



Swedish Agency
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Source to Sea

Linkages in the 2030 Agenda for Sustainable Development



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Linkages in the 2030 Agenda for Sustainable Development

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Swedish Agency for Marine and Water Management report 2016:22

Preface

The Swedish Agency for Marine and Water Management (SwAM) has, within the framework of its cooperation with the Swedish International Development Agency (Sida), financed a study undertaken by the Stockholm International Water Institute (SIWI) with the aim to understand the many linkages between freshwater and marine targets in the 2030 Agenda for Sustainable Development (2030 Agenda). The report highlights the importance of understanding linkages between targets in the 2030 Agenda in order to secure healthy aquatic ecosystems along the source-to-sea continuum through analyzing links and gaps between the sustainable development goals (SDGs) on water (SDG 6) and oceans (SDG 14).

The 2030 Agenda was adopted in September 2015 and consists of 17 sustainable development goals and 169 targets, which are integrated and indivisible, balancing the social, economic and environmental dimensions of sustainable development. One important challenge in implementing the agenda will lie in addressing the complex interlinkages that span across its different goals and targets.

Intensification of human activities to meet societal demands has led to impacts on ecosystems that extend from land and along rivers to the coastal zones and in marine environments. The relationship between upstream pressures and downstream effects highlight the importance of coordinating efforts to achieve SDG 6 on freshwater and SDG 14 on oceans.

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Executive summary

In September 2015, the United Nations adopted a new agenda for sustainable development (2030 Agenda). The agenda consists of 17 sustainable development goals (SDGs) and 169 targets which are integrated and indivisible, balancing the social, economic and environmental dimensions of sustainable development. This study examines the links between SDG 6 on clean water and sanitation and SDG 14 on sustainable use of the oceans. It also analyses interdependencies between SDG 6 and 14 and other relevant goals in the agenda.

Developments upstream, on land and along rivers, might cause negative effects on ecosystems downstream in the coastal zones and in marine environments. To ensure the well-being of ecosystems in the whole source-to-sea continuum, an understanding of the systemic linkages between different segments in the continuum is necessary. The relationships between upstream pressures and downstream effects highlight the importance of integrating efforts and understanding the cross-disciplinary connections to achieve SDG 6 on freshwater and SDG 14 on oceans.

In order to capture these linkages, this analysis has been conducted at target and proposed indicator levels. The indicators form a key aspect of the SDGs, as they provide a clear indication of how the targets, which are broadly formulated, should be interpreted. At the time of writing this report, the indicators have not yet been formally adopted. However, they still provide an indication of where the monitoring and follow-up will be directed.

The results show that the linkages between SDGs 6 and 14 are weaker than expected. While SDG 6 focuses to a larger extent on social aspects, such as human health, SDG 14 has a stronger emphasis on the marine environment. Furthermore, the analysis shows that there are gaps between SDGs 6 and 14 and the broader 2030 Agenda. Targets and indicators related to development activities within the agenda, for example food security (SDG 2) and industrial processes (SDG 9), place little emphasis on downstream environmental sustainability. Finally, the report also maps out key global, regional and national processes and actors that are important for the implementation of the agenda with respect to SDGs 6 and 14.

Even though the agenda provides a platform for stronger integration between goals and targets, this study shows that there are still challenges that have to be overcome in terms of linkages between goals in order to avoid sectorial division in the implementation. In relation to SDGs 6 and 14, it is important to engage all sectors and stakeholders, implement monitoring systems that capture the links in the agenda and achieve increased capacity to deal with trade-offs between different priorities.

1. Introduction

The vision formulated in the 2030 Agenda for Sustainable Development¹ paints the picture of a world free from poverty and hunger where citizens have universal and equitable access to education, health care, food, water, sanitation and energy, enjoy equal rights and opportunities and where each country enjoys sustained, inclusive and sustainable economic growth. An integral part of that vision is the recognition of the need to sustainably manage the planet's natural resources to be able to achieve and sustain the social and economic development required to achieve the ambitious set of goals by 2030.

The adopted 17 goals and 169 associated targets are “*integrated and indivisible*”^{1bid} balancing complex economic, social and environmental dimensions of sustainable development. The formulation of the goals and targets captures several cross-disciplinary connections, but it has not been able to encompass all actual systemic linkages². In order to maximize synergies and balance potential trade-offs in the delivery of different targets it will be important to understand both explicit and implicit interlinkages.

A central challenge in the effort to achieve a sustainable development concerns how to balance competing uses of water in an equitable manner while maintaining water quality and ensuring healthy and diverse ecosystems from “source” to “sea”. Access to water is a pre-requisite for human well-being and for much of the food, energy and industrial production that is necessary to achieve a sustainable economic growth. At the same time, such activities may also significantly alter a number of water-related flows that connect land and urban areas with freshwater systems, deltas, coasts and oceans³.

The dynamic interface between land and oceans captures a key development and environmental challenge of our time. Marine and coastal resources represent enormous assets and opportunities for local and global economy, but they may be jeopardized by upstream activities on land and along rivers. A third of the total annual economic value of the oceans is dependent on healthy ocean ecosystems⁴. Unless properly managed, activities to generate economic

¹ UNGA. 2015. “Transforming Our World : The 2030 Agenda for Sustainable Development” (United Nations General Assembly, 2015), (http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E).

² Le Blanc, D. 2015. Towards integration at last? The sustainable development goals as a network of targets. DESA. (http://www.un.org/esa/desa/papers/2015/wp141_2015.pdf).

³ Granit, J., Liss Lymer, B., Olsen, S.B., Tengberg, A., Nömmann, S. and Clausen, T.J. 2016. A conceptual framework for governing and managing key flows in a source-to-sea continuum. Global Environment Facility Scientific and Technical Advisory Panel (GEF/STAP). 50th Meeting of the GEF Council. (https://www.thegef.org/sites/default/files/council-meeting-documents/EN_GEF.STAP_C.50.Inf_05.Rev_01_A_Conceptual_Framework_v2_0.pdf).

⁴ Hoegh-Guldberg, O. et al. 2015. Reviving the Ocean Economy: the case for action - 2015. WWF International, Gland, Switzerland., Geneva, 60 pp. (http://assets.worldwildlife.org/publications/790/files/original/Reviving_Ocean_Economy_REPORT_low_res.pdf?1429717323&_ga=1.234312854.907008324.1429607832).

growth and increased human well-being in one part of a catchment may negatively affect ecosystem health, resilience and economic growth potential of downstream areas. As a result, they may even jeopardize the progress towards overall sustainability. Governance and management arrangements to deal with such linkages are often fragmented, struggling to balance diverse and potentially conflicting management objectives, stakeholder priorities, and institutional arrangements in different parts of an inter-linked system.⁵ Issues tend to be dealt with segment by segment, or sector by sector, aiming for outcomes that may or may not be optimal for the system as a whole.^{Ibid} These challenges are present at all scales of governance, from global to local levels.

Implementation of the 2030 Agenda for a Sustainable Development has the potential of harnessing stronger integration in the delivery of connected goals and strengthens the much-needed multi-disciplinary cooperation and coordination across connected sectors. Unless the important land-sea linkages are also properly recognized and addressed as part of the 2030 Agenda, the challenges to balance needs and demands between upstream and downstream systems risks hampering the achievement of several SDG targets. Issues related to those linkages span across the majority of the SDGs, but are central to two of them: SDG 6 “Ensure availability and sustainable management of water and sanitation for all” and SDG 14 “Conserve and sustainably use the oceans, seas and marine resources for sustainable development”.

This study analyses the connections and gaps between SDGs 6 and 14 in relation to their adopted targets and the current⁶ formulation of respective indicators. Recognizing the need for multi-sectoral coordination in the delivery of SDGs 6 and 14, it also analyses the interdependencies with other relevant goals and their importance to progress towards broader development aspirations. The study is also intended to provide an overview of the main relevant processes at global, regional and national levels that can support a coordinated delivery of these goals.

⁵ Granit, J., Liss Lymer, B., Olsen, S.B., Tengberg, A., Nömmann, S. and Clausen, T.J. 2016. A conceptual framework for governing and managing key flows in a source-to-sea continuum. Global Environment Facility Scientific and Technical Advisory Panel (GEF/STAP). 50th Meeting of the GEF Council. (https://www.thegef.org/sites/default/files/council-meeting-documents/EN_GEF.STAP_.C.50.Inf_.05.Rev_.01_A_Conceptual_Framework_v2_0.pdf).

⁶ June, 2016.

2. Methodology

The main purpose of this study is to identify, describe and roughly assess the relative strength of possible links between SDG 6 and SDG 14 and briefly describe the links between these two SDGs and the full 2030 Agenda for Sustainable Development. As the 2030 Agenda for Sustainable Development still contains parts that remain to be decided (such as the global indicator framework and follow-up mechanism), the ambition is to provide an as accurate as possible snapshot of the current situation.

2.1. Links between SDG 6 and SDG 14

Any assessment of the potential links between SDGs and their relative strength will mainly be qualitative and, hence, subjective. To reduce the level of subjectivity in the analysis and assessments in this report the authors have adapted a method of analysis to classify the nature and strength of inter-linkages between SDGs targets that was developed by Newcastle University, Stakeholder Forum and Bioregional⁷.

For the analysis of the links between SDGs 6 and 14, the main focus has been put on assessing the targets and their proposed indicators. Although the indicators are not decided upon yet, they do provide a hint on where monitoring and follow-up will be directed. They also present the highest level of concreteness and detail. As the formulation of goals and targets often provide significant room for interpretation, the indicators may serve as guidance to where the thrust of the target lies.

The links between SDGs 6 and 14 have been identified and described in detail using a methodology inspired by “Seeing the Whole: Implementing the SDGs in an integrated and coherent way”.^{7 8}

For the purpose of this analysis, six types of links are deemed relevant. On a general level, targets may *support* each other when they contribute to fulfilling each other’s objectives, targets may also enable each other by having an impact on the achievement of each other, and targets may also *rely* on each other by presenting the only way by which another target can be achieved.

Other important features include the directness, comprehensiveness and the direction of the link. The directness is a measurement of the number of intermediate steps between efforts to fulfil one target and impacts on the other targets indicator or objective. As many of the targets, and sometimes also the

⁷ Coopman, A., Osborn, D., Ullah, F., Auckland, E., and Long, G. 2016. *Seeing the Whole: Implementing the SDGs in an integrated and coherent way*, (<http://www.stakeholderforum.org/sf/fileadmin/files/SeeingTheWhole.ResearchPilotReportOnSDGsImplementation.pdf>).

⁸ An alternative methodology for assessing the interactions between SDGs was presented by the International Council for Science (ICSU) in June 2016. In this framework, a seven point scale from “cancelling” (-3) via “counteracting” (-2), “constraining” (-1), “consistent” (0), “enabling” (+1) “reinforcing” (+2) to “indivisible” (+3) is suggested as a scoring matrix. (<http://www.icsu.org/publications/reports-and-reviews/working-paper-framework-for-understanding-sdg-interactions-2016/>).

indicators, cover several different parts, comprehensiveness is used to indicate if the link relates to the full target/indicator or only a part of it. The direction of the link is used to describe if there is a reciprocal relationship between the targets so that they strengthen each other or if it is unidirectional so that one target enables the achievement of the other but not the other way around.

To quantify the strength of a link, they have been given an approximate numerical value generally based on the category of the link with regards to the relative strength within that category. The final numerical values are hence a combination of the category value multiplied with a subjective strength factor with three levels. A strong link within the category is given the factor 1 and a weak link is given the factor 0.5.

Table 1. Analysis methodology – type of links⁹.

CATEGORY	CATEGORY DEFINITION	TYPE	TYPE DEFINITION	SCORE
Supporting	Targets that support each other fulfil objectives expressed by both.	Supporting	Both targets contribute to the same objective	1–2
Enabling	Targets that enable one another have impact on the achievement of another target.	Disabling	Implementing target B may hinder or reverse the achievement of target A	0
		Indirect Enabling	Target B's implementation indirectly enables the achievement of Target A	1
		Direct Enabling	Target B's implementation directly enables the achievement of Target A	2
		Direct Enabling in both directions	Target B's implementation enables the achievement of Target A, and Target A's implementation enables Target B's achievement	3
Relying	Targets that rely on one another can partly or only be fulfilled through the other target.	Reliance	Target B is a subcategory of Target A and/or necessary for Target A's achievement	2

⁹ Adapted from: Coopman, A., et al. 2016. *Seeing the Whole: Implementing the SDGs in an integrated and coherent way*. (<http://www.stakeholderforum.org/sf/fileadmin/files/SeeingTheWhole.ResearchPilotReportOnSDGsImplementation.pdf>).

2.2. Links between SDGs 6 and 14 and other SDGs

In order to analyse the upstream-downstream linkages in the broader 2030 Agenda, we made use of the “key source-to-sea flows” as defined by Granit (2016)¹⁰, i.e. the flows of water, sediment, pollutants, biota, material and ecosystem services that connect geographies from the upstream “source” to the downstream “sea”. The aim of this analysis is to provide an overview of the upstream-downstream linkages in the broader 2030 Agenda. This overview does not have the ambition to be fully exhaustive. The primary reasons are that the indicator framework is still not sufficiently finalised to allow for a detailed study to be carried out and the need to limit the objectives of the study within meaningful boundaries.

2.3. Mapping of key global, regional and national processes

A review on key global, regional and national processes has been undertaken with a focus on: a) ongoing work to design indicators and support SDG review processes at global, regional and national levels; and b) key actors involved in implementation and/or support to national implementation of SDGs 6 and 14. This review has relied primarily on information available at public websites. It does not represent a complete mapping, but provides an overview of some of the key actors and processes that are likely to be of relevance for the review and implementation of SDGs 6 and 14.

¹⁰ Granit, J., Liss Lymer, B., Olsen, S.B., Tengberg, A., Nömmann, S. and Clausen, T.J. 2016. A conceptual framework for governing and managing key flows in a source-to-sea continuum. Global Environment Facility Scientific and Technical Advisory Panel (GEF/STAP). 50th Meeting of the GEF Council. (https://www.thegef.org/sites/default/files/council-meeting-documents/EN_GEF.STAP_C.50.Inf_05.Rev_01_A_Conceptual_Framework_v2_0.pdf).

3. The formulation and follow-up of the SDGs

The 17 Sustainable Development Goals officially came into force on 1 January 2016. The goals were formally adopted as an integral part of the 2030 Agenda for Sustainable Development at the UN Sustainable Development Summit that took place 25–27 September 2015 at UN headquarters in New York. The scope of the goals is global as they apply universally to all countries and are intended to encompass the three dimensions of sustainable development: economic growth, social inclusion and environmental protection.

