

# Foundations for source-to-sea management

## Case Study – Vu Gia-Thu Bon



Photo: Minh Hai

### Piloting the source-to-sea approach in the Vu Gia-Thu Bon River Basin

The Stockholm International Water Institute (SIWI), funded by the Federal Ministry of Economic Cooperation and Development (BMZ) conducted a project “Foundations for Source-to-Sea Management” to pilot the source-to-sea approach in the Vu Gia-Thu River Basin, Viet Nam, with local support from IUCN Viet Nam, and the Lake Hawassa Sub-Basin, Ethiopia. By focusing on the first three steps of the source-to-sea approach, the two pilots:

- increased knowledge of priority local challenges constraining sustainable development;
- strengthened awareness of the linkages between upstream and downstream activities and their impacts;
- highlighted the opportunities and challenges associated with implementing the source-to-sea approach to management; and
- built local capacity for taking a holistic approach to natural resource management and economic development.



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The Vu Gia-Thu Bon River Basin is in central Viet Nam and covers an area of 10,350 km<sup>2</sup>, including mainly Quang Nam Province and Da Nang City. Da Nang City is known as the “worth living city”. Hoi An, an ancient town and UNESCO World Heritage site, is near the mouth the Thu Bon River and the Cu Lao Cham islands are just offshore, these are both important tourist destinations. Plastic pollution has skyrocketed on the political agenda at the national level as well as in Da Nang City and Quang Nam Province, making the situation ripe for applying the Source-To-Sea Framework for Marine Litter Prevention (Figure 1, next page).

Taking a source-to-sea approach to marine litter prevention can strengthen cooperation between upstream and down-stream stakeholders and coordination between relevant sectors. This can lead to the design of courses of action that ensure outcomes of mutual benefit while reducing negative impacts and improving overall system health.



**FIGURE 1**  
Six steps of the Source-to-Sea Framework for Marine Litter Prevention.  
Photo: Ruth Mathews

STEP 1 CHARACTERIZE	STEP 2 ENGAGE	STEP 3 DIAGNOSE	STEP 4 DESIGN	STEP 5 ACT	STEP 6 ADAPT
Identify land-based sources of plastic pollution and understand their impacts from source to sea	Engage local to global stakeholders to gain control of plastic waste	Develop coherent governance, finance and management across sectors and at all scales	Stimulate individual to global behaviour change that prevents marine litter	Prioritize within and between source-to-sea systems to direct resources where they are most needed	Monitor changes leading to reduced plastic leakage, replicate successes with local adaptation

## Framing the challenge

In 2019, Quang Nam Province had a population of 1,567,890 people while Da Nang City’s population was 1,234,310. The Vu Gia-Thu Bon basin has short, steep watersheds with highly variable seasonal flow. This results in rapid runoff events that can carry solid waste from land areas near waterways from the upper to lower basin quickly. Plastic leakage from land-based sources has been identified as a critical challenge in the Vu Gia-Thu Bon River Basin and commitment to address this has grown as concern about the volume of plastic entering marine environments has risen globally.

A study was conducted to identify land-based sources of plastic pollution and understand their impacts from a source-to-sea perspective<sup>1</sup>. The study used three cluster types as a means of characterizing the sources and impacts of plastic pollution: urban centres, rural areas and low density settlements, coastal and/or touristic areas.

While urban centres generate an estimated 206 tonnes per day of plastic waste, they also have higher levels of waste collection and management services. On the other hand, rural areas generate fewer tonnes of plastic waste per day but a much higher percentage is unmanaged, allowing it to be swept into rivers and out to sea. Likewise, about one quarter of plastic waste is unmanaged in coastal areas, which are the most vulnerable to leaking plastic to the sea.

Obtaining a source-to-sea perspective of plastic waste generation, collection and recycling rates, and potential for leakage to the riverine and marine environments is key to developing strategies for reducing plastic leakage and addressing the crisis of marine litter. With more than 5 million visitors to Hoi An and 7.2 million to Da Nang in 2019, plastic litter is both an impact to the tourism sector by making the area less attractive to tourists and a challenge for the municipality to collect and manage.

Clean-ups of touristic areas are happening more frequently, but this needs to be maintained regularly. At the same time, landfills are overflowing and will soon be out of room for more waste.

