identify clear objectives and develop a sound implementation strategy from a regulatory and operational perspective. Review of SDG 14 targets for fisheries and SDG 15 targets for forestry and land use revealed that the targets did not readily outline objectives from causes and consequences needed to adequately analyze the risks for a regulatory approach.

49. Key performance indicators (KPIs) in addition to other key indicators should be developed to properly implement a risk management process within a regulatory context. KPI-coupled Key Risk Indicators (KRIs) and Key Control Indicators (KCIs) would provide the basis for monitoring of impacts coupled with the effectiveness of the management and operational controls.

50. The SDG and their targets should be reviewed regularly to identify intersections and interdependencies between them: the goal of any given SDG depends on the goals of other SDG being reached. Also, some of the SDG targets may be relevant to other targets (e.g., fisheries targets for SDG 14 that are relevant to SDG 3 for health and safety).

51. International and regional agreements, conventions, policies, standards, guidelines and statistics should be analyzed to identify gaps, duplications and redundancies between goals and objectives. This would help to avoid the development of new technical and regulatory standards for SDG targets. The output of such an exercise would provide a catalogue of relevant instruments for the implementation of the SDG targets.

Implementation of the SDG targets

52. Implementation of the SDG requires mature governance approaches coupled with adequate stakeholder engagement and institutional capacity.

53. National competent authorities should implement structured risk-based regulatory approaches to ensure that these are effective at achieving the targets and can be efficiently implemented within the operational activities of a given sector as well as enforced.

54. This, in turn, requires developing regulatory processes and building risk-based regulatory systems that would be proportionate to risks that are relevant to SDG targets in terms of regulatory requirements, conformity assessment and surveillance processes. Within this context, the SDG targets can be considered as objectives of a regulatory system, whereas the GRM risk management framework in combination with other tools and methodologies can be applied to design processes required for societal stakeholders to be involved in managing the risks related to the achievement of the SDG targets.

Building regulatory systems in support of SDG targets: Use of standards

55. Promoting the use of standards by policy-makers and business would not only help integrate standards into regulatory systems, but also enhance the design of regulatory systems while providing clarity for institutions in the development of their programs.

Risk identification and assessment in regulatory frameworks

56. Data and modelling play an important role in risk analysis to characterize the risks in terms of causes, events and consequences. Tolerance criteria must be established to evaluate the risks of regulatory options within the national policy context.

57. Risk management and assessment activities including key indicators should be underpinned by current scientific knowledge through formalized and independent advisory processes. Such an approach will ensure that the risks perceived by stakeholders and regulators are examined against existing scientific and technical evidence providing transparency while fostering support from stakeholders. This will enhance the science-informing policy and policy-informing science paradigms and approaches but will require exchange of best practice.

58. National competent authorities will need structured risk-based regulatory approaches to ensure that these are effective at achieving the targets and can be efficiently implemented within the operational activities of a given sector as well as enforced.

Regulation development

59. Regulations, standards and guidelines should be developed from the premise that "people want to comply". The mechanisms of implementation (e.g., regulations, standards and guidelines) must be efficiently integrated within the operations of a given sector to be effective at reaching a given objective, including through the adoption of guidelines and relevant enforcing jurisdiction.

60. Enforcement is a necessary component of any regulatory system. Sufficient resources should be allocated to its planning and its execution. In the presence of regulatory failures, including high levels of non-compliance, instead of introducing new regulations, policy-makers would be well advised to analyze the regulatory system in its entirety, including the need for employee training, the difficulty of implementing regulations within daily operations, the capacity of the sector to implement the regulation, as well as the extent of intentional violations.

Tools and methodologies

61. Methodologies presented and discussed at the meeting can be applied within regulatory systems in the context of the SDGs. Bow-tie models, DAPSI(W)R(M) Framework, Spatial Planning techniques, cost-benefit analysis constitute efficient tools within regulatory frameworks relevant to SDG 14.