The goals are not legally binding, but national governments are expected to establish frameworks for the fulfilment of all the 17 goals and integrating them in their sustainable development policies, plans and programmes. Countries also have the primary responsibility for the follow-up and review of progress on the goals. While governments have the main responsibility for the achievement of the goals, all stakeholders; authorities, private sector, civil society, academia and others are expected to contribute.

The 17 goals are further specified in 169 targets that detail the areas in which efforts shall be taken and results are expected. The goals and targets will, on the global level, be monitored and reviewed by a set of indicators. The process for developing indicators is led by the Inter-agency Expert Group on SDG indicators (IAEG-SDGs) that was created in March 2015 by the United Nations Statistical Commission (UNSC). The group is composed by representatives from national statistical offices from 28 UN member states with regional and international agencies as observers. The members are appointed for an initial period of two years after which some are expected to be replaced by representatives from the same region. The member countries appointed in 2016 are listed in Annex 1. The IAEG-SDGs was tasked to:

“Develop an indicator framework and a list of indicators for the monitoring of the goals and targets of the post-2015 development agenda at the global level, taking into account existing efforts by different groups of countries and organizations, including regional and international agencies, regional commissions, academia, civil society and other relevant international organisations, to be adopted by the Statistical Commission at its 47th session in 2016”

The indicators form a key aspect of the SDGs as they provide a clear indication of how the targets, which are broadly formulated, should be interpreted. Most importantly, they also provide the definition of how to assess when the target can be considered as achieved. From a methodological point of view the indicators are not covering the full extent of the target, but experience from the Millennium Development Goals indicate that they, for practical purposes and to a large extent in the policy dialogues, become the targets.

The process for establishing indicators is both a political and technical process. Several UN Member States have expressed concerns that a too technical process may alter the spirit of the goals. This has meant that there is

significant political interest in the development of the indicator framework with expectations on great political oversight by the UN General Assembly to ensure that the delicate balance between technical consistency and political coherence is maintained. From a political point of view, the Member States stressed that the indicators must directly respond to the goals and targets agreed in the Open Working Group and their level of ambition. They must not undermine or re-interpret the targets and cover all targets including targets on means of implementation. In addition, the indicators should give equal weight to all targets, maintain the balance achieved, and should not introduce any new or contentious issues. From a more technical standpoint, it was stressed that the number of global indicators should be limited and should include multi-purpose indicators that address several targets at the same time in order not to overburden the national statistical capacities.

The selection of indicators by the IAEG-SDGs has been a long process with several consultations and iterations of the proposed indicators. In March 2016, a proposed list of indicators was presented to the United Nations Statistical Commission in its 47th session. The UNSC agreed with the proposed global indicator framework for the SDGs as a practical starting point, subject to future technical refinement and tasked the IAEG-SDGs to establish a tier system for the indicators. The UNSC emphasized that the global indicators proposed are intended for global follow-up and review and hence not necessarily applicable to all national contexts, and that indicators for regional, national and sub-national levels of monitoring will be developed at the regional and national levels. In addition, it stated that national reviews are voluntary and country-led and will take into account different national realities, capacities and levels of development and will respect policy space and priorities for all countries. This indicates that, compared to the MDG monitoring, there is only a quite soft moral obligation to adhere to the SDG indicator framework. This could mean that the SDGs will rather function as an inspirational smorgasbord for the development of national policies and plans than as a strict guiding tool.

3.1. Proposed indicators and tiers

Already at the first meeting of the IAEG-SDGs, in June 2015, it was proposed that the indicators might be grouped in three different tiers: a first tier for which an established methodology exists and data are already widely available; a second tier for which a methodology has been established but for which data are not easily available; and a third for which an internationally agreed methodology has not yet been developed.

The 47th session of the UN Statistical Commission agreed with the IAEG-SDG proposed work plan for the coming year (to March 2017). The IAEG-SDG shall among other things:

- Agree on the global reporting mechanism, including identifying entities responsible for compiling data for global reporting on individual indicators;
- Establish a tier system for the indicators with a work plan for further development of tier III indicators and procedures for the methodological review and approval of indicators

- Review the data availability for tier I and tier II indicators and develop a plan for increasing the data coverage of tier II indicators;
- Continue the discussion on interlinkages across Goals and targets and on the use of multipurpose indicators.

At the IAEG-SDG meeting in late March 2016 it was decided that the initial tier system shall be finalised by 29 July and that the plans for development of the tier III indicators proposed by international agencies shall be reviewed and finalised by 15 September.

The proposed indicators were provisionally placed in tiers by IAEG-SDG in March 2016. Of the eleven proposed indicators for SDG 6 are six categorised in tier I and the remaining five in tier III. Of the ten proposed SDG 14 indicators, only two are categorised as tier I while the remaining eight are provisionally placed in tier III (see Table 2 below). It should be noted that UN-Water proposed that seven SDG 6 indicators should be categorised in tier I and the remaining four in tier II, and the SDG 14 agencies placed two indicators in tier I, four in tier II and four in tier III. In the assessment of the authors, the SDG 6 indicators placed in tier III are closer to be finalised than the SDG 14 indicators placed in tier III.

Table 2. Provisional proposed tiers for SDG 6 and SDG 14 indicators.

Indicator	Proposed Tier by Agency	Revised Tier (by Secretariat)	Possible Custodian Agency(ies)	Other Involved Agencies
6.1.1 Proportion of population using safely managed drinking water services	<i>Tier I</i>	Tier I	WHO/UNICEF	UNEP
6.2.1 Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water	<i>Tier I</i>	Tier I	WHO/UNICEF	UNEP
6.3.1 Proportion of wastewater safely treated	<i>Tier I</i>	Tier III- work plan on methodology	UN Habitat, WHO, UNSD	UNEP
6.3.2 Proportion of bodies of water with good ambient water quality	<i>Tier II</i>	Tier III	UNEP	UN-Water
6.4.1 Change in water-use efficiency over time	<i>Tier II</i>	Tier III- work plan on methodology	FAO	UNEP
6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources	<i>Tier I</i>	Tier I	FAO	UNEP
6.5.1 Degree of integrated water resources management implementation (0-100)	<i>Tier I</i>	Tier I	UNEP	UN Water
6.5.2 Proportion of transboundary basin area with an operational arrangement for water cooperation	<i>Tier II</i>	Tier III	UNESCO, UNECE	UNECE
6.6.1 Change in the extent of water-related ecosystems over time	<i>Tier II</i>	Tier III	UNEP	UN Water

Indicator	Proposed Tier by Agency	Revised Tier (by Secretariat)	Possible Custodian Agency(ies)	Other Involved Agencies
6.a.1 Amount of water- and sanitation-related official development assistance that is part of a government-coordinated spending plan	<i>Tier I</i>	Tier I	OECD	UN Water & WHO
6.b.1 Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management	<i>Tier I</i>	Tier I	WHO & UNEP	OECD
14.1.1 Index of coastal eutrophication and floating plastic debris density	<i>Tier II</i>	Tier III	UNEP	FAO, UNESCO-IOC, IMO
14.2.1 Proportion of national exclusive economic zones managed using ecosystem-based approaches	<i>Tier II</i>	Tier III	UNEP	UNESCO-IOC FAO
14.3.1 Average marine acidity (pH) measured at agreed suite of representative sampling stations	<i>Tier II</i>	Tier III	UNEP	UNESCO-IOC, FAO-to confirm
14.4.1 Proportion of fish stocks within biologically sustainable levels	<i>Tier I</i>	Tier I	FAO	
14.5.1 Coverage of protected areas in relation to marine areas	<i>Tier I</i>	Tier I	UNEP-WCMC, UNEP	
14.6.1 Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing	<i>Tier III</i>	Tier III	FAO	
14.7.1 Sustainable fisheries as a percentage of GDP in small island developing States, least developed countries and all countries	<i>Tier II</i>	Tier III		FAO, UNEP, World Bank
14.a.1 Proportion of total research budget allocated to research in the field of marine technology	<i>Tier III</i>	Tier III	UNEP, World Bank-to confirm	
14.b.1 Progress by countries in the degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small-scale fisheries	<i>Tier III</i>	Tier III	FAO	
14.c.1 Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nation Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources	<i>Tier III</i>	Tier III	UN-DOALOS, FAO, UNEP, ILO, other UN Oceans agencies	

It should be noted that the placement of a proposed indicator in a specific tier seems to be based solely on technical grounds. This means that, if the political guidance has worked as intended, the proposed indicators, irrespective of tier;

- directly responds to the goals and targets agreed in the Open Working Group and their level of ambition,
- does not undermine or re-interpret the targets and,
- gives equal weight to all targets, maintains the balance, and has not introduced any new or contentious issues

Hence, the proposed indicators should be “correct” interpretations of the targets and work as a reasonably correct basis for an analysis of the links between different goals.

3.2. Follow-up mechanism for the SDGs

The High-level Political Forum on Sustainable Development (HLPF) will be the main venue for overseeing follow-up and review at the global level. The HLPF was established already in 2013 as a successor to the Commission on Sustainable Development (CSD).¹¹ The discussions in HLPF “will be informed by an annual progress report on the SDGs prepared by the UN Secretary-General in cooperation with the United Nations system, based on the global indicator framework and data produced by national statistical systems and information collected at the regional level”¹².

During the HLPF, the Voluntary National Reviews will be carried out under the auspices of ECOSOC, and every fourth year under the auspices of the UNGA. These reviews will be “voluntary but should encourage reporting and include developed and developing countries as well as relevant UN entities, civil society and private sector”.¹² They should further be State-led, involve high-level participants and provide platforms for partnerships. A voluntary common reporting guideline has been proposed by the Secretary-General.¹³ Regional mechanisms offer opportunities for “peer learning, including through voluntary reviews, sharing of best practices and discussion of shared targets”.¹² The HLPF is to share experiences and provide political leadership, guidance and recommendations for follow-up, and will focus on the assessment of progress, achievements and challenges, as well as emerging issues. A programme of annual themes for the HLPF’s under the auspices of the ECOSOC has been proposed by the Secretary-General, while the meetings under UNGA would be a comprehensive review of all the SDG’s.¹³

¹¹ Resolution adopted by the General Assembly on 9 July 2013, 67/290. Format and organizational aspects of the high-level political forum on sustainable development (http://www.un.org/en/development/desa/policy/cdp/ARES67290_en.pdf).

¹² UNGA. 2015. Transforming Our World: The 2030 Agenda for Sustainable Development (UNGA Resolution A/RES/70/1, 25 September 2015) (http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E).

¹³ Critical Milestones towards Coherent, Efficient and Inclusive Follow-up and Review at the Global Level. Report of the Secretary-General (UN Doc. A/70/684, 15 January 2016) (http://www.un.org/ga/search/view_doc.asp?symbol=A/70/684&Lang=E).

Table 3. Annual theme of the high-level political forum and sequence of thematic reviews over the four-year cycle¹³.

	2016	2017	2018	2019
Theme of the high-level political forum	Ensuring that no one is left behind	Ensuring food security on a safe planet by 2030	Making cities sustainable and building productive capacities	Empowering people and ensuring inclusiveness: peaceful and inclusive societies, human capital development, and gender equality
Suggested non-exclusive subset of SDGs (for thematic review)	SDGs 1, 6, 8, 10 + SDG 17	SDGs 2, 13, 14, 15 + SDG 17	SDGs 7, 9, 11, 12 + SDGI 17	SDGs 3, 4, 5, 16 + SDG 17
Comment on the choice of SDGs for review		The subset would address the theme through the angle of food security, climate change, terrestrial ecosystems and oceans	The subset would look at the linkages between energy, cities, and industrialization, and sustainable patterns of consumption and production	The subset would look at the relationships between peaceful and inclusive societies, gender equality, education and health

As can be seen by the proposal by the Secretary- General, the physical link between fresh and marine water is deemed to be of less importance than the coherence of issues relating to inequalities (SDGs 1, 6, 8 and 10) and food (SDGs 2, 13, 14 and 15). This seemed to indicate that the main focus of SDG 6 was on the social services contained in targets 6.1 and 6.2 and the main focus of SDG 14 is on its role in food production, i.e. fishing that is addressed by targets 14.4, 14.6 and 14.7. Such a separation of SDG's 6 and 14 in the HLPF could be an important hindrance to the ambition of assuring a coherent management of marine and freshwater resources. If SDG 6 was largely considered to be an issue of equity and SDG 14 mainly a food security concern, it would have been difficult to use the SDGs as a means to converge the freshwater and marine agendas.

On June 6, the co-facilitators for the informal consultation on the Follow-up and Review of the 2030 Agenda for Sustainable Development issued a final draft resolution proposing a different clustering of the SDGs under revised themes for the review process.¹⁴

¹⁴ Ambassadors Young and Petersen. 2016. *Final draft resolution on Follow-up and review of the 2030 Agenda for sustainable development at the global level*, (<http://www.un.org/pga/70/wp-content/uploads/sites/10/2015/08/2030-Agenda-Follow-up-and-review-7-June-2016.pdf>).

Table 4. Final draft proposal on themes and clusters of SDGs for the HLPFs 2017–2019.

	2017	2018	2019
Theme of the high-level political forum	Eradicating poverty and promoting prosperity in a changing world	Transformation toward sustainable and resilient societies	Empowering people and ensuring inclusiveness and equality
Set of focus goals	1, 2, 3, 5, 9, 14 and 17	6, 7, 11, 12, 15 and 17	4, 8, 10, 13, 16 and 17

This new proposal for clustering of the SDGs maintains the separation of SDGs 6 and 14. The placement of SDG 14 under the theme of poverty reduction and prosperity promotion together with hunger, health, gender equality, industry, innovation and infrastructure may indicate that the focus might rather be on ocean resources as a source of income than on their conservation and protection. Placing SDG 6 under the theme of transformation towards resilient societies together with energy, cities, consumption/production and life on land could indicate that water quality, water efficiency and water-related ecosystems get higher priority.

This proposed clustering of SDGs 6 and 14 is not optimal from a source-to-sea-perspective. It removes freshwater from the causal chain from food production as the main user of freshwater and a main source of eutrophication.

Conclusion

The proposed mechanism for global follow-up and review of the 2030 Agenda is not likely to strengthen the links between freshwater and marine issues and might be a significant hinder to coherent management. This in turn increases the importance of emphasising perspectives in the follow-up of both SDG 6 and SDG 14. For the follow-up of SDG 14 it is vital to highlight the links between hunger, health and industry via freshwater use and quality to marine resources. For SDG 6, it is key to underline that the effects of actions within energy, cities, production and consumption as well as terrestrial ecosystems extend downstream to the marine environment.

