

Implementing the source-to-sea approach in projects and programmes

IW:LEARN Regional Workshop Latin America Caribbean | Cartagena, Colombia

16 September 2019

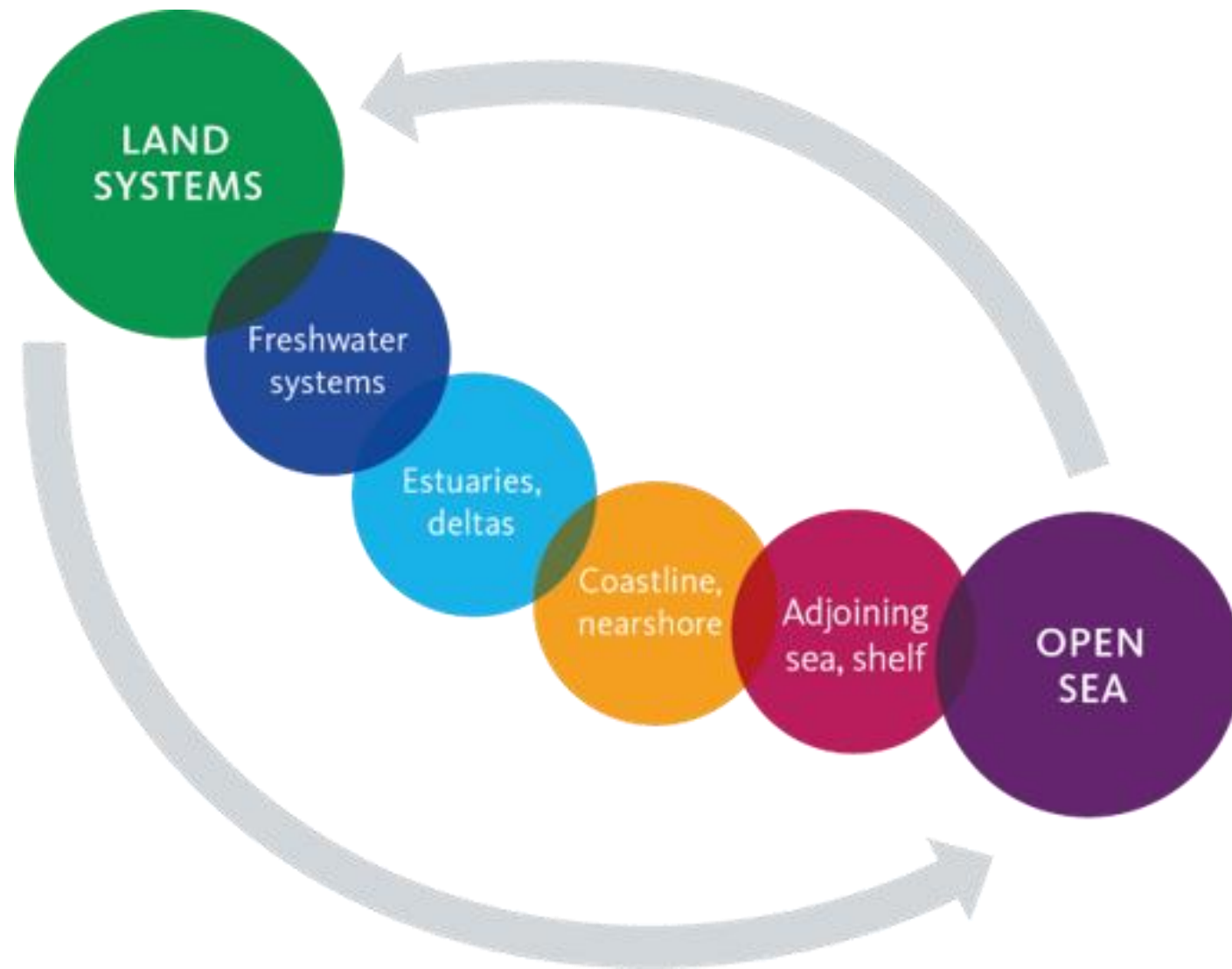


10:30 11:00	Introduction to the training agenda, the source-to-sea approach and source-to-sea management
11:00 13:30	<p>Introduction to STEP 1: CHARACTERIZE (10 minutes)</p> <p>Group work: (20 minutes)</p> <ul style="list-style-type: none"> Characterizing key flows Selecting priority flows Determining the system boundary <p>Group discussion (15 minutes)</p> <p>Introduction to STEP 2: ENGAGE (10 minutes)</p> <p>Group work (20 minutes)</p> <ul style="list-style-type: none"> Identifying source-to-sea stakeholders Developing an engagement plan <p>Group discussion (15 minutes)</p> <p>Introduction to STEP 3: DIAGNOSE (10 minutes)</p> <p>Group work: (20 minutes)</p> <ul style="list-style-type: none"> Developing a governance baseline – gaps and overlaps Relating practices to enabling conditions <p>Group discussion (15 minutes)</p> <p>Introduction to STEP 4: DESIGN (15 minutes)</p>
Lunch break (13:30 – 14:30)	
14:30 16:00	<p>Group work (25 minutes)</p> <ul style="list-style-type: none"> Four orders of outcome Intervention strategies <p>Group discussion (20 minutes)</p> <p>Introduction to STEP 5: ACT (5 minutes)</p> <p>Group work (15 minutes)</p> <ul style="list-style-type: none"> Implementation plan Funding plan <p>Group discussion (10 minutes)</p> <p>Introduction to STEP 6: ADAPT (5 minutes)</p> <p>Group discussion (10 minutes)</p> <ul style="list-style-type: none"> Source-to-sea monitoring
Coffee break (16:00 – 16:30)	
16:30 17:30	Project team presentations
17:30	Close

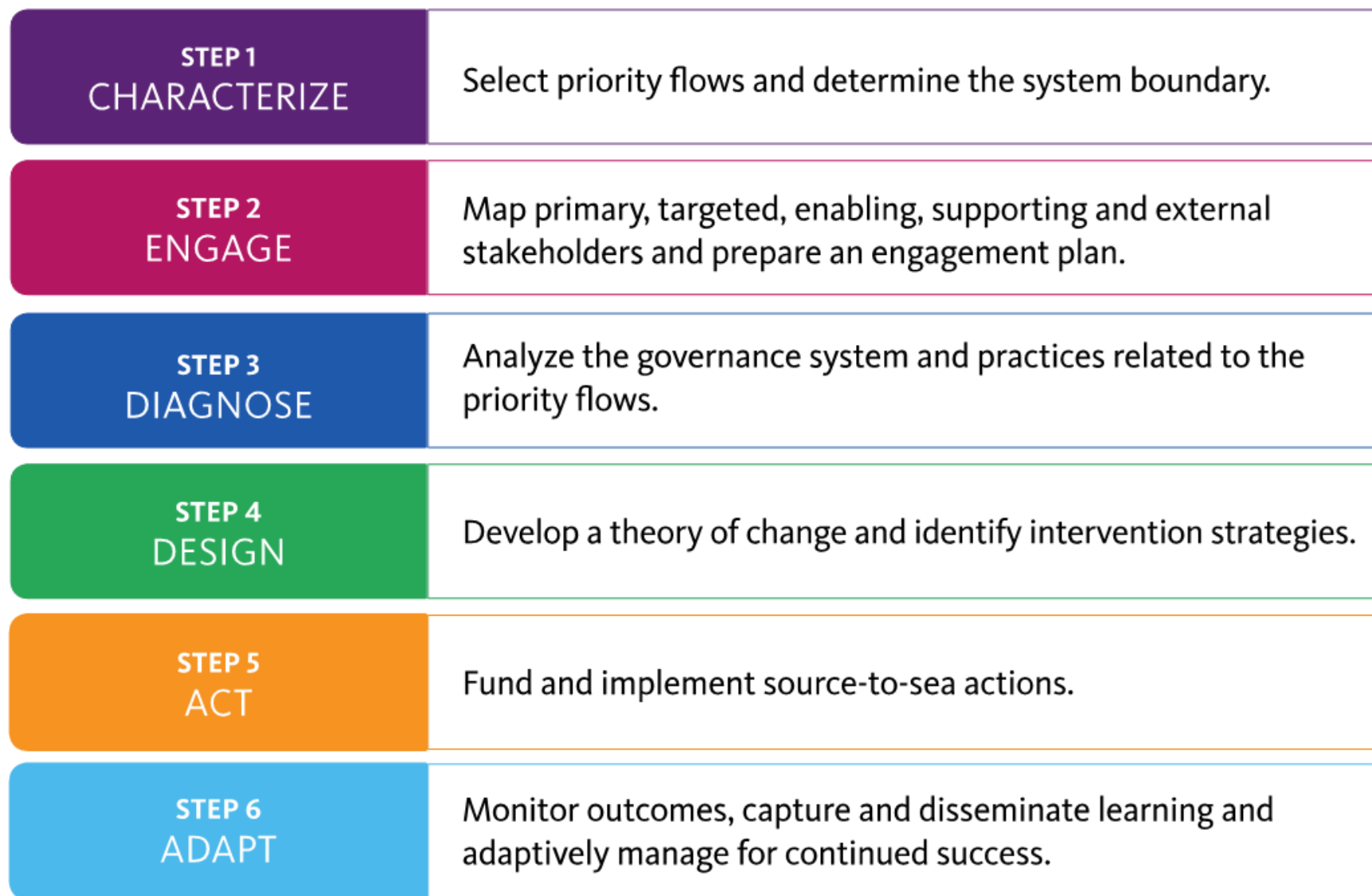
An aerial photograph of a river delta, likely the Rhine-Meuse delta, showing a complex network of waterways and land. The image is overlaid with a semi-transparent blue filter. The text 'Introduction' is written in white, bold, sans-serif font on the left side of the image.

Introduction

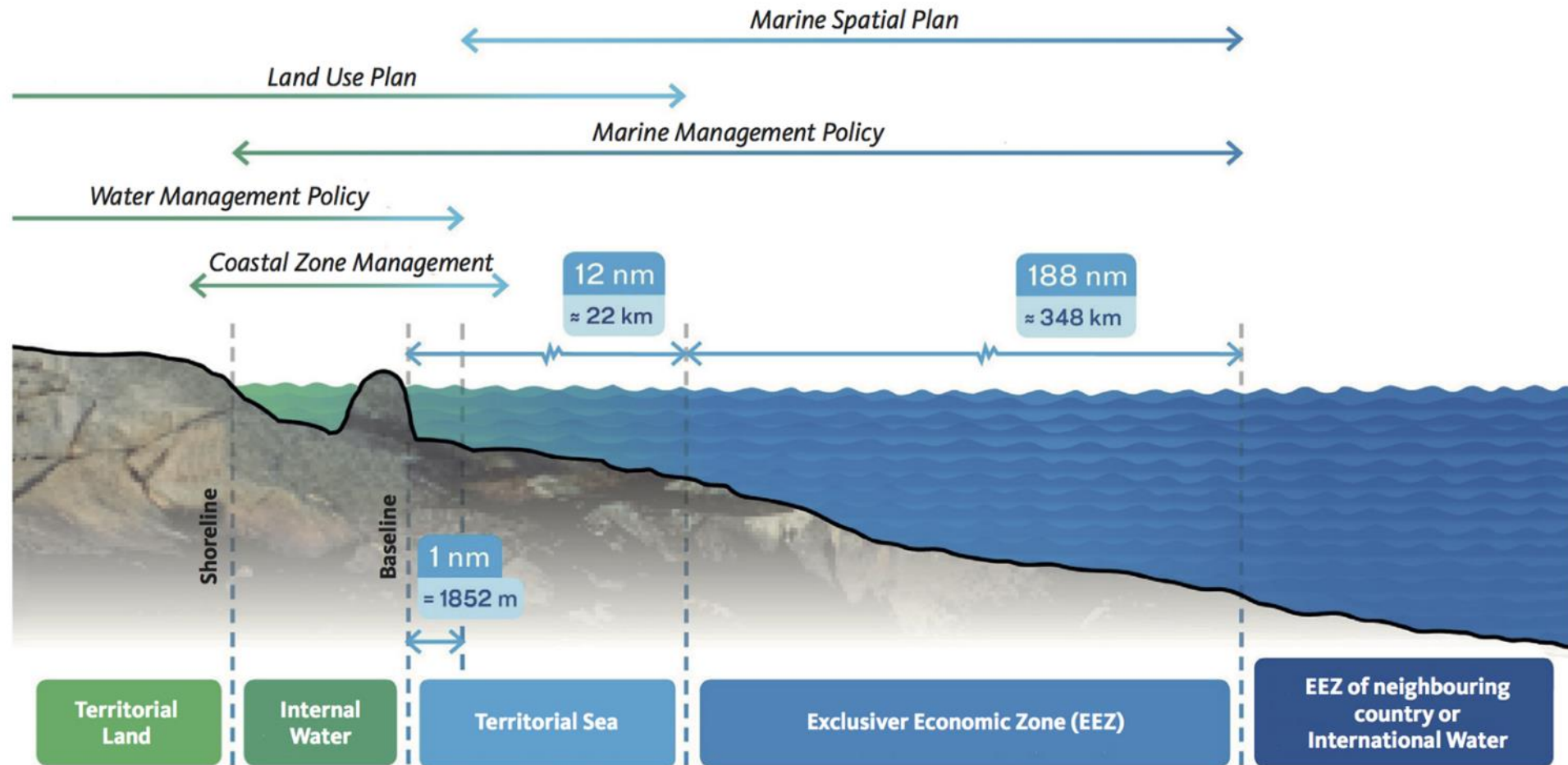
Source-to-sea approach and source-to-sea management