62. Conduct risk management approaches can enhance the traditional regulatory risk management prescriptive approach to changing behavior. Conduct risk management provides a new angle on the traditional problem of regulatory risk management approaches by relying more on behavioral insights into culture and conduct as they support those that want to work towards achieving the targets. The Universal Conduct Risk Paradigm (UCRP) discussed at the workshop provides a sound guideline in that direction.

63. Examples of risk-based supervision methodologies presented at the meeting (e.g. "PRISM") can also be adapted to the specifics of the marine sector. UNECE GRM recommendations, including the recent recommendation aimed at providing guidance to market surveillance authorities in planning surveillance activities on the basis of a predictive risk-based assessment of products/businesses within their jurisdiction (Recommendation S) can be adapted to prioritizing regulatory activities with respect to the risks relevant to the implementation of SDG targets.

Proposed decisions

64. Based on the results of the meeting:
    a. to develop a recommendation for regulators on building risk-based regulatory frameworks and applying risk management tools in support of the SDGs
    b. To present the recommendation draft at the Annual Session of the Working Party 6 in 2017.

Annex I

List of participants

Chairperson

Kevin Knight (Chair, Technical Committee 262: Risk management, International Organization for Standardization)

Coordinators

Donald Macrae (Independent consultant, United Kingdom)

Valentin Nikonov (Project Manager, Tochka)

1. Roland Cormier (Helmholtz-Zentrum Geesthacht, Germany)
2. Markus Krebsz (PRMIA / Culture & Conduct Group, United Kingdom & Germany)
3. Justin McCarthy (PRMIA, Ireland)
4. Peter Morfee (Ministry of Economic Development, New Zealand)
5. Simon Webb (The Nicholas Group, United Kingdom)
6. Andreas Kannen (Helmholtz-Zentrum Geesthacht, Germany)
7. Andrew Mickiewicz (Kelley Drye & Warren LLP, United States)
8. Andronikos Kafas (Marine Scotland, Scottish Government, Scotland)
9. Barbara Kishchuk (Canadian Forestry Service, Natural Resources Canada, Canada)
10. Chris Kelble (NOAA Atlantic Oceanographic and Meteorological Laboratory, United States)
11. Grímur Valdimarsson (Ministry of Industries and Innovation, Iceland)
12. Jake Rice (Fisheries and Oceans Canada, Canada)
13. Lorenza Jachia (United Nations Economic Commission for Europe (UNECE), Switzerland)
14. Michel Comeau (Fisheries and Oceans Canada, Canada)
15. Mike Elliott (Institute of Estuarine & Coastal Studies (IECS), University of Hull, United Kingdom)
16. Pia-Johanna Schweizer (Institute for Advanced Sustainability Studies Potsdam (IASS), Germany)
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ANNEX II SMART analysis of the SDG 14 Targets

1. By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution
2. By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans
3. Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels
4. By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics
5. By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information
6. By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation
7. By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism
8. Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries
9. Provide access for small-scale artisanal fishers to marine resources and markets
10. Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of The Future We Want

A SMART[4] analysis of SDG 14 target number 1 and 4 (Table 1) suggests the need to review the targets to extract and outline a clear objective before developing national regulatory frameworks and implementing them within national legislative authorities, governance structure and institutional capacities. Effective management and operational objectives should be SMART and linked to monitoring which will then indicate whether or not they have been met:

1. **Specific**. Objectives should clearly specify the state to be achieved and be interpreted unambiguously by all stakeholders.
2. **Measurable**. Good objectives should relate to measurable properties of ecosystems and human societies, so that indicators and reference points can be developed to measure progress towards the objective.
3. **Achievable**. Good objectives should not conflict and can be achieved within an effective management framework otherwise they and their proposers lose credibility. Good objectives should describe a state

[4] Rice, J., Trujillo, V., Jennings, S., Hylland, K., Hagstrom, O., Astudillo, A., & Jensen, J. 2005. Guidance on the Application of the Ecosystem Approach to Management of Human Activities in the European Marine Environment, ICES Cooperative Research Report, No. 273. 22 pp.

of the ecosystem, including the position and activities of humans within it, which accurately reflects the values and desires of a majority of stakeholders.