4. Analysis of linkages between SDG 6 and SDG 14

4.1. Links between SDG 6 and SDG 14

In this chapter, the physical and potential social links between the targets for SDG 6 and SDG 14 are described and analysed in the light of the proposed indicators for these targets. A full listing of the goals and targets for SDG 6 and SDG 14 is found in Annex 2.

Table 5. Summary of relative strengths of links between SDG 6 and SDG 14.

Indicator	14.1.1	14.2.1	14.3.1	14.4.1	14.5.1	14.6.1	14.7.1	14.a.1	14.b.1	14.c.1
6.1.1										
6.2.1	0,5	0,125								
6.3.1	2	2								
6.3.2	2	2					0,25			
6.4.1	0,5	1								
6.4.2	0,5	1								
6.5.1	2	2								
6.5.2	1	0,5								
6.6.1	2	2		0,5	0,5		0,5			
6.a.1	0,5									
6.b.1										
Legend		Weaker								Stronger

SDG 6 target 1: Drinking water

The first target under SDG 6 is to “By 2030, achieve universal and equitable access to safe and affordable drinking water for all”. The proposed indicator, which has been placed in Tier 1 by both the IAEG-SDG Secretariat and by UN-Water, reads “Proportion of population using safely managed drinking water services”. “Safely managed” refers to accessibility, availability and quality for human use.¹⁵

In relation to overall water use, this target and its indicator only relates to drinking water. According to UN-Water, domestic water use (out of which drinking water only represents a fraction) represents 8 percent of the global use of freshwater¹⁶, while agricultural and industrial use represents 70 and 22 percent respectively.

¹⁵ Metadata on Suggested Indicators for Global Monitoring of SDG 6 on Water and Sanitation, (http://www.unwater.org/fileadmin/user_upload/unwater_new/docs/Goal%206_Metadata%20Compilation%20for%20Suggested%20Indicators_UN-Water_v2016-04-01_2.pdf).

¹⁶ (http://www.unwater.org/downloads/Water_facts_and_trends.pdf).

The target could, in areas where a large part of the drinking water is, or is projected to become, supplied from desalination of seawater, contribute to marine pollution through salty and polluted waste products from desalination. This link is however deemed negligible, since desalination will most likely be used to fulfil SDG target 6.1 to a very limited extent and the effects of desalination, especially if it is well designed, on the marine environment are primarily local.

On the social side, it is likely that increased access to drinking/household water will increase the use of water for domestic purposes. This could contribute to increasing water use and wastewater production. These links are further explored under Goal 6 target 3: Water quality and 4: Water use efficiency.

Conclusion

Considering the limited proportion of drinking water in overall water use and wastewater production, there is no prominent link between goal 6 target 1 and the targets under goal 14. Links related to water use efficiency and wastewater are explored as part of Goal 6, targets 3 and 4.

SDG 6 target 2: Sanitation

The second target under SDG 6 is to “By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations”. The proposed indicator, which has been placed in Tier 1 by both the IAEG-SDG Secretariat and by UN-Water, reads “Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water”.

The metadata provided on the proposed indicator defines “safely managed sanitation services” as: a basic sanitation facility at the household level (flush or pour flush toilets to sewer systems, septic tanks or pit latrines, ventilated improved pit latrines, pit latrines with a slab, and composting toilets) which is not shared with other households and where excreta is safely disposed in situ or treated off-site¹⁷. The explicit purpose of the safely managed sanitation services is to “hygienically separate human excreta from human contact”¹⁷ and that “safe management of faecal wastes should be considered, as discharges of untreated wastewater into the environment create public health hazards.”¹⁷ As such, the indicator focuses on direct human public health and not on broader and indirect environmental risks.

¹⁷ Metadata on Suggested Indicators for Global Monitoring of SDG 6 on Water and Sanitation, (http://www.unwater.org/fileadmin/user_upload/unwater_new/docs/Goal%206_Metadata%20Compilation%20for%20Suggested%20Indicators_UN-Water_v2016-04-01_2.pdf).

Overall, human wastewater flows are thought to contribute 12 % of the riverine nitrogen flux in the United States, 25 % in Western Europe, 33 % in China, and 68 % in the Republic of Korea¹⁸, which contributes to eutrophication of fresh, coastal and marine waters.

The provision of access to sanitation services does not alter the total amount of nutrients excreted from humans. How the excreta is treated will however determine to what extent it contributes to eutrophication. If an increased use of flush toilets is not complemented by adequate wastewater management, this could contribute to negative effects on marine environments. The proposed indicator for target 6.2 does however explicitly refer to safe in situ disposal or off-site treatment.

In the author's assessment, it is likely that efforts to fulfil target 6.2 will contribute to lower nutrient emissions from domestic wastewater as sanitation facilities are expanded and upgraded. However, there is a risk that the strong focus on human health leads to quick and low-cost efforts to remove human excreta from populated areas without concern for the environment. This risk should however be mitigated by target 6.3 on freshwater quality.

Conclusion

There is a weak unidirectional link between target 6.2 and target 14.1 as increased access to safely managed sanitation services should enable the reduction of marine nutrient pollution. The link is deemed to be weak as the fulfilment of target 6.3 does not necessarily lead to lower nutrient emissions even if it is considered likely to do so.

There is also a weak indirectly enabling link to target 14.2 as reduction of the marine nutrient load should protect marine and coastal ecosystems from the adverse impacts of eutrophication and dead zones. This link is deemed to be weak as sustainable management and protection of marine and coastal ecosystems requires significant actions in several other areas as well.

SDG 6 target 3: Water quality

The third target under SDG 6 is to “By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally”.

Target 6.3 is broken down into two indicators. The first indicator: 6.3.1 “Proportion of wastewater safely treated” addresses the latter part of the target that calls for a halving of the proportion of untreated wastewater. The second indicator 6.3.2: “Proportion of bodies of water with good ambient water quality” aims to cover freshwater quality more generally by assessing the proportion of freshwater bodies with good ambient water quality.

¹⁸ Millennium Ecosystem Assessment (MA). 2005. Ecosystems and Human Wellbeing: Policy Responses Volume 3. Chapter 9: Nutrient Management: pp. 295-311. Primary Authors: Howarth, R. and K. Ramakrishna. Eds. K. Chopra, R. Leemans, P. Kumar, and H. Simons. Washington, DC: Island Press. (<http://www.millenniumassessment.org/documents/document.314.aspx.pdf>).

Both indicators were placed in Tier 3 by the IAEG-SDG Secretariat, while UN-Water placed indicator 6.3.1 in Tier 1 and 6.3.2 in Tier 2.

Indicator 6.3.1.

The indicator 6.3.1 is designed to cover all wastewater, with focus on households and effluent from hazardous industries. WHO and UNICEF have compiled a comprehensive methodological note describing the rationale behind and process for measuring this indicator.¹⁹ They propose that a ladder of different types of “safe” treatment is defined from no treatment to the highest level of service. A list of normative definitions of target elements defines untreated wastewater as either:

- a) Wastewater generated by households which does not undergo treatment as defined by SEEA treatment ladders: primary, secondary, tertiary to advanced treatment, or
- b) Wastewater generated by hazardous economic activities that do not undergo treatment where treatment is defined by SEEA treatment ladders (i.e. primary, secondary and tertiary treatment). In particular, hazardous (as defined by ISIC) industrial wastewater discharges can be verified against discharge permits.

For domestic wastewater and non-toxic industrial wastewater, the most important issue, from a human health perspective, is to safeguard that humans do not come into contact with the faecal or other contagious matter, neither directly nor through vectors, until potential pathogens have died off. From an environmental perspective, the main purpose of treatment is to prevent unacceptable damage to the natural environment. Wastewater treatment plants are usually designed to reduce the amount of organic and suspended solids that may pollute the environment. Pathogen removal is seldom the objective for wastewater treatment unless the effluent will be used e.g. in agriculture.

The focus of the methodology proposed by WHO and UNICEF for the measurement of safe treatment household wastewater seems to be on human health and safety from contact with faecal matter. They provide a list of “integrated safety factors” for different types of sanitation facilities depending on the income level of the country. This list indicates that the main concern is human health and the risks for spreading diseases and not the risks to the environment at large e.g. through emissions of nutrients that may cause eutrophication.

Hence, while the target and the indicator clearly points to the need for treatment of wastewater, which as mentioned above almost invariably is done to protect the environment, a more careful assessment of the methodology for

¹⁹ Methodological note: Proposed indicator framework for monitoring SDG targets on drinking-water, sanitation, hygiene and wastewater (http://www.wssinfo.org/fileadmin/user_upload/resources/Methodological-note-on-monitoring-SDG-targets-for-WASH-and-wastewater_WHO-UNICEF_8October2015_Final.pdf).

domestic wastewater reveals that several solutions that doesn't involve treatment and does little to protect the environment would be counted towards fulfilment of indicator 6.3.1.

The focus on treatment of wastewater from economic activities will be placed on industries dealing with hazardous substances. Hazardous substances are defined as those listed in the Stockholm, Basel and Rotterdam conventions. The methodological note suggests that official records and mass balances are used to estimate the amounts of wastewater produced. These amounts shall than be compared with audited compliance records of actually treated wastewater according to national standards.

A halving of the proportion of untreated wastewater as defined and measured by indicator 6.3.1 is likely to relieve fresh and marine water recipients of a significant part of the (Biochemical oxygen demand BOD) and nutrient loads and greatly contribute to reducing marine pollution. It would also contribute significantly to reducing adverse impacts on the marine and coastal environments and allow for their restoration. It can be argued that reducing the nutrient load is a prerequisite for successful restoration.

Indicator 6.3.2.

Indicator 6.3.2 shall measure the areal proportion of water bodies in a country with good ambient water quality compared to all water bodies in the country.¹⁷ The word "Good" is defined as an ambient water quality that does not damage ecosystem function and human health.¹⁷ The following five sub-indicators shall be used to construct a water quality index using the arithmetic mean of the proximity-to-target scores (low score indicates that the status is far from target, 100 indicates that the target is met):

- total dissolved solids (TDS);
- percentage dissolved oxygen (% DO);
- dissolved inorganic nitrogen (DIN);
- dissolved inorganic phosphorus (DIP); and
- *Escherichia coli* (*E. coli*).

The sub-indicators are selected to represent a core set of major water quality impairments in many parts of the world. For further information see: Water Quality Index for Biodiversity – Technical Development Document²⁰. However, they do not capture all water quality parameters of importance to freshwater, coastal and marine biodiversity and ecosystem well-being. For example, they do not refer to marine litter/plastics explicitly mentioned under target 14.1 or environmentally persistent contaminants that accumulate in the food chain and have been linked to adverse effects in both humans and wildlife^{21 22}.

²⁰ Water Quality Index for Biodiversity – Technical Development Document (<http://www.unep.org/gemswater/Portals/24154/pdfs/new/2008%20Water%20Quality%20Index%20for%20Biodiversity%20TechDoc%20July%2028%202008.pdf>). Accessed May 2016.

²¹ Ross, P. S. and Birnbaum, L. S. 2003. Integrated Human and Ecological Risk Assessment: A Case Study of Persistent Organic Pollutants (POPs) in Humans and Wildlife. *Human and Ecological Risk Assessment: An International Journal*. 9:1: 303–324.

The indicator does not provide for means to track pollutant flows through the environment. From a marine perspective, the amount and concentration of polluted water flows to the sea would be more important than the relative areal extent of freshwater bodies with “good” quality. The proposed areal-based indicator would not be able to capture temporal and spatial water quality variability that could have potential negative effects on both freshwater and marine environments. The indicator also does not recognize differences in the parameters for “good” quality between fresh and marine waters (e.g. phosphorous or nitrogen as the limiting nutrient for freshwater vs. marine waters).

However, while the proposed indicator in itself does not necessarily lead to a reduction of marine pollution, the explicit aim of target 6.3 is to reduce freshwater pollution, dumping and release of hazardous chemicals, which in turn would lead to improved marine water quality. It is likely that the activities undertaken to achieve progress on the proposed indicator 6.3.2 (or a similar indicator) would also contribute to a fulfilment of target 14.1 and enable progress on target 14.2.

Conclusion

Target 6.3 has an intimate and unidirectional direct enabling link to target 14.1. The way the proposed indicators are designed, slightly undermines this link by, in the case of 6.3.1, focussing more on direct human health impacts than on environmental concerns and, in the case of 6.3.2, by focussing on the area of polluted freshwater bodies rather than on the flow of pollutants.

Fulfilment of target 6.3 is considered a crucial but not sufficient step for fulfilling target 14.1 as it also requires actions reducing marine debris that is not covered by target 6.3.

Target 6.3 would also directly enable target 14.2. This link is weaker than the link between target 6.3 and 14.1, especially as the proposed indicator for target 14.2 focusses on the relative area under ecosystem-based management, which is not affected by the influx of pollutants from freshwater bodies. A significant reduction of the pollution loads on coastal and marine environments is however considered vital for success actions towards healthy and productive oceans and coastal areas.

Target 6.3 has a weak indirect enabling link to 14.7 as good water quality is important for sustainable use of marine resources through fishing, aquaculture and tourism. The formulation of the proposed indicator 14.7.1 is however questionable as an increase of economic benefits from aquaculture and tourism would reduce the share of GDP coming from sustainable fisheries. See more under 14.7.

SDG 6 target 4: Water efficiency

The fourth target under SDG 6 is to “By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of

²² Williams, R.T. and Cook, J.C. 2007. “Exposure to Pharmaceuticals Present in the Environment,” *Drug Information Journal*, no. 41:2: 133–41.

freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity”. There are two proposed indicators:

- 6.4.1 “Change in water-use efficiency over time”, and
- 6.4.2 “Level of water stress: freshwater withdrawal as a proportion of available freshwater resources”

The proposed indicator 6.4.1 was suggested to be placed in tier 2 by UN-Water but was placed in tier 3 by the IAEG-SDG secretariat with the comment that there is a work plan on the methodology. The proposed indicator 6.4.2 was placed in tier 1 by both the secretariat and UN-Water.

Water efficiency, measured as the amount of economic value produced for every cubic meter of water withdrawn, is key to improving the use of water in all economic sectors. Under increasing water efficiency, less water will be abstracted from rivers, lakes, reservoirs and aquifers for a given economic output. With increasing economic growth, this could of course mean that more water is withdrawn in absolute terms, but it will at least be less water than would have been abstracted under constant or decreasing water efficiency. This is where the second proposed indicator comes in – to make sure that the withdrawals do not exceed sustainable levels.