Quick action is needed and characterizing the sources of plastic pollution as outlined here can direct investments to solutions with the greatest impact. Critical issues were identified, specifically:

- low solid waste collection rates in rural or low-density areas are the leading cause of plastic pollution;
- about one third of plastic waste is uncollected in rural and coastal areas, much of which quickly becomes marine litter;
- the volume of plastic waste being recycled is quite low – only around 7 percent – and is limited primarily to PET bottles; and
- the overall amounts of plastic waste are contributing to rapidly filling landfills.

## Engaging stakeholders

Solving the problem of plastic pollution in the Vu Gia-Thu Bon River Basin requires the involvement of a broad range of stakeholders from government and business, non-governmental organizations and academia and citizens who represent interests and activities across the source-to-sea system. Creating a shared understanding of the issues forms the basis for finding solutions that can be adopted and implemented across all sectors.

Identifying stakeholders to engage includes asking:

- Who is being impacted?
- Whose actions need to change?
- Which government institutions are responsible?
- Are there financiers who can help?
- Are there others who can bring solutions?

To understand how best to engage each stakeholder it is helpful to determine their level of interest and influence in reaching the desired future.

By conducting an assessment of stakeholders from source to sea in the Vu Gia-Thu Bon basin, it was found that local fishers and residents, and tourism and other businesses dependent on the quality of natural resources are being impacted by plastic pollution, but generally, they have little influence in how plastic products are produced, used and managed once they become waste. Those responsible for the management of solid waste have a high level of interest in preventing plastic pollution but may be constrained by limited financial resources, infrastructure gaps and technical capacity. Government agencies with mandates to address pollution such as provincial level Departments of Natural Resources and the Environment (DONRE), may appear to have a high level of influence – however, they may be limited in the capacity to implement their mandate. Enabling exchange between stakeholders strengthens the influence of weaker stakeholders and clarifies the goals of those with more power.

A workshop was held in Hoi An with 85 participants during which stakeholders shared their knowledge of solid waste management in the basin, their concerns about the failures that have led to plastic litter in waterways, coasts and in the sea, and their hopes for the future. The interactive and inclusive stakeholder engagement process enabled participants to craft a more complete picture of existing strengths and weaknesses of current solid waste management in the Vu Gia-Thu Bon basin. It also created a common understanding of the sources of plastic pollution and the challenges faced in solid waste management. This helped forge a forceful and shared desire for finding viable solutions. Participants highlighted that these solutions must include the informal sector, which is critical for waste collection and recycling, and also increase focus on improving waste collection services in rural areas.

The workshop was followed by a two-day training in applying the source-to-sea approach for teams from DONRE from Quang Nam and Da Nang which were assigned subsequent homework. The purpose was to strengthen capacity of



Photo: Ruth Mathews

the DONRE staff to address the issue of plastic leakage through the application of the source-to-sea approach.

## Coordinating governance

There is an annual total of 13,524 tonnes of uncollected plastic waste in the Vu Gia-Thu Bon River Basin. Urban areas contribute 0.6 kg of plastic waste to waterways per capita per year, which is equivalent to 120 plastic bags. While in coastal areas the amount is 3 kg and in rural areas 4 kg per person, This adds up to the same amount of plastic as 1,500 plastic bags per person in coastal areas and 2,000 plastic bags in rural areas<sup>2</sup>.

Improper management of plastic waste arises from a lack of an appropriate governance system and inadequate enforcement, often complicated by insufficient finance, poor quality infrastructure and outdated technology. Establishing a governance baseline is useful for analyzing the relevance, strengths and gaps in instruments addressing plastic pollution and how these are implemented, and the barriers faced by institutions at all levels.

In Viet Nam, waste management is one of seven priority programs of the National Strategy for Environmental Protection. Unfortunately, despite an exemplary early mover initiative for integrated waste management, it is held back from a lack of action plans and adequate funding to meet the ambitious targets. Similarly, the National Strategy on Integrated Solid Waste Management sets targets and provides a framework for charging sanitary fees from waste generators. However, mechanisms for revenue collection are insufficient and far from full-cost recovery. These failings hamper achievement of intended goals as incentive is low.