Source-to-sea system

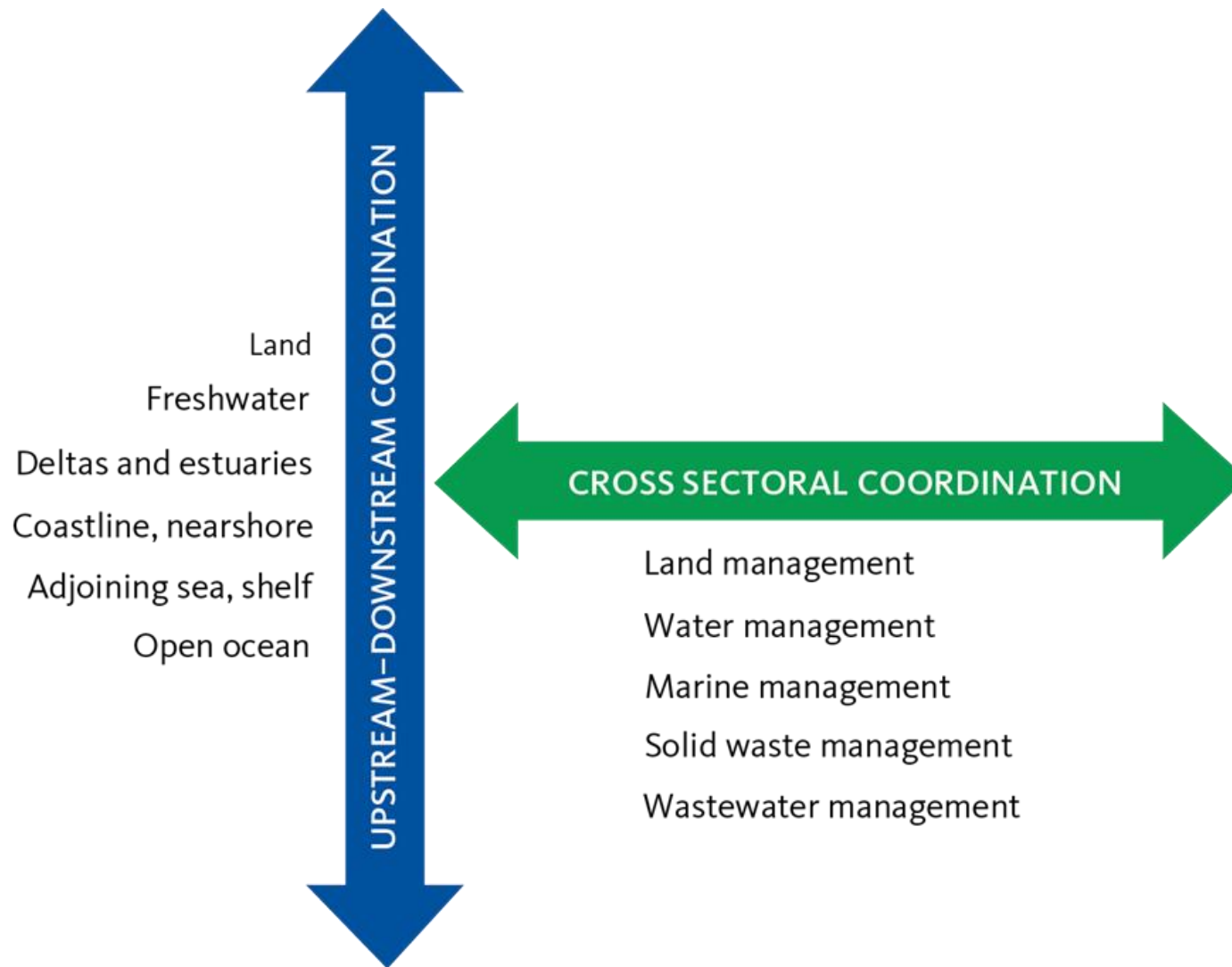


Six steps of the source-to-sea approach

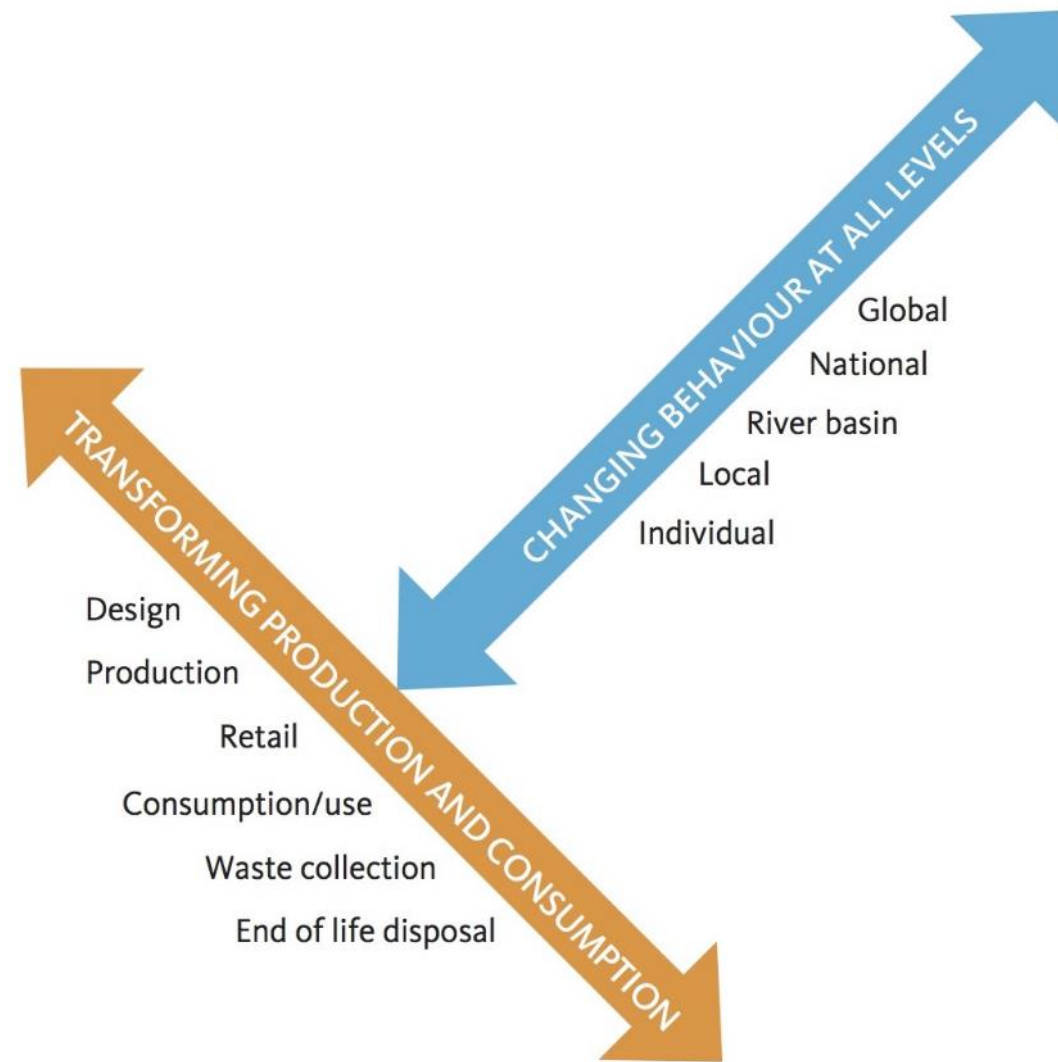


Overlapping spatial plans over land and sea in Sweden from Swedish Agency for Marine and Water Management.