The target is explicitly aiming for reducing the number of people suffering from water scarcity. To account for ecosystem needs of water, not only the quantity, but also the timing and quality of water flows need to be taken into consideration. However, improved water-use efficiency and reduced water stress should also bring benefits to freshwater ecosystems and their downstream coastal and marine ecosystems that depend upon adequate freshwater flows.

Conclusion

From a marine and coastal perspective, the indicators under target 6.4 are complementary. The link to 14.1 is assessed to be weak, indirect and unidirectional as more well-functioning freshwater ecosystems and ecosystem services can handle and treat pollution more effectively. The main connection from reduced freshwater use to marine issues is through improved health of freshwater ecosystems. The link to 14.2 is assessed to be weak, direct and unidirectional as there is no strict boundary between freshwater, coastal and marine ecosystems, why an improvement of the ecosystems health in freshwater is likely to protect coastal and marine ecosystems and strengthen their resilience.

SDG 6 target 5: Integrated Water Resources Management

The fifth target under SDG 6 is to “By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate”. There are two proposed indicators:

- 6.5.1 “Degree of integrated water resources management implementation (0–100)”, and
- 6.5.2 “Proportion of transboundary basin area with an operational arrangement for water cooperation”

The proposed indicator 6.5.1 was placed in tier 1 by both the secretariat and UN-Water. The proposed indicator 6.5.2 was suggested to be placed in tier 2 by UN-Water but was placed in tier 3 by the IAEG-SDG secretariat.

The SDG target 6.5 is a pure process target for the putting in place of IWRM at all levels and ensuring that there is a good balance between the different uses of freshwater for production of water dependant services and goods.

Indicator 6.5.1.

As integrated water resources management (IWRM), at least in theory, covers the entire range of freshwater challenges and opportunities at all levels of administrative units (country, state, province, district, municipality) there is an extremely wide range of activities that may fall under its implementation. IWRM is almost by definition of the concept beneficial for the freshwater and for the society in which it is implemented. This means that implementation of true IWRM will ensure positive social, economic and environmental impacts.

The methodology for the proposed indicator relies on score-based national survey questionnaires as the primary data source. In 2012, when the latest monitoring was reported, the only survey questions relating to marine environments where about desalination of seawater. Although many IWRM efforts cover also downstream deltas, the monitoring methodology suggest indicate that future monitoring on IWRM implementation will have very limited focus on aspects related to the coastal and marine environment.

However, if IWRM implementation leads to improved water use efficiency and water quality, this would most likely also have positive effects on coastal and marine water quality and ecosystems (as discussed in relation to targets 6.3 and 6.4).

Implementation of IWRM may also have positive political and pedagogical spill-over effects on the management of coastal and marine resources, including conservation efforts and sustainable use of marine resources. These potential links are considered too vague and weak to be quantified in this report.

Indicator 6.5.2.

The proposed indicator on transboundary water cooperation provides little direction on the type or quality of the cooperation. The metadata requires that the cooperation framework is operational with regular meetings between riparian countries on integrated management and information exchange on the shared water resource. It is proposed to measure the relative areal surface of a transboundary basin that is covered by some type of cooperation framework.

The existence of such cooperation frameworks are assessed to contribute to better management of the fresh water resource with regards to the aspects that are covered by the framework. The connection between the existence of a cooperation framework, through improving freshwater management and quality, to improving coastal and marine pollution and management of ecosystems is considered to be indirect compared to the actual implementation of IWRM.

Conclusion

The implementation of IWRM on national and transboundary level should have positive effects on sustainable freshwater management and use, which would in turn have positive direct and unidirectional links to marine and

coastal pollution and ecosystems management. The existence of transboundary cooperation frameworks for freshwater management will incentivise and enable better implementation of management and measures to improve freshwater and downstream pollution and ecosystems.

The link between the IWRM part of 6.5 and 14.1 and 14.2 is deemed to be directly enabling and unidirectional. The link between the transboundary part of 6.5 and 14.1 and 14.2 is deemed to be indirectly enabling and unidirectional.

SDG 6 target 6: Water related ecosystems

The sixth target under SDG 6 is to “By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes”. The proposed indicator, which has been placed in Tier 3 by the IAEG-SDG Secretariat and in Tier 2 by UN-Water, reads “Change in the extent of water-related ecosystems over time”.

The target 6.6 is difficult to analyse as it unconventionally defines mountains, forests and aquifers and water related ecosystems. As water is a prerequisite for life as we know it on planet Earth, all ecosystems are in some sense water-related, but by mentioning specific ecosystems the target indicates that these are the primary or only foci of the target. There are several other types of ecosystems that could be considered as water-related, e.g. savannahs, plains and (highly important in the context of this analysis), coastal and marine ecosystems.

The metadata note makes the below definitions of the target elements:¹⁷

- *Protect* implies a reduction or eradication in loss or degradation.
- *Restore* implies a reversal of loss or degradation.
- *Mountains, Forests, Wetlands, Rivers, Aquifers and Lakes* include ecosystems that provide freshwater-related ecosystem services.
- *Wetlands* are further defined under the Ramsar Convention as areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres. It may also include subterranean hydrological systems.

From a marine perspective, it is worth to note that the definition provided by UN-Water counts all water bodies to a depth not exceeding six metres at low tide as wetlands. This would include a large part of the coastal areas.

The proposed indicator is to measure the change in the areal extent of water related ecosystems over time. There have been earlier suggestions to use the areal extent of wetlands as a proxy for water-related ecosystems, but in the last proposal this was extended to all water-related ecosystems. The metadata note provides lists of data sources for ecosystems/land types outside those listed in the target. One challenge with the proposed indicator is that, for example, the meaning of “mountain ecosystems” and method to measure their extent are not defined. Another challenge is that the areal extent does not capture any qualitative aspects of the ecosystems, such as biodiversity or productivity.

The normative gist of target 6.6 is that water-related ecosystems and their ecosystem services shall not be further degraded, but improved/restored. This

could in turn have strong positive effects on coastal and marine pollution and ecosystem health. If the Ramsar definition of wetlands is followed, the coastal area and shallow reefs are included in this target making the link to marine environments even stronger.

Conclusion

The actual meaning of target 6.6 is hard to assess and the proposed indicator provides little additional clarification as to the types of activities that might be performed to achieve the target. The proposed indicator seems to make coastal wetlands part of target 6.6 creating a very strong link.

Implementation of activities, both practical and administrative, to protect and restore water-related ecosystems, including coastal wetlands, should have strong and beneficial links to most of SDG 14.

Restoring and protecting water-related ecosystems should include reducing pollution loads. If coastal areas are included in 6.6, there is a partial reliance and a bidirectional directly enabling link between 6.6 and 14.1. There is also partial reliance and a bidirectional directly enabling link between 6.6 and 14.2 as both are focussed on protecting ecosystems. However, the proposed indicators for these two targets do not support this link.

The purpose of target 14.4 seems to be the restoration of fish stocks in the shortest time feasible. Fulfilment of 6.6 would not contribute to better regulation of harvesting and overfishing, but it should contribute to restoring fish stocks. The restoration of marine fish stocks would to some extent contribute to restoration and protection of water-related ecosystems, especially in the coastal areas. There is hence a weak indirectly enabling bidirectional link between 6.6 and 14.4.

If protecting and restoring ecosystems include conservation measures, there can be an indirectly enabling bidirectional link between 6.6 and 14.5. As this is unclear and the potential link only exists in the coastal areas, it is deemed to be weak.

The relationship between 6.6 and 14.7 could be both disabling and directly enabling. Protecting and restoring freshwater and coastal ecosystems could limit the opportunities for Small Island developing States and least developed countries to extract economic benefits from marine resources but it could also increase the sustainability of such endeavours. In a longer perspective, it is deemed likely that the fulfilment of 6.6 would increase amounts of sustainable economic benefits that Small Island developing States and least developed countries can extract from the sea.

SDG 6 target a: Official development assistance

The first of the implementation targets under SDG 6 is to “By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation- related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies”. The proposed indicator, which has been placed in Tier 1 by the IAEG-SDG Secretariat and by UN-Water, reads “Amount of water- and sanitation-related official development assistance that is part of a government-coordinated spending plan”.

The target and the proposed indicator only relates to countries receiving official development assistance and covers all types of activities related to water and sanitation (including those with few and weak links to marine and coastal issues). At present, the majority of development assistance to the water and sanitation sector is spent on drinking water supply²³, which is considered to have only a weak link to targets under SDG 14 (see: Goal 6 target 1: Drinking water). To the extent that development aid is used for other water related activities (e.g. Water sector policy and administrative management; Water resources conservation (including data collection); Sanitation – large systems; Basic sanitation; River basins’ development and Waste management / disposal), it should have enabling effects on pollution. It is hence assessed that target 6.a has a weak and indirectly enabling link to 14.1.

SDG 6 target b: Local participation

The second of the implementation targets under SDG 6 is to “Support and strengthen the participation of local communities in improving water and sanitation management”. The proposed indicator, which has been placed in Tier 1 by the IAEG-SDG Secretariat and by UN-Water, reads “Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management”.

Increased participation in water and sanitation management is mainly a way to increase the ownership, accountability and democratic control over local implementation. It often also leads to increased sustainability of the initiatives, which depending on the initiative in question could also have positive effects on SDG 14 (see analysis for Goal 6, target 1–6).

SDG 14 target 1: Marine pollution

The first target under SDG 14 is to “By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution”. The proposed indicator, which has been placed in Tier 3 by the IAEG-SDG Secretariat, reads “Index of coastal eutrophication and floating plastic debris density”.

The main cause of hypoxic conditions, so called dead zones, is excessive nutrient pollution from land-based human activities. The proportion of floating plastic debris that enters the marine environment through rivers seems not to have been quantified on a global level, but is probably significant. As an example, it has been estimated that 4.2 metric tonnes of plastics enters the Black Sea every day via the Danube²⁴.

²³ UN-Water global analysis and assessment of sanitation and drinking-water (GLAAS) 2014 report: investing in water and sanitation: increasing access, reducing inequalities (http://apps.who.int/iris/bitstream/10665/139735/1/9789241508087_eng.pdf?ua=1&ua=1).

²⁴ Lechner, A., Keckeis, H., Lumesberger-Loisl, F., Zens, B., Krusch, R., Tritthart, M., Glas, M. and Schludermann, E. 2014. The Danube so colourful: A potpourri of plastic litter outnumbers fish larvae in Europe's second largest river. *Environmental pollution*. 188:177–181. (<http://www.sciencedirect.com/science/article/pii/S0269749114000475>).

Although plastics is not part of the proposed indicators for SDG 6.3, increased treatment of wastewater, including storm water, should have a beneficial effect on the amount of plastic debris that enters the oceans. There are few other large-scale technical solutions for reducing the amount of plastic litter in fresh and marine waters, why other actions towards achieving this part of target 14.1 would include education and creation of incentives for reduced littering or reduction in the production and use of plastics. It is envisaged that a combination of technical and policy tools will be needed to successfully address marine plastic debris, meaning that the link to 6.3 (and especially the proposed indicator 6.3.1) remains strong.

Conclusion

While there are strong links from several SDG 6 targets to 14.1, there are no significant links from 14.1 to targets under SDG 6, with the possible exception to 6.6 that is linked through the definition of wetlands in the proposed indicator (see Goal 6 target 6: Water related ecosystems). SDG 14.1 is impacted by:

- 6.2 a weak directly enabling unidirectional link
- 6.3.1 a directly enabling unidirectional link
- 6.3.2 a directly enabling unidirectional link
- 6.4.1 a weak indirectly enabling unidirectional link
- 6.4.2 a weak indirectly enabling unidirectional link
- 6.5.1 a directly enabling unidirectional link
- 6.5.2 an indirectly enabling unidirectional link
- 6.6 a directly enabling possibly bidirectional link
- 6.a a weak indirectly enabling unidirectional link

SDG 14 target 2: Marine and coastal ecosystems

The second target under SDG 14 is to “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”. The proposed indicator, which has been placed in Tier 3 by the IAEG-SDG Secretariat, reads “Proportion of national exclusive economic zones managed using ecosystem-based approaches”.

The metadata²⁵ for indicator 14.2.1 does not provide much detail on the focus, definitions or methodology of the proposed indicator. Ecosystem-based approaches are described by UNDP as a “holistic, integrated approach”²⁶ that is “as much a process as an end point”²⁶ and that there are “multiple paths to implementing EBM”²⁶. The core concepts of ecosystem-based approaches are, according to UNEP²⁶:

²⁵ (<http://unstats.un.org/sdgs/files/metadata-compilation/Metadata-Goal-14.pdf>).

²⁶ UNEP. 2011. Taking Steps toward Marine and Coastal Ecosystem-Based Management - An Introductory Guide (http://www.unep.org/pdf/EBM_Manual_r15_Final.pdf).

- Recognizing connections within and across ecosystems
- Utilizing an ecosystem services perspective
- Addressing cumulative impacts
- Managing for multiple objectives
- Embracing change, learning, and adapting

This definition indicates that the limits for the indicator not easily can be drawn by exclusive economic zones as several ecosystems and their services does extend from the terrestrial environment into the sea, crossing national boundaries along the coast and extends beyond the 200 nautical miles from the mean low water mark. It would also be difficult to define when a sufficient level of ecosystem-based approach management is achieved so that it can be counted against the indicator.

Based on the indicator formulation and the available metadata it is not possible to draw any further conclusions regarding the links from 14.2 to the targets under SDG 6.

Conclusion

As previously discussed, there are strong links from several SDG 6 targets to 14.2 (see table 5). There are no significant links from 14.2 to targets under SDG 6, with the possible exception to 6.6 that is linked through the definition of wetlands in the proposed indicator (see Goal 6 target 6: Water related ecosystems). SDG 14.2 is impacted by:

- 6.2 a very weak indirectly enabling unidirectional link
- 6.3.1 a directly enabling unidirectional link
- 6.3.2 a directly enabling unidirectional link
- 6.4.1 a weak directly enabling unidirectional link
- 6.4.2 a weak directly enabling unidirectional link
- 6.5.1 a directly enabling unidirectional link
- 6.5.2 a weak indirectly enabling unidirectional link
- 6.6 a directly enabling possibly bidirectional link

SDG 14 target 3: Ocean acidification

The third target under SDG 14 is to “Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels”. The proposed indicator, which has been placed in Tier 3 by the IAEG-SDG Secretariat, reads “Average marine acidity (pH) measured at agreed suite of representative sampling stations”.

Emissions of carbon dioxide and its subsequent uptake by seas is the main cause of ocean acidification. The potential impact on ocean acidification from freshwater is negligible.

Conclusion

There are no significant links between targets under SDG 6 and 14.3.

