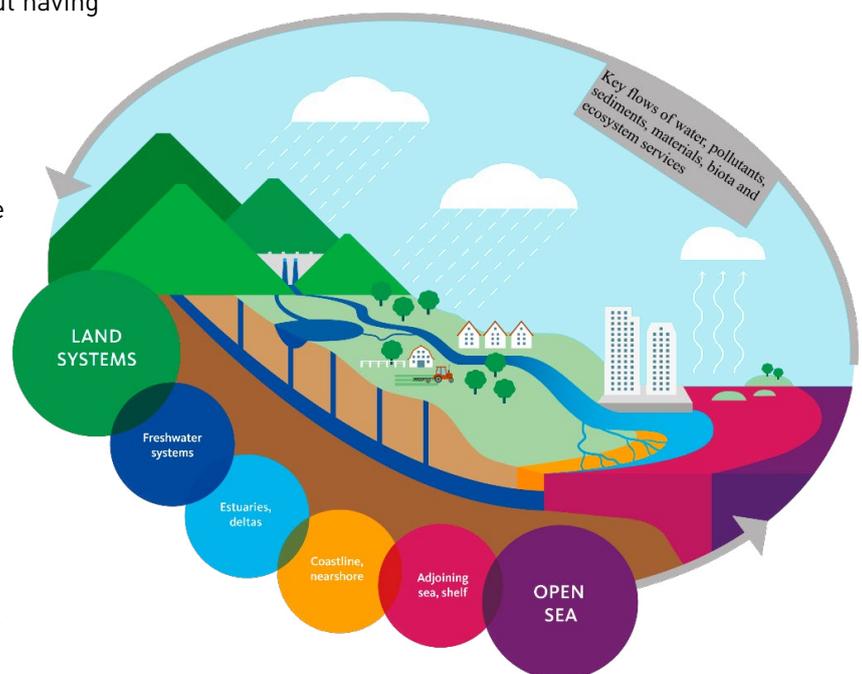


The world's marine areas, lakes, rivers, wetlands, deltas and groundwater aquifers and the ecosystem services they provide are of outmost importance, not least for the poorest people. But they are also highly affected by human change. The degradation of freshwater, terrestrial and marine environments has a direct impact on biodiversity and crucial ecosystem services leading to negative effects on livelihoods, human health, food and water security¹. Climate change is a factor that aggravates these problems as water is the primary medium through which climate change influences the Earth's ecosystems. Development interventions are often based on a sectoral and/or a geographical approach making them poorly suited tools for addressing these challenges and impacts in the system as a whole. Practices, following in line with the segmentation of policies, procedures and regulations, are normally directed toward maximising local benefits and are considering upstream and/or downstream impacts to a lesser degree, resulting in benefits for one sector but having negative consequences on another.

Understanding that more holistic solutions are necessary the Source-to-Sea (S2S) approach defines the linkages between upstream and downstream activities to tackle the impacts within a S2S system (Figure 1) related to the key flows of water, pollutants, sediments, material, biota² and ecosystem services. The S2S approach addresses the impacts (Figure 2 – challenges and issues) from activities on land, along lakes, rivers, wetlands, aquifers on downstream coasts and oceans on these flows and hence takes a wider scope than Integrated Water Resource Management (IWRM), which focuses solely on freshwater in river basins. Critically, the approach promotes environmental, economic and social benefits by integrating upstream

and downstream activities (Figure 2 – measures) on the key flows, also for the benefit of upstream communities through improved ecosystem functions and services³. The approach can similarly create opportunities for new partnerships and cross-sectoral learning and cooperation. Hence, a S2S approach can be usefully applied when planning for, and managing interventions and strategies in Sida's development cooperation.

Figure 1: Segments comprising the source-to-sea system. The arrows indicate the upstream-downstream linkages between the segments. In the system there are typically ecological and hydrological return flows, such as migrating fish species. Economic and social activities downstream have a positive (or negative) effect on upstream communities, and create additional return flows, including ecosystem services, remittances etc. (adapted from Groeneweg-Thakar et. al. 2020).



