

REPORT

Accountability for source-to-sea action to prevent plastic pollution



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Executive summary

This report presents a framework for strengthening accountability within the plastics value chain based on the Source-to-Sea Framework for Marine Litter Prevention presented in Mathews and Stretz (2019) and the accountability framework for the water, sanitation, and hygiene (WASH) sector presented in United Nations Development Programme (UNDP) Water Governance Facility and United Nations Children's Fund (UNICEF) (2015). A framework for accountability between actors that are responsible for individual or joint actions can foster arrangements between stakeholders, illuminate the interdependencies between them, and help clarify co-responsibilities for action.

The issue of plastic pollution in freshwater bodies and the ocean demands increasing global attention as we come to better understand the extent of the impacts of plastics and microplastics on the environment, economy, biodiversity, and human health. A vast amount of this pollution originates from land-based sources, with inadequate solid and liquid waste management in rural and urban areas among the main contributors of plastic leakage into rivers, lakes, and aquifers, and ultimately into coastal and marine waters.

If we are to halt the flow of plastic pollution into waterbodies and the ocean, a broad range of stakeholders must come together to collectively make the necessary changes in waste and wastewater management and the life cycle of plastic goods. An accountability framework for source-to-sea action on plastic pollution helps to clarify the contributions of each actor toward a common goal. Making these relationships explicit can facilitate agreements between actors, providing a foundation for collaborative action.

The accountability framework for source-to-sea action on plastics focuses on identifying the roles and responsibilities of each actor and the interdependencies between them to:

- Identify where changes in behaviour and practices, or other enabling conditions, are needed.
- Provide a system view of all the actions that need to be taken and how they fit together.
- Foster the creation of shared action plans by encouraging greater stakeholder participation and establishing consultation processes where trust can develop.

Three examples of an accountability framework are presented: a) under a linear economy; b) under a circular economy; and c) in a practical application in Hoi An, Viet Nam. The structure of the accountability framework changes in the move from a linear to a circular economy. In the linear economy, there is no connection between those who design and produce plastic products and packaging and those who are responsible for it at the end of life. There can also be a disconnect in the levels of government that set the policies and performance standards for the production of plastic goods and those that are responsible for providing waste and wastewater management services. As the circular economy develops, these divides are bridged, increasing the accountability relationships along the entire value chain.

The six-step source-to-sea approach can be used to develop the accountability framework. The first three steps of the source-to-sea approach lay the groundwork for developing the accountability framework by generating a common understanding of the context within

which actions need to be taken. Step 4 guides the development of a shared vision and action plan. The accountability framework then ties together Steps 4, 5, and 6 by defining the roles and responsibilities for implementing the action plan and providing a means for monitoring progress and adaptation based on learning. The accountability framework is a valuable outcome of the source-to-sea approach as well as an important addition to the methodology.

The Hoi An case study demonstrates the accountability framework in action on a local scale. Testing this model of accountability in Hoi An has demonstrated that engaging stakeholders in developing an accountability framework fosters shared understanding, which can lead to increased trust and collaboration among actors along the plastic value chain.

The shared understanding of the issues and the clarity of roles and responsibilities developed during the process of elaborating the accountability framework can be useful in resolving some of the issues that have stalled progress previously. Not only will the accountability framework lead to greater chances of success, but the process of developing it will also facilitate the identification of coordinated and collaborative solutions that will benefit the source-to-sea system. Ultimately, learning to work across sectors and improving understanding of upstream-downstream linkages will lay the foundations for more coherent and coordinated actions and reap benefits beyond the issue of plastic pollution.

Preamble

The 2022 Sustainable Development Report (Sachs et al., 2022) confirmed that many countries are not on track to meet the Sustainable Development Goals' (SDG) targets by 2030. A focus on achieving individual targets has been hampering progress, since many of the goals are interlinked. This can be clearly seen with SDGs 6: Clean Water and Sanitation, 11: Sustainable Cities and Communities, and 14: Life Below Water. Access to clean drinking water and the health of freshwater, coastal, and marine ecosystems are threatened by the ways in which solid waste and wastewater are treated in urban and rural areas, and by pollution entering waterbodies and flowing down to the coast and into the ocean.

The issue of plastic pollution in freshwater bodies and the ocean is demanding increased global attention as we come to better understand the extent of the impacts of plastics and microplastics on the environment, economy, biodiversity, and human health. The main sources of marine pollution are land-based, with plastic pollution, untreated wastewater, and agricultural run-off being the primary culprits. Inadequate solid and liquid waste management in both urban and rural areas, and limited progress towards improved farm management practices are degrading water quality and ecosystems in rivers, lakes, and aquifers, and ultimately in coastal and marine waters.

These issues cannot be solved in isolation as they cross the traditional land-freshwater-coastal-marine boundaries. Coordination across sectors throughout the plastic value chain and cooperation between upstream and downstream stakeholders are needed urgently to prevent further plastic pollution. For benefits to accrue across the source-to-sea system, government, private sector, and civil society actors must share responsibility for delivering a range of different and complementary actions. The source-to-sea framework for accountability to prevent plastic pollution can be used to facilitate collaborative action toward this goal.

Introduction

As global challenges around water security, biodiversity loss, pollution, and climate change continue to mount, it is clear that new approaches to addressing such challenges are required. These major global challenges are interconnected in large part through the links between ecosystems and the services they provide, which we rely upon. But we have only recently come to better understand important linkages between land, freshwater, coasts, and oceans thanks to new insights into the complex social, environmental, and economic relationships between different ecosystems on land and in rivers, deltas, estuaries, coasts, the nearshore, and the ocean.

The Stockholm International Water Institute (SIWI) has been at the forefront of developing and testing methods and tools that address the linkages between land, freshwater, coastal, and marine ecosystems and the issues that arise from fragmented governance and siloed management of these ecosystems. A particular focus has been placed on preventing plastic pollution. This began with the development of the Source-to-Sea Framework for Marine Litter Prevention (Mathews and Stretz, 2019), and the piloting of the Framework in the Vu Gia-Thu Bon River Basin in Viet Nam (Mathews and Groeneweg-Thakar, 2020) and the Lake Hawassa sub-basin in Ethiopia (Weinberg et al., 2020). The Framework was further applied in the project Design and Accountability for Source-to-Sea Action on Plastic, implemented in Hoi An, Viet Nam.

This report reflects the learning from these projects, particularly the development of an accountability framework to prevent plastic pollution. Halting the flow of plastic pollution into waterbodies and the ocean requires a broad range of stakeholders to take action collectively. For this to be successful, the roles and responsibilities of each actor and the interdependencies between actors must be well understood, and the full suite of necessary actions must be undertaken. The process of developing an accountability framework facilitates the shared understanding and commitment needed for collaborative action to succeed.

What is meant by source to sea?

Source-to-sea concept

The source-to-sea concept brings scrutiny to the environmental, social, and economic linkages across the source-to-sea system (Figure 1) (Granit et al., 2017). A source-to-sea system is defined as the biophysical continuum of the land area that is drained by a river system, its lakes and tributaries (the river basin), connected aquifers, and downstream recipients, including deltas and estuaries, coasts and nearshore waters, the adjoining sea and continental shelf, and the open ocean. Each of these ecosystems is known as a segment of the source-to-sea system. A source-to-sea system can also be defined at a larger scale to include a sea and its entire drainage area, which may include several river basins, for example the Baltic Sea. However, a direct connection to the sea is not required, which means that endorheic basins can also be considered as source-to-sea (lake) systems.

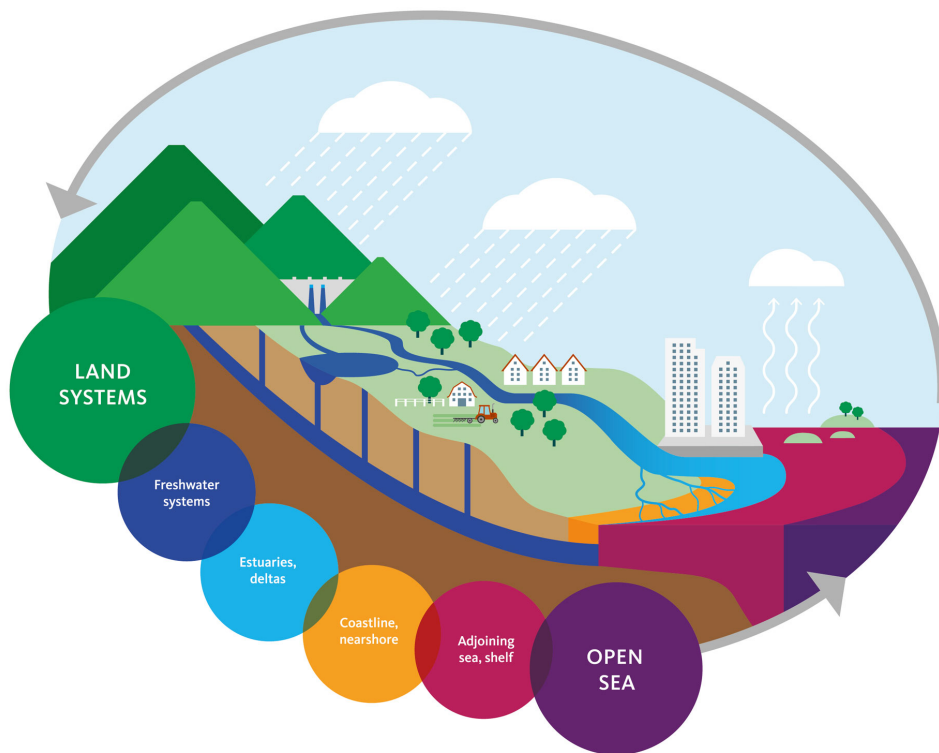


Figure 1. Source-to-sea system. Source: Groeneweg-Thakar et al. (2020)

Source-to-sea systems are connected by key flows such as water, sediments, pollutants, biota, materials, and ecosystem services, and the interactions between them (Figure 2). Alterations to these key flows through human activities can have both upstream and downstream social, environmental, and/or economic consequences.



Figure 2. Key flows in a source-to-sea system. Source: Mathews et al. (2019)

Key flows within a source-to-sea system

WATER | water flows through the entire water cycle and the intra- and inter-annual patterns strongly define the attributes of the river, floodplain, delta, estuary, coast, and nearshore ecosystems.

SEDIMENTS | flows of sediments of different sizes build riverbeds, beaches, floodplains, and deltas, and they can increase or change in type through land-based activities.

BIOTA | refers to the plant and animal life that may be living within a source-to-sea system. This biota has adapted over millennia to the conditions present in the surrounding habitat.

POLLUTANTS | a range of pollutants can enter source-to-sea systems from a variety of sources, e.g. industrial and domestic wastewater, agriculture, horticulture and silviculture, aquaculture, etc., and can be transported through the source-to-sea system altering ecosystems and impacting human health.

MATERIALS | human-built infrastructure such as dams, bridges, culverts, dikes, levees, etc.; clearing and hardening of shorelines; draining of wetlands; and land reclamation can alter the geomorphology of source-to-sea systems. These material flows can disrupt positive flows of water, sediments, and biota by either blocking them entirely or altering their movement, which can alter or disconnect vital habitats.

ECOSYSTEM SERVICES | these are the ecosystem conditions or processes utilized, actively or passively, to contribute to enhanced human well-being.