The primary responsibility for environment management, pollution control and waste management sits with the Ministry of Natural Resources and Environment (MONRE) however, the Ministries of Construction, Agriculture and Rural Development, Health, Finance, Planning and Investment, Transportation, and Science and Technology all have mandates that contribute in some way to how plastic waste is managed. This leads to overlapping roles and responsibilities and in some cases, conflicting aims. This underlines the need for coordination across these ministries and their related provincial and district offices in implementing solid waste management.

Governance in the Vu Gia-Thu Bon basin, as in most locations, does not explicitly address the upstream-downstream linkages between sources of plastic leakage and the locations and stakeholders being impacted by plastic pollution. By completing a governance baseline that is mapped to the source-to-sea system, strategies can be developed to address the gaps by creating a coherent suite of instruments at all levels that deliver the changes in behaviour needed to prevent plastic pollution. Analysis of the barriers that institutions face in their implementation can be used to strengthen them.

Source-to-sea management can improve overall system health by reducing flows detrimental to the source-to-sea system and enhancing flows that maintain ecosystem functions and services. The foundations for source-to-sea management are established by first understanding alterations to key flows that connect the source-to-sea system (water, biota, sediment, pollutants, materials, ecosystems services). 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 sets 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 toward long-term outcomes.

## What comes next?

This pilot of the source-to-sea approach is a step toward preventing marine litter from the Vu Gia-Thu Bon River Basin. It clearly demonstrates the need for source-to-sea management: plastic leakage will not be prevented without cooperation between upstream and downstream stakeholders and success relies on strengthening coordination across different government agencies, the private sector and individuals residing in or visiting the area. The

foundation for source-to-sea management is built through developing a shared knowledge base on the geography of land-based sources of plastic pollution, as well as its causes and impacts. Strengthening the bonds between stakeholders from source to sea leads to a common vision for the future. Understanding the strengths and weaknesses, gaps and conflicts in the governance system reveals the challenges and opportunities for coordination.

With this foundation in place, it is possible to take the next step in the source-to-sea approach: designing a theory of change and defining an action plan that will lead to the vision for the future. In the Vu Gia-Thu Bon, there is now greater understanding of sources of plastic pollution from urban centres, rural and low population density areas, and coastal and/or touristic areas, and the specific challenges faced in each. Stakeholders have come together to share their perspectives, the hurdles they face and their dreams for a cleaner, healthier environment. In government, the capacity in applying the source-to-sea approach is growing. As the roots of commitment to prevent marine litter deepen within the Vu Gia-Thu Bon basin, these seeds will begin to bear fruit. Together the local communities, businesses and government can find a path that will strengthen local management of waste, drawing upon inputs from global, national and provincial levels focused on addressing local needs and priorities.

## About this publication

This document has been authored by Ruth E. Mathews and Kanika Groeneweg-Thakar. It has been produced as an outcome from the “Foundations for Source-to-Sea Management” project carried out by SIWI from September 2019–May 2020 and funded by the German Federal Ministry of Economic Cooperation and Development (BMZ). The authors and SIWI wish to thank BMZ and Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) for their support. Activities conducted in this pilot were supported by IUCN Viet Nam.

## Additional resources

This project followed the guidance provided in “Implementing the Source-to-Sea Approach: A Guide for Practitioners” and “Source-to-Sea Framework for Marine Litter Prevention: Preventing Plastic Leakage from River Basins”. Both of these resources as well as many others can be found at [www.siwi.org/source-to-sea](http://www.siwi.org/source-to-sea).

## References

- 1 RWA. (2020). Source-to-Sea Analysis of Plastic Waste Management in Vu Gia –Thu Bon River Basin. SIWI.

## About SIWI

SIWI's vision is a water wise world, where we recognize the value of water, and ensure that it is shared and allocated sustainably, equitably and efficiently, to meet everyone's basic needs.

Through applied research, policy consultation, capacity-building, and connecting key actors across sectors, SIWI stimulates the development of innovative policies and scientifically-based solutions to water-related challenges.

SIWI's Source-to-Sea Programme develops knowledge resources and implements projects globally. Since 2014 SIWI has been the host and coordinating body of the Action Platform for Source-to-Sea Management (S2S Platform). The S2S Platform is a multi-stakeholder initiative to exchange and generate knowledge, and support joint action for improved management of land, water, coastal and marine linkages.