¹ Water scarcity hotspots have been shuffled downstream during 20th and 21st century due to human interventions to address upstream water scarcity. <https://www.nature.com/articles/ncomms15697>
² Biota refers to the plant and animal life that may be living within a S2S system.

³ Aquatic ecosystem goods and services are the stocks and flows derived from ecosystem processes that have some value to humankind (Limburg K. E. 2009)

Figure 2: A Source to Sea approach to development.



Examples of SDG linkages.

F Key flows

F.1. Upstream water resources as an example of water as a key flow; **F. 2.** Pollution as key flow, **F. 3.** Hydro power construction as an example of material as a key flow. **F.4.** Sand-dredging with impact on sedimentation as a key flow, **F.5.** Fish as an example of biota as key flow. **F.6.** Ensuring water supply as an example of ecosystem services.

C Challenges and issues

C.1. Upstream water out-take and water treatment, **C.2.** Water out-take/irrigation resulting in lower downstream flows, **C.3.** Increase or decrease in rainfall resulting in risk for downstream flooding or draught, **C.4.** Overexploitation of groundwater aquifers, **C.5.** Construction of infrastructure which impact rivers and their flows. **C.6.** Pollution, including plastics, from industrial production and discharge of wastewater, **C.7.** Nutrients and chemicals from agriculture activities, **C.8.** Energy production providing electricity but potentially blocking upward migration of fish, **C.9.** Loss of biodiversity in water and on land, **C.10.** Reduction of wetlands coverage, **C.11.** Disconnected management of resources and flows within the S2S system with lack of communication and joint target setting between sectors, **C.12.** Lack of transboundary access to resources with implications for migration and conflicts.

M Measures

M.1. Forestry management protecting soils, biodiversity and risk of floods, **M.2.** Connecting rivers to floodplains and aquifers, with biodiversity benefits, **M.3.** Stakeholder consultation between sectors and upstream and downstream stakeholders as a tool for solving mismanagement of key flows, **M.4.** Protecting and restoring reefs for coastal protection and habitat, **M.5.** Conserving and protecting wetlands, mangroves and dunes, **M.6.** Establishing flood bypasses to reduce downstream flooding, **M.7.** Providing riparian buffers to maintain water quality and reduce erosion, **M.8.** Growing crops across slopes to reduce erosion and increase infiltration, **M.9.** Conserving and protecting water sources (i.e. protected areas), **M.10.** Apply a Human Rights Based Approach to safeguard all water-related human rights and that no one is left behind, **M.11.** A special focus on environmental flows in IWRM, **M.12.** Focus on protection and restoration of water-related ecosystems and related ecosystem services, in water governance, for improved human health and poverty alleviation, **M.13.** Strengthened climate change adaptation to improve livelihoods, well-being and resilience, **M.14.** Implement nature-based solutions to improve livelihoods, resilience and human health, **M. 15.** Strengthen inter-sectoral management systems to improve development outcomes. **M.16.** Establishment of inter-sectoral legal and governing frameworks and local government monitoring of compliance.

