Tool Guide for Stakeholder Engagement in Coastal Communities

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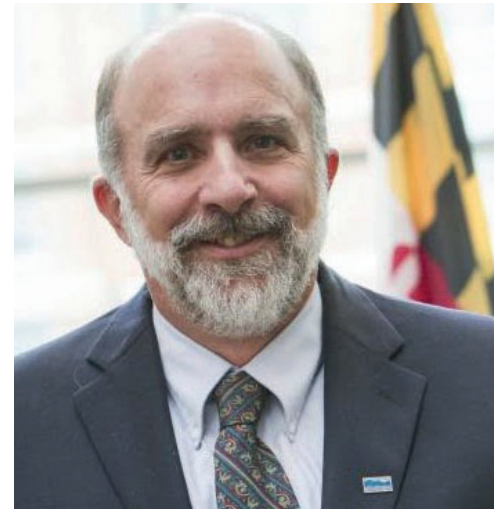
Dear user,



We are excited that you are interested in using or learning about stakeholder engagement from this Tool Guide. We strongly believe that well organized and executed stakeholder engagement is a key component of achieving sustainable ecosystems. This Tool Guide is expected to continue to evolve as more methodologies and approaches are developed to fully engage stakeholders in effective environmental stewardship. Please provide feedback and contact us as you use the Tool Guide – we are interested in your feedback. Best wishes on your journey to embrace stakeholder engagement in your efforts to achieve healthy and sustainable ecosystems.

William C. Dennison

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Tool Guide for Stakeholder Engagement in Coastal Communities

Great Blue Heron in the Chesapeake Bay. Photo Courtesy of UMCES.

About this Guide

This guide aims to assist in implementing the COAST Card framework in different locations and settings. Effective communication, collaboration, and stakeholder engagement are essential for ensuring the framework is implemented successfully and sustainably. Engaging stakeholders in the co-production process is an excellent way to develop a shared vision and shared responsibility.

However, if target setting, planning, organizing, and facilitation of the engagement activity are not adequately considered, there is a risk of mismatched needs and achievements, duplication of known or existing outputs, or a loss of motivation for stakeholders.

This guide is not only for facilitators but also for participants to understand the methodologies used and to help facilitate discussions during the workshop or other collaborative engagement activities.

About the COAST Card Project

Section 1: Why engage stakeholders?

Section 2: How should engagement activities organized?

Section 3: How should thoughts and ideas be integrated?

Section 4: Case studies that implement the techniques from this toolguide.

A Note From the COAST Card Team:

The COAST Card team is committed to continuously refining the stakeholder engagement methods outlined in this book. Therefore, this engagement toolguide will be a living document that will have future editions and translated versions. This document, all the subsequent editions, and translated versions, will be available for download online. Please scan the QR code with your phone camera or visit the COAST Card website at www.coast-card.org

Scan Here for More COAST Card Resources

The COAST Card Project

A Transdisciplinary Approach to Socio-Environmental Problem Solving

In the face of rapid and profound socio-environmental challenges, the need for innovative and transformative tools has become increasingly apparent. The Coastal Ocean Assessment for Sustainability and Transformation, or the COAST Card, is an innovative framework that integrates three powerful tools (Figure A.1) to assess and report on complex socio-environmental challenges. It brings together researchers, practitioners, and stakeholders from the USA, Philippines, Norway, India, and Japan (Figure A.2) under the support of the Belmont Forum, a consortium of scientific funding agencies dedicated to developing collaborative research actions across borders.

The COAST Card framework merges social network analysis, socio-environmental report cards, and system dynamics modeling (Table A.1) to enable the assessment of coastal and ocean systems. Central to this framework is stakeholder and community engagement. This will provide guidance on optimal cost-benefit solutions to maintain or improve the health of these systems. Additionally, this framework can identify the actors best placed to deliver these solutions. By getting the right people, armed with publicly available synthesized information, informed by robust models, and having trusted relationships through the co-production of COAST Card, positive socio-environmental change can be catalyzed.