SDG 14 target 4: Overfishing

The fourth target under SDG 14 is to “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”. The proposed indicator, which has been placed in Tier 1 by the IAEG-SDG Secretariat, reads “Proportion of fish stocks within biologically sustainable levels”.

The means detailed in target 14.4 all relate to the regulation and management of fishing. However, the purpose of the target is to restore fish stocks as quickly as possible. The proposed indicator relates almost exclusively to the purpose of the target. While the regulation of fisheries has very little to do with the targets under SDG 6, the health and volume of fish stocks may be strongly influenced by management of freshwaters and their ecosystems.

Conclusion

The management of freshwater (SDG 6.5), freshwater ecosystems (SDG 6.6) and freshwater quality (SDG 6.3) may enable, or at least facilitate, the restoration of fish stocks. However, the link to a revitalisation of fish stocks mainly goes via the two targets 14.1 on marine pollution and 14.2 on marine ecosystems that are being directly impacted by better freshwater management. The more direct link between the protection and restoration of freshwater ecosystems and the restoration of fish stocks is assessed to be weak and indirect as it mainly exists between the proposed indicators for SDG 14.4 and SDG 6.6.

SDG 14 target 5: Conservation of marine areas

The fifth target under SDG 14 is to “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”. The proposed indicator, which has been placed in Tier 1 by the IAEG-SDG Secretariat, reads “Coverage of protected areas in relation to marine areas”. The metadata²⁵ for this proposed indicator rather seems to be an argumentation for a different generic indicator for biodiversity based on the proportion of key biodiversity areas that are protected for the purpose of biodiversity conservation. The metadata actually argues against the officially proposed indicator by stating that “traditionally reported simple statistics of territorial area covered by protected areas ... do not recognise the extreme variation of biodiversity importance over space, and so risk generating perverse outcomes through the protection of areas which are large at the expense of those which require protection.”²⁵ Conservation in the context of SDG 14.5 is interpreted as the setting up of protected areas. IUCN defines a protected area as: “A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.”²⁷

²⁷ IUCN. 2013. Guidelines for Applying Protected Area Management Categories (https://cmsdata.iucn.org/downloads/iucn_assignment_1.pdf).

This means that the fulfilment of SDG 14.5 almost exclusively depend on administrative measures with few, if any, clear links to SDG 6. However, as the definition of the proposed indicator for SDG 6.6 also includes coastal areas, there is a potential overlap with 14.5. The way the proposed indicators are formulated, the establishment of protected coastal areas under 14.5 would not count against indicator 6.6.1 unless it increases the surface area of the ecosystem in question.

Conclusion

Despite the indicator induced overlap between the implicit purposes between target 14.5 and 6.6 the possible link between the targets is assessed to be weak and indirect. As the metadata for SDG 14.5 as well as the purpose and of 6.6 are unclear at present, the interpretations and conclusions regarding this link are highly tentative.

SDG 14 target 6: Fisheries subsidies

The sixth target under SDG 14 is to “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”. The proposed indicator, which has been placed in Tier 3 by the IAEG-SDG Secretariat, reads “Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing”.

According to the metadata²⁵, the indicator variables largely relate to self-assessed administrative actions, i.e. the establishment/ratification and implementation:

- of national plans of action to combat illegal, unreported and unregulated fishing,
- of the 2009 FAO Agreement on Port State Measures, and
- of the 1993 FAO Compliance Agreement.

The metadata note states that “the indicator is not directly linked to a given specific target [as worded in the Open Working Group Report]”. There is a significant discrepancy between the purpose of the target and the scope of the proposed indicator.

Conclusion

To the extent that removal of certain fisheries subsidies (the target purpose) or action on the indicator results in more resilient coastal and freshwater ecosystems, it would support the purpose, but not the proposed indicator, for SDG 6.6. It is assessed that no significant link exists between SDG 14.6 and the targets under SDG 6.

SDG 14 target 7: Economic benefits from marine resources

The seventh target under SDG 14 is to “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”. The proposed indicator, which has been placed in Tier 3 by the IAEG-SDG Secretariat, reads “Sustainable fisheries as a percentage of GDP in Small Island Developing States, least developed countries and all countries”.

No metadata is provided for the proposed indicator, making an analysis of this target and its links to targets under SDG 6 difficult. One specific challenge is that there is a potential contradiction between the target and the proposed indicator as an increase in the economic benefits from aquaculture and tourism actually would reduce the percentage of GDP from sustainable fisheries.

Conclusion

It is assessed that sustainable use of marine resources would have no significant impact on the targets under SDG 6. As mentioned above under Goal 6 target 3: Water quality and Goal 6 target 6: Water related ecosystems there are weak indirectly enabling and unidirectional links from these targets to target 14.7.

SDG 14 implementation target a: Economic benefits from marine resources

The first implementation target under SDG 14 is to “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”. The proposed indicator, which has been placed in Tier 3 by the IAEG-SDG Secretariat, reads “Proportion of total research budget allocated to research in the field of marine technology”.

No metadata is provided for the proposed indicator, making an analysis of this target and its links to targets under SDG 6 difficult. Improving ocean health through increase in in scientific knowledge, research capacity and transfer of marine technology (it is unclear how this is defined) is likely to be a long process. It could improve the health of coastal ecosystems and thereby contribute to the purpose, but not the proposed indicator, for SDG 6.6. It is assessed that no significant link exists between SDG 14.a and the targets under SDG 6.

SDG 14 implementation target b: Access for small-scale fishers

The second implementation target under SDG 14 is to “Provide access for small-scale artisanal fishers to marine resources and markets”. The proposed indicator, which has been placed in Tier 3 by the IAEG-SDG Secretariat, reads “Progress by countries in the degree of application of a legal/regulatory/-policy/institutional framework which recognizes and protects access rights for small-scale fisheries”.

The metadata and the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries²⁸ that it refers to does not differentiate between marine and freshwater resources even though the target clearly specifies marine resources and markets. Two of the sub indicators refer to aspects that are deemed to have very indirect, if any, links to targets under SDG 6; “Existence of instruments that specifically target or address the small-scale fisheries sector” and “Existence of mechanisms enabling small-scale fishers and fish workers to contribute to decision-making processes”.

A third sub indicator “Ongoing specific initiatives to implement the SSF Guidelines” does provide some explicit links as it e.g. calls for “the harmonization of policies affecting the health of marine and inland waterbodies and ecosystems”²⁸. However, there are several other parts of the SSF Guidelines that would count against fulfilment of this sub-indicator, which in turn only has a relative weight of 30 percent. Hence, this link is not deemed to be significant.

SDG 14 implementation target c: United Nations Convention on the Law of the Sea

The third implementation target under SDG 14 is to “Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, 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’”. The proposed indicator, which has been placed in Tier 3 by the IAEG-SDG Secretariat, reads “Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nation Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources”.

Unfortunately, the metadata provided seems, also for this proposed indicator, to refer to a differently formulated indicator. A background note on “Provisional proposed tiering system for the indicators”²⁹ that was produced for the third IAEG-SDGs meeting, states that there is no methodology yet for the proposed indicator 14.c.1.

One question with regards to the fulfilment of this target is whether it requires the ratification and implementation of the entire United Nations Convention on the Law of the Sea (UNCLOS) or only the sections that relate to conservation and sustainable use. The sections of UNCLOS³⁰ that mainly relates to conservation and sustainable use of marine resources are found in

²⁸ FAO. 2015. Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries (<http://www.fao.org/3/a-i4356e.pdf>).

²⁹ IAEG-SDGs. 2016. Provisional proposed tiering system for the indicators (<http://unstats.un.org/sdgs/files/meetings/iaeg-sdgs-meeting-03/Provisional-Proposed-Tiers-for-SDG-Indicators-24-03-16.pdf>).

³⁰ United Nations Convention on the Law of the Sea (http://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf).

part five “Exclusive Economic Zone” and in part seven “High Seas” where section two has the title “Conservation and Management of the Living Resources of the High Seas”.

The management of marine and coastal ecosystems within the exclusive economic zones are explicitly covered by target 14.2 and its proposed indicator (see Goal 14 target 2: Marine and coastal ecosystems). The section on conservation and management on the high seas mainly relates to fishing and marine mammals, which are assessed to have few and distant, links to SDG 6.

4.2. Source-to-sea linkages in the broader 2030 Agenda

According to the analysis above, the closest and strongest links between the SDGs 6 and 14 exist between the targets 14.1 and 14.2 with 6.3, 6.5 and 6.6. However, targets that support, rely upon, enable or even disenable the “access to water and sanitation for all” and/or the “conservation and sustainable use of the oceans, seas and marine resources” are found under several SDGs.

In order to analyse the upstream-downstream linkages in the broader 2030 Agenda, we make use of the “key source-to-sea flows” as defined by Granit (2016)³¹ as flows of water, sediment, pollutants, biota, material and ecosystem services that connect geographies from the upstream “source” to the downstream “sea”. We assessed to what extent efforts to achieve the various SDG targets would *risk altering*, *rely upon* or would contribute to *improve the management* of adequate key source-to-sea flows.

Environmental dimensions

SDG targets related to the protection of water-related ecosystems (target 6.6), marine and coastal ecosystems (target 14.2), terrestrial and inland freshwater ecosystems (target 15.1) and their services rely upon adequate source-to-sea flows. It is however well documented that activities to meet demands for economic growth (target 8.1), food (target 2.3) renewable energy (target 7.2) and industrialization (target 9.2) risk to significantly alter these flows.

Water regulation and water use to support increasing agricultural (target 2.3), renewable energy (target 7.2) and industrial (target 9.2) production have direct impact on water flow patterns – which are essential to the ecological health of river, floodplain and estuarine ecosystems³². Sediment trapping by dams can lead

³¹ Granit, J., Liss Lymer, B., Olsen, S.B., Tengberg, A., Nömmann, S. and Clausen, T.J. 2016. A conceptual framework for governing and managing key flows in a source-to-sea continuum. Global Environment Facility Scientific and Technical Advisory Panel (GEF/STAP). 50th Meeting of the GEF Council. (https://www.thegef.org/sites/default/files/council-meeting-documents/EN_GEF.STAP_C.50.Inf_05.Rev_01_A_Conceptual_Framework_v2_0.pdf).

³² Bunn, S.E. and Arthington, A.H. 2002. “Basic Principles and Ecological Consequences of Altered Flow Regimes for Aquatic Biodiversity,” *Environmental Management* 30, no. 4 (October 1, 2002): 492–507.

to delta starvation³³ and coastal erosion³⁴. Activities causing soil degradation and erosion in the catchment, such as the clearing of land for agricultural purposes, can increase sediment loads and lead to smothering of coral reefs and seagrass beds downstream. Eutrophication due to upstream nutrient loads is one of the leading causes of degradation of marine waters³⁵. The cumulative effects of a wide range of environmentally persistent contaminants, mainly from fossil fuel combustion and agricultural sources, are a major global environmental challenge in both fresh and marine waters³⁶. The large amounts marine litter and micro-plastics available in marine environments have negative impacts on biodiversity and food security and are primarily from land-based sources³⁷. Construction and other development activities to respond to needs for housing (11.1), river and marine transport (11.2), renewable energy (7.2) and natural disaster defence risk transforming landscapes. River regulation and flow modifications have caused the disappearance and fragmentation of habitats and substantial declines in the populations of many fish species around the world³⁸.

In order to protect and restore ecosystems from source to sea, progress towards targets related to e.g. sustainable consumption and production (targets 12.1–12.8); sustainable food production (target 2.4); improved water quality (target 6.2); water-use efficiency (target 6.4); IWRM (target 6.5); energy efficiency (target 7.3); decoupled economic growth from environmental degradation (target 8.4); and sustainable industries (target 9.4) will be instrumental. However, even though the above targets all seem very relevant to freshwater, coastal and marine ecosystems, the way current indicators are formulated, the level of sustainability of any given production may or may not factor in issues like water use or water pollution.

While wastewater treatment and reduced pollution is primarily addressed through targets on water quality (6.3), environmentally sound management of

³³ Syvitski J.P.M., Kettner, A.J., Overeem, I., Hutton, E.W.H., Hannon, M.T., Brakenridge, G.R., Day, J., Vörösmarty, C., Saito, Y., Giosan, L., and Nicholls, R.J. 2009. "Sinking Deltas due to Human Activities," *Nature Geoscience* 2, no. 10 (October 2009): 681–86.

³⁴ Cheng K. Ly. 1980. "The Role of the Akosombo Dam on the Volta River in Causing Coastal Erosion in Central and Eastern Ghana (West Africa)," *Marine Geology* 37, no. 3–4 (September 1980): 323–32.

³⁵ Howarth, R.W., Sharpley, A., and Walker, D. 2002. "Sources of Nutrient Pollution to Coastal Waters in the United States: Implications for Achieving Coastal Water Quality Goals," *Estuaries* 25, no. 4 (August 2002): 656–76.

³⁶ STAP. 2012. "GEF Guidance on Emerging Chemicals Management in Developing Countries and Countries with Economies in Transition". Global Environment Facility (GEF) Scientific and Advisory Panel (STAP), (<http://www.stapgef.org/stap/wp-content/uploads/2013/05/ECMI-Overview.pdf>).

³⁷ UNGA. 2016. Report of the Secretary-General. Seventy-first session. 22 March 2016. Oceans and the law of the sea. United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea. Seventeenth Meeting "Marine debris, plastics and micro-plastics". (http://www.un.org/ga/search/view_doc.asp?symbol=A/71/74).

³⁸ Gough, P., P. Philipsen, P.P. Schollemma & H. Wannigen. 2012. From sea to source; International guidance for the restoration of fish migration highways. (<http://www.fromseatosource.com/?page=DOWNLOAD>).

chemicals and wastes (target 12.4) and substantially reduced waste generation (12.5), the indicator for sustainable industries and environmentally sound industrial processes (target 9.4) is limited to CO₂ emission per unit of value added. The indicators for targets on sustainable management and efficient use of natural resources (12.1) and decoupled economic growth from environmental degradation (8.4) are both based on material footprint and domestic material consumption, i.e. in terms of biomass, fossil fuels, metal ores and non-metallic minerals.

The food production sector is by far the largest water consumer and the use of fertilizers, pesticides and antibiotics in crop and livestock production is a major cause of water pollution and eutrophication. Even so, the targets and indicators related to SDG 2 place little emphasis on downstream environmental sustainability. The indicator for sustainable food production (target 2.4) is “Proportion of agricultural area under productive and sustainable agriculture”. There does not seem to be a firm definition for what constitutes “sustainable agriculture”. However, according to the metadata file, sustainable agriculture should “maintain the natural resource base in order to ensure sufficient productivity for the foreseeable future”. Depending on the geographical scope within “productivity” is interpreted, this could mean little or no consideration to downstream effects of agriculture in terms of pollution and eutrophication.