4. **Realistic**. Good objectives will be implementable using the resources (research, monitoring, and assessment and enforcement tools) available to developers, managers and stakeholders. Good objectives should reflect the aspirations of stakeholders, such that the majority of stakeholders will strive to achieve them and ensure sustainable development.
5. **Time-bounded**. There should be a clearly defined time scale for meeting objectives.

Depending on the element of the risks being managed, key indicators are needed to inform management and stakeholders in relation to the sources of the risks, the events that are to be avoided including their causes and consequences in and especially to determine the effectiveness of the management and operational measures. Indicators should measure key elements established for strategic goals and tactical objectives. Operational examples include Key Risk Indicators (KRI) to indicate a change in the probability of impact of a risk; Key Control Indicators (KCI) to indicate a change in the effectiveness or usage of a control as well as Key Performance Indicators (KPI) to indicate changes in the organizational performance linked to its strategy. Table 2 and Table 3 are summaries of the key points that were discussed during the workshop.

Please note that time did not allow for a comprehensive review of all SDG 14 (Life below water) targets and so only Targets 1 and 4 (Table 2 and Table 3) as well as SDG 15 (Life on land) target 2 (Table 4) were addressed. These reviews are examples of how all targets would be analyzed and the discussions laid the groundwork for tackling the other targets and the other SDG. Also, it was agreed during the workshop that a project to identify a comprehensive system of regulatory measures to implement these targets was a feasible proposition, although its timescale would be difficult to attain.

Table 1. SMART Analysis of SDG 14 Target 1.

SDG 14 Target 1	S	M	A	R	T
By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	😐	☹	☹	☹	☺

- **Specific**: Possibly yes. However, there is a mix of objectives and factors. The target should differentiate between the releases of contaminants without effects from pollution that carry effects of concern.
- **Measurable**: Probably not unless defined more clearly and with numerical values. It is measurable in terms of standards and monitoring requirements for contaminants for point sources if these value can be collated. However, monitoring pollution rarely leads to the identification of activities that need to be managed given the synergistic and in combination effects of point source and non-points (diffuse inputs) sources of contaminants.
- **Achievable**: Possibly yes for given state waters but not for global waters. However, it is not clear if the target is intended to prevent the causes of pollution being the contaminants as well as the effects of pollution per se. Each is not treated by the same management and operational controls including legislative authorities and regulations.
- **Realistic:** Possibly yes but with excessive caution. Given the costs of trying to prevent all sources of contamination to reduce the pollution effects, the target may be realistic but certainly ambitious.
- **Time bounded**: Possibly yes. However, the date given may not be sufficiently far away to guarantee success.

General Comments

This target does not clearly establish the types of contamination (inputs to the system) or separate these from pollution per se which arises when biological effects are observed either in the natural biota or humans. Pollution effects depend on the levels of contaminants released in a given system. To implement this target, national and international jurisdictions would have to identify the contaminants and pollution effects of concern. Jurisdictions would have to set coherent priorities in terms of physical (e.g., solids, litter, sediments, structures, etc.), chemical (e.g., metals, PCBs, oils, TBT, nutrients, organic matter, radionuclides, etc.) and biological (e.g., microbes, alien species, GMOs, etc.) contaminants to be managed regionally at larger scales. Land-based point sources and diffuse inputs would also have to be included as these contribute to pollution effects in coastal and oceans environments. It may be achievable for developed countries as it already occurs. However, it may be more difficult to achieve for developing countries given the broad range of regulatory systems required to address contamination and pollution effects.

Preventing the release of contaminants or reducing the level of contaminants being released is two distinct management strategies. Not all contaminants need to be regulated when they can be assimilated without detectable pollution effects (without harm to fish or the biota, for example degradable and oxidizable wastes such as sewage and organic matter) as the costs for such an approach would not be justifiable. A regulation can prevent one contaminant from release while reducing another. However, preventing pollution effects requires a comprehensive management strategy across jurisdictions and sectors of operation. In the management of risks, a prevention strategy occurs before a mitigation strategy to significantly reduce levels or effects. Any regulatory system would have to either prevent or reduce the inputs (contaminants) or reduce the effects of pollution.