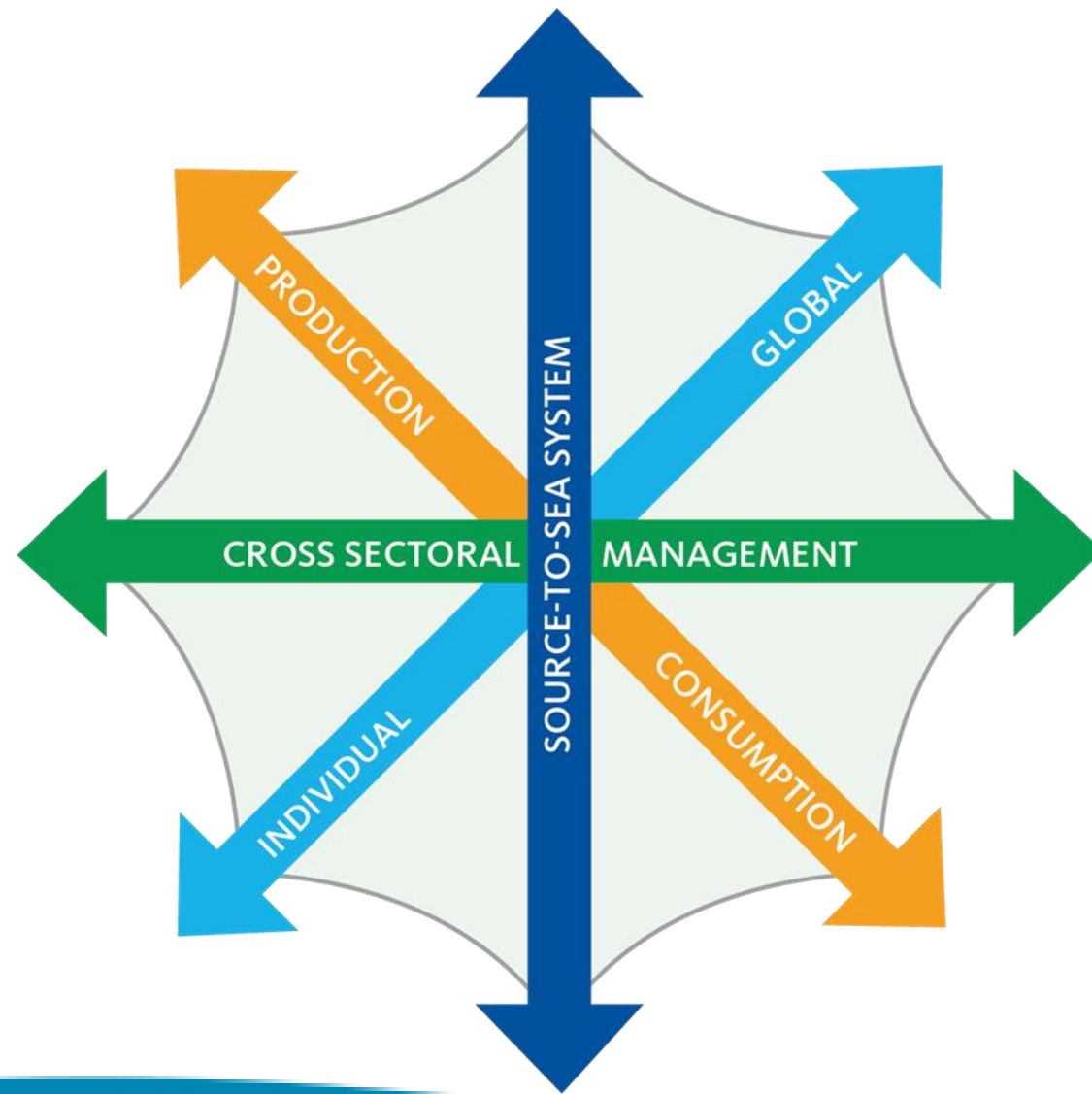
Overlapping and segmented governance



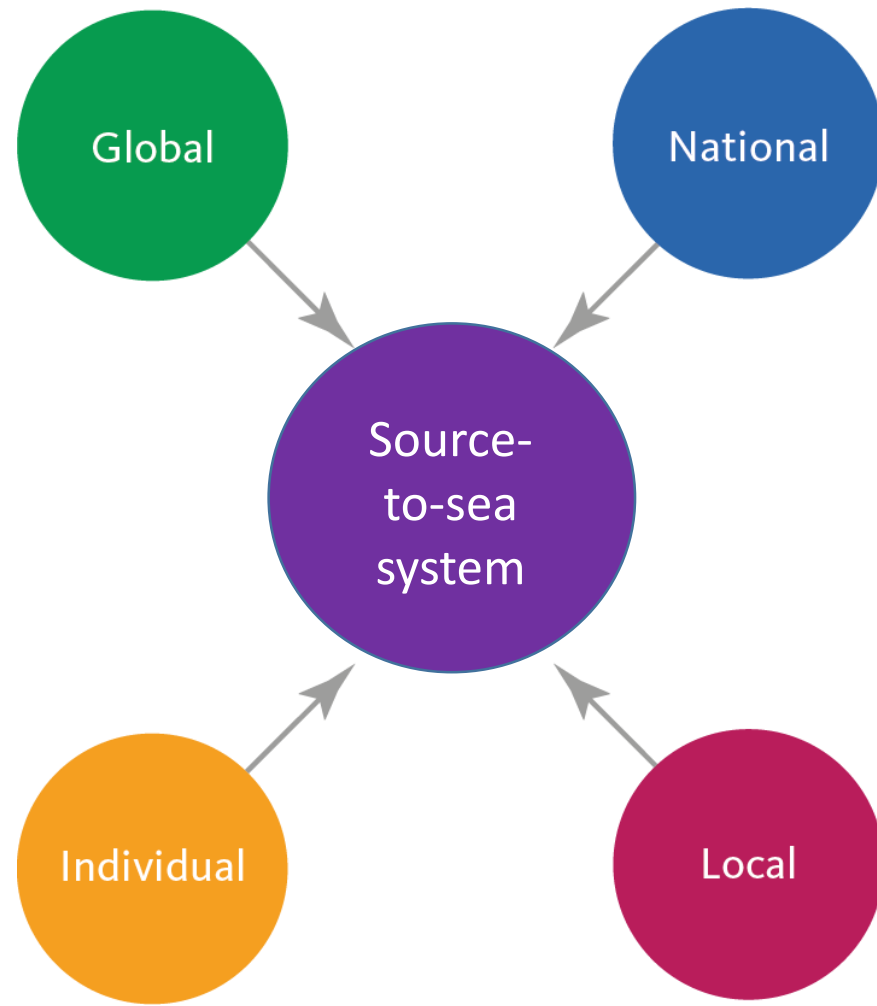
Coordination dimensions for source-to-sea management



Governance dimensions for source-to-sea management



Solution space for source-to-sea management



Governance at all levels for sustainable source-to-sea systems

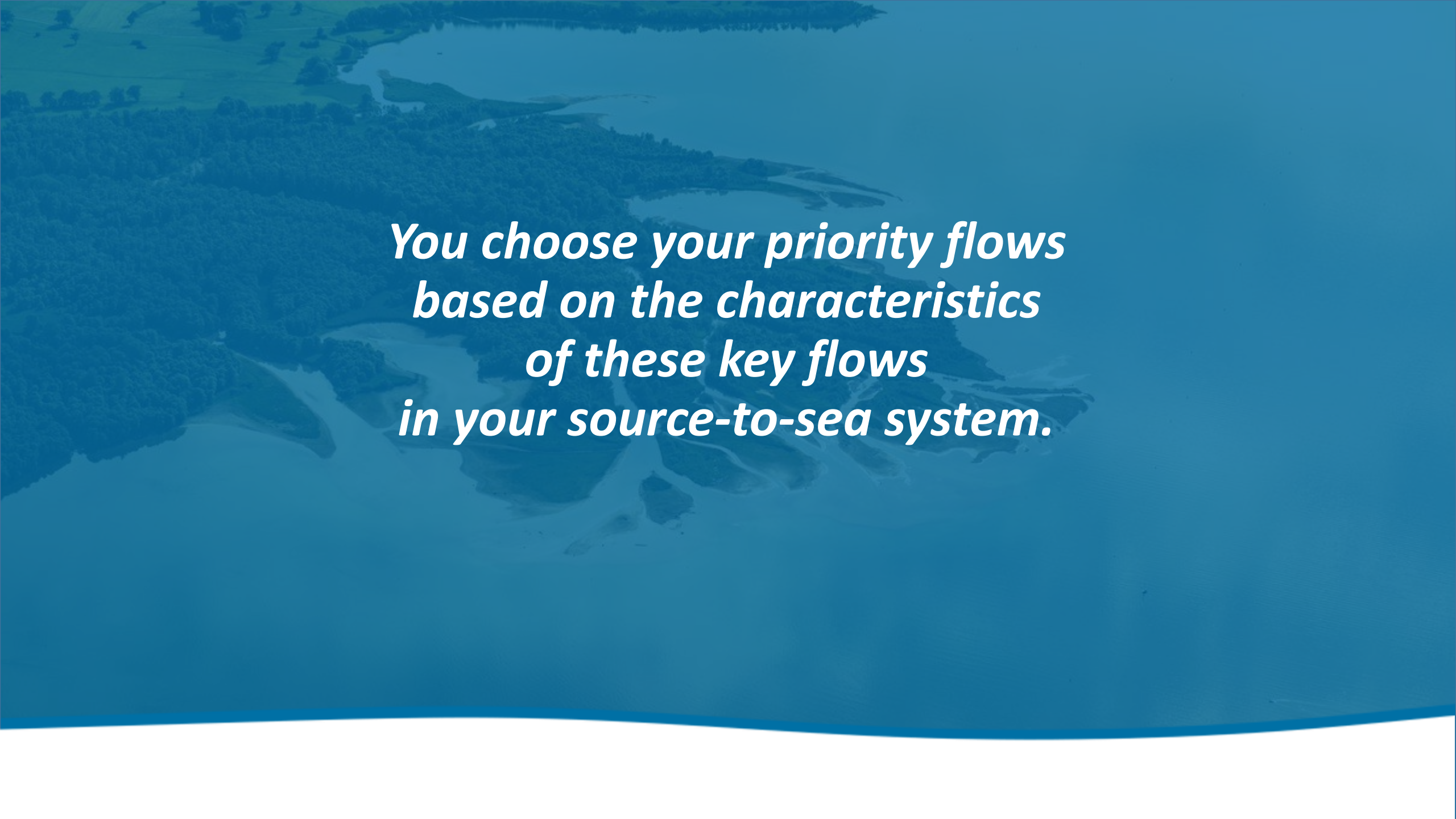
An aerial photograph of a river delta, likely the Amazon, showing a complex network of water channels and forested land. The image is overlaid with a semi-transparent blue filter. The text is positioned in the lower-left quadrant of the image.

STEP 1: Characterize

Select priority flows and determine the system boundary



Key source-to-sea flows

An aerial photograph of a river delta, likely the Amazon, showing a complex network of waterways and forested land. The image is overlaid with a semi-transparent blue filter. Centered on the image is a block of white text in an italicized font.

*You choose your priority flows
based on the characteristics
of these key flows
in your source-to-sea system.*

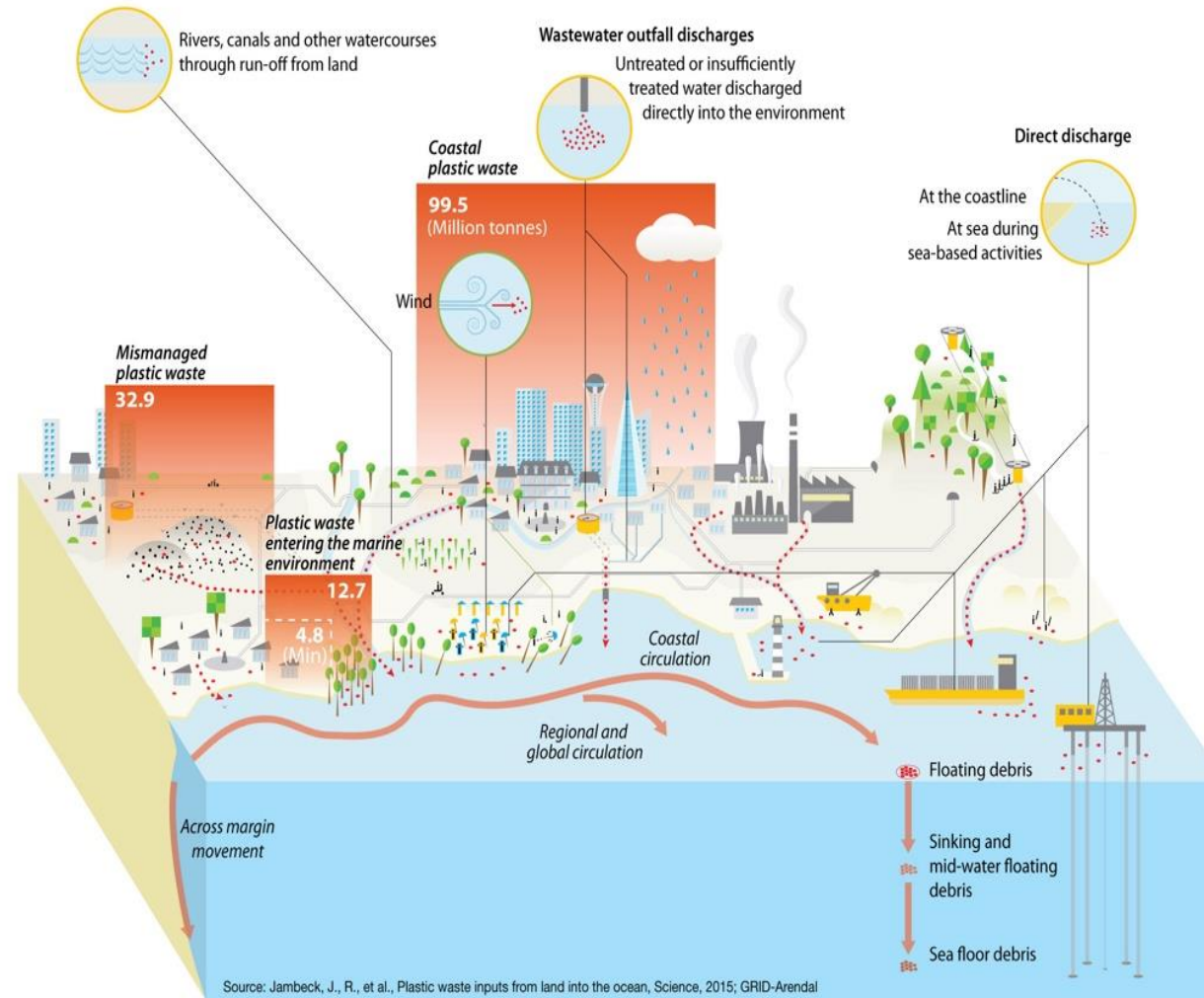
Examples of priority flows

- Decreased **water flows** due to increasing withdrawals from growing urban areas.
- Increased **sediment flows** due to soil erosion from agricultural areas.
- Reduced **biota flows** due to blocked migration of anadromous fish populations.
- Increased **pollutant flows** due to plastic leakage from land-based sources.
- **Material flows** (levees) cutting off floodplains from the main channel resulting in loss of aquifer recharge.
- Loss of **ecosystem services** (water purification) and poorer water quality from draining and filling wetlands.