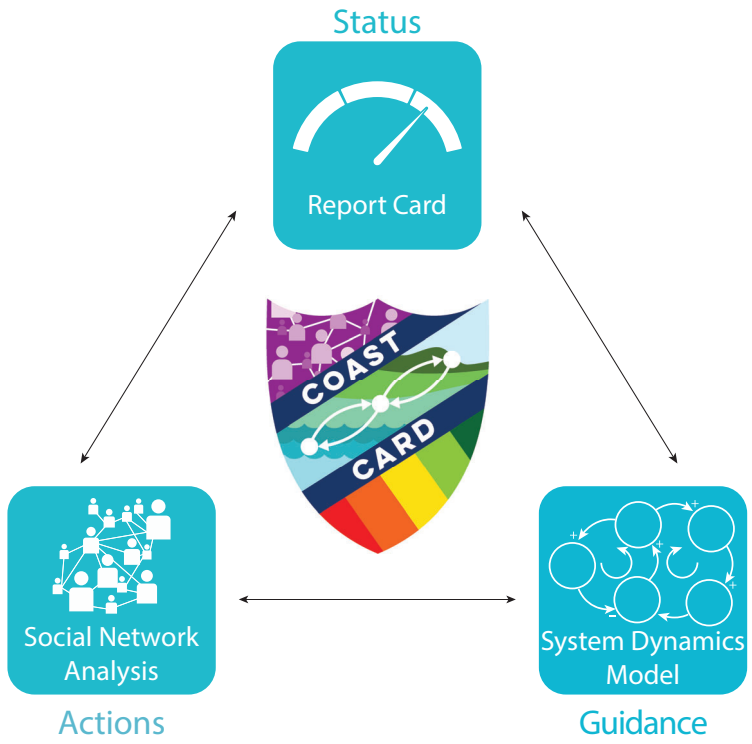


Figure A.1 *The three pillars of the COAST Card Framework. Vargas-Nguyen, et al (2024). The COAST Card Framework. Manuscript in preparation.*

Table A.1 Key Elements of the COAST Card Framework:

Report Cards:	**System Dynamics Modeling:**	**Social Network Analysis:**
Stakeholder-driven assessments providing an overview of key indicators related to specific issues or challenges, aiding in developing a shared understanding among stakeholders and catalyzing management action.	Bridging qualitative and quantitative data to understand how variables interact over time, enabling informed resource management decisions.	Helps in identifying collaborative opportunities among various groups within a system, revealing key actors and enabling strategies for engagement.

Figure A.2 *Map of international partners (United States of America, the Philippines, India, Japan, and Norway) and call-outs of study sites around the world with photos of various engagement events that were held at each site. The COAST Card project is funded through the Belmont Forum with each country funded through the respective national agency as listed. Photo Credits: Veronica Malabanan Lucchese (Chesapeake Bay, USA), Kazuo Nadaoka (Ishigaki Island, Japan), Roshni Nair (Goa, India), Thong Nguyen (Manila Bay, Philippines), Takashi Kimura (Tokyo Bay, Japan).*

A.1 The COAST Card Process Requires Stakeholder Engagement

Social Learning Leads to Informed Decision-Making

The COAST Card framework builds on the socio-environmental Report Card framework that was pioneered in Chesapeake Bay Watershed in the United States. It is being developed for the Potomac Watershed within the Chesapeake Bay, in Tokyo Bay and Sekisei Lagoon in Japan, Manila Bay in the Philippines, and the Goa Coast of India. This multi-year project explores and addresses shared and unique challenges within different cultural and environmental systems. One overarching theme is the engagement of stakeholders which is critical for effective socio-environmental management. Each country team is now embarking on a series of stakeholder engagement activities to develop a theory of change to co-create a shared vision for each study site and co-developed COAST cards.

Through the COAST Card process, communities can access a comprehensive suite of tools that inform decision-making. The spiral learning process underpinning the framework ensures iterative learning from each international site, encompassing Chesapeake Bay, Manila Bay, Tokyo Bay, Ishigaki Island/Sekisei Lagoon, and the Goa coast of India (Figure A.3). The COAST Card process bridges the gap between qualitative and quantitative information, allowing stakeholders to make informed decisions regarding socio-environmental challenges. Engaging stakeholders is essential for a comprehensive understanding of our socio-environmental systems.