Social dimensions

The SDG target to eradicate extreme poverty (target 1.1) relies partly upon adequate source-to-sea flows in the sense that activities and processes that alter source-to-sea flows need to be managed with a view to sustain important ecosystem services and livelihood opportunities. People close to, or below the poverty line, are often the ones most vulnerable to changes in water availability and variability, being more likely to rely upon rain-fed agriculture and live in marginal lands and in flood-prone areas. Many of the ecosystem services and livelihood opportunities of critical importance to local economies and the poorest populations are dependent on healthy ecosystem assets. Fish can represent a major source of protein and income for the poor³⁹, but river regulation and water flow obstruction may jeopardize important fish stocks. Return flows from irrigation have been known to result in stream salinization, affecting the productivity of agricultural lands in river basins and deltas⁴⁰. Polluted waters can have a wide range of negative impacts on local economies, such as reduced tourism and agricultural potential. The potential importance of ecosystem goods and services to poverty alleviation are however not explicit in the formulation of SDG 1 targets and indicators.

Upstream-downstream linkages are more explicitly recognized in relation to resilience and reduced exposure of poor and vulnerable people to extreme events/disasters (target 1.5) and reduced deaths and economic losses caused by

³⁹ Welcomme, R.L., Cowx, I.G., Coates, D., Bene, D., Funge-Smith, S., Halls, A. and Lorenzen, K. 2010. “Inland Capture Fisheries.” *Philosophical Transactions of the Royal Society B: Biological Sciences* 365, no. 1554 (September 27, 2010): 2881–96.

⁴⁰ Goss, K.F. 2003. “Environmental Flows, River Salinity and Biodiversity Conservation: Managing Trade-Offs in the Murray–Darling Basin.” *Australian Journal of Botany* 51, no. 6: 619.

disasters, including water-related disasters (target 11.5). Management of activities that risk altering water and sediment flows are critical to be able to reduce flood risk and flood severity along rivers and deltas.

The SDGs also recognize the importance of water quality for human health. Target 3.9 aims to “reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination”. In addition, targets related to basic services such as water (6.1) and sanitation (6.2) are important to be able to reduce water-borne diseases (target 3.3) and ensure access to adequate, safe and affordable housing (target 11.1).

Economic dimensions

Sustaining per capita economic growth (target 8.1) while decoupling it from environmental degradation (target 8.4) is dependent upon appropriate management of source-to-sea flows. Estimates suggest that water scarcity, exacerbated by climate change, could cost some regions up to 6 percent of their GDP by 2050 compared to 2015 levels as a result of water-related losses in agriculture, health, income and property – sending them into sustained negative growth⁴¹. Nearly 80 % of jobs globally are dependent on sustainably managed water resources and water-related services, including sanitation⁴². The total global economic losses associated with inadequate water supply and sanitation have been estimated at US\$ 260 billion annually, or up 1.5 % of the GDP of some countries⁴³. In this context, it is also important to factor in the economic value of oceans, estimated at USD 2.5 trillion per year – more than two-thirds of which being dependent on healthy ocean ecosystems⁴⁴.

“Green” investments to increase resource efficiency in productive sectors and to develop waste and wastewater treatment/4R technologies can provide important economic growth opportunities in “high-value, labour-intensive sectors” (target 8.2) while contributing to environmental objectives in both freshwater and coastal and marine ecosystems. Sustaining blue economic growth – the benefits generated by coasts and oceans – is dependent upon the management of activities that take place upstream⁴⁵. This is likely to become

⁴¹ World Bank. 2016. “High and Dry – Climate Change, Water and the Economy” (World Bank, 2016), (<https://openknowledge.worldbank.org/bitstream/handle/10986/23665/K8517.pdf?sequence=3&isAllowed=y>).

⁴² UNESCO, WWAP, and UN-Water. 2016. *Water and Jobs*. (<http://unesdoc.unesco.org/images/0024/002439/243938e.pdf>).

⁴³ Hutton, G. 2012. “Global Costs and Benefits of Drinking-Water Supply and Sanitation Interventions to Reach the MDG Target and Universal Coverage” (WHO, 2012), WHO/HSE/WSH/12.01, (http://apps.who.int/iris/bitstream/10665/75140/1/WHO_HSE_WSH_12.01_eng.pdf?ua=1).

⁴⁴ Hoegh-Guldberg, O., et al. 2015. *Reviving the Ocean Economy - the Case for Action*. WWF International, Gland, Switzerland, Geneva.

⁴⁵ Granit, J., Liss Lymer, B., Olsen, S.B., Tengberg, A., Nömmann, S. and Clausen, T.J. 2016. A conceptual framework for governing and managing key flows in a source-to-sea continuum. Global Environment Facility Scientific and Technical Advisory Panel (GEF/STAP). 50th Meeting of the GEF

increasingly important to sustain economic growth both upstream and downstream in many countries. If well distributed within a country or region, overall economic growth would also benefit the poorest populations.

Conclusions

The SDGs whose implementation are likely to *risk altering* the majority of the defined key source-to-sea flows are primarily those that concern production/-resource use: food (SDG 2), renewable energy (SDG 7), economic growth (SDG 8), infrastructure and industrialization (SDG 9). Meanwhile, targets that *rely upon* adequate source-to-sea flows span across the social, environmental and economic dimensions of the 2030 Agenda. It is clear that progress towards improved management and resource use efficiency will be instrumental to be able to balance the social, environmental and economic dimensions of the 2030 Agenda and secure the long-term availability of resources and ecosystem health in freshwater, coastal and marine environments. The potential negative impacts of increased food production on the source-to-sea flows is likely to constitute one of the key challenges of the 2030 Agenda. Source-to-sea relevant issues related to sustainable food production, such as water-use efficiency and nutrient pollution, are addressed primarily through targets 6.3, 6.4 and 14.1. It is however imperative that those targets are duly considered also by the agricultural sector, as well as other productive sectors.

5. Key international processes related to SDGs 6 and 14

5.1. Global-level processes and mechanisms

Indicator development and review

As mentioned in the section on “The formulation and follow-up of the Sustainable Development Goals, their targets and their indicators”, the UN General assembly, the UN Statistical Commission, the Inter-agency and Expert Group on SDG Indicators and the UN Economic and Social Council are key actors in the monitoring and follow-up of the 2030 Development Agenda. In addition to these actors, the Secretary-General is responsible for the Global SDGs report; the Chief Executives Board shall align the UNs work with the SDGs and emerging challenges to ensure UN System-wide policy coherence and the UN Development Group shall support the work on country progress reports and national thematic reports. Most UN Secretariat entities, UN Specialized agencies and UN System organizations shall provide thematic reviews and analyses within their respective areas.

UN-Water, the United Nations inter-agency coordination mechanism for all freshwater related issues, is a key contact point for SDG 6. As a coordination mechanism, UN-Water is not an actor in itself, but a platform for its 31 members and 38 partners⁴⁶. The purpose is to complement and add value to existing programmes and projects by facilitating synergies and joint efforts and to maximize coherence as well as effectiveness of the support to Member States in their efforts towards achieving the time-bound goals, targets and actions related to its scope of work. The scope of UN-Water’s work encompasses all aspects of freshwater (quality, quantity, management, sanitation, water-related disasters, etc.), including surface and groundwater resources and the interface between fresh and sea water.

Under the UN-Water umbrella, three programmes are proposed for the monitoring and analysis of the indicators proposed for SDG 6 targets:

- 6.1 and 6.2 are monitored by the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP). JMP is the official mechanism of the UN system mandated to monitor global progress towards MDG Target 7.C and was established in 1990 building on monitoring activities carried out by WHO since the 1960s.
- For 6.3, 6.4, 6.5 and 6.6, that were not part of the MDGs, a new global monitoring initiative has been developed “Integrated monitoring of water and sanitation related SDG targets” (GEMI). GEMI is an inter-agency initiative composed of UNEP, UN-Habitat, UNICEF, FAO, UNESCO, WHO and WMO. The GEMI is meant to be a part of a coherent monitoring framework for water and sanitation and a support to

⁴⁶ UN-Water, webpage retrieved 21 June 2016 (<http://www.unwater.org/about/members-and-partners/en/>).

“country progress through well-informed decision-making on water, based on harmonized, comprehensive, timely and accurate information”.⁴⁷

- It is additionally proposed that the monitoring of the means of implementation (SDG targets 6.a and 6.b) builds on the UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS) and the GEMI reporting towards target 6.5 on integrated water resources management (IWRM), based on the existing UN-Water IWRM status reporting.⁴⁸

UN-Water has also proposed custodian agencies for the proposed SDG 6 indicators according to the below list.

Table 6: SDG 6 Custodian Agencies⁴⁹

No	SDG 6 proposed global indicator (short title)	Custodian
6.1.1	Safely managed drinking water services	WHO UNICEF
6.2.1	Safely managed sanitation services	WHO UNICEF
6.3.1	Wastewater safely treated	WHO UN-Habitat
6.3.2	Good ambient water quality	UNEP
6.4.1	Water use efficiency	FAO
6.4.2	Level of water stress	FAO
6.5.1	Integrated water resources management	UNEP
6.5.2	Transboundary basin area with an operational arrangement for water cooperation	UNECE UNESCO
6.6.1	Water-related ecosystems	UNEP
6.a.1	Water- and sanitation-related official development assistance that is part of a government coordinated spending plan	WHO UNEP OECD
6.b.1	Participation of local communities in water and sanitation management	WHO UNEP

Similarly to UN-Water with regards to freshwater, UN Oceans is an inter-agency mechanism that seeks to enhance the coordination, coherence and effectiveness of competent organizations of the United Nations system and the International

⁴⁷ UN-Water, webpage retrieved 18 June 2016. (<http://www.unwater.org/gemi/gemi-background-and-objectives/en/>).

⁴⁸ UN-Water, webpage retrieved 17 June 2016. (<http://www.unwater.org/gemi/global-monitoring/en/>).

⁴⁹ Harlin J. 2016. Presentation 24 May 2016. Retrieved 21 June 2016. (http://staging.unep.org/docs/unea2/Joakim%20Harlin_UNEA%202020_Water%20Side%20Event_GEMI.pdf).

Seabed Authority.⁵⁰ However, UN-Oceans does not seem to have played the same role as UN-Water with regards to coordinating the input on ocean and coastal issues into the 2030 Development Agenda nor the development of the indicator framework. Instead, the Global Forum on Oceans, which was first mobilized ahead of the 2002 World Summit on Sustainable Development, prepared a proposal for a Sustainable Development Goal on Oceans and Seas and presented this at the 8th Session of the Open Working Group on Sustainable Development Goals in 2014. Although there are significant differences, there are many similarities between this first proposal and the later adopted SDG 14 targets. However, in the case of SDG 14, no entity seems to have assumed a coordinating role similar to that of UN-Water in the case of SDG 6.

Important global actors for SDG 14 include the organisations that have contributed to the metadata on SDG 14. These are:

- UNEP 14.1.1 and 14.2.1
- FAO 14.4.1, 14.6.1 and 14.b.1
- IUCN 14.5.1
- International Labour Organisation 14.c.1
- 14.3.1, 14.7.1, 14.a.1, no metadata provided

A potentially highly important process for SDG 14 is the one leading up to and culminating in the “United Nations Conference to Support the Implementation of Sustainable Development Goal 14: Conserve and Sustainably Use the Oceans, Seas and Marine Resources for Sustainable Development” to be held in New York from 5 to 9 June 2017. The purpose of the conference is to support the implementation of Sustainable Development Goal 14. Fiji and Sweden have offered co-host and finance the conference.⁵¹ According to the revised zero draft for the General Assembly Modalities resolution⁵² for the conference, the preparatory process shall have two co-facilitators that would chair a two-day preparatory meeting in February 2017 to consider the themes for the Partnership dialogues and elements for a draft political declaration. It is further proposed that the Secretary General submits a note by end of January 2017 that outlines challenges and opportunities, gaps and constraints in the implementation of SDG 14 to inform the preparatory meeting.

⁵⁰ UN General Assembly. 2013. Resolution adopted by the General Assembly on 9 December 2013 (http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/68/70).

⁵¹ UN General Assembly, Second Committee. 2015. Sustainable Development. (http://www.un.org/ga/search/view_doc.asp?symbol=A/C.2/70/L.3/REV.1&Lang=E).

⁵² Ambassadors Koonjul and Lennartsson. 2016. Revised zero draft for the General Assembly Modalities resolution (<https://sustainabledevelopment.un.org/content/documents/10476letterPresGA10June.pdf>).

The role of UN agencies in the SDG implementation

Fourteen organisations, programmes or agencies are members of both UN-Water and UN-Oceans, indicating a mandate that covers both freshwater and marine issues. They are:

- UN Department of Economic and Social Affairs (UNDESA),
- UN Economic and Social Commission for Asia and the Pacific (ESCAP),
- UN Development Programme (UNDP),
- UN Environment Programme (UNEP),
- Convention on Biological Diversity (CBD),
- Food and Agriculture Organization of the United Nations (FAO),
- UN Educational, Scientific and Cultural Organization (UNESCO),
- World Meteorological Organization (WMO) and
- World Bank
- UN Industrial Development Organization (UNIDO),
- UN Conference on Trade and Development (UNCTAD),
- International Labour Organization (ILO),
- UN High Commissioner for Refugees (UNHCR); and
- International Atomic Energy Agency (IAEA),

The mandates and thematic areas of these entities differ quite substantially and sometimes overlap.

UNDESA promotes international cooperation for development in general. It compiles and disseminates economic, social and environmental data, facilitates negotiations and major UN summits and conferences and supports the nationalisation of policy frameworks, such as the 2030 Development Agenda⁵³. UNDESA is a key actor in and facilitator of the administrative parts of the SDG process with no particular thematic focus.

ESCAP is the regional development arm of UN in the Asia-Pacific region, providing technical assistance and capacity building to member States within several areas including sustainable development, environment and development and disaster risk reduction⁵⁴, but not with a specific focus on water or source-to-sea issues.

UNDP's focus is to help countries eradicate poverty through support to sustainable development; democratic governance and peacebuilding; and climate and disaster resilience. The implementation of the 2030 Development Agenda lies at the core of UNDP's efforts. Since the Resident Representative of UNDP usually also acts as the UN Resident Coordinator in a country, UNDP has an important role to support UN country teams in their response to Member States' needs in relation to the 2030 Agenda. In terms of SDG 6 and 14, UNDP sees their

⁵³ UNDESA, webpage accessed 28 June 2016 (<http://www.un.org/en/development/desa/what-we-do.html>).