TYPES OF PLASTIC WASTE?	WHICH SIZE?	HOW CAN IT BEHAVE?	WHAT HAPPENS?		
<ul style="list-style-type: none"> • Packaging waste (e.g. paper wrapping, bottles, plastic film) • End of life products (e.g. toothbrush) • Additives (e.g. microbeads in toothpaste or paint) 	<ul style="list-style-type: none"> • Regular size (e.g., lighter, bottle) • Bulky (e.g. chair) • Micro-plastics <5 mm (e.g. microbeads, disintegrated foil) • Nano-plastics <0,001 mm 	<ul style="list-style-type: none"> • Buoyant (either less dense than water or encapsulated air) • Hovering in the water column (same density) • Sinking (higher density) 	<ul style="list-style-type: none"> • Reduction in size due to breakdown of material • Adhesion of toxins • Release of toxins 		
				WHO IS GENERATING PLASTIC WASTE	HOW DOES IT ENTER THE WATER?
				<ul style="list-style-type: none"> • Commerce • Individuals/household • Agriculture • Industry 	<ul style="list-style-type: none"> • Inadequate waste management • Stormwater drainage • Sewer/wastewater systems • Direct littering or dumping

Characterizing priority flows

Pathways and fluxes of plastics into the oceans




Sources of plastic leakage to the oceans


DIRECT	INDIRECT
Economic losses	
<ul style="list-style-type: none"> Higher cost of drinking water due to the increased amount of plastic pollution in the water Less income and reduced employment in coastal communities due to decreased tourism related to dirty and less attractive beaches (2) High costs for coastal and beach clean-ups (13) Loss of employment in fisheries due to reduced catch resulting from ghost fishing and fish mortality (7) 	<ul style="list-style-type: none"> Stress on commercial species and higher losses/costs for the fishing industry (7) (13) Reduced availability of water-based food due to the lower rates of reproduction Less productive aquaculture In the shipping sector, damages by marine litter harming ship propulsion equipment (6) Higher operational and maintenance costs of propellers, intake pipes and other infrastructure
Biota and ecosystems	
<ul style="list-style-type: none"> Pressure on aquatic species due to plastic debris ingestion or entanglement (1) Loss of biodiversity in aquatic ecosystems Spread of invasive species (4) Threat of collapsing ecosystems Smothering of organisms, reduced light penetration, and dragging along the sea floor causing physical damage (3) 	<ul style="list-style-type: none"> Damage to coral reefs due to debris entanglement Bioaccumulation of toxic substances due to ingestion of hazardous chemicals that are in the plastic or adsorbed on its surface (5)
Infrastructure and disaster risk	
<ul style="list-style-type: none"> Increased risk of flooding due to blockage of stormwater systems and drainage (11) Higher cost of flood damage due to increased frequency and stage of flooding Increased melting rates of sea ice (15) 	<ul style="list-style-type: none"> Higher maintenance for water-using infrastructure (e.g. cooling systems of power plants, dams) and decreased lifetime Higher maintenance and clean-up costs for stormwater drainage and other water transport infrastructure
Human health	
<ul style="list-style-type: none"> Reduced drinking water quality Contamination of water-based food with microplastics Risk of microplastics consumption through the food-chain (9) Health risks to coastal visitors through ingestion of contaminated food (12) 	<ul style="list-style-type: none"> Cumulative impact of plastic pollution on human well-being resulting in increased overall stress on health of the population Risk of cancerogenic diseases (10) Contamination through water-based food (12) Higher expenses for public health
Quality of life	
<ul style="list-style-type: none"> Reduced opportunities for recreational activities Decreased quality of recreational and social services due to plastic pollution across the source to sea system Air pollution/bad smell in recreational water zones 	<ul style="list-style-type: none"> Reduction of aesthetic value and beauty of rivers, coasts and oceans Degradation of riverine, coastal and marine environment

Direct and indirect impacts of plastic leakage

Defining the system boundary

- The selected priority flows
 - The alterations to the priority flows
 - The impacts arising from alterations in priority flows and their location
 - The activities contributing to the alterations in priority flows
 - The geographic scale of the strategic interventions
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STEP 1: Output

1. Characterization of key flows and selection of priority flows
 2. Sources and impacts of alteration of priority flows
 3. Stakeholders impacted by the alteration of priority flows and locations of impacts
 4. Delineation of the system boundary for the project or programme
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STEP 1: Work group questions

1. What is known about the key flows and how they have been altered from their natural ranges of variation? Which key flows will be selected as priority flows?
2. What are the sources of the alterations in the priority flows and where do they occur?
3. What are the impacts from these alterations?
4. Given the priority flows that have been altered, the origin of the alteration and their impacts, what is the system boundary?

LINK TO NEXT STEPS

The characterization of key flows and the selection of the system boundary are used in Step 2 to identify the stakeholders to engage in the project or programme and in Step 3 when identifying governance and practices related to the priority flows.

An aerial photograph of a river delta, likely the Amazon, showing a complex network of waterways and dense green forest. The image is overlaid with a semi-transparent blue filter. The text 'STEP 2: Engage' is written in white, bold, sans-serif font on the left side of the image.

STEP 2: Engage

Map primary, targeted, enabling, supporting and external stakeholders and prepare an engagement plan

PRIMARY

Affected by the alteration of priority flows and benefit from intervention strategies

TARGETED

Practices are contributing to the alteration of priority flows and whose behaviour is directly targeted

ENABLING

Provide enabling conditions for behaviour changes and benefits to occur and be sustained over time

SUPPORTING

Development partners or financiers whose strategies are aligned with the outcomes

EXTERNAL

Individuals or groups outside system boundary who share an interest in outcomes

Source-to-sea stakeholders


Source-to-sea stakeholders - marine litter

- **Primary stakeholders** who are negatively impacted by plastic leakage and will benefit from intervention strategies preventing it.
- **Targeted stakeholders** whose practices are contributing to the amount of plastic leakage and whose behaviour change is directly targeted.
- **Enabling stakeholders** that provide the conditions for behaviour changes that result in preventing plastic leakage and for these to be sustained over time.
- **Supporting stakeholders** such as development partners or financiers whose strategies are aligned with reduced plastic leakage.
- **External stakeholders** such as individuals or groups outside the system boundary who share an interest in reduced plastic leakage.




Targeted stakeholders along the plastic supply chain

STEP 2: Output

1. Stakeholder mapping that identifies the primary, targeted and enabling stakeholders to be directly engaged in the source-to-sea project or programme, and the supporting and external stakeholders with an interest in the issue being addressed.
 2. A stakeholder engagement plan.
- 

STEP 2: Work group questions

1. Which individuals or groups are affected by the alteration of priority flows and will directly benefit from project/programme interventions?
 2. Which individuals or groups are contributing to the alteration of priority flows and whose practices must be directly targeted to reduce alterations of flows?
 3. Which institutions provide or should provide enabling conditions for behavioural changes and benefits to occur and be sustained over time?
 4. Are there development partners or financiers whose strategies are aligned with the outcomes of the project or programme?
 5. Are there individuals or groups outside the system boundary who share an interest in the outcomes of the project?
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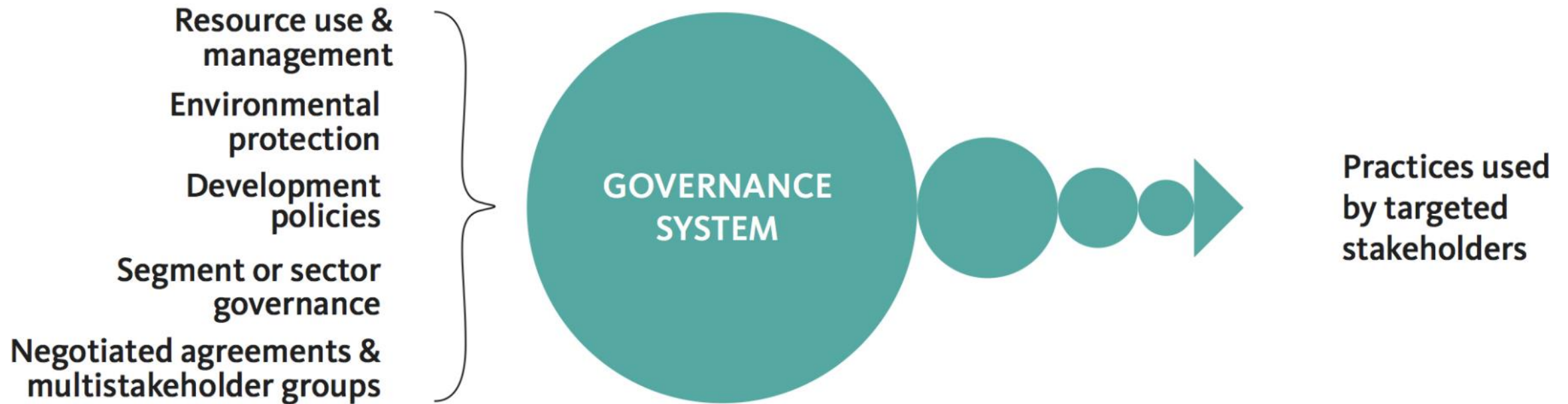
LINK TO NEXT STEPS

- *Primary stakeholders* will be used in designing the monitoring plan and in reporting results in **Step 6**
- *Targeted and enabling stakeholders* will be used in diagnosing the governance system and practices in Step 3 and in developing the intervention strategies in **Step 4**
- *Supporting stakeholders* inform financing activities in **Step 5**
- External stakeholders will be used in building political will or market forces for implementing intervention strategies in **Step 5** and for disseminating results in **Step 6**

An aerial photograph of a river delta, likely the Amazon, showing a complex network of waterways and forested land. The image is overlaid with a semi-transparent blue filter.