Source-to-sea governance

Traditional governance frameworks and resource management approaches are often structured around managing individual segments of a source-to-sea system and/or focused on delivering outcomes for one sector, e.g. forestry, power production, or fisheries. This makes them poorly suited as tools for managing the source-to-sea system as a whole. This often results in outcomes that may not be optimal for the entire source-to-sea system due to a focus on optimizing outputs from one segment or sector alone that has unintended consequences for others. For example, draining wetlands to convert land to agriculture may

result in reduced groundwater recharge, ultimately leading to land subsidence and saltwater intrusion in coastal areas. Source-to-sea governance can combat this by widening the perspective to include upstream and downstream linkages and multiple sectors. Source-to-sea governance identifies opportunities to stimulate coordination between sectors and cooperation across segments, which can lead to measurable social, environmental, and economic improvement across freshwater, coastal, nearshore, and marine environments.

Source-to-sea approach

The source-to-sea approach (Mathews et al., 2019) provides a structured process for strengthening cooperation between upstream and downstream stakeholders and building coordination between sectors (Figure 3). By bringing stakeholders and sectors together, the source-to-sea approach facilitates the identification and prioritization of issues to be addressed across the source-to-sea system. The six steps of the source-to-sea approach serve to elicit a shared knowledge base of the biophysical, social, and governance systems that can be used to develop policies, processes, and mechanisms for managing the source-to-sea system as a whole. The intended outcome of the source-to-sea approach is to identify appropriate courses of action to address alterations of key flows, resulting in social, environmental, and economic benefits.

Principles of the source-to-sea approach

- ✓ **HOLISTIC** | addressing upstream and downstream linkages across issues, stakeholders, desired outcomes, costs, and benefits.
- ✓ **COLLABORATIVE** | building on and enhancing existing institutions, established methods, and ongoing processes.
- ✓ **PRIORITIZING** | targeting and addressing the issues that hold the greatest potential for generating positive impacts for the system as a whole, while minimizing negative impacts.
- ✓ **PARTICIPATORY** | engaging upstream and downstream stakeholders from the start, including marginalized and vulnerable people, and ensuring equitable sharing of benefits.
- ✓ **CONTEXT DEPENDENT** | derived from, and responsive to, the local context.
- ✓ **RESULTS ORIENTED** | targeting intermediate outcomes that contribute to overall improved economic, social, and environmental status.
- ✓ **ADAPTIVE** | 'learning by doing' through pragmatic implementation, monitoring, evaluation, and adaptive management, and sharing across basins and seas.

The six steps begin with understanding the pressures and drivers of altered key flows. This in combination with selecting an appropriate scale of intervention, engagement of stakeholders (both upstream and downstream), and a thorough understanding of the governance context set the basis for defining a theory of change to guide planning and implementation. Monitoring and adaptive management round out the process and can be used to refine the theory of change and ensure continuous improvement towards long-term outcomes.

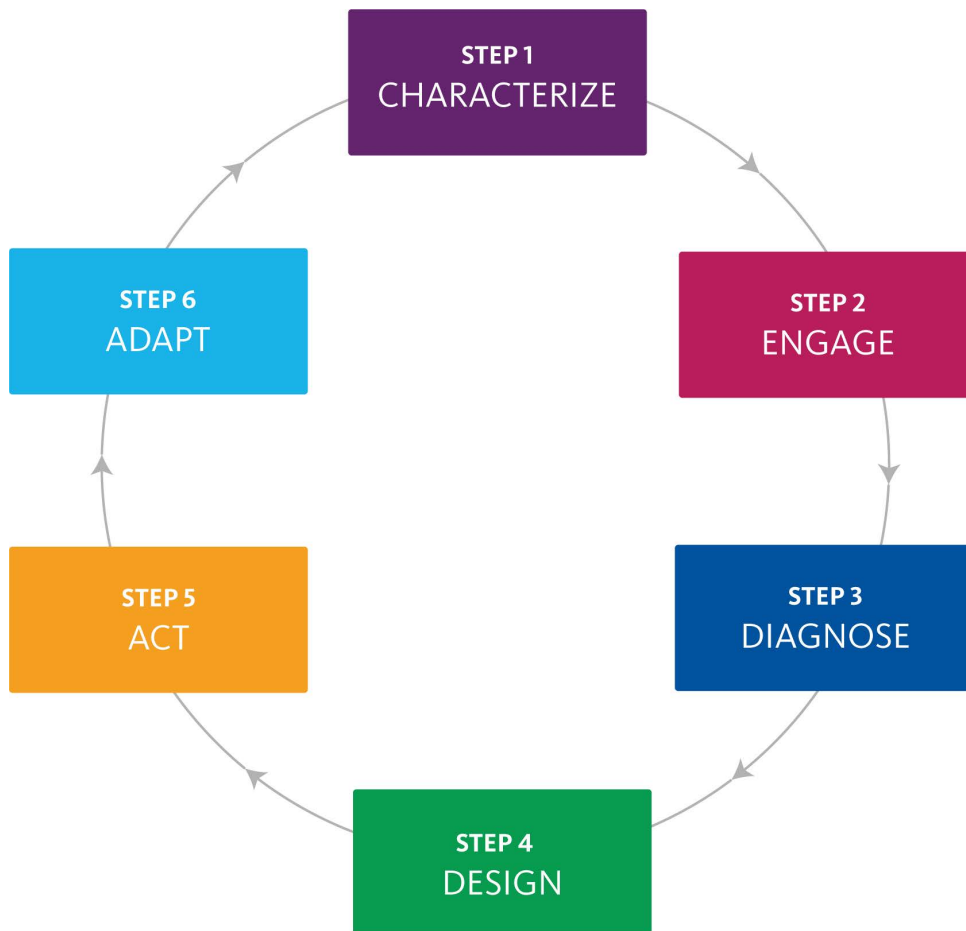
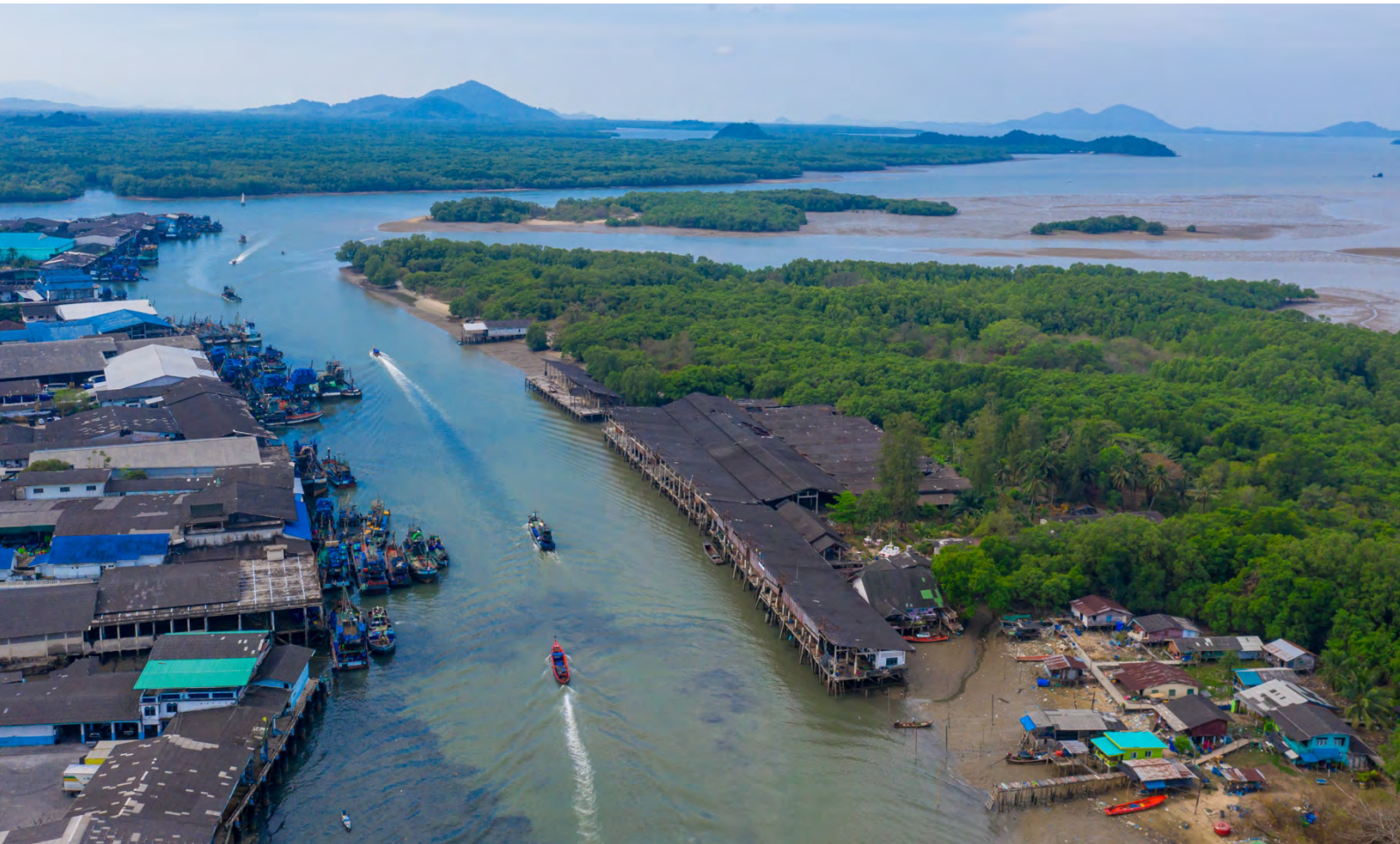


Figure 3. Six steps of the source-to-sea approach. Source: Mathews et al. (2019)

Source-to-sea challenges

Source-to-sea challenges cross traditional land-freshwater-coast-marine boundaries and arise when one or more key flows are altered due to human activities. Source-to-sea challenges affect one or more segments of the source-to-sea system and/or they cannot be resolved by one sector alone. Source-to-sea challenges are inherently complex, needing coordination between different sectors and cooperation between upstream and downstream actors to build a coherent approach to addressing the challenge (although such coordination can be difficult to foster).

A wide range of activities can result in source-to-sea challenges related to the key flows that connect land, freshwater, coastal, and marine ecosystems. These activities may occur upstream and result in downstream impacts, e.g. alterations to hydrologic regimes through water withdrawals or dam operations; increases to sediment flows due to deforestation, agriculture, or construction; decreases in sediment due to dams; or nutrient or chemical pollution due to inadequate treatment and control. They also may occur downstream with upstream impacts, e.g. overfishing resulting in higher food prices, reduced availability of protein, and increased pressure on land for food production. To confront a source-to-sea challenge, collaboration is necessary between actors present in different segments of the source-to-sea system or active in different sectors.



Aerial view of Ranong estuary, Thailand. Photo: Panwasin Seemala, Shutterstock.

Plastic pollution: a source-to-sea challenge

Plastic pollution is an urgent and major challenge facing humanity and requires action across source-to-sea systems and along the entire plastic value chain. Current fragmented and isolated responses to plastic pollution have been largely unsuccessful or only partly successful in preventing plastic pollution. If we are to cease the flow of plastic pollution into waterbodies and the ocean, a broad range of stakeholders must come together to collectively make the necessary changes in waste and wastewater management and the life cycle of plastic goods.

The rapid development, widespread use, and inadequate management of plastics during the 20th and 21st centuries have led to alarming quantities of plastic waste being released into the environment. Since 1950, it is estimated that 9.2 billion tonnes of plastic have been produced and half of this has been manufactured since 2000 (Dalberg Advisors, 2019). It is estimated that around 76 per cent (around 6.9 billion tonnes) of cumulative plastic produced since 1950 has been discarded as waste, ending up in landfills, dumps, or uncontrolled waste streams. Up to 2017 only 10 per cent of plastic had been recycled (Geyer, 2020 as cited in UNEP, 2021a). The versatility, low cost, durability, and light weight of plastics has driven demand for thousands of different uses across many sectors and reinforces a calculation that under a business-as-usual scenario it is expected that the production of plastics will double by 2040 (The Pew Charitable Trusts and SYSTEMIQ, 2020) Most of the plastic entering the ocean is post-consumer single-use plastics such as bottles, tubs, trays, and films, e.g. bags, stretch wrap, etc. (UNEP, 2021b).