There are several international and regional agreements, conventions and guidelines that are currently in practice for this target. As a regional example, there are four decades of experience in North-east Atlantic dealing with contamination and pollution issues (e.g., OSPAR in the North Sea, HELCOM, etc.). These organizations have developed a wide range of indicators and standards for measuring contaminants, determining effects, setting licenses conditions, determining compliance with license conditions, and training staff. An inventory of such documentation should be made available to assist countries involved in the implementation of this target.

Table 2. SMART analysis of SDG 14 Target 4.

SDG 14 Target 4	S	M	A	R	T
By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics	☹	☺	😐	☹	☺

- **Specific**: Possibly not as there is a mix of objectives and factors that could not be treated with the same management and operational controls.
- **Measurable**: Yes. It is measurable in terms of the maximum sustainable yield concepts and its values that are based on biological characteristic of the targeted and by-catch species.
- **Achievable**: Yes but with excessive caution. However there is a need for strong and effective governance and institutional capacities. Scientific and fisheries management techniques are well known but the governance may also need strengthening in terms of legislative and regulatory capacities depending on the national and international jurisdictional context.
- **Realistic:** No. There is usually considerable time lag between the implementation of a fisheries management plans and the response from a given fish stock in terms of maintenance and recovery.
- **Time bounded**: Yes. Simply because there is a date of 2020 to achieve this target.

General Comments

The analysis of the target should describe the outcome of fisheries management measures as:

‘‘By 2020, effectively regulate harvesting to produce MSY as determined by their biological characteristics’’

Such a statement would set the objective of ‘‘effectively regulate harvesting’’ as being the implementation of fisheries management regimes to achieve maximum sustainable yield (MSY). From a risk management perspective, the statement establishes a clear objective where the MSY, or a proxy, could be considered as the key performance indicator of the management system. The risk, however, should be identified in relation to the biological characteristics of the targeted and by-catch species to avoid narrow focused approach of one number such as an MSY.

There is always the likelihood of overfishing and illegal harvesting in any fisheries management regime and regulatory system. The development of surveillance and enforcement strategies should be based on an analysis of the reasons of why overfishing is happening. Management controls of fleet and effort coupled with operational controls such as seasons, selectivity of fish size, age or maturity that is based on best-available or current scientific knowledge and provides an assurance that the fisheries management plan reduces the risks of not achieving the target to a level as low as reasonably practicable. A risk management approach should also consider the differences between overfishing and recovery of a population. Fish species such as cod can take centuries to recover while invertebrate species such as shrimp can recover in a matter of years. Equivalent regulatory regimes would also provide sound management tools for open sea stocks. In addition, destructive fishing practices would have to be defined in terms of the changes to habitat.

There are several international and regional agreements, conventions and guidelines that are available for this target. For example, the FAO code of conduct for responsible fisheries provides valuable guidance and definitions for the implementation of this target. An inventory of such documentation should be made available to assist countries involved in the implementation of this target. Similarly the previously agreed UNEP targets for Ecosystem-based Fisheries Management, CCMLAR targets and ICES targets, amongst others, and the Reference points for Ocean Management Areas (OMAS) are useful in this context[5]. Other SDGs should also be considered while developing fisheries management plans such as health and safety as describe in SDG 3 targets.

[5] UNEP: Ecosystem-based Management of Fisheries: Opportunities and challenges for coordination between marine Regional Fishery Bodies and Regional Seas Conventions. UNEP Regional Seas Reports and studies. No. 175. UNEP, 2001. 52 pp. ISBN: 92-807-2105-4

Table 3. SMART analysis of SDG 15 Target 2.