STEP 3: Diagnose

Analyze the governance system and practices related to the priority flows




The governance system conditions the practices used

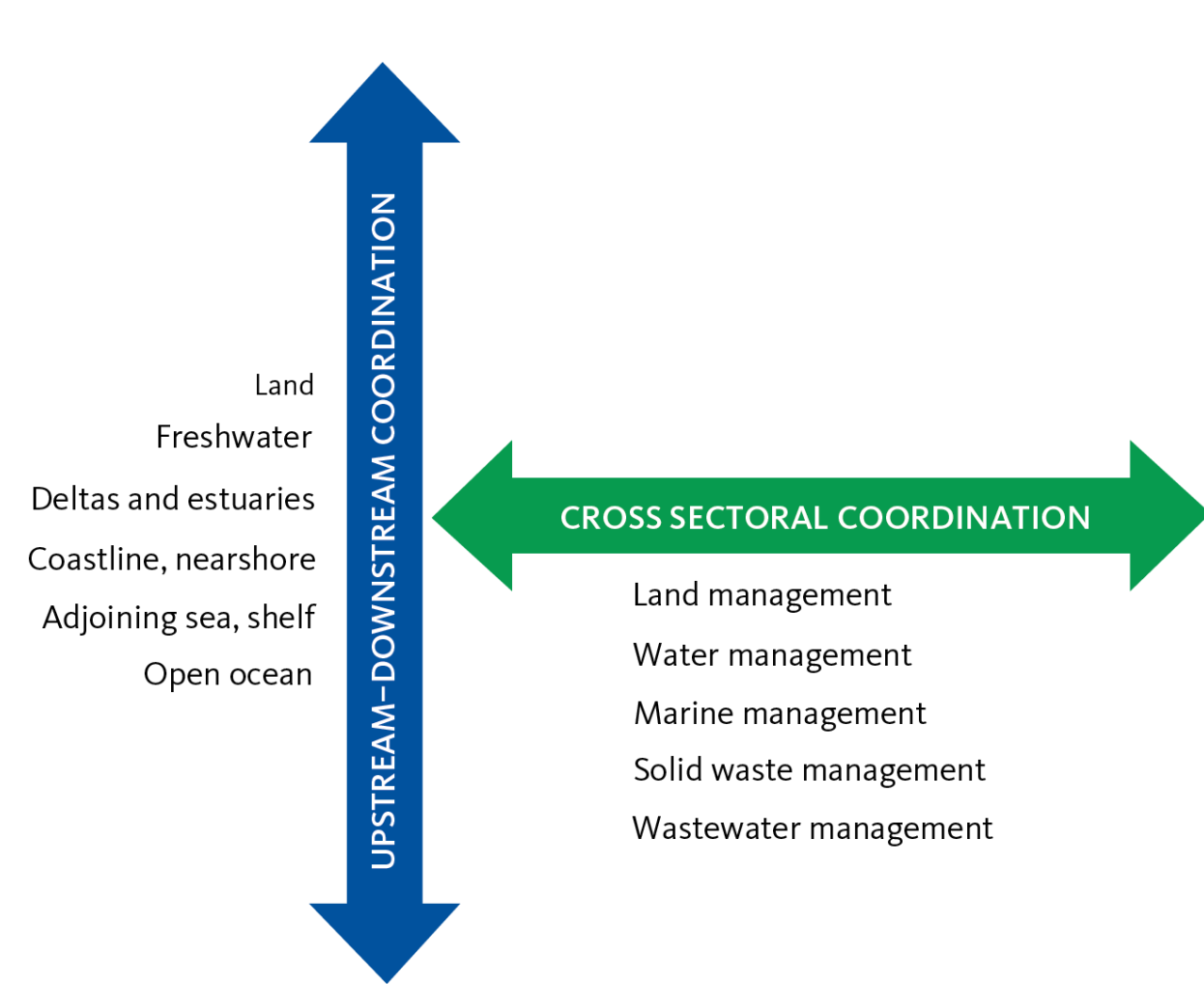
Components of the governance system

The governance system includes local, national, regional or global institutions and agreements as well as community level user groups or resource management agreements and institutions with mandates related to:

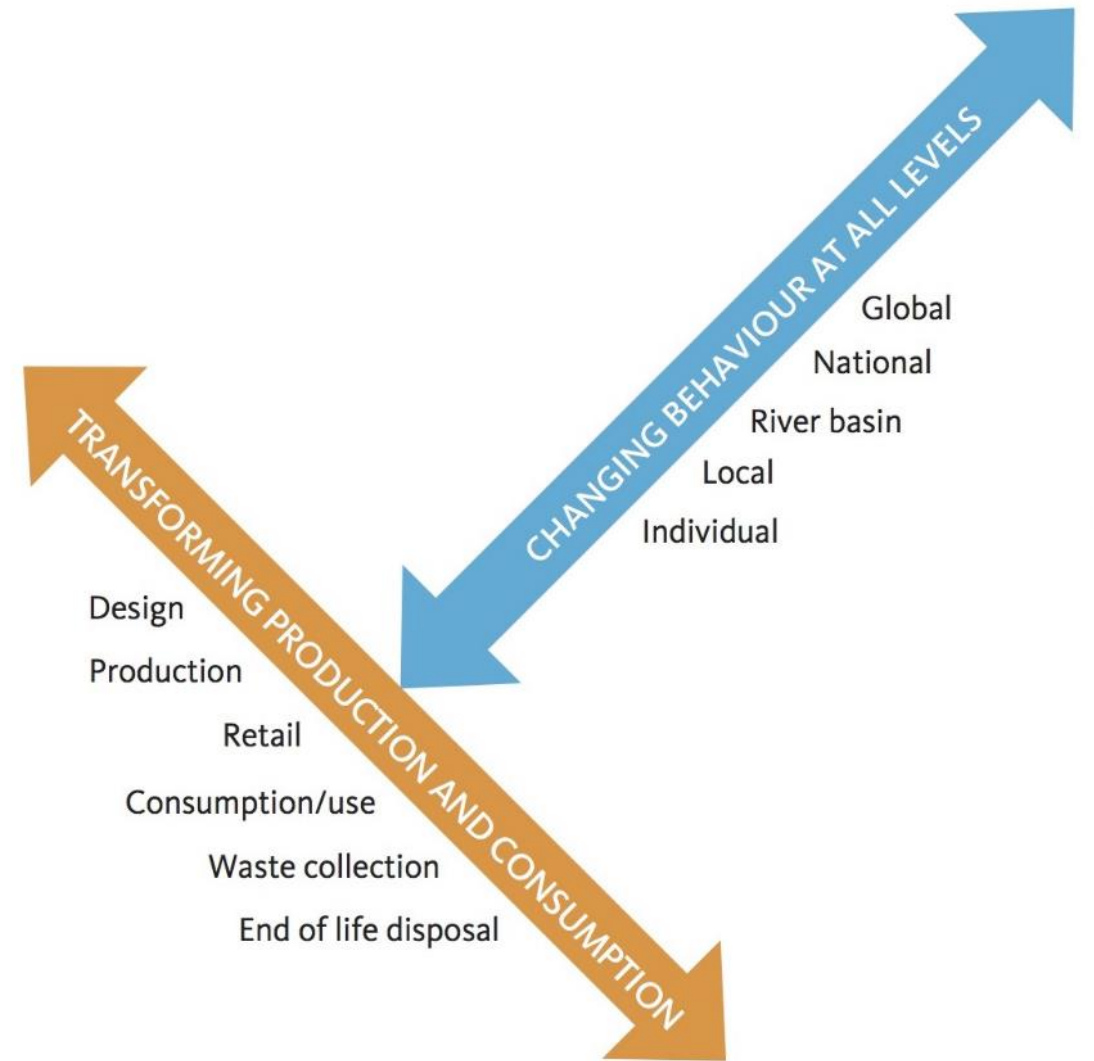
- Land use (urban, rural, coastal)
- Freshwater management (surface and groundwater; quantity and quality)
- Natural resource use (agriculture, horticulture, silviculture, aquaculture, mining, fisheries)
- Environmental protection (including protected areas in terrestrial, freshwater and marine environments)
- Development policies (e.g., economic, energy, transportation)
- Policies, procedures and regulations within and across segments of the source-to-sea continuum

Governance baseline

- The governance baseline provides a narrative that builds a common understanding of the strengths and weaknesses of the current situation and can lead to identifying what changes are needed to reach the goals of the project or programme.
 - It can reveal where governance is not adequately addressing the linkages between source-to-sea segments.
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Longitudinal and lateral dimensions of source-to-sea management




Cross-cutting dimensions of marine litter prevention

Diagnosing the governance system

- Identify any policies, procedures and regulations that have conflicting aims or transfer impacts from activities in one segment to another segment of the source-to-sea system.
- Evaluate whether institutions with different mandates along the source-to-sea continuum are collaborating effectively to achieve common goals and objectives or if they are conflicting with each other.
- Determine if any policies, procedures or regulations support source-to-sea management. Are these being enforced?

STEP 3: Output

1. Governance baseline analysis with relevance to priority flows, sectors related to targeted stakeholders and impacts to primary stakeholders and source-to-sea segments.
 2. Assessment of overlaps and gaps in governance and management frameworks and identification where coordination is needed.
 3. Baseline analysis of current practices and gap assessment of enabling conditions for improved practices.
 4. Identification of existing engagement processes that can be joined or built upon.
- 

STEP 3: Work group questions

1. Which institutions, legal and regulatory frameworks, rights, ownership, informal agreements have management mandates for priority flows, targeted activities and/or source-to-sea segments?
2. Are those management mandates in conflict with each other and are they supportive of achieving the desired source-to-sea outcomes?
3. Are there other actors, e.g., companies or non-governmental organizations, that may influence the priority flows, targeted activities and/or source-to-sea segments?
4. What is the relative power and impact of government, the private sector and civil society in affecting the condition of the source-to-sea system?
5. Are the practices being used by the targeted stakeholders in line with the institutional mandates or is there a failure in enforcement?
6. Are there mechanisms for stakeholders to be involved in decision making, are there procedures in place for resolving conflicts that may arise between stakeholders and are they being effectively applied?

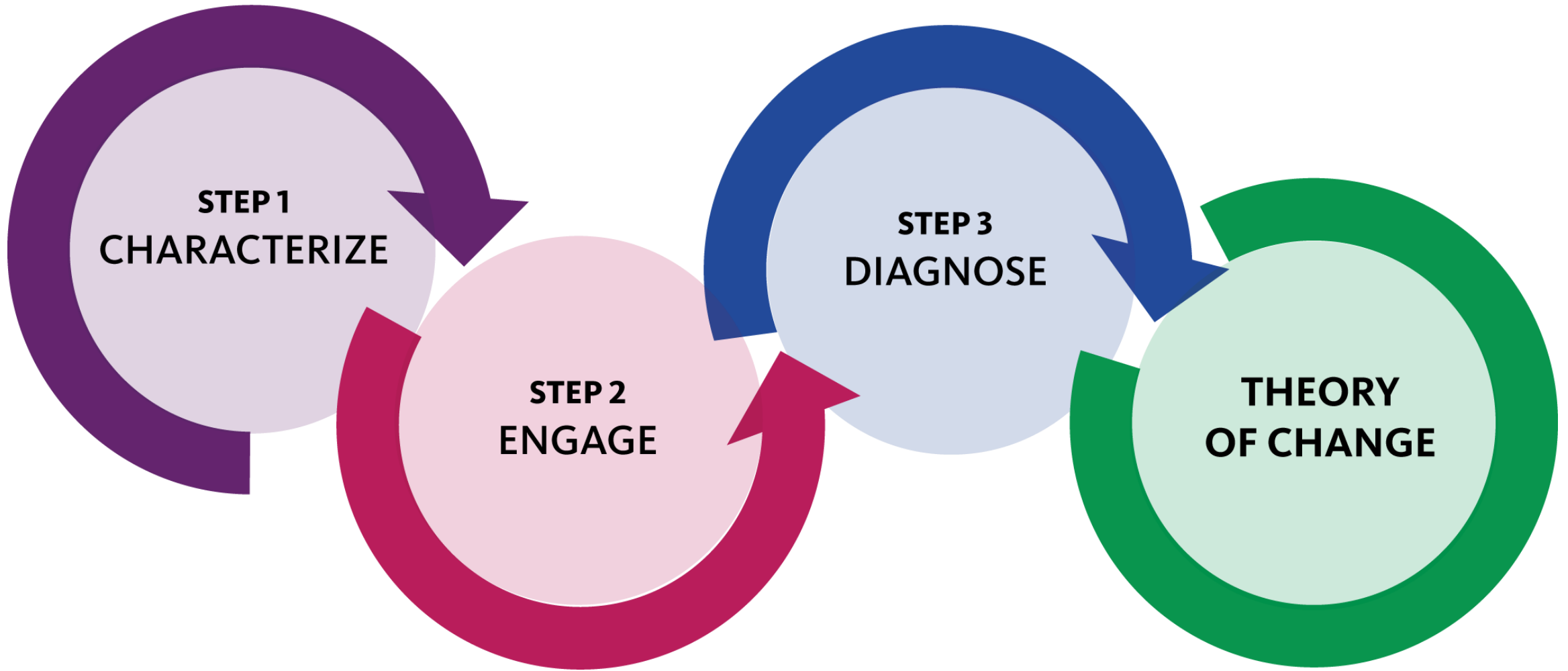
LINK TO NEXT STEPS

The analysis of the governance system and practices related to the priority flows will feed into the definition of the theory of change and identification of strategic interventions in Step 4.