SOURCE TO SEA AND SIDA'S PERSPECTIVES

By using a systemic approach, S2S directly support **environmental, climate change** and biodiversity results but can also help to address the other perspectives for Swedish development cooperation. Pollution from upstream sources might for instance negatively affect **poverty** in coastal communities that rely on tourism or fisheries. Likewise, the rural poor in inland communities are to a large extent dependent on freshwater ecosystem services, and are more vulnerable to changes in water quality/availability and to water-related natural disasters. By using a S2S approach, multi-dimensional poverty is addressed by creating collaboration between sectors and stakeholders. It can promote increased food security, access to well-functioning ecosystem services and goods as well as employment possibilities, also for people in upstream communities. Applying a S2S approach could work as a catalyst to support the **rights**, power and voice of poor upstream and downstream communities by being inclusive, transparent and objective. Increased transparency and participation can be tools used to build public trust, for inclusion of local and indigenous knowledge and voices, and to challenge corruption. Of special relevance are rights connected to the utilization of ecosystem services in both marine and freshwater ecosystems. Competition over natural resources in a S2S system, and growing pressure on water, land, forests and minerals, can add to **conflicts** on local, national and regional levels. Displacement and forced migration could be other negative consequences. By using a S2S approach, joint management capacities and governing frameworks can be strengthened, with the potential to decrease the risk of conflict while at the same time protect natural resources and livelihoods. A S2S approach could also help to address **gender** inequalities, which is one of the main challenges to advance the environmental dimension of sustainable development. This is critical not least as women play important roles in the management and use of water resources both up- and downstream as well as within food value chains inland and in coastal areas.

WHAT ARE THE BENEFITS WITH A SOURCE TO SEA APPROACH?

The intended outcome of the S2S approach is to identify appropriate courses of action to address alterations of key flows (water, pollutants, sediments, materials, biota and ecosystem services), resulting in economic, social and environmental benefits.

These benefits are achieved by designing courses of action that improve overall system health by reducing flows detrimental to the S2S system and enhancing flows that maintain or improve ecosystem functions and services (Figure 2 – Measures). This can be done across an entire S2S system or within a defined geographical area.

The S2S approach support enhanced coordination in two main dimensions; 1) across the S2S continuum from land to freshwater to marine environments, and vice versa; and 2) between sectors. The approach acknowledges the need for a thorough understanding of the drivers and pressures on water and marine resources, environmental flows, an appropriate scale of intervention, engagement of upstream and downstream stakeholders and taking into account the specific governance context. Moreover, the S2S approach is pragmatic and adaptive, i.e., it is not necessary to have perfect knowledge of the flows and their alterations to apply the approach. Instead, projects and programmes can be developed using best available knowledge and integration of monitoring and evaluation that builds upon the initial learnings. Applying an adaptive management is especially important when implementing the S2S approach as the impact of actions in one segment of the system may not be fully understood on another.

Another advantage of the S2S approach is that it can bring in new stakeholders who traditionally might not be involved within a certain sector but that are critical in achieving development results. In fact, many of the decisions and actions needed often belongs to stakeholders outside the usual water- or marine sector, including public and private sector actors (Box 1). These may be beneficiaries or decision-makers upstream or downstream of the project or programme activities, interest-based groups from different source-to-sea segments, the private sector who have cross-sectoral interests operating on a broader geographic scale. Engaging stakeholders from different parts of the S2S continuum can result in improved environmental quality for citizens, health benefits, increased cost effectiveness and greater economic potential for downstream sectors such as coastal tourism and fisheries. Bringing together upstream and downstream stakeholders can also create opportunities for new partnerships and innovative financing solutions. The S2S approach targets and links, several SDGs and applying the approach helps balance upstream and downstream demands ensuring that interventions to forward the achievement of one of the SDGs does not impede the achievement of others.

Box 1: Examples of stakeholders and sectors

- An ocean-focused project looking at *marine pollution* may initially work on ocean clean up and abandoned fishing gears. By taking a S2S approach to the problem of marine pollution, the project looks upstream to land-based pollution and the delivery of these pollutants via waterways, including engagement of upstream decision-makers, manufacturing businesses, and private garbage collection companies.
- An intervention targeting upstream *agricultural production*, should in a S2S approach consider how nutrients, and increase use of irrigation, affect the downstream communities and the freshwater and marine environment. It engages coastal communities and downstream water management experts.
- A contribution aiming at expanding *energy production* based on upstream water flows should assess its downstream impacts, as well as including the participation of downstream communities and stakeholders in the design and monitoring. It may include both local, national and transboundary stakeholders.
- Projects with an objective to increase upstream *economic production and employment* should take into account the downstream, coastal and marine sectors as to find sustainable solutions (for instance nature-based solutions) that could benefit communities across the S2S continuum.