Plastic pollution is a global challenge not only because of its impacts across segments of the source-to-sea system but also due to the global nature of its production and consumption. Locations of production may be far removed from the use and disposal of plastic goods and where the environmental impact occurs. **Error! Reference source not found.** **Error! Reference source not found.** presents a generic and linear model of the life cycle of plastic products from product design and production to sale of the goods produced, their use and ultimately their disposal. The actors who fulfil each of these roles can be located in different segments of the source-to-sea system or sometimes hundreds or thousands of kilometres away from each other as production, retail, and consumption can happen over vast distances, while consumption, waste collection, and disposal tend to occur in more localized areas.

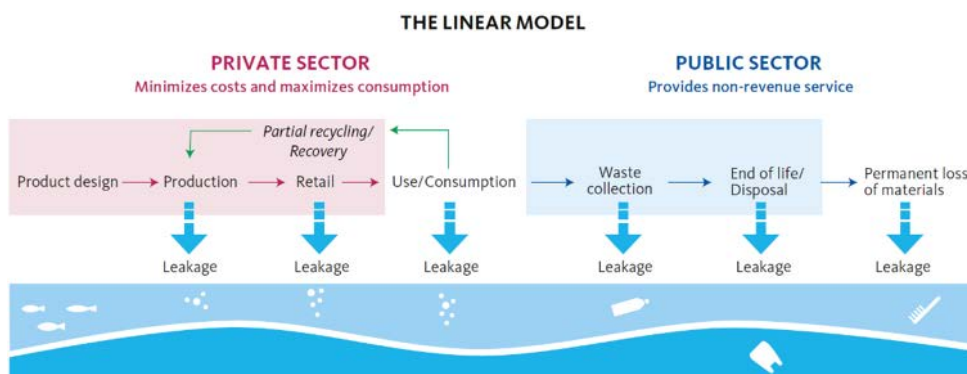


Figure 4. The linear model of production, use, and disposal of plastic products. Source: Mathews and Stretz (2019)

To address the global challenge of plastic waste we must avoid narrow, isolated, and linear methods that ignore the connectivity of land, freshwater, coastal, and marine ecosystems and the interdependencies between actors along the plastic value chain. It requires collaborative action from source to sea and coordination across the sectors involved in the life cycle of plastics (production, commercialization, consumption, and end of life) at all levels, from local to global. The declaration signed by 175 countries in 2022: End Plastic Pollution: Towards an internationally legally binding instrument, which was adopted at the fifth session of the United Nations Environment Assembly (UNEA 5.2), notes that plastic pollution in marine and other environments can be of a transboundary nature and needs to be tackled through a full life-cycle approach. It also states that there is an urgent need to strengthen coordination, cooperation, and governance, recognizing this is a root cause of plastic pollution (UNEP/EA.5/L.23/Rev.1).

Sources of plastic leakage

The disposal of plastic on land is the main source of plastic that enters freshwater and marine ecosystems; sources include waste disposal and management, littering, sewer overflows, illegal dumping, stormwater runoff, and industrial activities (Sorrentino, 2022).

According to the Pew Charitable Trusts and SYSTEMIQ (2020), the primary routes for this waste to enter the ocean are as follows:

- Uncollected waste dumped directly into water.
- Uncollected waste dumped on land that makes its way into water.
- Collected waste deposited in dumpsites that travels via land and air into water.
- Collected waste dumped directly into water by collection trucks.

Of additional concern are microplastics, which can result from the fragmentation of larger pieces of plastic, leakage from production facilities, loss during transport, abrasion of tyres during driving, leaching from landfills, bio-sludge from wastewater treatment plants, and agricultural run-off (UNEP, 2021a).

Solid and liquid waste management: downfalls and limitations

Considering these are primary routes for plastic waste, it is difficult to overstate the importance of appropriate municipal and rural solid and liquid waste management in diminishing and eventually stopping the flow of plastic waste into waterbodies and the ocean. Currently, the burden of addressing plastic leakage from land-based sources falls mainly on municipalities and their provision of waste and wastewater management services, even though the impacts may be felt by a much wider range of stakeholders. In rural areas, the challenges of providing adequate solid waste and wastewater management are even greater due to the dispersed nature of the population, poor access to transportation networks, and limited financial and technical capabilities. In many cases those responsible for providing these services are also the weakest actors, with limited resources and capacities, and an extensive list of other priorities.

A large proportion of the global population has limited access to solid waste and wastewater management systems or lacks access altogether. This is especially true in low- and low-middle income countries (UNEP, 2021b). With current levels of support, many municipalities and

rural communities are not able to gain control over their waste. While much of the required action needs to be taken at the local level, local actors alone cannot drive all the required changes and need support from actors across the plastic value chain, the source-to-sea system, and beyond.

The growth of plastic waste is putting pressure on solid waste and wastewater management systems around the world, thereby highlighting technological and logistical inadequacies in handling increasing quantities and avoiding leakage into the environment. The major problem for solid waste management in developing countries is intrinsic in its presently applied linear strategy, leading to end-of-life disposal in ever-growing landfill heaps. This pressure will continue to grow in a business-as-usual scenario, due to the increasing demand for plastic products and our dependency on them for a myriad of applications. Following that scenario, the global cost of managing municipal solid waste is set to grow from USD 38 billion in 2019 to USD 61 billion by 2040, and annual oceanic plastic pollution is also set to triple by 2040 (The Pew Charitable Trusts and SYSTEMIQ, 2020).

Preventing plastic pollution from source to sea

Based on the source-to-sea approach, the Source-to-Sea Framework for Marine Litter Prevention stresses the importance of linkages across the source-to-sea system and marries this with the need to revolutionize our production and consumption system from linear to circular (Figure 5) (Mathews and Stretz, 2019). When applying the Source-to-Sea Framework, a broad range of stakeholders that can collectively make the changes necessary to cease the flow of plastic pollution into waterbodies and the ocean are brought together. By paying attention to the sources and impacts of plastic pollution and providing the necessary enabling conditions, cooperation between upstream and downstream actors and coordination between sectors can be incentivized. Engagement of actors across the source-to-sea system and the plastic value chain can result in changes in behaviour from individual to global levels, as needed to prevent plastic pollution and reduce pressures on local actors.

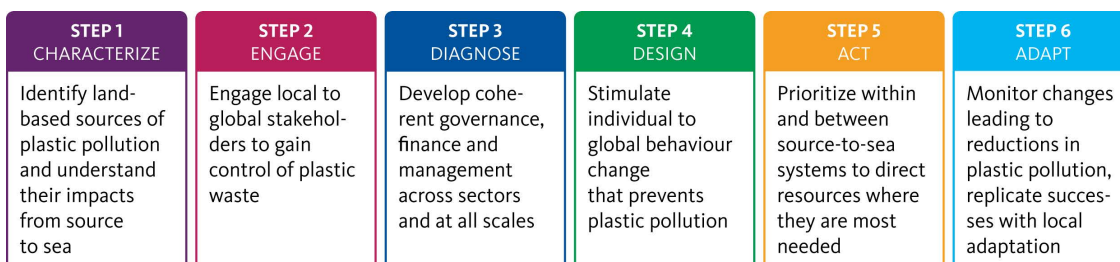


Figure 5. The six-step Source-to-Sea Framework for Marine Litter Prevention. Source: Mathews and Stretz (2019)

The Source-to-Sea Framework for Marine Litter Prevention is founded on two tenets. Firstly, that taking a source-to-sea view of the problem of land-based sources of plastic pollution will highlight the need to funnel resources to local waste and wastewater managers enabling them to gain greater control of plastic waste; and secondly, assessing the benefits of preventing plastic pollution across the source-to-sea system will strengthen the business case for the transition to a circular economy for plastic. These two circles – from source to sea and back upstream, and from raw materials to product use and back to production materials – are like two intersecting cogs that drive each other, one providing services that manage end-of-life

disposal and the other driving demand for plastic waste to be recycled (Figure 6). The solution for preventing plastic pollution lies in both systems working together.

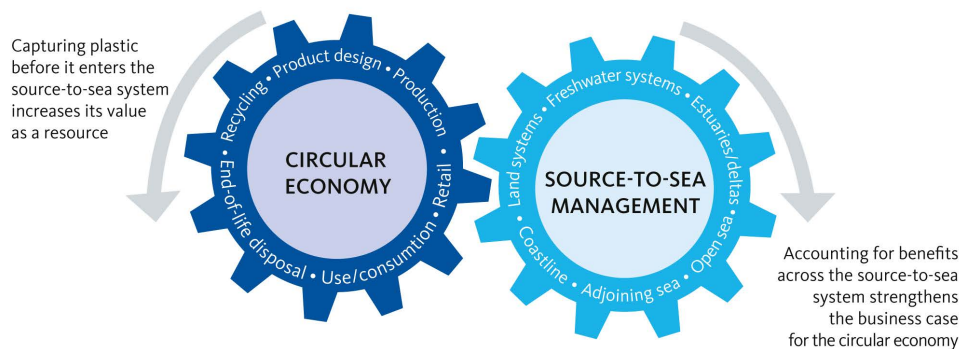


Figure 6. Source-to-sea management and the circular economy are mutually supporting approaches to preventing plastic pollution. Source: Mathews and Stretz (2019)

The Source-to-Sea Framework can be applied at differing levels and scales of intervention. The Framework is equally applicable to a municipality that wishes to understand its contribution to plastic pollution, how it is impacted and what it can do to reduce the plastic leakage, and to ministries concerned with developing policies and directing investments at the national level. It can be applied on a local, regional, national, or even transnational level. Whatever the level, conflicting interests of polluters and those impacted can be evaluated and translated into targeted actions.

Collaborative action to prevent plastic pollution

Preventing plastic pollution cannot be accomplished without concerted effort from a range of actors along the plastic value chain. Even when focusing only on the part of the value chain from consumer use of plastic products to their end-of-life disposal or recycling in one location, there can be many responsible actors. These may include the following:

- The consumers themselves: businesses, households, tourists and visitors, public sector, schools, etc.
- Collectors of plastic waste and other solid waste through the formal sector, i.e. contracted parties responsible for solid waste collection, or through the informal sector which may be interested only in collection of plastic with an economic value.
- Solid waste managers: those responsible for ensuring that waste is treated appropriately in sanitary facilities such as landfills, incinerators, etc.
- Recyclers that collect and prepare recyclable plastic for transport to processing facilities.
- Recyclable plastic processing facility managers.
- Those that procure the recycled plastic material for use in production.
- Government authorities responsible for solid waste and wastewater management, infrastructure and investment, education and citizen engagement, environmental management, etc.

Each actor along the plastic value chain plays a specific role and delivers a service to other actors in the value chain (Figure 7). An example is waste and wastewater services, which are contracted by the local government and provided to the consumers of plastic goods and packaging. The local government contracts the service providers in response to the citizens voicing their rights, needs, and preferences. In receiving waste and wastewater management services, citizens dispose of waste in designated locations and pay a fee for the service. These services and relationships link the different actors together in a web of interdependencies. To move towards zero plastic pollution, each of these actors needs to contribute specific services that will combine to achieve that aim.