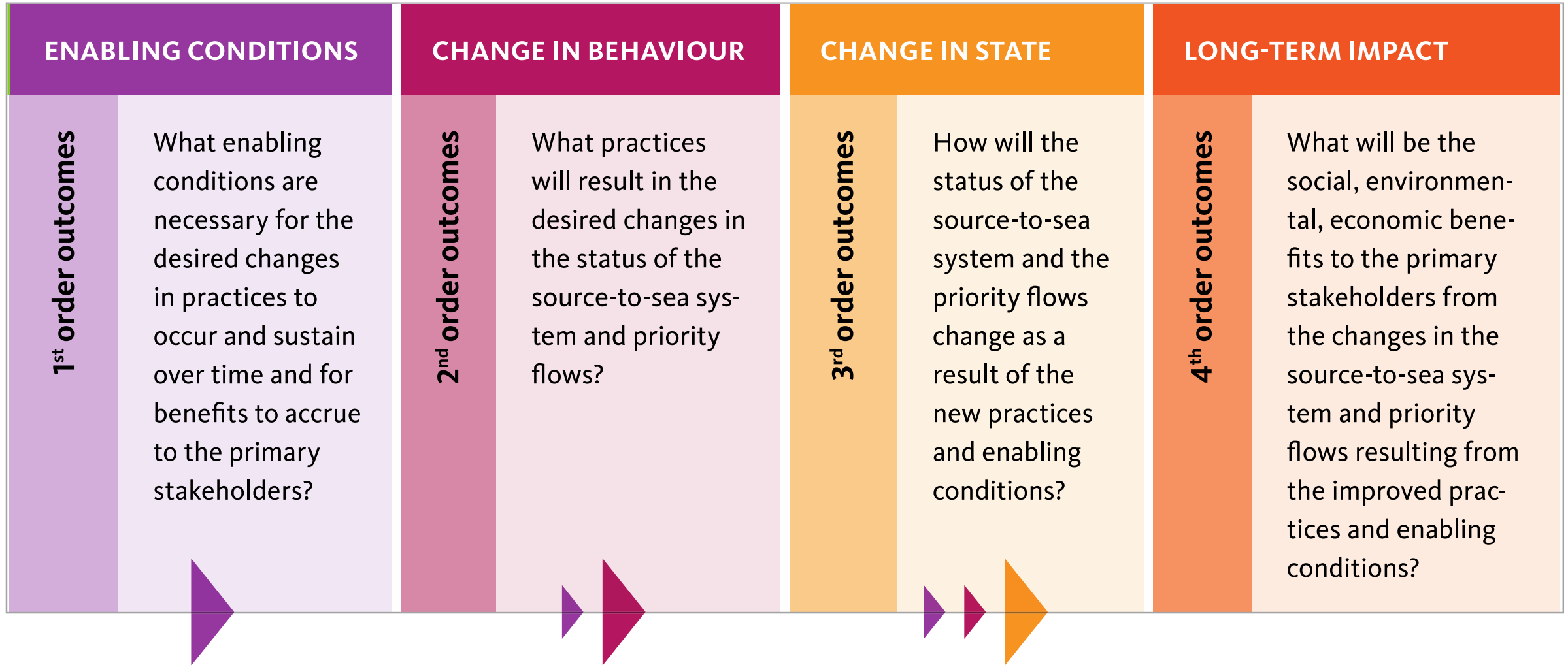
An aerial photograph of a river delta, showing a complex network of water channels and land. The image is overlaid with a semi-transparent blue filter. The text 'STEP 4: Design' is written in white, bold, sans-serif font on the left side of the image.

STEP 4: Design

Develop of a theory of change and determine intervention strategies



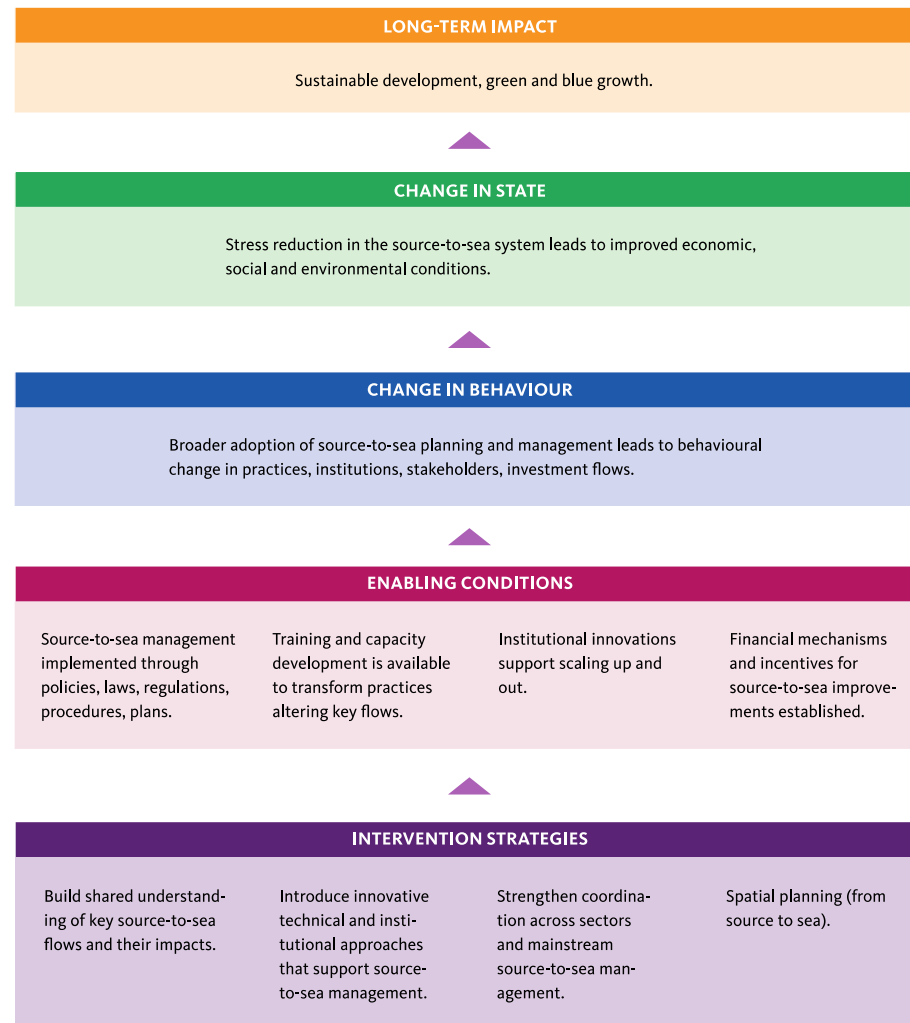
Steps 1, 2 and 3 feed into the theory of change



Four orders of outcome

Four orders of outcome

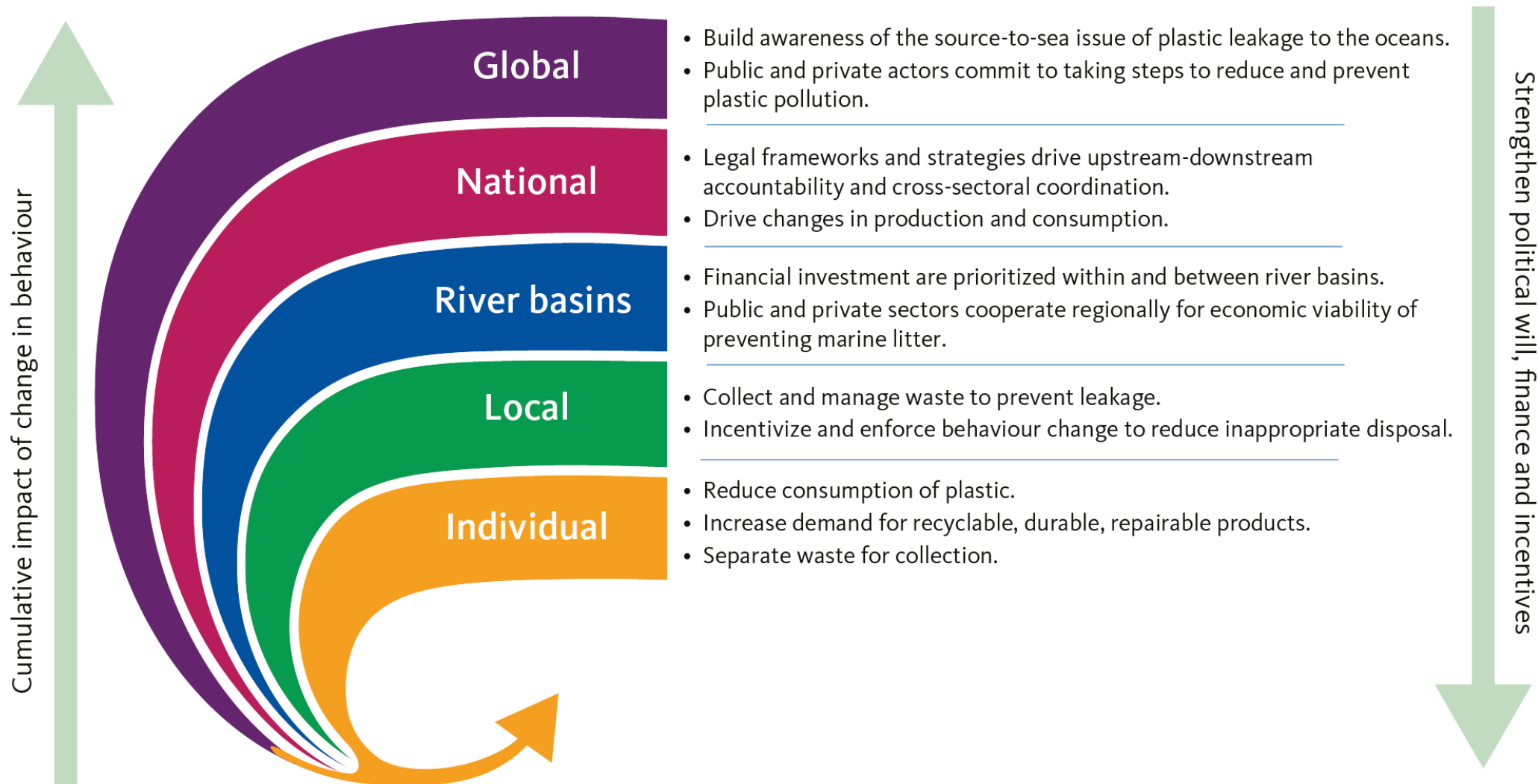
- *First order outcomes* are the **enabling conditions** that support the required changes in the behaviour of the targeted stakeholders as determined in Step 2.
- *Second order outcomes* are the **changes in practices or behaviours** identified in Step 3 as necessary to realize the desired changes in the source-to-sea flows and the resulting benefits for the primary stakeholders.
- *Third order outcomes* are the desired **changes in the status of the source-to-sea system** resulting from the restoration of priority flows that were characterized in Step 1.
- *The fourth order outcomes* are the expected **economic, social and environmental benefits** to be gained through implementation of the intervention strategies. The benefits accrue to the primary stakeholders identified in Step 2 and result from the improved status of the source-to-sea system due to preventing plastic leakage. For the full range of fourth order outcomes to be assessed, both direct and indirect benefits across all relevant source-to-sea segments should be considered.