INTEGRATING A SOURCE TO SEA APPROACH IN SIDA'S WORK

Integration of a S2S approach can be included in strategy processes, operationalization, and within and between contributions. Which sectors to target depends on the key flows, the targeted stakeholders and the practices resulting in the alteration of flows, and the governance system. Multi-sectoral engagement will often be important and water resources, agriculture, fisheries, forestry, environment, coastal, marine, industrial, energy and transport sectors can all be key in a S2S intervention. A transboundary lens is also often needed due to inter-state or intra-state borders in a S2S system. Linked to the above is the opportunity to address the governing system, or tools, within a S2S continuum (Box 2). Depending on the strategy context, these governing systems can be found on global, regional, national and local levels. Integrating S2S priorities into public sector action plans and budgets is one way of leveraging the project or programme intervention strategies and desired outcomes for long-term sustainability. Applying a S2S approach enables co-creation of interventions, not only with the most obvious partner, but also across sectors and the S2S system. Ultimately, a S2S perspective should be applied broadly and for long term

benefit. As such, it can be a tool for building synergies between and within Swedish development strategies and by connecting Sida financed contributions to each other for better development results while also considering other donors activities in the area (e.g. donor coordination).

Box 2: Examples of governing frameworks

- Environmental strategies and targets
- Financing mechanisms such as earmarked eco-taxes and product levies
- Banning or taxing particularly polluting products
- Subsidizing recycling in value chains
- Standards and quality requirements for products and services
- Monitoring and control of environmental compliance.

Guiding Questions

To enable a systematic S2S approach and maximize synergies, the following questions could be considered on **strategy/portfolio level**:

- What are the main ecosystem services⁴ contributing to the livelihood and resilience of poor and vulnerable communities?
 - Who are the actors/stakeholders involved that influence key flows that affect these services?
 - Who can benefit and who could be negatively affected by upstream and downstream activities in a S2S system?
- Given the main ecosystem services identified, which strategy objectives, what contributions and which partnerships are likely to have the most influence on the flows in a S2S system?
- Where can action (institutional, economic, social or biophysical⁵) be prioritized for maximum benefit when looking at the S2S continuum within a river basin, multiple river basins, and downstream coastal and marine areas?

⁴ See Limburg (2009) for an overview of ecosystem services

⁵ Natural systems, engineered or physical interventions

To maximize positive environmental, economic and social impacts, stakeholder engagement and coordination, the following questions could be considered on **contribution level**:

- Does the contribution build on an analysis of the S2S continuum and the sectors around it? If not, can this be done and is there room to use a S2S approach for co-creation with you partner(s)?
- Is the contribution likely to influence S2S flows and ecosystem services contributing to the livelihood and resilience of poor and vulnerable communities? If so:
 - Are measures identified to maximize benefits and/or to mitigate potential negative impacts on ecosystem services?
 - Are all relevant stakeholders, including both those up and downstream, included to address the identified measures?
 - Does the contribution set aside resources to ensure adequate coordination between key sectors and stakeholders?
- Can a S2S approach be used as to better integrate the five perspectives in your contribution, see for example the human rights-based approach and water (Sida 2022)?

To support the application of Sida's perspectives and a coordinated implementation of SDGs, the following **messages for normative dialogue** could be :

- Collaboration between sectors, and between stakeholders from different geographical areas, will be critical to achieve results within interconnected geographical regions. The S2S approach enables inter-sectoral and multi-stakeholder engagement and coordination for mutual achievement of SDG targets.
- Human activities in combination with the effects of climate change put increasing pressure on natural ecosystems and resources in river basins, deltas, coasts and the ocean. Poor communities are to a large extent dependent on ecosystem services, and more vulnerable to water-related changes for their livelihoods. Sida supports the S2S approach as a means to address multi-dimensional poverty, better environmental governance and management, conflict prevention, the rights, power and voice of poor upstream and downstream communities, including women, by being inclusive, transparent and objective.

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