Figure 7. Actors along the plastic value chain. Source: Mathews and Stretz (2019)

There is both push and pull within this value chain, i.e. businesses, consumers, and the public sector can make choices to push recyclable plastic into the value chain by producing recyclable products, actively separating these plastics out of the solid waste stream and depositing them where they can be collected and delivered to recyclers easily. There can also be a pull by those that want to use recycled plastic in the production of plastic products, thereby increasing the demand and therefore the value of recyclable plastic, which will motivate recyclers to collect more of the recyclable plastic. The pull can also come from governments creating new policies, e.g. banning single-use plastics or setting levels of post-consumer waste to be used in the production of plastic products through extended user responsibility and other legal and regulatory means. Businesses and consumers that use or sell plastic products can also increase demand and pull for certain products by selectively choosing products that are reusable, recyclable, or manufactured using post-consumer waste. These push-pull forces can also work in the opposite direction through refusal to change policies, products, and behaviours toward circularity.

"The Source-to-Sea Framework links between levels and suggests a cascading attribution of responsibility from individuals and local governments, who cannot achieve the change alone, to the global community, where awareness is constantly growing."

Mathews and Stretz (2019)

The initiative to prevent plastic pollution can occur at different levels, from individual to global, and result in a cascade of changes across the plastic value chain (Figure 8). For example, residents can change their behaviour to reduce plastic litter where they live, thereby

reducing plastic waste entering the ocean. Alternatively, global commitments to address the problem of plastic pollution can incentivize changes at individual, local, river basin, and national levels. These commitments filter down to national-level policies, laws, and regulations, as well as finance allocations that improve waste management within river basins at local levels and support individual behaviour change. River basin agreements and plans may also strengthen local-level action. The multi-dimensional nature of the plastic pollution crisis stresses the need for mutual accountability among actors.

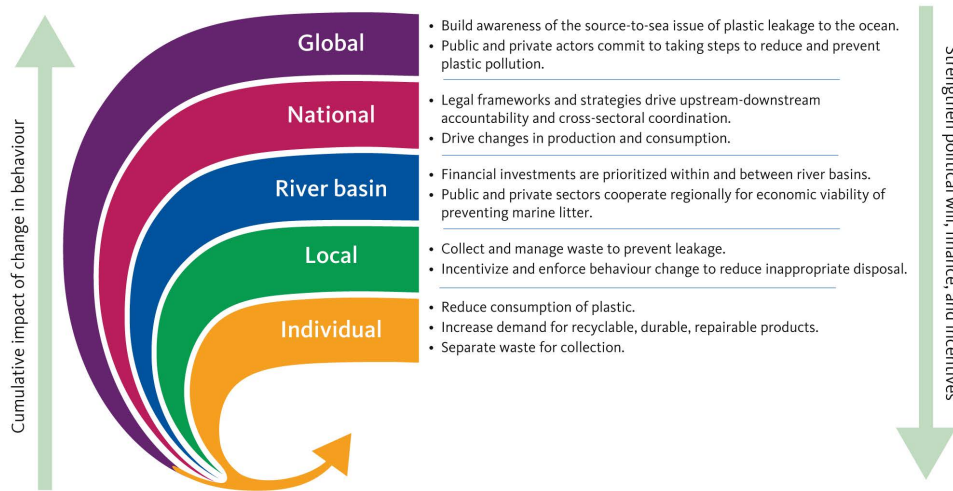


Figure 8. Interdependent actions that collectively drive change toward preventing plastic pollution. Source: Mathews and Stretz, 2019

Understanding the relationships between actors and their interdependencies can support analyses of what is working and where there are gaps, barriers, lack of incentives, or opportunities for taking appropriate actions. Given the complexity of actors and actions needed to prevent plastic pollution, clarification of the roles and responsibilities – and services provided – for each of the actors is a starting point for collaborative action that will result in the changes needed. Furthermore, for collaborative action to be successful, there needs to be a shared understanding of the problem and a common vision to work towards. Mutually reinforcing activities that recognize the interconnectedness between actors need to be developed and the outcomes of these actions measured using agreed indicators via a common measurement system. Once a multi-stakeholder process is initiated, for collaborative action to succeed, there needs to be accountability between the different actors for delivering the actions required from each of them.

Accountability for preventing plastic pollution

To prevent plastic pollution, various government, private sector, and civil society actors need to develop a common vision and share responsibility for delivering a range of different and complementary actions. Given the complex nature of plastic pollution, these actions may be interdependent, i.e. one actor may be dependent on another's actions to be successful.

Mapping these relationships and the interdependencies between actors can identify who is accountable to whom, for what services, and for what purposes. This will help realize the relations between the different actors and the accountability within the system.

Understanding these interdependencies and strengthening the relationships between actors is critical to the successful prevention of plastic pollution.

Building a framework for accountability between actors and the individual or joint actions they are responsible for will illuminate the interdependencies between them (UNDP Water Governance Facility and UNICEF, 2015). Making these relationships explicit can form the basis for agreements between actors and help clarify the responsibility of each actor to contribute to collaborative action. Describing roles and responsibilities for each actor and their reliance on other actors can help identify where changes in behaviour and practices, or other enabling conditions, are needed. This provides a system view of all the actions that need to be taken and how they fit together, which can then lead to a shared action plan. An accountability framework that clearly defines roles and responsibilities can allow actors' activities to be assessed transparently and objectively. The timely sharing of accurate information, establishing processes for consultation between actors, and creating greater stakeholder participation can help develop trust, thereby engendering a willingness to work together towards the common goal.

The accountability framework can also be used for periodic evaluation of progress on individual actions, with each actor being held accountable for their contribution to the action plan. Collectively, it can assist in monitoring overall progress towards the achievement of the shared goals. By tracking the outcomes from the actions taken, collaborative action can be evaluated and adapted as new challenges arise. New knowledge or changes in the social, environmental, and/or economic conditions within which the collaborative action is operating can be incorporated. The accountability framework can be applicable to actors operating at local, regional, national, and international scales.

What is accountability?

Accountability is relevant in relationships between two or more interdependent parties and refers to taking responsibility for decisions or actions such that others who are depending on certain outcomes can be confident of their delivery. Accountability works to improve relationships, increase trust and transparency, and enable participation (UNDP Water Governance Facility and UNICEF, 2015).

Three elements need to be in place for effective accountability: responsibility, answerability, and enforceability.

- **Responsibility** indicates the expected behaviour, actions, duties, performance standards, and/or roles by which an actor can be assessed transparently and objectively. At the same time, other related stakeholders need to know their rights and obligations in relation to the actor and effective coordination mechanisms between different responsible parties need to be put in place.
- **Answerability** requires timely and accurate information to be made available and spaces for interaction created between service beneficiaries and service providers where decisions can be explained, questioned, and/or justified. This should improve information, consultation, and stakeholder inclusion in the different stages of decision-making.
- **Enforceability** requires mechanisms to be put in place to monitor the degree to which each actor complies with agreed actions and established standards. It is possible to impose sanctions on non-compliance and ensure that appropriate corrective and remedial action is taken when required.

Accountability from source to sea

Since source-to-sea challenges cross traditional land-freshwater-coast-marine boundaries and arise when one or more key flows are altered due to human activities, they require the engagement of more than one sector. This requires sectoral policy-makers and resource managers to consult with other sectors in an effort to achieve optimal benefits for the source-to-sea system. Intra- and inter-sectoral consultation will illuminate potential trade-offs. This will help to avoid actions that result in benefits in one part of the source-to-sea system or one sector at the expense of another, or at least the actions are modified to reduce the impacts on others. It can also help to avoid actions taken independently by individual sectors conflicting with other sectoral actions such that the benefits of one or both actions are reduced or even eliminated. On the positive side, consultation between sectors can identify potential synergies where greater system-wide benefits accrue from a coherent approach to addressing the source-to-sea challenge. This can increase motivation for sectors to broaden their view to incorporate a suite of goals that will provide benefits for the source-to-sea system as a whole.

Addressing source-to-sea challenges also requires cooperation between upstream and downstream actors. Upstream and downstream actors need to understand each other's needs and the positive or negative impacts of ongoing and proposed activities. This can raise awareness of the social, environmental, and economic connections across the source-to-sea system and lead to mutual understanding of how activities affect each other. With adequate incentives in place, the commitment to change practices and activities that are impacting parties in other parts of the source-to-sea system is strengthened. The will to change can also be built by realizing that the benefits of making these changes can also benefit the party making the changes. An example of this is where pollution from upstream activities is degrading mangroves or coral reefs, thereby diminishing coastal defences. Reducing pollution flows to coastal areas can reduce storm damage and related costs of rebuilding after disasters.

To achieve optimal benefits for the source-to-sea system, upstream and downstream and sectoral actors need to develop a shared vision for the desired future. This vision can centre around specific SDGs or individual targets, reducing climate risks, or improving food security, for example. Establishing a shared vision founded on sufficient understanding of the upstream-downstream connections can fuel the needed cooperation. Upstream and downstream actors from relevant sectors and policy-makers will each have a responsibility to make a particular contribution to achieving the shared vision. In this case, everyone is responsible for the shared vision, and answerable to each other for their own individual

choices, actions, and contributions towards achieving it. By communicating the impacts and benefits that can flow upstream and downstream, actions can be harmonized to achieve the shared vision.

Source-to-sea accountability addresses the social, environmental, and economic linkages along the land-freshwater-coastal-marine continuum and formulates a structure that can organize relations between actors in a source-to-sea system. The collection of actions combines to make progress towards the shared vision. For policy-makers this means they consult with other policy-makers from different sectors as part of their planning and decision-making processes and mechanisms will need to be put in place for this coordination. There can be interdependencies between actors whereby the failure of one actor to deliver can result in the failure of another actor to be able to deliver. Hence, it becomes important to monitor the delivery of each individual action and for all actors to be answerable to the collective for the actions that they are responsible for. In this way, the accountability framework can be used for monitoring individual contributions to the collaborative action as well as overall movement towards the ultimate goal.

In addition to accountability of all parties to the shared vision and the set of actions required to achieve it (and therefore to each other), local and national governments are accountable for responding to the legal rights and expressed needs of citizens in their policies and performance standards. In return, all parties are responsible for compliance to those policies and performance standards and for voicing their rights, needs, and preferences to policy-makers.

Translating accountability to plastic pollution prevention

The impacts of inadequate solid waste and wastewater management in upstream areas can affect downstream communities as well as those reliant on coastal and marine ecosystems for their livelihoods (Figure 9). Preventing plastic pollution involves a large number of actors across the plastic value chain that deliver an array of services. These actors stretch across geographies and represent myriad sectors. Refining the relationships between actors in terms of services provided and received, and accountability for this service provision, is a powerful tool for clarifying, documenting, and managing collaborative action.