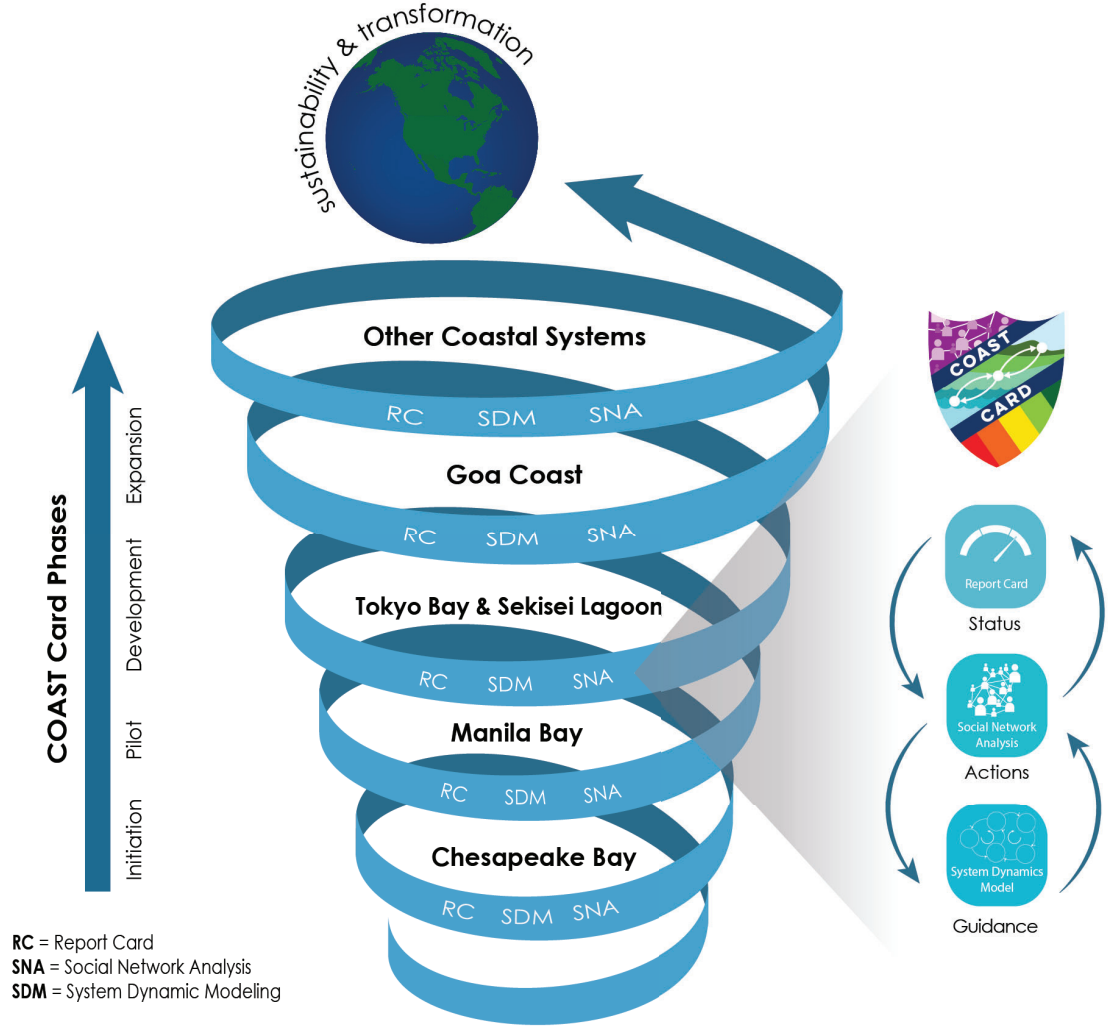


Figure A.3 *The spiral learning process of the COAST Card Approach and the three central pillars of the COAST Card framework. Vargas-Nguyen, et al (2024). The COAST Card Framework. Manuscript in preparation.*

A.2 Socio-Environmental Report Cards

Co-Developing Holistic Assessments

Socio-environmental Report Cards are the foundation of our COAST Card framework and require the engagement of stakeholders for their co-development. They are assessment products that compare a region's ecological, social, cultural, and economic status with predefined goals. They provide grades that reflect a region's status on a regular basis. Report cards are powerful communication tools that engage stakeholders by offering easily understood assessments that socialize science, fostering a shared understanding of a region's challenges (Table A.2).

Report cards incorporating social, economic, and ecological indicators, known as Socio-environmental Report Cards, deliver a more holistic view than those focusing solely on environmental data. Both types hold value, but the trend leans towards a more comprehensive socio-environmental approach, aligning with sustainable development principles.