SDG 15 Target 2	S	M	A	R	T
By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	☹	😐	😐	☹	☺

- **Specific**: Possibly not as there is a mix of objectives and factors that could not be treated with the same management and operational controls. There is also a very wide range of causes of deforestation and degradation of forest and landscapes that require very specific management and operational regulatory systems.
- **Measurable**: Yes. Although sustainable management of all types of forest is not directly measurable, deforestation and restoration of deforested areas are measurable at regional or local scales. However, reforestation does not necessarily equate to restored ecosystem functions of a forest in terms of habitats and biodiversity.
- **Achievable**: Yes. Given strong and effective governance and institutional capacities, managing forests and land-use sustainably can be achieved where there are clear goals and objectives. Forestry management techniques are well established within national jurisdictional contexts. These techniques may need to reconcile the need for wood product and the need to maintain forests for other benefits such water retention and regulation. However, this does not necessarily mean that it will halt deforestation globally given regional and local needs. Forestry and land-use are managed, in most cases, by completely independent jurisdictions and legislative authorities which all have very different policy goals that are not always compatible with this Goal. Globally, this is exacerbated greatly given the broad range of governance, cultural needs, economies and needs of people at regional and local scales.
- **Realistic:** No. There is usually considerable time lag between the implementation of forestry and land-use management plans and the response of land-based ecosystems in terms of maintenance and recovery.
- **Time bounded**: Yes. Simply because there is a date of 2020 to achieve this target.

General Comments

There are several international and regional agreements, conventions and guidelines that are available for this target. An inventory of such documentation should be made available to assist countries involved in the implementation of this target. Other SDGs should also be considered while developing fisheries management plans such as health and safety as described in SDG 3 targets.

1. FAO Global Forest Resources Assessment 2015: standards for reporting area, deforestation, afforestation/reforestation, biomass http://www.fao.org/forest-resources-assessment/en/
    a. Terms and Definitions - http://www.fao.org/docrep/017/ap862e/ap862e00.pdf
    b. Synthesis Report: http://www.fao.org/typo3temp/pics/037c39b851.png
    c. Desk Reference (complete data tables): http://www.fao.org/typo3temp/pics/d5f5d2c90c.jpg
2. Montreal Process (temperate and boreal forests) https://www.montrealprocess.org/index.shtml
    a. Criteria and Indicators Framework https://www.montrealprocess.org/Resources/Criteria_and_Indicators/index.shtml
3. International Tropical Timber Organization (ITTO) http://www.itto.int/
    a. Criteria and Indicators (general info) and Framework http://www.itto.int/feature04/
4. Forest Europe http://foresteurope.org/
    a. Criteria and Indicators Framework http://foresteurope.org/sfm-criteria-indicators2/
    b. 2011 State of Europe's Forests report http://www.foresteurope.org/documentos/State_of_Europes_Forests_2011_Report_Revised_November_2011.pdf

In addition, Canada is leading the development of a set of core global indictors for sustainable forest management.

- FAO/Canada workshop to develop a global "core" set for forest sustainability indicators http://www.fao.org/forestry/ci/91695/en/
    - Ottawa Action Plan: http://www.fao.org/forestry/45399-0c682d3b14e4f99744259881ec2d7048e.pdf
    - Proceedings of the workshop:

http://www.fao.org/forestry/45401-051b882b24060ae2a238aed3c6cda3b70.pdf

Additional references regarding information on standards for specific aspects:

- UNCCC - Greenhouse Gas Source and Sink reports (Forest Carbon) – standards for reporting forest carbon emissions and removals
- UNECE – Economic reporting by Joint Forest Sector Questionnaire (JFSQ) – standards for reporting production, harvest, and economic outlooks
- UNECE – Forest Bioenergy reporting through Joint Wood Energy Enquiry – standards and definitions for global reporting of energy from forest biomass
- International Standard Industrial Classification of All Economic Activities (ISIC Rev. 4) – standards for global trade, production and employment numbers

National standards for reporting on aspects of forests:

- Canadian Council of Forest Ministers C&I
- Australian National C&I, US National C&I, etc.
- Certification Bodies – FSC, PEFC (SFI and CSA in Canada)

Sub-national standards:

- Most provinces have adapted C&I for provincial reporting. BC, Ontario and Saskatchewan all do “State of the Forest” reports based on C&I standards.
- Forest Management Units also often use some combination of Certification standard and provincial C&I standard for planning, reporting and getting public input on management at the local scale