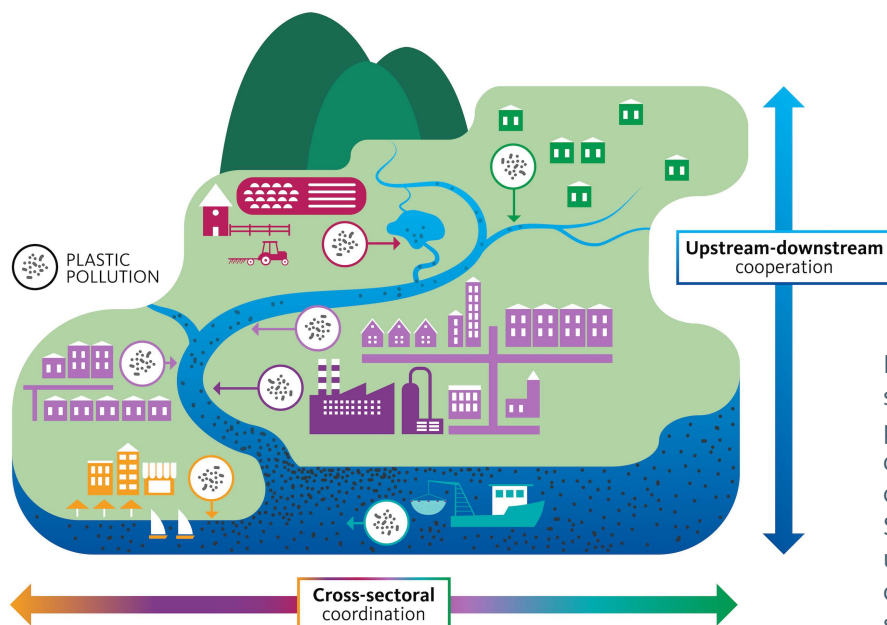


Figure 9. Land-based sources of plastic pollution travel downstream to the coast and the ocean. Solutions must include upstream-downstream cooperation and cross-sectoral coordination.

The different actors along the plastic value chain can be grouped into four types: a) plastic goods and packaging producers; b) plastic goods and packaging users; c) waste and wastewater managers; and d) local and national governments. Examples of accountability relations between these actors include:

- Policy-makers at the national and international levels set performance standards and policies on raw materials production and the design and manufacture of plastic goods and enforce these, while those that produce and sell plastic goods and packaging must comply with these performance standards and policies.
- The users of plastic goods and packaging can call for policies, performance standards, and services related to their rights, needs, and preferences, e.g. the right to a healthy environment. These can be communicated directly to policy-makers at the national and international levels or through civil society, sector, and/or non-profit organizations. At the local level, users may communicate rights and preferences related to waste and wastewater collection and management. In return, policy-makers are accountable to the users for protecting their rights, meeting their needs, and for spending public funds in doing so.
- Local policy-makers contract and pay entities for provision of waste and wastewater collection and treatment, and in return these entities provide these services within the terms of the contract.
- Plastic goods and packaging users are accountable to waste and wastewater managers, primarily through payment of fees for waste collection and treatment services and through proper disposal of waste. Waste and wastewater managers are responsible for providing these contracted services and for addressing complaints from customers regarding these services.

Under a linear economy model (Figure 10), it is noticeable that there is no accountability relationship between the private sector actors that produce plastic goods and packaging, and those that are responsible for the end-of-life collection and disposal of plastic goods. The former produce and provide access to plastic goods and packaging and relinquish responsibility for these products once they are sold. This places the full burden of managing plastic waste on local governments. Furthermore, the producers of plastic goods and packaging, particularly the raw material providers, product designers, and manufacturers, are most likely to be located far from the use of the products and the subsequent end-of-life management. This geographical divide complicates accountability since the government authorities that are responsible for providing waste and wastewater management services are operating on a local scale, while the production of plastic goods is often operating outside the local authority's jurisdiction on a global scale.

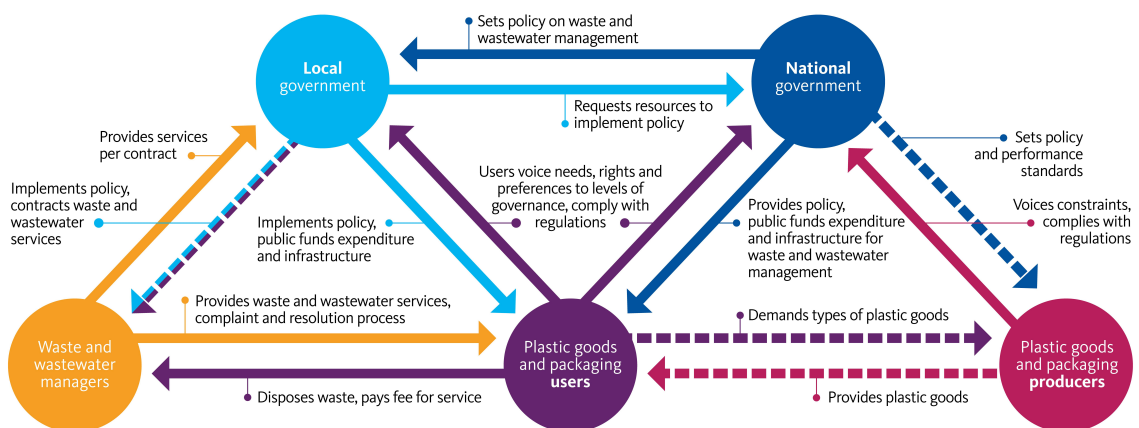


Figure 10. Accountability relationships in the plastic value chain under the linear economy model. Solid lines represent accountability relationships; dashed lines indicate relationships without accountability.

The policy-makers responsible for policies and performance standards for all stages of plastic goods production are far removed from the challenges of local waste management and may not prioritize improvements in local waste management services and the resulting reduction in plastic pollution in their decisions. Depending on the political context, it may be easier or harder for the users of plastic goods to communicate their rights, needs, and desired policies and performance standards to the different levels of policy-makers. This communication might then be undertaken by civil society or non-governmental organizations (NGOs) on behalf of citizens.

Significant changes need to occur in different sectors and at all levels from individual to global and across geographies if we are going to halt plastic pollution everywhere. Among these is the move away from single-use plastic and the development of a circular economy for plastic products and packaging. In the circular economy, plastic goods and packaging, once they have reached the end of their life, are recycled into resource materials for future production. This changes the accountability relationships, most notably, the relations between plastic goods and packaging providers and end-of-life waste managers (Figure 11). The end-of-life managers are no longer solely those responsible for waste or wastewater management but also include recyclers who capture recyclable plastic and become suppliers of raw materials for the production of plastic goods and packaging. Plastic goods and packaging providers are accountable to recyclers to design and produce plastic goods and packaging for ease of recycling. They are also responsible for using recycled materials in the manufacture of their products. Recyclers are responsible for collecting and processing recyclable products and making recycled material available for use in producing plastic goods and packaging. For this to be possible, the users of plastic goods and packaging need to separate waste for ease of collection of recyclable plastics and there must be links between the recyclers and the producers for the transfer of materials from one to the other.

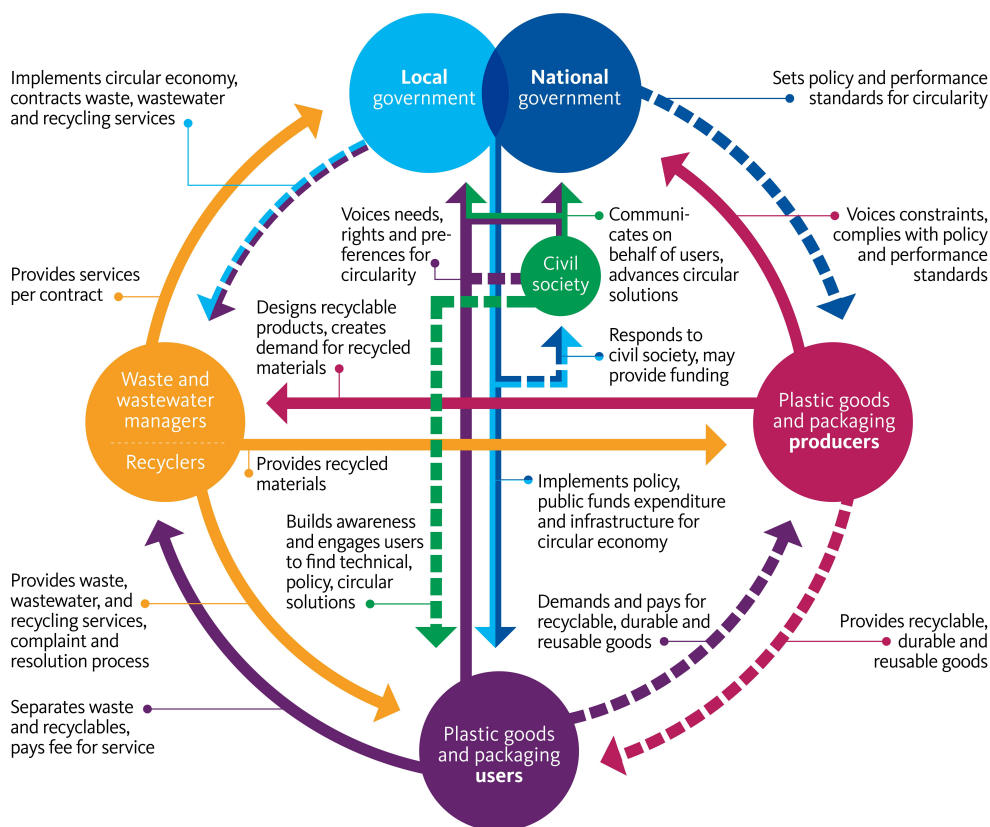


Figure 11. Accountability relations along the plastic value chain in the circular economy model. Solid lines represent accountability relationships; dashed lines indicate relationships without accountability.

It should be noted that waste collection and management can be conducted either as part of the formal sector, where there are clearly defined services to be provided and payment for these services, or by the informal sector. The latter occurs commonly in developing countries where there is insufficient formal waste management capacity. The business case for collecting and processing recyclable plastic can be strong enough for this to be developed as a standalone business, as opposed to a service provided by the local government. In some cases, both the formal and informal sectors are involved. The role of the informal sector in the plastic value chain adds further complexity to relationships between actors. Given the importance of the services provided by the informal sector, it is important to include them in the mapping of accountability relationships.

The formal and informal sectors may pull in different directions. If recycling is done by the informal sector, then waste managers may not have the financial incentive to compel households and businesses to separate waste since they may not reap a financial benefit from recyclers for delivering this waste. Waste managers stay in the linear value chain, depositing waste in landfills or incineration. The informal sector is not in a position to sanction households and businesses if they do not separate their waste. The informal sector does its best to capture the recyclable waste and divert that income away from the formal waste collectors and managers. This can further erode the formal sector's initiative to ensure recyclable plastic is properly separated and collected. For these reasons, both the formal and informal sectors need to be engaged in collaborative action to prevent plastic pollution.



Informal workers at waste collection facility, Hoi An, Viet Nam. Photo: Ruth Mathews.

Source-to-sea approach to formulating an accountability framework

Understanding the nature of source-to-sea challenges can be difficult given their complexity both in terms of the geographic area and the number of different actors across sectors involved in the challenge. The source-to-sea approach is a six-step structured process that can be used to arrive at an accountability framework that works specifically with the source-to-sea challenge being tackled and the local context (Mathews et al., 2019). The source-to-sea approach begins by building a shared knowledge base of the biophysical, social, and governance systems relevant to the source-to-sea challenge (Figure 12). This knowledge base can then be used to develop a common vision for the future and for assessing the current situation in terms of gaps, barriers, limitations, and opportunities in reaching the desired future condition. Based on this assessment, an action plan can be developed to support the changes needed, take advantage of opportunities, and address barriers and gaps.

Implementation of the action plan will require collaboration, given the geographic and sectoral multi-dimensionality of source-to-sea challenges. This then leads to the development of an accountability framework that will facilitate the achievement of the action plan and ultimately the shared vision.