Table A.2 Key Values of Report Cards

Socializing Science:
Involving various stakeholders, including experts, in the selection of indicators, data analysis, and interpretation. Emphasizing stakeholder consultation distinguishes Report Cards, employing non-technical language and visual elements for public dissemination.

Awareness and Management Enhancement:
Holding stakeholders accountable for restoration efforts, creating local, regional, and sometimes even national awareness of environmental issues. They impact resource management and inform political decision-making.

Revelations and Insights:
Uncovering significant insights and integrating data to reveal previously unnoticed patterns and emerging revelations.

Constructive Peer Pressure:
Segregating reporting regions encourages healthy competition among municipalities and landowners, fostering positive peer pressure to drive improvements.

Balance Among Competing Values:
Integrating social, economic, and ecological information offers a holistic view of interconnected systems, addressing competing values and potential trade-offs.

Figure A.4 *Press release event of the 2022 Chesapeake Bay and Watershed Report Card. Photo Credit: Alexandra Fries.*

A.3 System Dynamics Modeling

Finding Causal Relationships

The COAST Card project applies the System Dynamics (SD) method for modeling,simulating, and analyzing of complex, dynamic systems. This approach aims to bring scorecards to life by reproducing the dynamics of nature through a model representation of the underlying causal system's structure. Typically, a model interface will be provided that turns the simulator into an interactive learning environment (ILE).

To that end, the SD method is used to facilitate stakeholder engagement. The purpose of using SD in stakeholder engagement is to represent the knowledge and opinions of stakeholders and experts in a consistent and coherent framework by way of a comprehensive model that spans a wide range of societal sectors and scientific disciplines. Such a model may help us identify inconsistencies, incoherencies, potential conflicts, synergies, and disagreements that may be addressed in a well organized way. The model can be modified and made subject to simulation in order to investigate the dynamic consequences of alternative systems' structures, including new policies that can constitute a management strategy.

To ensure that the model accurately represents the knowledge and opinions expressed by stakeholders and experts, system dynamics modeling (SDM), and simulation are used in Group (Community) Model Building (GMB). This facilitates effective knowledge elicitation through an explicit formulation of opinions. The resulting model serves as an operational knowledge repository that links the system's structure to its dynamics. When stakeholders and experts recognize that the model accurately reflects their knowledge and opinions (face validity), they develop true ownership of the model and are more likely to accept the conclusions and policy recommendations from the model analysis.

Figure A.5 *Group Model Building session during the SDM workshop at the University of the Philippines. Photo Credit: Gil Jacinto.*

A.4 Social Network Analysis

Optimizing Stakeholder Relationships

The COAST Card framework underscores the vital role of stakeholder engagement and transdisciplinary collaboration in achieving sustainable outcomes. However, it's recognized that stakeholders may not always be fully motivated to collaborate, sometimes prioritizing their interests over collective solutions. Social Network Analysis (SNA) and socio-ecological network analysis are employed within natural resource governance contexts to address this challenge.

SNA is a robust methodological approach examining social structures and relationships among entities. In essence, it involves studying the connections and interactions between key stakeholders or groups within a given region, represented as nodes in a network (Figure A.6). By mapping out these social connections, SNA can reveal the underlying structure of relationships and highlight influential stakeholders. This understanding allows for identifying strategic actions more likely to garner stakeholder support and buy-in. Moreover, SNA enables the evaluation of engagement processes by tracking how connections evolve. This dynamic perspective provides valuable insights into the effectiveness of engagement efforts and allows for adjustments as needed. In the COAST Card framework, SNA is being used to understand who are the key actors that are involved and should be involved in the governance of the socio-environmental system (Figure A.7).

Ultimately, SNA is a powerful tool for enhancing stakeholder engagement, fostering collaboration, and facilitating more informed decision-making within complex socio-ecological systems.