⁵⁴ ESCAP, webpage accessed 28 June 2016 (<http://www.unescap.org/about>).

water and oceans governance programmes as strongly aligned with the formulated goals and supportive of a majority of the respective targets.⁵⁵ UNDP clearly expresses the very close links between freshwater and marine systems and advocates for integrated ecosystem-based management and governance. UNDP's Water and Ocean Governance Programme is operating in over 100 countries.⁵⁶

UNEP has played an active part in the establishment of the 2030 Development Agenda and the SDGs⁵⁷. As the primary UN organization mandated to support environmental monitoring, it has taken active part in the development of a large number of indicators, including several SDG 6 and 14 indicators. UNEP's work on freshwater prioritizes water quality, water-energy-food nexus (within a productive landscape) and capacity building for (transboundary) watershed management.⁵⁸ UNEP hosts the secretariat of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA). GPA is claimed to be "the only global intergovernmental mechanism directly addressing the connectivity between terrestrial, freshwater, coastal and marine ecosystems"⁵⁹. Under GPA, three global multi-stakeholder partnerships are run: the Global Partnership on Nutrient Management (GPNM)⁶⁰, the Global Partnership on Marine Litter (GPML)⁶¹ and the Global Wastewater Initiative (GWI)⁶². The UNEP Regional Seas programmes also provide important mechanisms to facilitate regional cooperation on the management marine and coastal resources.

CBD is focussed on biodiversity in general and have programmes on inland waters⁶³ as well as marine and coastal⁶⁴ biodiversity. The Parties have adopted the ecosystem approach as the primary framework of the convention, defined as "a strategy for the integrated management of land, water and living resources"⁶⁵.

⁵⁵ UNDP. 2016. UNDP Support to Implementation of the Sustainable Development Goals [chapters on SDG 6 and 14], accessed 29 June 2016 (http://www.undp.org/content/dam/undp/library/Sustainable%20Development/6_Water_Jan15_digital.pdf) and (http://www.undp.org/content/dam/undp/library/Sustainable%20Development/14_Oceans_Jan15_digital.pdf).

⁵⁶ UNDP, webpage accessed 29 June 2016 (<http://www.undp.org/content/undp/en/home/ourwork/sustainable-development/natural-capital-and-the-environment/water-and-oceans/>).

⁵⁷ UNEP, webpage accessed 30 June 2016 (<http://web.unep.org/post2015/design.php>).

⁵⁸ UNEP, webpage accessed 30 June 2016 (<http://www.unep.org/themes/freshwater/>).

⁵⁹ UNEP, webpage accessed 30 June 2016 (<http://unep.org/gpa/about/about.asp>).

⁶⁰ UNEP, webpage accessed 30 June 2016 (<http://unep.org/gpa/gpnm/gpnm.asp>).

⁶¹ UNEP, webpage accessed 30 June 2016 (<http://unep.org/gpa/gpml/gpml.asp>).

⁶² UNEP, webpage accessed 30 June 2016 (<http://unep.org/gpa/gwi/gwi.asp>).

⁶³ CBD, webpage accessed 28 June 2016 (<https://www.cbd.int/waters>).

⁶⁴ CBD, webpage accessed 28 June 2016 (<https://www.cbd.int/marine>).

⁶⁵ CBD, webpage accessed 28 June 2016 (<https://www.cbd.int/ecosystem/>).

Integrated basin-scale, coastal and marine management and control of land-based pollution sources are highlighted as priorities under the convention.

FAO is focussed on achieving food security for all by eradicating hunger and malnutrition; elimination of poverty; and, sustainable management and use of natural resources, including land, water, air, climate and genetic resources⁶⁶. Several SDG 6 and 14 targets are directly dependent on sustainable production in sectors that are covered by FAO's mandate, such as agriculture, forestry, aquaculture, fishery and other human activities with large spatial and water-related footprints. FAO has been closely involved in the formulation of SDG 6 and 14 indicators on water-use efficiency and fisheries.

UNESCO is the UN agency specialised on education. As such, their main focus of the SDGs lies on goal 4. The organisation has however made significant contributions to water over the last 50 years⁶⁷ through a number of actors in their so called "water family". The UNESCO water family comprises the International Hydrological Programme (IHP), the World Water Assessment Programme (WWAP), the UNESCO-IHE Institute for Water Education, 36 Centres under the auspices of UNESCO on water around the world and 36 water related Chairs and UNITWIN Networks⁶⁸. In UNESCO's assessment of their potential contribution to the SDGs, they specifically list water security as one important aspect of their support to natural sciences. UNESCO is also one of the custodian agencies for the 6.5 indicator related to transboundary water cooperation. On marine issues, UNESCO Intergovernmental Oceanographic Commission (IOC) coordinates programmes in marine research, services, observation systems, hazard mitigation, and capacity development for effective management of ocean and coastal areas and resources⁶⁹. UNESCO's work on building capacity, monitoring and knowledge development is relevant to several targets under SDGs 6 and 14. However, the integration between these two fields within UNESCO seems to be quite weak.

WMO is focussed on observation and monitoring regarding "the state and behaviour of the Earth's atmosphere, its interaction with the land and oceans, the weather and climate it produces and the resulting distribution of water resources"⁷⁰. This includes programmes on hydrology and water resources, marine meteorology and oceanography and the global climate observing system.

The financial and technical assistance provided through the World Bank represents an important avenue to address countries' investment needs in the area of water. The World Bank established a Global Practice on freshwater in

⁶⁶ FAO, webpage accessed 28 June 2016 (<http://www.fao.org/about/en/>).

⁶⁷ UNESCO. 2016. Water, People and Cooperation – 50 years of water programmes for sustainable development at UNESCO (<http://unesdoc.unesco.org/images/0023/002350/235002e.pdf>).

⁶⁸ UNESCO. 2016. 53rd session of the IHP Bureau in Paris, 19-21 April 2016 (http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/pdf/53rd_IHP_Bureau_doc_8.pdf).

⁶⁹ UNESCO, webpage accessed 29 June 2016 (<http://www.unesco.org/new/en/natural-sciences/ioc-oceans/about-us/>).

⁷⁰ WMO, webpage accessed 29 June 2016 (<http://public.wmo.int/en/about-us>).

2014 with the ambition to expand the traditional focus on delivery of water services by adding improving water management as a way to achieving SDGs also in other sectors⁷¹. The Global Practice on water is closely integrated with the other 13 Global Practices and five cross-cutting solutions areas, bringing together knowledge and operational service delivery arms related to water. The Water Global Practice manages a portfolio of approximately US\$25 billion in lending through 177 projects and country, regional and global packages of economic and technical expertise, around 72 % of lending is for services: water supply and sanitation and irrigation.^{Ibid}⁷¹ The Water Global Practice is also supporting the Heads of State Panel on Water (in partnership with UN, World Economic Forum, World Water Council, Stockholm International Water Institute, and the World Resources Institute with financial support from the Government of the Netherlands). The World Bank's work on ocean, fisheries and coastal economies lies under the environment branch of the Global Practice on Environment and Natural Resources⁷². The Bank's active 'blue growth' portfolio is worth US\$6.4 billion and some \$1 billion is provided for sustainable fisheries and aquaculture, and for efforts to conserve and enhance coastal and ocean habitats. In addition, some \$5.4 billion goes to coastal infrastructure such as waste treatment, watershed management and other activities that help reduce coastal pollution.^{Ibid} The Bank convenes partners and stakeholders to mobilize support for healthy oceans through e.g. the PROFISH program, the Alliance for Responsible Fisheries, the Strategic Partnership for Fisheries in Africa and the Ocean Partnerships for Sustainable Fisheries and Biodiversity Conservation.^{Ibid}

UNIDO's mandate is to promote and accelerate inclusive and sustainable industrial development, which they see as well included in SDG 9. In addition, they see several other goals and targets either directly or indirectly related to inclusive and sustainable industrial development⁷³. For freshwater, targets 6.1, 6.3, 6.4, 6.5, 6.a and 6.b are considered to have direct relevance and targets 6.2 and 6.6 indirect relevance. For the marine and coastal goal, targets 14.1, 14.2, 14.6, 14.7, 14.a, 14.b and 14.c are considered to have direct relevance to ISID and targets 14.3, 14.4, and 14.5 indirect relevance. It may also be worth to note that UNIDO is one of few agencies that recognized source-to-sea linkages in their comments to the SDGs, highlighting marine concerns in their comments on SDG 6 and stressed the need for control of freshwater pollution and protection of groundwater in their comments on SDG 14.^{Ibid}

UNCTAD's purpose is to promote development through international trade. In UNCTAD's own assessment of their mandate in relation to the SDGs, SDG 6

⁷¹ World Bank, webpage accessed 29 June 2016 (<http://www.worldbank.org/en/topic/water/overview#2>).

⁷² World Bank, webpage accessed 29 June 2016 (<http://www.worldbank.org/en/topic/environment/brief/oceans>).

⁷³ UNIDO. 2016. The 2030 Agenda for Sustainable Development: Achieving the industry-related goals and targets (http://www.unido.org/fileadmin/user_media_upgrade/Who_we_are/Mission/ISID_SDG_brochure_final.pdf).

is not mentioned at all⁷⁴. On SDG 14, work related to fisheries subsidies (Target 14.6) and economic benefits to SIDS of sustainable use of marine resources (Targets 14.7 and 14.b) are mentioned.

ILOs engagement with the 2030 Development Agenda is focussed on “decent work”⁷⁵, relevant to SDG 6 in relation to working conditions, workers’ health and potential paid and decent job opportunities provided through investments in water and sanitation⁷⁶. With regards to SDG 14, ILO stresses targets 14.4, 14.6 and 14.7 where they claim that “Decent work for all, including fair remuneration and working conditions to the world’s seafarers and fishers, is a foundation for conserving marine resources and reducing overfishing”^{Ibid}.

UNHCR is the UN’s refugee agency and their work related to water and marine issues mainly includes efforts to manage environmental resources to avoid conflicts and disasters, provision of water and sanitation services to refugees and safeguarding that their operations have minimal negative environmental impact⁷⁷.

IAEA are focussed on nuclear technology and safety⁷⁸. Although several nuclear facilities are cooled with fresh and salt water and a release of radioactive material into water from operations or disposal of waste would be detrimental for fulfilment of SDGs 6 and 14, IAEA are assessed to be less relevant from a SDG or source-to-sea-perspective.

5.2. Regional-level processes and mechanisms

Although countries have the primary responsibility for implementation, follow-up and review of the SDGs, the 2030 Agenda acknowledges the importance of “regional and sub-regional dimensions, regional economic integration and interconnectivity in sustainable development” and the role regional and sub-regional frameworks can play to “facilitate the effective translation of sustainable development policies into concrete action at the national level”⁷⁹.

Target 6.5 refers specifically to transboundary cooperation in the implementation of IWRM, but many other SDG 6 and 14 targets would also benefit greatly from regional cooperation. Efforts to ensure water quality (6.3), reduce

⁷⁴ UNCTAD, webpage accessed 28 June 2016 (<http://unctad.org/en/Pages/About%20UNCTAD/UNCTAD-and-the-Global-Goals/Goals-12-14-and-15-Planet.aspx>).

⁷⁵ ILO, webpage accessed 28 June 2016 (<http://www.ilo.org/global/topics/sdg-2030/lang-en/index.htm>).

⁷⁶ ILO. 2016. Decent Work and the 2030 Agenda for Sustainable Development, (http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/wcms_436923.pdf).

⁷⁷ UNHCR, webpage accessed 29 June 2016 (<http://www.unhcr.org/sustainable-environmental-management.html>).

⁷⁸ IAEA, webpage accessed 28 June 2016 (<https://www.iaea.org/ourwork>).

⁷⁹ UNGA. 2015. “Transforming Our World : The 2030 Agenda for Sustainable Development” (United Nations General Assembly, 2015), (http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E).

marine pollution from land-based activities (14.1), protect and restore water-related habitats and sustainably manage and protect marine and coastal ecosystems (14.2) etc. stand a lot to gain cooperation between countries in activities such as monitoring, determining carrying capacity of recipient environments, setting environmental targets and prioritizing action.

Mechanisms to support such regional cooperation in river basins include transboundary water treaties. Experiences show that challenges in achieving effective cooperation with upstream stakeholders in river basins often represent an obstacle in efforts to reduce marine pollution (14.1) and achieve improved environmental conditions in downstream coastal and marine environments (14.2)⁸⁰. According to the Transboundary Waters Assessment Programme (TWAP)⁸¹, about 60 percent of the world's transboundary river basins have some form of legal framework in place. Many of those river basins also have an international river basin organisation in place to support cooperation. Transboundary water cooperation is also guided by the obligations set out in the UNECE Convention (Convention on the Protection and Use of Transboundary Watercourses and International Lakes) and the UN Watercourses Convention. The main focus of many of these treaties concerns rights and obligations between states in relation to water rights and the use and construction of water infrastructure such as dams. However, they often include provisions that are important from a source-to-sea perspective, such as the obligation not to cause significant harm to other watercourse states.

Regional Seas Conventions and programmes support multi-country cooperation on coastal and marine environmental issues. Most Regional Seas Conventions and programmes have agreed upon specific protocols or action plans to address negative impacts from land-based activities to achieve the objectives of the GPA. Commitment from countries and available financing to implement agreed actions are however highly variable between different regions. The extent to which countries will prioritize regional cooperation through these mechanisms to assist the delivery upon relevant SDGs remains to be seen.

Over the past 25 years, the Global Environment Facility (GEF) has complemented and supported the work of river basin initiatives and Regional Seas programmes through investing in regional cooperation on river basins, lake basins, aquifers and Large Marine Ecosystems (LMEs). The GEF International Waters project portfolio spans across connected water systems in many regions. This puts GEF in a unique position to connect linkages between fresh-and marine-related SDG targets and support cooperation between upstream and downstream stakeholders. GEF is already supporting several initiatives designed specifically to address upstream-downstream linkages. Examples include the long-term support

⁸⁰ Granit, J., Liss Lymer, B., Olsen, S.B., Tengberg, A., Nömmann, S. and Clausen, T.J. 2016. A conceptual framework for governing and managing key flows in a source-to-sea continuum. Global Environment Facility Scientific and Technical Advisory Panel (GEF/STAP). 50th Meeting of the GEF Council. (https://www.thegef.org/sites/default/files/council-meeting-documents/EN_GEF.STAP_C.50.Inf_05.Rev_01_A_Conceptual_Framework_v2_0.pdf).