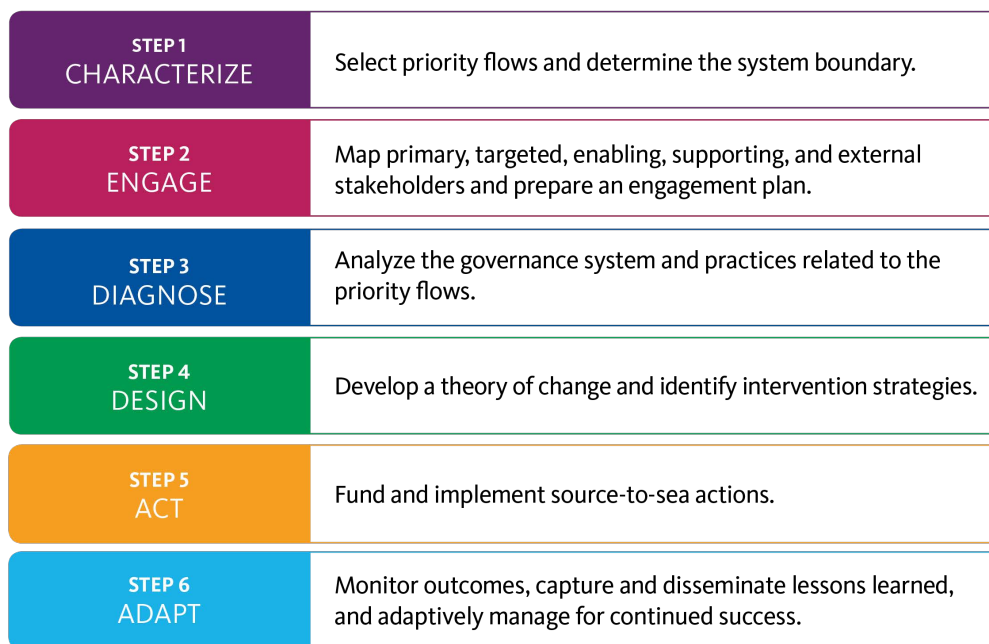


Figure 12. Six steps of the source-to-sea approach. Source: Mathews et al. (2019)

Applying the six steps

The source-to-sea approach is useful in preparing the ground for collaborative action in preventing plastic waste by providing a structured process that brings together the necessary upstream and downstream stakeholders and actors across the plastic value chain. By progressing through the six steps of the source-to-sea approach, the collective can create a shared understanding of the current situation and look forward to a desired future. Through the stepwise approach, the gaps, barriers, challenges, and opportunities can be identified, and specific actions elaborated to address them. From this, an action plan with clearly defined responsibilities can be formulated and agreement made on an accountability framework. This accountability framework forms the basis for monitoring and evaluation of the collaborative action through progress reporting by each individual actor.

The first three steps of the source-to-sea approach lay the groundwork for developing the accountability framework by generating a common understanding of the context within which actions need to be taken. Step 4 guides the development of a shared vision and action plan. The accountability framework then ties together Steps 4, 5, and 6 by defining the roles and responsibilities for implementing the action plan and providing a means for monitoring progress and adaptation based on learning. In this way, the accountability framework is a valuable outcome of the source-to-sea approach as well as an important addition to the methodology.

STEP 1 Characterize

Knowledge about the sources and impacts of plastic pollution and the potential benefit of prevention is collected and analysed to provide as comprehensive a view as possible of the current conditions in the source-to-sea system. In addition to compiling what is known about plastic pollution in the source-to-sea system, the analysis can help identify what behaviours or activities are leading to leakage of plastic into the environment. This analysis can cover both the local activities that are contributing to plastic pollution and activities along the entire plastic value chain. This compilation of knowledge about the source-to-sea challenge creates a baseline against which progress can be measured and is useful in identifying stakeholders in Step 2.

STEP 2 Engage

With the characterization in STEP 1 completed, an assessment is undertaken to identify the stakeholders that need to be engaged in the collaborative action to prevent plastic pollution. This step involves identification and classification of the main stakeholders as well as preparing plans for engagement. Stakeholders include those that are impacted by plastic pollution, those whose practices generate the problems, those that finance interventions, and those that provide governance. Many stakeholders will be found in multiple stakeholder categories. These include:

- **Primary stakeholders** are individuals or communities affected by plastic pollution, including residents, communities reliant on natural resources affected by the pollution, businesses impacted by the pollution both directly and through reputational risk, and those dependent on the ecosystem services that are lost due to the pollution. The primary stakeholders are the beneficiaries of the collaborative action when it prevents further plastic pollution.
- **Targeted stakeholders** are those whose activities and behaviours contribute to plastic leakage into the environment and can reach from local actors to global

producers and supply chains. Some targeted stakeholders may be located within the source-to-sea system and others may be far removed. This can make engagement difficult; however, these stakeholders hold the key to preventing pollution through changes in behaviour, e.g. through ensuring plastic is disposed of properly, and through alteration to their practices, e.g. by increasing the use of post-consumer waste in product design. Engaging these stakeholders is important as decisions may impact their livelihoods or they may be helpful in identifying barriers that may need to be removed.

- **Enabling stakeholders** are those that play a role in creating the enabling conditions that will prevent plastic pollution. They include institutions granted formal or informal mandates for governing the use and disposal of plastic products and packaging, institutions that set and implement policies, and those that provide the resources required to implement policies. With the prevalence of plastic use in almost all areas of our lives, these institutions may represent a wide range of sectors and may have responsibilities in different segments of the source-to-sea system. This points to the need to coordinate their efforts if there are many institutions involved in addressing the problem or if mandates are overlapping.
- **Supporting stakeholders** include development partners or financiers whose strategies are aligned with and can support the activities designed to prevent plastic pollution. This includes stakeholders that build awareness or knowledge, such as universities, or civil society organizations and development partners that bring additional knowledge or financial resources to address challenges.
- **External stakeholders** are individuals or groups outside of the source-to-sea system that share an interest in preventing plastic pollution. These stakeholders can be very important in building political will to address plastic pollution. The role of these external stakeholders is evident in the global concern about plastic polluting the ocean that has grown rapidly over recent years.

Having a wide set of stakeholders involved in the process is important, not just for decision-making, but they also broaden the opportunities for innovative solutions, can create influence for increasing the prioritization of a challenge, and can increase access to a wider set of potential resources.

STEP 3 Diagnose

The final part of building the shared knowledge base is the governance baseline. This analysis looks at the institutional framework as well as the instruments used by government actors across all relevant sectors in relation to the production, use, and management of plastic goods. The cross-sectoral nature of the plastic pollution challenge and its solutions becomes clear in this governance analysis. Of keen interest are those areas where mandates and responsibilities overlap, are in conflict, or where there are gaps. Understanding these issues in the governance system is important as these may need to be addressed both structurally through new policies, laws, and regulations and their enforcement, and behaviourally by creating mechanisms and resources for coordination. This governance analysis can reach beyond the local and national levels to include global agreements, e.g. the treaty on plastics proposed for development at UNEA 5.2. It can also include informal and even ad hoc governance mechanisms that can arise through unofficial channels.

STEP 4 Design

Having compiled knowledge about the biophysical, social, and governance systems, the next step is to use this as a basis for developing a shared vision on preventing plastic pollution. A theory of change for achieving this vision is elaborated and becomes the basis for agreement on an action plan (Figure 13). This is when stakeholders come together around a common agenda to which they each contribute specific actions. The theory of change will detail the changes in behaviours and practices needed to prevent plastic pollution from entering the source-to-sea system and will span the changes needed in the plastic value chain to achieve this. By detailing the changes needed it is possible to identify the enabling conditions, i.e. the legal framework, technical and professional capacity, and the finance needed to support, regulate, and incentivize those changes. These enabling conditions need to address the barriers, gaps, and challenges identified in Steps 1, 2, and 3.

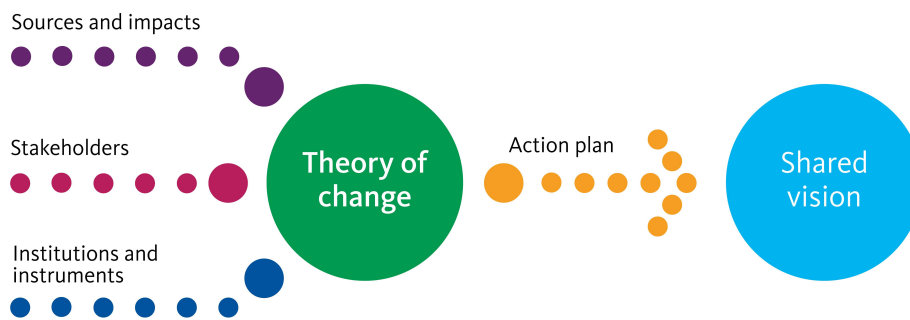


Figure 13. Steps 1, 2, and 3 of the source-to-sea approach provide the basis for developing a theory of change and action plan for achieving the shared vision.

STEP 5 Act

When the shared vision is agreed and actions identified, the focus turns toward implementation. This is where the accountability framework comes in. Given the collaborative nature of an action plan and the inherent interdependencies between actors, it is critical to have a clear and shared understanding of each party's roles and responsibilities in implementing the action plan. Many of these actions may be accomplished independently, but they need to be coordinated so the action plan achieves the aims set out for it. This means the action plan should include both a clear description of the actions to be undertaken and the responsible parties, and the timeline for implementation (Figure 14). This will ensure that prerequisite conditions are in place for when an action is initiated.

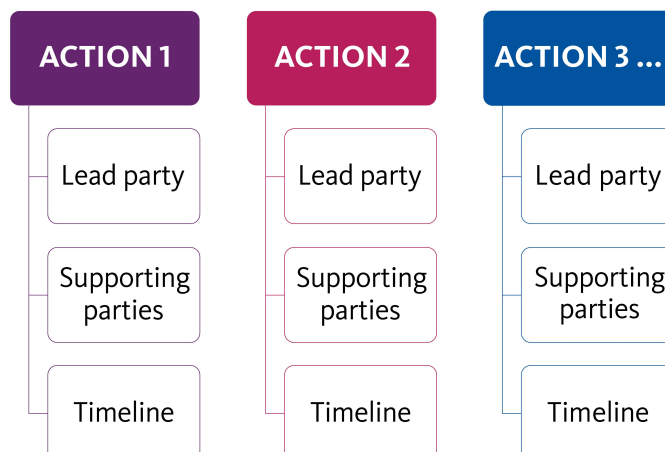


Figure 14. The action plan indicates the responsible party or parties, any interdependencies with other actions or actors, and the timeline for implementation that reflects prerequisite conditions for the

STEP 6 Adapt

The final stage of the source-to-sea approach is monitoring, evaluation, and adaptation. The previous steps lay the groundwork for this, with Step 1 creating a baseline of levels, sources, and impacts of plastic pollution to measure progress against. As actions to address the release of plastic into the environment are taken, this baseline can be used to measure the reductions by source and the resultant reduction in social, economic, and environmental impacts. The stakeholder mapping and assessment accomplished in Step 2 establishes the role of each stakeholder in preventing plastic pollution and the relationships and interdependencies between stakeholders. These roles, responsibilities, relationships, and interdependencies are articulated in the accountability framework. By tracking the implementation of the agreed actions and their results, it is possible to uncover oversights or misunderstandings in the accountability framework. It is also possible to clarify priority areas for investment given the extent to which they reduce plastic pollution and/or its impacts.

The theory of change outlined in Step 4 documents the assumptions about the causes of plastic pollution and solutions to address these causes. This is the first step towards increasing understanding of how the biophysical, social, and governance systems interact and how an individual's or organization's actions either increase or prevent plastic pollution. Developing a theory of change is a critical step in finding the solutions and priorities for investment, and the time invested in this process is a large part of creating a collection of actors that are ready to pull in the same direction. It also becomes an iterative tool for documenting new understanding as it arises, which can be used to further refine the collaborative action. All this leads to an action plan and Step 5 puts that plan into action. With its implementation, the action plan should lead to changes in the biophysical, social, and governance systems, which will need to be reflected in the theory of change resulting in an updated action plan. The circularity of the source-to-sea approach supports learning that can be translated into continual improvement and refinement of the action plan and prioritization of investments.