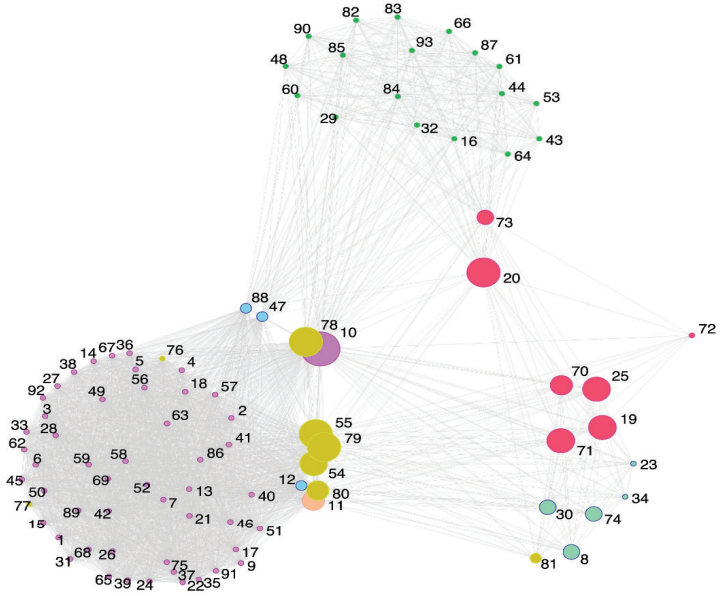


Figure A.6 *An example social network visualization with the network nodes representing stakeholders or groups, and the connecting lines representing relationships or interconnection between them. (Unpublished manuscript).*

Figure A.7 *SNA station in a Listening Session in the Chesapeake Bay watershed where stakeholders are asked "Who they work with" and "Who they wish to work with" on issues involving the watershed. Photo credit: João Paulo Coimbra.*

A.5 The Belmont Forum

Fostering Transdisciplinary and Transnational Collaboration

The Belmont Forum is an international partnership of funding organizations and science councils committed to advancing global environmental change research. It aims to mobilize funding to support transdisciplinary research that addresses pressing environmental challenges (Figure A.8). The Belmont Forum provides a platform for collaboration among scientists, policymakers, and stakeholders worldwide.

In collaboration with Future Earth and JPI Oceans, the Belmont Forum[1] launched an international call for research proposals on Transdisciplinary Research for Ocean Sustainability. COAST Card[2] is one of the 13 projects funded through this call. The priority area of the Ocean CRA[3] is to address the overall challenge of ocean sustainability, specifically focusing on using the United Nations Sustainable Development Goal #14 (Conserve and sustainably use the oceans, seas, and marine resources for sustainable development) as the overarching framework.

Stakeholder engagement is essential for ensuring the relevance, effectiveness, and sustainability of projects in the Ocean CRA projects:

- Helps to understand stakeholder needs and priorities, guiding project planning and ensuring research addresses real-world challenges.
- Involving stakeholders from the early stages allows for co-designing research objectives, leading to more effective outcomes.
- Stakeholder engagement facilitates knowledge exchange, building the capacity of both researchers and stakeholders to address ocean sustainability challenges.
- Stakeholders play a crucial role in implementing research findings and translating them into policies, practices, and actions.

By actively involving stakeholders throughout the research process, projects can generate actionable insights, foster collaboration, and drive positive change toward ocean sustainability (Figure A.8).

Figure A.8 *Belmont Forum projects begin with collaboration between stakeholders and research teams leading to a more holistic view of the values and threats through knowledge exchange. Credit: IAN Press.*[2]

[1] Visit The Belmont Forum website: www.belmontforum.org

[2] Researchers and stakeholders address coastal vulnerability and freshwater security (2017). IAN Press, Cambridge, MD, 8pp (Belmont Forum Newsletter): https://tinyurl.com/yvtj4tjd

[3] Visit Oceans CRA's website: hubs.belmontforum.org/ocean-hub/

A.6 Stakeholder Engagement is Key

Fostering Shared Understanding and a Vision for the Future

Engaging stakeholders in socio-environmental decision-making has numerous advantages for solving environmental issues. It ensures the project aligns with local community values, allows diverse community members' voices to be heard, and gathers expertise that strengthens decision-making. Despite its challenges, we've designed and compiled various tools through our extensive experience, engaging a wide range of stakeholders globally. Our goal is to train individuals in leadership skills, tools, and activities to work collaboratively with stakeholders on various environmental problems.

Stakeholder engagement involves those affected by the issue and those who can act upon it, including individuals, groups, organizations, and societies. While the process demands time and effort and can sometimes pose risks, the benefits are manifold, including addressing complex problems, incorporating diverse perspectives, and ensuring proper framing of questions and solutions. Stakeholder engagement follows various levels, from informing and consulting to collaborating and empowering stakeholders in the decision-making process. Key questions involve understanding the stakeholders' expertise, accessibility, urgency, and capacity to contribute.