Theory of change

Intervention strategies

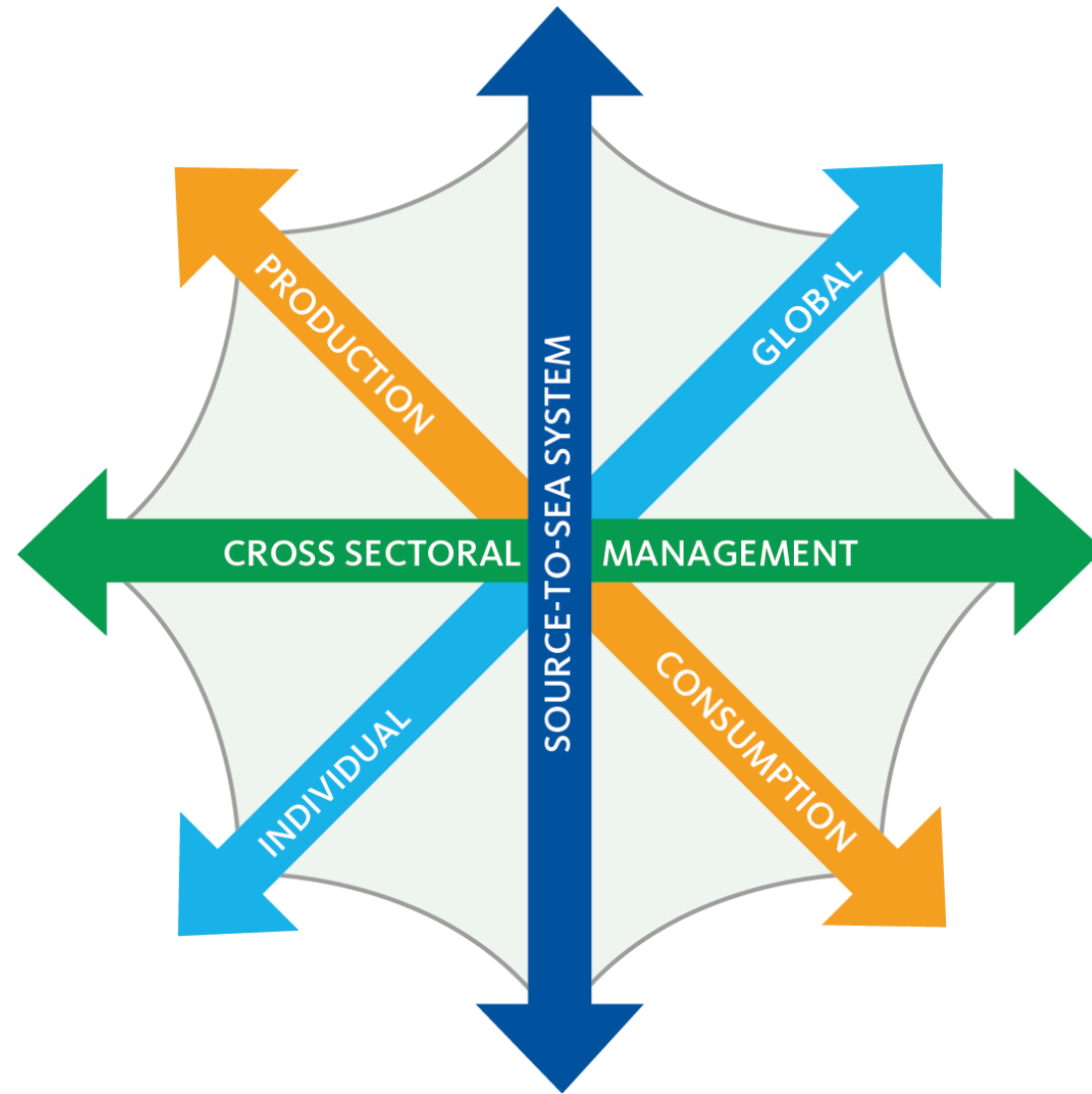
- **First order outcome:** Strategies to increase technical or governance capacity
 - strengthen institutions, new regulations or financial mechanisms
 - increase levels of engagement and political will
 - include stakeholder participation in decision making
 - ensure gender representation
 - establish mechanisms for coordination, cooperation and collaboration across relevant source-to-sea segments
- **Second order outcome:** Strategies that support the use of new practices by targeted stakeholders
 - reduce the alterations of source-to-sea flows and restore relevant aspects of the source-to-sea system
 - improve practices used by targeted stakeholders, e.g. training in resource management practices, improved supply chains and access to market, new infrastructure, peer learning and user groups, financial investments, etc.
- **Third order outcome:** Strategies that establish monitoring and assessment
 - process, stress reduction, environmental status and socio-economic status indicators
 - capture learning for dissemination and adaptive management.
- **Fourth order outcome:** Strategies that ensure social, environmental and economic benefits are delivered to primary stakeholders and sustained over time.



Interventions at each level are needed to reach desired outcomes


Prioritizing across (or between) the source-to-sea system(s)

- Where are the greatest sources of alteration to the priority flows and which are having the greatest impact.
- On what governance level can the major sources be best tackled?
- Is there a regional area within the source-to-sea system that includes these major sources or are they dispersed throughout the basin?
- Which sources should be addressed first?
- With these priorities in mind, which interventions will be the most effective?



Solution space defined by four dimensions of source-to-sea management

STEP 4: Output

1. Well-developed theory of change with documentation of assumptions and unknowns.
 2. Table of intervention strategies, the stakeholders to engage and the linkages between intervention strategies and desired outcomes.
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STEP 4: Work group questions

1. What is the long-term impact that the project or programme is aiming for?
2. What social, environmental and/or economic benefits will be reaped by the primary stakeholders and to what extent will resilience be increased as a result of the project or programme?
3. What practices are to be used by the targeted stakeholders to achieve the long-term impact of the project or programme?
4. To what degree are enabling conditions present for the desired changes in practices to occur and sustain over time?
5. What activities and intervention strategies will change the practices of the targeted stakeholders and establish the necessary enabling conditions?
6. If the desired practices are implemented, how will priority flows and the status of the source-to-sea system be changed?

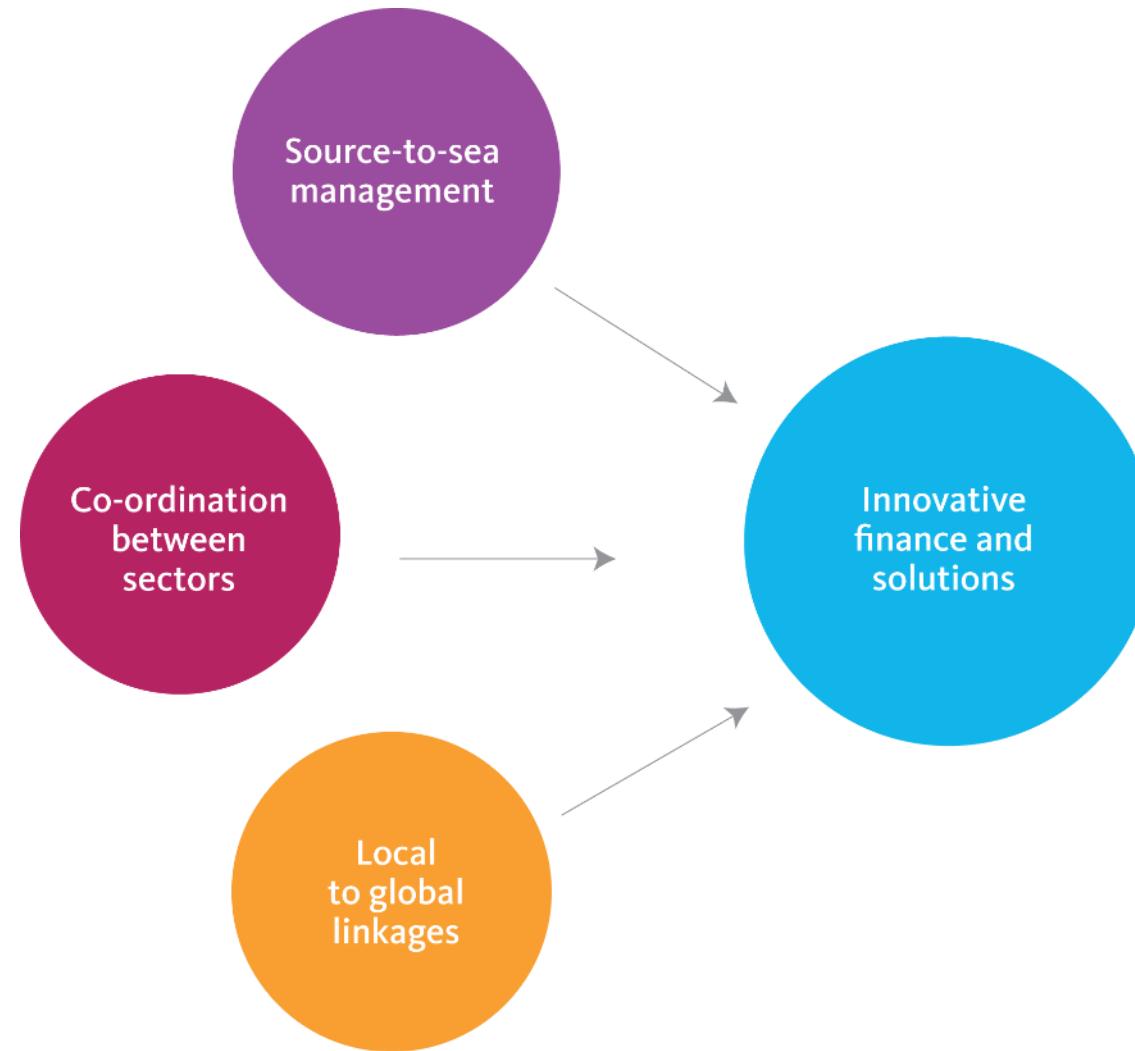
LINK TO NEXT STEPS

The theory of change documented in Step 4 becomes the basis for monitoring and adaptive management in Step 6. The intervention strategies developed from the theory of change will be implemented in Step 5.

An aerial photograph of a river delta, showing a dense network of water channels and surrounding land. The image is overlaid with a semi-transparent blue filter. The text is positioned on the left side of the image.