Accountability for action

By engaging stakeholders throughout the six steps of the source-to-sea approach, the community of actors has an opportunity to further develop and expand their understanding of their own roles and responsibilities, and their interdependencies with other actors. They can also build a collective view of the source-to-sea challenge of plastic pollution. By going through the six steps together, and by recognizing that everyone has a role to play in achieving the shared vision, each stakeholder becomes an active participant in preventing pollution. This bottom-up process of creating a vision for the future and developing an action plan to achieve it creates individual and shared ownership of the problem and its solutions. This can help build trust between stakeholders as the group takes on the problem together instead of putting all the responsibility to solve the problem on one actor.

The accountability framework ties the six steps of the source-to-sea approach together. The accountability relationships arise from the shared knowledge base prepared in Steps 1, 2, and 3, while Step 4 sets the direction for collaborative action. Building an accountability framework that reflects the outcomes of the four steps increases the likelihood of success. Where failures occur, these become learning opportunities that can be used to refine the theory of change and revise the action plan to accommodate this new knowledge. In this way, the accountability framework needs to be a living document that becomes a mechanism for tracking progress that can evolve over time.

By recognizing that collaborative action is needed and that benefits will be accrued across the source-to-sea system and the sectors operating within it, the commitment to take action can grow stronger. The relationships developed during this process can be useful in resolving some of the issues that have stalled progress previously. Not only will this lead to greater chances of success, but this process will also lay the foundations for more coherent and coordinated solutions that will benefit the source-to-sea system. Ultimately, learning to work across sectors and improving understanding of upstream-downstream linkages will reap benefits beyond the issue of plastic pollution.



Global source-to-sea workshop co-organized with UNECE Secretariat for the Water Convention on Transboundary River Cooperation in Geneva, December 2022.
Photo: José Murillo.

Case study: Hoi An, Vietnam

In 2021/22, SIWI implemented the project Design and Accountability for Source-to-Sea Action on Plastic, which focused on supporting local authorities and stakeholders in Hoi An, Viet Nam in developing a five-year environment strategy and strengthening coordination between actors along the plastic waste value chain. This resulted in:

- Deeper understanding of the need for and benefits of the source-to-sea approach in strategy design and its relevance in environmental management.
- Appreciation of the need for coordination between government authorities and the cross-sectoral nature of environmental issues.
- Identification of the role of stakeholders along the plastic waste value chain in preventing plastic pollution and recognition of the interdependencies between actors.
- An accountability framework for preventing plastic pollution.

This presented a first opportunity to apply the source-to-sea approach to the development of an environment strategy and engage stakeholders along the plastic waste value chain in Hoi An in developing their own accountability framework.

Hoi An and the challenge of plastic pollution

Hoi An is a city with a population of roughly 150,000 inhabitants situated near the mouth of the Thu Bon River in the Quang Nam Province of Viet Nam. The old town of Hoi An was designated as a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site in 1999 and is an example of a 15–19th century Southeast Asian trading port. Since its declaration as a World Heritage Site, the city has enjoyed a rapidly growing tourism industry to the point where providing the goods and services required to sustain growth is putting the city under strain. Hoi An has the ambition to become an eco-cultural city, which includes meeting the Green Tourism Criteria outlined in decision No. 3570/QĐ-UBND dated 4 December 2021 of the Quang Nam Provincial People's Committee on promulgation of the Green Tourism Criteria.

Despite water being an integral attraction of the city, Hoi An faces several environmental, social, and economic challenges influenced by its coastal position. It is vulnerable to flooding, saltwater intrusion, and pollution flows from upstream. These challenges can have significant effects on the environment, society, and economy. The vulnerability of the city is intensified by climate change and its growing seasonal population of tourists.

In recent years, waste generation has increased significantly in Hoi An. In 2013, the amount of waste collected per day was around 65.5 tonnes, but by 2020 the International Union for Conservation of Nature (IUCN) found that a total of 15,927 tonnes was generated, equivalent to 0.44 kg per person per day (Kieu et al., 2020). The city has a good level of waste collection with a daily service involving individuals, transfer sites, and trucks for final disposal either at compost sites for organic matter or the Cam Ha landfill (among other provincial sites) for mixed waste.

According to a study conducted by Hoi An Public Works Joint Stock Company (HAPW, the company responsible for solid waste management in the city), 26 per cent of the waste collected is plastic, either recyclable or non-recyclable. This can be partly explained by tourist numbers but is nevertheless high compared with other tourist cities in Viet Nam. Given this, initiatives have focused on reducing the use of single-use plastic and preventing its leakage into the environment.

Hoi An is currently one of the leading cities in Viet Nam for plastic pollution reduction and success in this city will set an example of what can be achieved in other parts of the country. However, upstream communities along the Thu Bon River and on the coast produce additional sources of plastic waste that impact residents and businesses in Hoi An. These communities produce less waste than Hoi An, but about 30 per cent of it goes unmanaged, making it more likely to end up in the river, on beaches, and in the sea (SIWI and RWA, 2020).

Plastic pollution has an important impact on the tourism industry of Hoi An because it negatively affects the scenic beauty of the shores and waterbodies. It also increases the risk of flooding, as plastic litter clogs the drains of the city; affects local flora and fauna (especially aquatic species); and creates a risk to people who may consume microplastics that enter the food chain through the fish and vegetables produced in the area.

There are 19 policies that relate to solid waste management in Viet Nam but their implementation and enforcement is limited. The most prominent and recent legislation, acts, and policies are as follows:

- Environmental Law 2020: this took effect in 2022 and fosters positive change for waste management by promoting community inclusion and waste separation at the source.
- Decree 45: aims to implement sanctions on households that do not conduct solid waste separation at the source.
- Directive 15: regulates and monitors the use of single-use plastic items, such as plastic bags and non-biodegradable plastic bags. This will promote the phasing out of domestic single-use plastics and is being implemented across local businesses.

Engaging stakeholders and developing an accountability framework

Recognizing that improving local management of plastic waste requires collaborative action, local actors across the plastic waste value chain were engaged in a participatory process to identify gaps, barriers, challenges, and opportunities to prevent plastic pollution. To provide a knowledge base for this engagement, a combination of desk review of existing data and materials using Steps 1, 2, and 3 of the source-to-sea approach were used to build an understanding of the plastic waste situation in Hoi An, including disposal, collection, transportation, and treatment. This was complemented by key informant interviews and questionnaire surveys of households and the informal sector. Discussions were held in four focus groups with stakeholders from the government sector, civil society organizations, private sector, and informal sector to identify the existing barriers and challenges in plastic waste management in Hoi An.

Subsequently, a stakeholder engagement workshop was held that brought the four stakeholder groups together to share information and identify actions that would contribute

to preventing plastic pollution. After each of the stakeholder groups presented the results of their focus group discussion, participants worked in cross-sectoral groups to:

- Develop an understanding of the relationships between different actors and identify interdependencies.
- Explore opportunities to prevent plastic pollution.
- Define actions and strengthen shared understanding on the way forward.

Through the group work, the stakeholders identified key actors in the plastic waste value chain and described each actor's dependencies on and contributions to the relevant activities of others. Understanding these roles and each actor's contribution is a first step towards collaborative action to prevent plastic pollution. These dependencies and contributions link the different actors together in a web of interdependencies and form the basis of the accountability framework.

Contributions and interdependencies of each stakeholder group

Local government

Local government agencies identified as having a role in preventing plastic pollution included the Hoi An People's Committee, Department of Natural Resources and Environment, Department of Economy, Department of Education and Training, and Department of Culture and Information.

Contributions to reducing plastic pollution:

- Empower people by creating the conditions needed for participation in preventing plastic pollution.
- Promote local initiatives through policies that strengthen action toward plastic pollution prevention.
- Provide an example in practice, creating community spill-over effects (carrying baskets to the market, using personal water bottles, not using plastic bags, etc).
- Organize the implementation of pilot models and help create a solution ecosystem.
- Strengthen the policy of reducing waste in general in the direction of source-to-sea management.
- Collect waste fees according to the volume generated and create incentives for people to practice segregation and reduce plastic waste.
- Promote communication activities to raise awareness among teachers and students, develop an activity plan at the beginning of the year, help schools to be proactive, and allocate funds to pilot communication models at schools and collection points for recyclable plastics.

Actions from other actors they depend on:

- The local government is dependent upon policy mechanisms and financial resources from the national government for implementation.
- It also depends on the private sector's and the community's awareness of and respect for the regulations.

Formal waste managers

HAPW is responsible for solid waste collection and treatment.

Contributions to reducing plastic pollution:

- Increase the rate of solid waste and plastic waste collection.
- Manage a composting plant and build and affirm the organic fertilizer brand in the market to encourage households to separate their wastes for collection.
- Collaborate with Reform Plastic, a local business that recycles low-value plastic waste, to facilitate collection from the materials recovery facilities

Actions from other actors they depend on:

- Enforcement of policies and regulations and funding from the local government.
- The behaviours of households, businesses, and tourists in waste disposal.
- Accessibility and affordability of replacement products that reduce plastic waste.
- They could also benefit from research activities to improve composting technology.

Informal waste collectors

Most informal collectors are experienced, hardworking, and professional. Each aggregator usually has its own group of collectors who sell only to a specific aggregator.

Contributions to reducing plastic pollution:

- Increase the proportion of recycled plastic waste (including low- and high-value waste).
- Help increase the lifespan of the landfill.
- Create jobs for local workers.
- Improve the city's environmental image.

Actions from other actors they depend on:

- The market demand for recyclable waste.
- The human resources to maintain operations.
- The local government's mechanisms and policies. The main opportunity for this group is the promulgation of a new law regulating waste segregation at source, increasing the recyclability of plastic and the implementation of extended producer responsibility that leads to development of a circular economy.
- Social recognition of their work as a valuable occupation and the promotion of gender equality in society.

Private sector

Key private sector actors active in preventing plastic pollution in Hoi An include tourism companies, hotels, restaurants, and other businesses involved in the tourism industry.

Contributions to reducing plastic pollution:

- Reduce single-use plastic, use eco-friendly replacement products, and educate their guests about the importance of using these alternative products.
- Develop and test new models such as providing refillable bottles, provide straws at the table instead of in every drink or substitute with biodegradable straws, and replace plastic bags with reusable bags.

- Create campaigns to raise their guests' awareness of the impacts of single-use plastic and the benefits of using alternative products. Guest uptake and acceptance is critical to the success of their efforts and business models.
- Reform Plastic is also an important actor as they provide solutions for recycling low-value plastic waste.

Actions from other actors they depend on:

- The supply chain of feasible, alternative products that are not cost prohibitive.
- Coordination with local government, civil society organizations, and NGOs in the implementation of plastic reduction activities depends on local government policies, community awareness and coordination, and the issuance of sanctions as needed for behaviours to change.

Civil society organizations and NGOs

Civil society organizations and NGOs play a large role in facilitating behaviour change and can test the viability of new waste management models and methods. This group includes the Farmers, Youth, and Women's unions, Tourism and Veterans' associations, the Market Management Board, and research institutes as well as many other groups. NGOs active in Hoi An include IUCN, GreenHub, Social and Environmental Activities Club (S.E.A.), Vietnam Zero Waste Alliance (VZWA), and Building Up Sustainability (BUS).