⁸¹ UNEP and UNEP-DHI. 2016. "Transboundary River Basins: Status and Trends" (Nairobi, Kenya: United Nations Environment Programme (UNEP), in progress 2016).

provided to cooperation in East Asian Seas, Patagonian Shelf, Mediterranean, Black Sea and the Caribbean. In several of these initiatives, the GEF has adopted a programmatic regional approach, including a range of projects at regional and national levels contributing towards the same objectives. In some cases, such as in the Danube River-Black Sea region, the GEF investments have enabled strengthened collaboration between river basin and coastal and marine regional cooperative mechanisms. Most of the GEF International Waters projects addressing source-to-sea linkages have been implemented by UNDP or UNEP as GEF implementing agencies. In several cases, World Bank investment funds for pollution reduction have complemented the GEF investments. Recently, FAO has also indicated a strong interest in projects that apply “source-to-sea approaches” to strengthen coordination between land, river, coastal and marine management. As an example, FAO is currently in the process to develop such a project in Alto Suchiato and Coatàn watersheds, shared by Guatemala and Mexico.

5.3. National-level processes and mechanisms

Voluntary national reviews

The 2016 High-level Political Forum on Sustainable Development (HLPF) was held 11–20 July, being the first is forum since the adoption of the 2030 Agenda and the SDGs. By the time of writing this report, the HLPF, and its Ministerial Declaration, is expected to “provide political leadership, guidance and recommendations on the 2030 Agenda's implementation and follow-up; keep track of progress; spur coherent policies informed by evidence, science and country experiences; as well as address new and emerging issues.”⁸² On national SDG processes, the “Potential elements of draft Ministerial Declaration”⁸³ highlights the importance of the national voluntary reviews, encourages member states to volunteer for 2017 reviews and emphasises the importance of quality data and of nationalizing and localizing the SDGs.

One of the main features of the HLPF 2016 is the voluntary reviews of 22 countries and thematic reviews of progress on the Sustainable Development Goals.

As of 19 April 2016, 22 countries had agreed to take part in the national reviews at the HLPF, namely:

China	Madagascar	Sierra Leone*
Colombia*	Mexico*	Switzerland*
Egypt*	Montenegro*	Togo
Estonia*	Morocco	Turkey*
Finland*	Norway	Uganda*
France	Philippines	Venezuela *
Georgia*	Republic of Korea*	
Germany*	Samoa*	

⁸² Division for sustainable development, UN-DESA, webpage retrieved 17 June 2016. (<https://sustainabledevelopment.un.org/hlpf>).

⁸³ Ambassadors Bird and Meza-Cuadra, letter dated 13 June 2016 (<https://sustainabledevelopment.un.org/content/documents/10455letterco-facilitators.pdf>).

Countries marked with * had submitted input by 17 June 2016. In general, the voluntary reviews presents the preparations that the countries have made to start engaging with the 2030 Development Agenda, often through a process to review the SDGs in relation to national policy priorities and develop national strategies to implement the 2030 Agenda. A few countries, like Montenegro, Samoa and Switzerland already have national sustainable development strategies in place. Uganda and Republic of Korea have already completed a process to mainstream the SDGs into national planning frameworks. Sierra Leone has integrated the SDGs into the 2016 national budget.

While some countries, like Colombia⁸⁴, do not spell out any thematic priorities at this point, others have already prioritized a select number of goals and targets to address through national action. A few countries highlight priorities related to SDGs 6 and 14: Egypt⁸⁵ highlights water scarcity as a major challenge; Venezuela⁸⁶ highlights the strong links between water and energy production; and Samoa's⁸⁷ national sustainable development strategy sees SDG 1–6 as unfinished business of the MDGs and prioritise them for implementation. However, Samoa only mentions SDG 6 targets related to access to safe drinking water and basic sanitation in specific terms. SDG 14 is seen as covered by Samoa's priorities to "... protect marine areas, critical ecosystems and endangered species as well as developing and implementing tracking systems for chemicals and hazardous waste".

The voluntary reviews also report on the process to adapt the countries' national statistical system to enable reporting on their progress to achieve the various SDG targets. Montenegro reports that a total of 54 percent of the proposed indicators can be monitored⁸⁸. Uganda's⁸⁹ national statistical framework have data readily available for 80 out of 230 indicators in the global SDG indicator framework.

The 2030 Agenda for a Sustainable Development⁹⁰, recognizes the need to take "into account different national realities, capacities and levels of development and respecting national policies and priorities" in the implementation of the 2030 Agenda. This means each country should select the indicators it judges to be most appropriate in the light of its own situation, its ability to carry out the necessary measuring process, the characteristics of its own development plan and the detail with which it wishes to monitor the operation of specific policies. As indicated by the voluntary reviews submitted

⁸⁴ (<https://sustainabledevelopment.un.org/hlpf/2016/colombia>).

⁸⁵ (<https://sustainabledevelopment.un.org/hlpf/2016/egypt>).

⁸⁶ (<https://sustainabledevelopment.un.org/hlpf/2016/venezuela>).

⁸⁷ (<https://sustainabledevelopment.un.org/hlpf/2016/samoa>).

⁸⁸ (<https://sustainabledevelopment.un.org/hlpf/2016/montenegro>).

⁸⁹ (<https://sustainabledevelopment.un.org/hlpf/2016/uganda>).

⁹⁰ UNGA. 2015. "Transforming Our World : The 2030 Agenda for Sustainable Development" (United Nations General Assembly, 2015), (http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E).

so far, national priorities is indeed setting the basis for the prioritization of SDG targets while the capacity of the national statistical systems will set the limits for what will come out of the SDG review process. With this in mind, there is a risk that complex linkages not explicitly captured in the way the SDGs were formulated, get overlooked in the process to prioritize and monitor the progress in achieving a wide range of goals and targets at the national level.

National review processes on SDG 6

In UN-Waters assessment, the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP) is well prepared to monitor SDG targets related to drinking water, sanitation and hygiene (SDG targets 6.1 and 6.2).

The methodologies developed by GEMI for SDGs 6.3 to 6.6 will be field-tested in a small number of countries that were selected based on willingness to participate and geographical balance before global implementation. The so-called “proof-of-concept” countries are Senegal and Uganda in Africa, Jordan in the Middle East, Bangladesh in Southern and Eastern Asia, Peru in Latin America and the Netherlands in Europe.

Inception workshops have been held in Senegal (25–26 April 2016), Jordan (22–23 May 2016), Peru (30–31 May 2016), and Uganda (15–16 June 2016). The dates for inception workshops in Bangladesh and the Netherlands remain to be set. The purposes of the national inception workshops are to introduce and get support for the SDG-water work at high policy level, to establish national teams and timelines, to define a harmonized national framework for the achievement of all the water-related indicators, to review options and capacity gaps and to outline possibilities for a regional approach.⁹¹

National review processes on SDG 14

The authors have not been able to find information on planned national processes for testing or rolling out monitoring or implementation of the targets or proposed indicators under SDG 14.

Support to national SDG implementation

Responding to Member States’ request for coherent and integrated support from the UN development system to the implementation of the 2030 Agenda, the United Nations Development Group (UNDG) has developed a common approach for effective and coherent implementation support, under the acronym MAPs (Mainstreaming, Acceleration and Policy Support)⁹². MAPs will guide UN Country Teams and Resident Coordinators in the support to countries’ SDG planning, implementation and monitoring. In recognition of the integrated nature of the 2030 Agenda, the implementation (acceleration) phase of MAPs pays special attention to synergies and trade-offs across sectors. It is likely that efforts will be focused on a limited number of “SDG accelerators”

⁹¹ FAO, webpage retrieved 18 June 2016. (<http://www.fao.org/nr/water/aquastat/projects/index.stm>).

⁹² (<https://undg.org/home/undg-mechanisms/sustainable-development-working-group/country-support/>).

through which investments can generate progress on multiple SDGs. Support for water-related issues, which span across the economic, social and environmental dimensions of the 2030 Agenda, could most likely act as an accelerator of multiple SDGs in several countries.

6. Conclusions and recommendations

Explicit linkages between SDGs 6 and 14 are weaker than expected

When looking at the level of targets and indicators, the explicit links between goals 6 and 14 are weaker than expected. While the targets and indicators under goal 6 have a strong emphasis on service provision and human health, targets and indicators under goal 14 has a stronger focus on the sustainable use of marine resources.

The strongest linkages between these two goals are provided by the targets on water quality (6.3), water-related ecosystems (6.6), marine pollution (14.1), marine ecosystems (14.2) and (partly) economic benefits from marine resources for Small Island Developing States (14.7). However, the strength of the connection between targets 6.6 and 14.2 depends heavily of the formulation of their respective indicators where a significant revision is possible since they have been placed in tier 3.

The implementation of Integrated Water Resource Management (IWRM) and improved cooperation on transboundary waters (6.5) would likely enhance the implementation of SDG 14 (notably targets 14.1 and 14.2), but this requires that aspects related to downstream environments are considered. The capacity to do so is however not considered by related indicators.

The target on water-use efficiency (6.4) provides potentially important links to target 14.2 on marine ecosystems (14.2). However, the related indicators provide only limited guidance on how to account for adequate water flows for ecosystem needs.

Targets 6.1 and 6.2 focus on drinking water and sanitation. These targets focus on service delivery, with a strong focus on human health and well-being. There are limited linkages to the SDG 14 targets.

Target 14.3 refers to ocean acidification, which is primarily caused by carbon dioxide emissions, of little relevance to the SDG 6 targets.

Targets 14.4 and 14.6 focus on the management of the fisheries. Although there are linkages between SDG 6 targets on water quality (6.3) and water-related ecosystems (6.6) and the well-being of many fish stocks, there are no explicit links between SDG 6 targets and the management of overfishing (14.4) and fishery subsidies (14.6).

The process indicators (6.a–b and 14.a–c) hardly provide any links between SDG 6 and 14. The process indicators can rather be said to demonstrate the sectoral divide between freshwater and marine frameworks, stakeholders, research and development assistance.

Broader source-to-sea linkages span across social, economic and environmental dimensions of the 2030 Agenda

Despite some gaps between SDG 6 and 14, source-to-sea-related priorities span across the social, economic and environmental dimensions of the broader 2030 Agenda. Looking at the level of SDG targets, they can be summarized as aims to:

Improve access to safe water and sanitation for human health	3.2, 3.3, 4.5, 5.4, 6.1, 6.2, 11.1
Reduce exposure to water-related extreme events	1.5, 2.4, 6.1, 6.2, 11.5, 13.1
Improve water-use efficiency and balance water demands between sectors and ecosystems from source to sea	2.3, 2.4, 6.4, 6.5, 7.2, 7.3, 8.1, 8.4, 9.4, 12.2, 14.2
Reduce freshwater- and marine pollution and its negative health and environmental impacts	3.9, 6.3, 11.6, 12.4, 12.5, 14.1
Sustain water-related ecosystem goods and services from source to sea	6.6, 11.4, 14.2, 15.1

These linkages are however not necessarily reflected at the indicator level. An important example concerns target 2.4 on sustainable food production that does not refer to agriculture as a source of pollution for downstream water environments. To achieve SDGs 6 and 14, it is of critical importance that productive sectors, such as agriculture, energy and industry address targets on water use efficiency and water quality/land-based pollution that are not explicitly addressed through the targets or indicators under SDGs 2, 7 and 9.

This also points to the danger of sectoral division in the implementation and follow-up of the 2030 Agenda. Analysing goals and targets from a source-to-sea perspective clearly points to the importance of treating the agenda as “integrated and indivisible”. Since, as an example, water use efficiency and minimized water pollution can be seen as pre-requisites for sustainable production in the majority of sectors, they cannot be treated as a “water goals” under the responsibility of the water sector even though they may not be specifically referred to as part of specific goals on food, energy and industrial production.

Overall, the SDG framework should provide an incentive for stronger integration between inter-linked individual goals and targets. However, such efforts need to be reinforced through collaboration across sectors and stakeholders – both upstream and downstream; monitoring systems that are able to capture the links between the social, economic and environmental dimensions of the 2030 Agenda; and increased capacity to deal with trade-offs between different priorities.

Annex 1

List of IAEG-SDG Members appointed in 2016

Chair of the Statistical Commission (ex officio member of the IAEG-SDG)

- United Kingdom of Great Britain and Northern Ireland

Eastern Africa

- Uganda
- United Republic of Tanzania

Middle and Southern Africa

- Botswana
- Cameroon

Western Africa

- Cabo Verde
- Senegal

Northern Africa

- Algeria

Western Asia

- Armenia
- Bahrain
- Egypt

Central, Eastern, Southern, and South-Eastern Asia

- China
- India
- Kyrgyzstan
- Philippines

Oceania

- Fiji
- Samoa

The Caribbean

- Cuba
- Jamaica

Central and South America

- Brazil
- Colombia
- Mexico

Eastern Europe

- Russian Federation

North America and Northern, Southern and Western Europe

- Canada
- France
- Germany
- Netherlands
- Sweden

Annex 2

Sustainable Development Goals and Targets 6 and 14

The Sustainable Development Goals numbers six and fourteen are dedicated to freshwater and oceans. The goals and targets were formally established in September 2015 and read:

Goal 6: Ensure availability and sustainable management of water and sanitation for all.

- Target 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all
- Target 6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
- Target 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
- Target 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
- Target 6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate
- Target 6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes
- Target 6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies
- Target 6.b Support and strengthen the participation of local communities in improving water and sanitation management

Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

- Target 14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution
- Target 14.2 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
- Target 14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels

- Target 14.4 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
- Target 14.5 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
- Target 14.6 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
- Target 14.7 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
- Target 14.a 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
- Target 14.b Provide access for small-scale artisanal fishers to marine resources and markets
- Target 14.c 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

Source to Sea

Linkages in the 2030 Agenda for Sustainable Development

The 2030 Agenda for Sustainable Development was adopted in 2015. The agenda consists of 17 sustainable development goals (SDGs) and 169 targets and aims to achieve a world free from poverty and hunger, promote people's well-being and protect the environment.

Intensification of human activities to meet societal demands has led to impacts on ecosystems that extend from land and along rivers to the coastal zones and in marine environments. The relationship between upstream pressures and downstream effects highlight the importance of coordinating efforts to achieve SDG 6 on freshwater and SDG 14 on oceans.

This study describes and assesses the relative strength of possible links between SDG 6 on water and sanitation and SDG 14 on oceans. It also examines the links between these two SDGs and the broader 2030 Agenda for Sustainable Development. The study was carried out by Stockholm International Water Institute (SIWI) and was commissioned by the Swedish Agency for Marine and Water Management (SwAM).

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