Scientific literature emphasizes making environmental science relevant to societal issues, which has been identified as transdisciplinary research, actionable science, and engaged scholarship, among other terms. The critical aspect is not the terminologies used, but the actions taken in engaging stakeholders to co-design and co-produce environmental solutions. Stakeholder engagement fosters a shared understanding, includes local knowledge, voices diverse perspectives, and delivers a credible and legitimate end product that aligns with user needs.

Figure A.9 *Attendees of the Manila Bay Stakeholder Conference and Workshop participating in a breakout group on the conservation of Manila Bay. Photo credit: Gil Jacinto.*

Figure A.10 *Attendees of the Chesapeake Bay Listening Session adding their input to a station. Photo credit: Veronica Malabanan Lucchese.*

Summary of The COAST Card Project

A.1 The COAST Card Process Requires Stakeholder Engagement

- Stakeholders provide a wider view of the social, cultural, environmental, and economic status in any given region.
- The spiral learning process underpinning the framework ensures iterative learning from each international site, encompassing Chesapeake Bay, Manila Bay, Tokyo Bay, Ishigaki Island and Sekisei Lagoon, and the Goa coast of India.
- The key elements of the COAST Card framework are Report Cards, System Dynamics Modeling and Social Network Analysis.

A.2 Socio-Environmental Report Cards

- Report Cards are intuitive to understand and synthesize a variety of data in a concise way.
- Co-development is the key to convince stakeholders to act on improving the grades shown in the Report Card.

A.3 System Dynamics Modeling

- The COAST Card project uses System Dynamics to model, simulate, and analyze complex, dynamic systems and bring scorecards to life.
- The SD method creates a comprehensive model that identifies inconsistencies, conflicts, synergies, and disagreements, which are addressed through Group Model Building.

A.4 Social Network Analysis

- Social Network Analysis (SNA) is a methodological approach that examines social structures and relationships to identify stakeholders and strategic actions to garner their support.
- SNA allows for the evaluation of engagement processes and facilitates informed decision-making in complex socio-ecological systems.

A.5 The Belmont Forum

- The Belmont Forum is an international partnership committed to advancing global environmental change research through transdisciplinary research.
- The Ocean CRA focuses on sustainable ocean use and stakeholder engagement to ensure relevant and effective outcomes.

A.6 Stakeholder Engagement is Key

- Stakeholder engagement involves those who are directly affected by environmental issues including individuals, groups, organizations and societies.
- Empowering stakeholders to assist in decision-making can lead to greater capacity for collaboration and long-term care.

Various COAST Card members paddling on the Potomac River in the Chesapeake Bay, USA. Photo Credit: Thong Nguyen.

COAST Card members visiting a bird sanctuary in a Mangrove island in Goa, India. Photo Credit: Arsenio Gonzalez.

COAST Card members before an outdoor meeting in Tokyo Bay. Photo Credit: Thong Nguyen.

COAST Card members on a boat ride around Ishigaki Island, Japan. Photo Credit: Thong Nguyen.

Mangroves on Ishigaki Island, Japan. Photo Courtesy of Vanessa Vargas-Ngwyen.

1

Objectives

Why Engage Stakeholders?

1.1 Coastal Systems are Key to Planetary Survival

Understanding Socio-Environmental Conditions and Challenges

Our oceans and coasts play a crucial role in sustaining life on our planet. They help produce oxygen, control the climate, and provide a home for a diverse array of living creatures. For centuries, humans have relied on coastal resources to fulfill their basic needs like food, transportation, and recreation. Unfortunately, our coastal ecosystems are in danger due to climate change, pollution, and overfishing. It is high time we take immediate action to conserve and restore these essential habitats. The Jomon Period in Japan, dating back 6,000 years, highlights the importance of coastal resources to human societies. During this era, people relied heavily on marine resources, especially shellfish. They developed advanced techniques for harvesting and processing these resources, and their economic and social systems revolved around the sea. However, the Industrial Revolution marked a significant turning point for coastal environments. The greenhouse gas emissions from human activities "caused" climate change, which led to global warming, rising sea levels, and ocean acidification. In addition, human activity like pollution, overfishing, and coastal development led to the degradation of coastal habitats and a decline in biodiversity. The combined effects of climate change and human activity put immense pressure on coastal ecosystems. Therefore, we must take action to conserve and regenerate these vital ecosystems, and it starts by envisioning an ideal future for our coastal systems.