Contributions to reducing plastic pollution:

- Provide technical, human, and financial support to stakeholders in Hoi An city for activities that prevent plastic pollution.
- Coordinate with government agencies and local communities to implement the local plastic reduction movement; raise awareness and mobilize participation among the people.
- Pilot and scale up new models (such as the 'greenhouse' model of waste collection bins made from low-value plastic that are used to collect single-use and low-value waste for recycling) through: a) communicating the use of new models such as 'greenhouses'; b) supporting the sorting and transportation of low-value waste; and c) finding buyers for low-value plastic.
- Strengthen incentives for small businesses and consumers to use more sustainable products and launch new initiatives, e.g. a plastic-free night market, setting up a water bottle refill station in the Ancient Town, and developing rules for a 'green' market.

Actions from other actors they depend on:

- This group depends on the permission of the city government to conduct activities and the allocation of funds for their activities.
- Reliance on local government mechanisms and policies, and private sector and community awareness and coordination in implementing activities.
- The opportunity for this group is the enthusiasm and coordination of businesses, the community, and local authorities to help increase the success rate of projects in preventing plastic pollution.

Accountability framework for Hoi An

The results of the focus group and workshop discussions were used to develop an accountability framework for Hoi An (Figure 15). This is structured similarly to the generic accountability framework presented in Figure 11 with the addition of the informal sector.

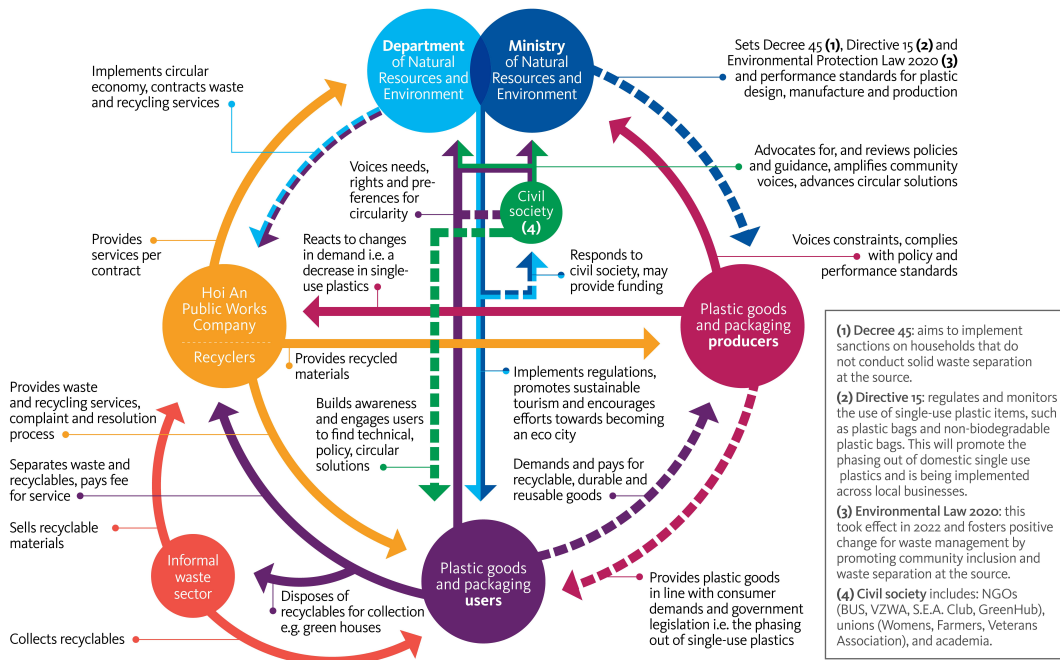


Figure 15. Circular accountability framework for Hoi An. Solid lines represent accountability relationships; dashed lines indicate relationships without accountability

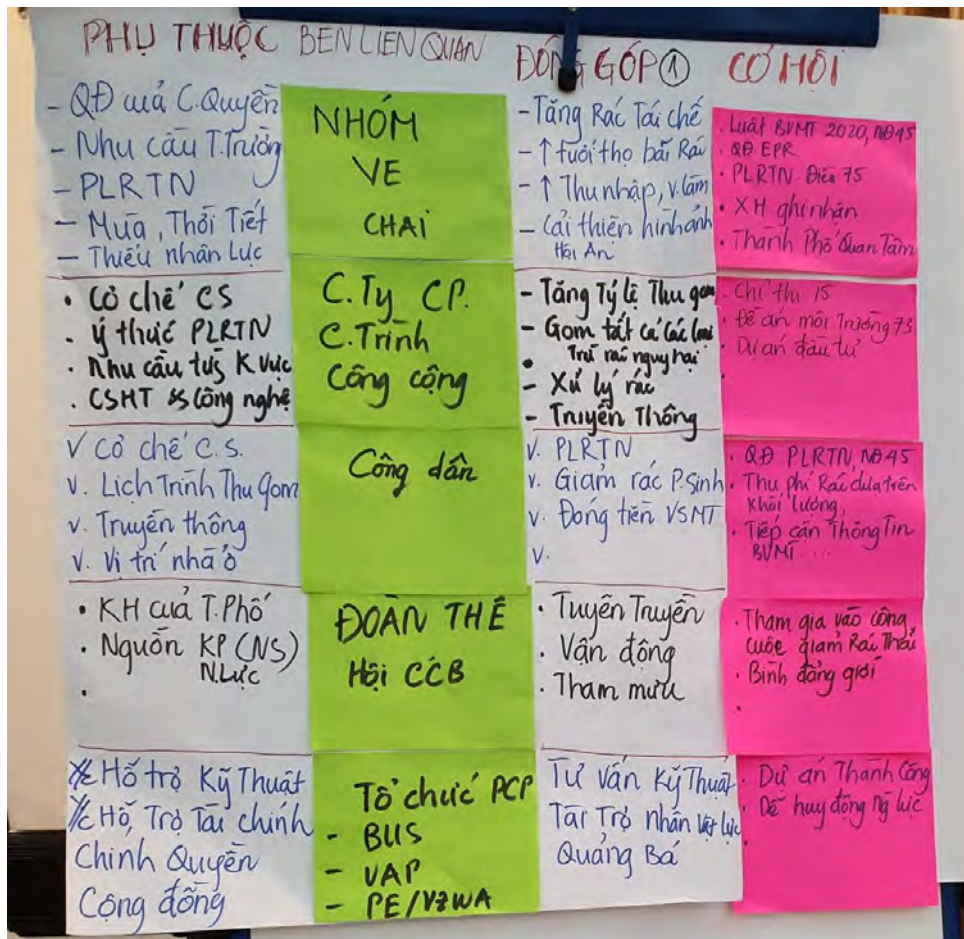
Taking action

Hoi An stakeholders identified 24 regulatory, community, and infrastructure actions that will improve plastic waste management and decided who should lead on each action. Each of the stakeholder groups can contribute to the implementation of these actions and their ultimate success. What is most evident from the focus groups and the workshop is that there is strong motivation among the different actors to reduce the amount of plastic waste through substitution with other non-plastic products, the increase of recyclable products, their collection and processing back into the plastic value chain, and through better management of all solid waste.

This will require investments in infrastructure, technical capacity, awareness-raising, and product development. Social incentives to participate in preventing plastic waste are heavily influenced by community knowledge, education, and training. Civil society organizations, NGOs, and research institutes are integral to providing and disseminating knowledge and building the social structures needed to enable change. Awareness among residents and the commitment of individuals, households, public institutions, and businesses to practise plastic reduction is the key to success. An increase in cross-departmental and sectoral communication will also be required to facilitate coordinated action. Resources are

needed to foster increased stakeholder communication and collaboration, encouraging different sectors to work together.

Stakeholders recognized that stepping beyond the boundaries of Hoi An will be necessary to reduce the impacts of plastic pollution. A significant amount of plastic travels downstream from upstream rural communities due to the steep hillsides, heavy rainfall, and disparity in waste management between communities. Preventing plastic pollution in Hoi An and securing a good quality environment for its residents and visitors will be possible only through engagement with upstream and downstream communities and improvement in their capacity to prevent plastic from entering the waterbodies and coastal areas. The results of the engagement of Hoi An stakeholders also affirmed that the source-to-sea approach had been successful in strengthening and clarifying relationships between different stakeholder groups and identifying an array of actions that could lead to reducing the flow of plastics into waterbodies and the ocean.



Workshop process to develop the accountability framework. Photo: Ruth Mathews.

Conclusion

Plastic pollution is a daunting challenge that requires action to be taken across all sectors in society and essentially everywhere on the planet. The accountability framework presented here is intended to provide some structure to the plethora of actions and the myriad of relationships that need to take place if we are to stop plastic pollution from entering the environment. Providing two versions of the accountability framework, one under a linear economy and one for the circular economy, highlights the gaps in relationships within the linear economy that contribute to the mounting volumes of plastic waste. Actors are forming new relationships with each other as we move towards circularity, and this gives insight into the path that will help us break free from the take-make-waste world we are living in.

Testing this model of accountability in Hoi An has demonstrated that engaging stakeholders in developing an accountability framework fosters shared understanding, which can lead to increased trust and collaboration among actors along the plastic value chain. This case focused on the waste part of the value chain within one locality. The Hoi An case also confirms that the six-step source-to-sea approach is useful in bringing together the requisite stakeholders for collaborative action on preventing plastic waste. Future applications should include additional actors, including those who design and produce plastic products and packaging. This will support the durability, reusability, and recyclability of products becoming integral in product design. Those who process recycled materials into a useful resource for the producers also need to be included.

Looking forward to the hoped-for international binding treaty on plastic and its implementation, the accountability framework for source-to-sea action can serve as a powerful tool in convening stakeholders and orienting them towards collaborative action that will tackle the global crisis of plastic pollution. Rapid progress on preventing plastic pollution is of utmost importance. To fully address plastic pollution requires the problem to be seen clearly and addressed as a source-to-sea challenge. While ultimately action will need to be taken everywhere to keep plastic from entering the environment, investments should be prioritized where they will have the most impact, and it is through assessment at the source-to-sea system level that these priorities can be discovered. As seen in Hoi An, it is not sufficient to make continuous improvements in a specific location. Solutions must be found to address plastic leakage throughout the source-to-sea system. In many cases, this means tackling the problem in the most challenging places. This will require recognition of the shared system-wide benefits that come from investments and a willingness to direct resources to finding and implementing holistic solutions. Accounting for the benefits that accrue across the source-to-sea system will be important for securing stakeholder commitments.

This report presents an accountability framework for the plastic value chain and to prevent plastic pollution. The accountability framework is a valuable outcome of the source-to-sea approach as well as an important addition to the methodology as it ties together the earlier steps 1, 2 and 3 with the latter steps of 4, 5, and 6. The process of bringing stakeholders together and elaborating roles, responsibilities, and interdependencies within a framework of accountability relationships can be used to structure and stimulate collaborative action on any source-to-sea challenge. Further applications of the source-to-sea accountability framework and the sharing of results is encouraged and can reinforce the value that comes from clarifying roles and responsibilities in the collaborative ecosystem of actors needed to address source-to-sea challenges. This should ultimately lead to greater success in efforts designed to address these challenges.

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About this publication

This report presents a framework for strengthening accountability within the plastics value chain. Three examples of an accountability framework are presented: a) under a linear economy; b) under a circular economy; and c) in a practical application in Hoi An, Viet Nam. The Hoi An case study demonstrates the accountability framework in action on a local scale. Such a framework can facilitate collaborative action between stakeholders and sectors, illuminate the interdependencies between them, and help clarify co-responsibilities for action. This is an essential step to prevent plastic pollution.

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