STEP 5: Act

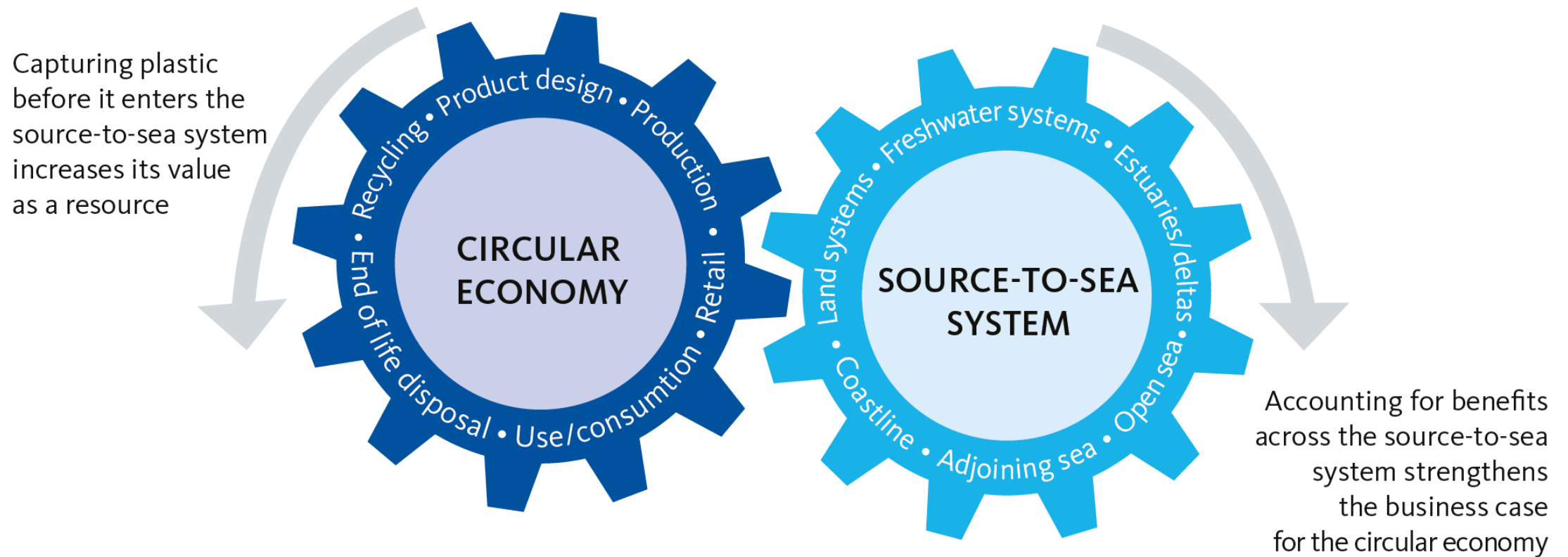
Fund and implement source-to-sea actions



Source-to-sea leads to innovative solutions

Examples of strategies for reducing plastic leakage in river basins

- Community-based collection systems
 - Attributing market value to plastics
 - Performance-based grant schemes
 - Private sector participation
 - Support planning, investment and implementation in municipalities
 - Ban on certain single-use plastics
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Source-to-sea management and circular economy are mutually supporting approaches to preventing marine litter.

Preventing plastic leakage

- What does the source-to-sea continuum tell us about the types of actions and investments needed to prevent plastic leakage?
- Where can action and investments be prioritised for maximum benefit when looking at one whole river basin or multiple river basins?
- What is the suite of management mandates and therefore institutions that need to be involved to address plastic leakage?
- Who are the supportive and external stakeholders who can support these governance and behaviour changes being made at each of the levels?



Governance, finance, management and behaviour across all levels facilitates local change

STEP 5: Output

Funding and implementation plan with:

1. Sources of and mechanisms for public, donor and/or private sector sources of funding and their linkages to intervention strategies and desired outcomes.
2. Strategy for securing sustainable financing for source-to-sea priorities.
3. Description of intervention strategies with activity plan including:
 - strategies and mechanisms for coordination between sectors and across source-to-sea segments;
 - stakeholder mapping relative to the intervention strategies and desired outcomes;
 - risk assessment and risk mitigation plan; and
 - timelines for implementation, monitoring and evaluation.

STEP 5: Work group questions

1. Are there financing partners or mechanisms that will support implementation of source-to-sea management?
2. What are the intervention strategies needed to achieve the four orders of outcome elaborated in the theory of change in Step 4?
3. What courses of action are needed to establish the conditions and commitments required to ensure long-term sustainability of source-to-sea capacity, funding and partnerships?

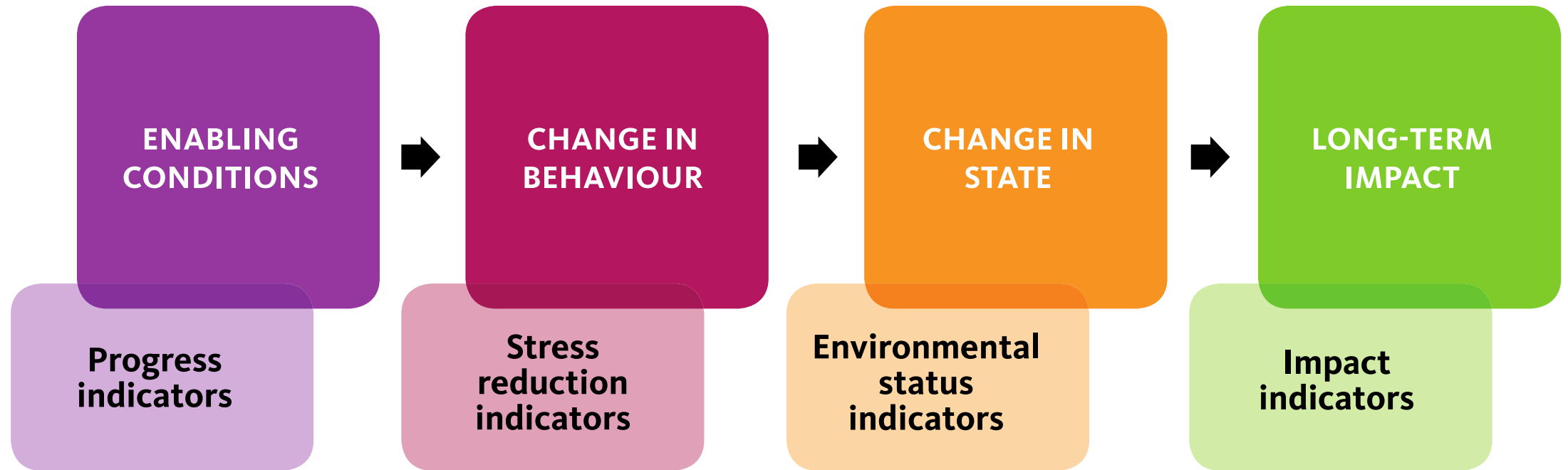
LINK TO NEXT STEPS

In Step 5, intervention strategies are implemented. The intended outcomes from their implementation will be monitored in Step 6. The results observed through the monitoring programme will form the basis for adaptive management.

An aerial photograph of a river delta, likely the Amazon, showing a complex network of waterways and forested land. The image is overlaid with a semi-transparent blue filter.

STEP 6: Adapt

Monitor outcomes, capture and disseminate learning and adaptively manage for continued success




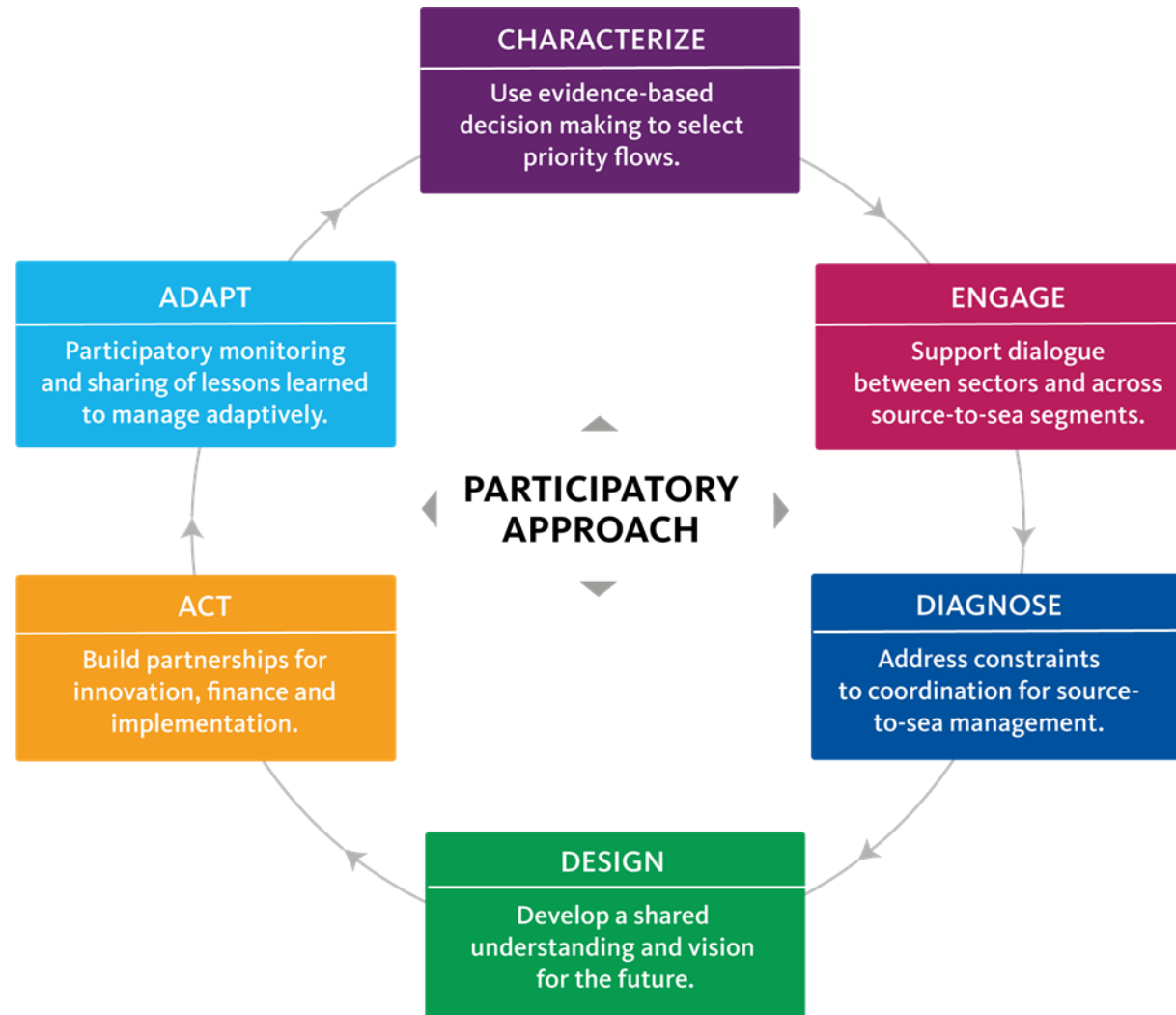
Four orders of outcome

STEP 6: Output

1. Monitoring plan indicating process, stress reduction, status and impact indicators, the methods of measurement and the timeframe for measuring and evaluating each indicator.
2. Project evaluation document with:
 - assumptions tested by project or programme implementation and identification of revisions needed in theory of change;
 - lessons learned;
 - communications and dissemination plan; and
 - recommendations for source-to-sea management and opportunities for scaling up the project or programme.

STEP 6: Group discussion questions

1. What is the appropriate set of indicators that will monitor progress toward source-to-sea first to fourth order outcomes?
 2. Have the assumptions elaborated in the theory of change been confirmed or is there new learning about the relationships between intervention strategies and outcomes?
 3. What are the lessons learned and how can these be disseminated to expand the application and success of source-to-sea management?
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Implementing the source-to-sea approach

A blue-tinted photograph of a grassy field with a large rock in the foreground. The text is overlaid on the left side of the image.

Thank you!

Ruth Mathews: ruth.mathews@siwi.org

<https://www.siw.org/what-we-do/source-to-sea/>