Global Threats

Over the next few decades and centuries, the health of our oceans will be under increasing stress from three key factors that interact with one another.[4] These factors are the rising seawater temperature, ocean acidification, and ocean deoxygenation. As a result, there will be significant changes in the chemistry, physics, and biology of the marine environment.

These changes will impact the ocean in ways we are still trying to understand. It is crucial that global decision-makers realize the vital role that the oceans play in sustaining life on our planet and the potential consequences of a high CO^2 world for both the ocean and society.

The Belmont Forum Ocean Sustainability Collaborative Research Action, which includes the COAST Card project (see section A5), promotes global partnerships to address this challenge by developing pathways toward sustainable ocean use and reducing the impacts of global change.

Figure 1.1 *Plymouth Marine Laboratory, UK's Ocean Acidification Research Programme indicates alarming new threats to our ocean.* [1]

[4] Turley, C. M., Williamson, P., Ziveri, P., Boot, K., Patrizia Ziveri, Keizer, T., Monroe, R., Gattuso, J.-P., & Huelsenbeck, M. (2014). Sour and breathless – Ocean under stress.

Identifying Values and Threats

The social and environmental values and threats of local coastal areas result from a complex interplay of factors. These factors include natural environmental features, socioeconomic characteristics, local governance, geographic setting, resilience of local ecosystems and societies, and health of the people. For example, the Chesapeake Bay watershed is known for its extensive waterways, eastern flyway, nutrient retention, and rich salt marshes, fish, and shellfish. However, these attributes face threats from agricultural nutrient runoff, urban expansion and runoff, algal blooms, hypoxia, and climate change.

These insights are based on existing scientific knowledge about the Chesapeake Bay watershed, which is illustrated in Figure 1.2 as a conceptual diagram developed by the US COAST Card team. However, it is equally important to understand how local stakeholders value the watershed and what they perceive as threats to these values. Harmonizing stakeholder perspectives with existing scientific knowledge fosters shared understanding and informed decision-making. This Tool Guide is designed to facilitate this integration.

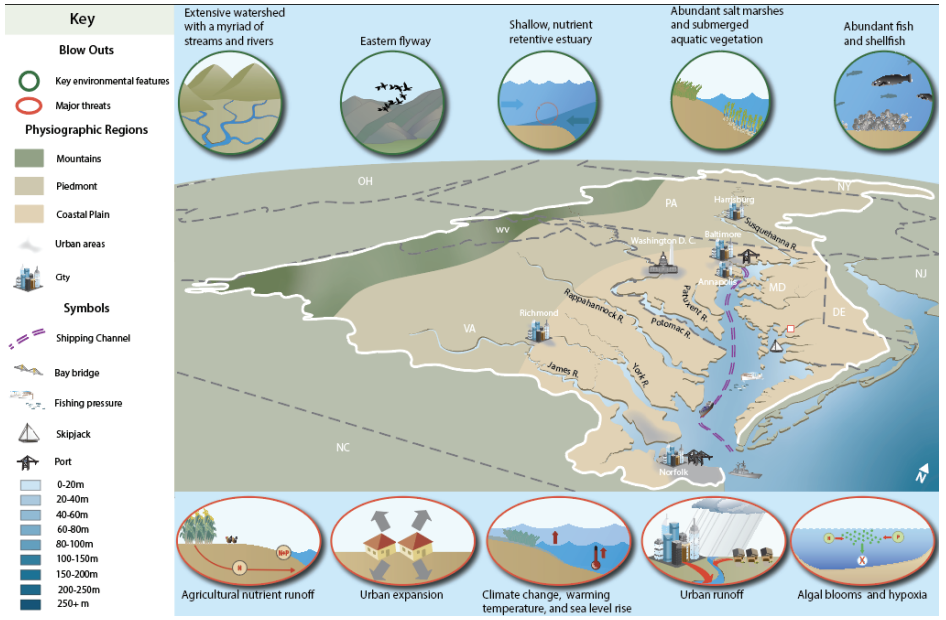


Figure 1.2 *Conceptual map of the Chesapeake Bay containing key environmental features of the area, as well as major threats. Vargas-Nguyen, et al (2024). The COAST Card Framework. Manuscript in preparation.*

Figure 1.3 *A vision diagram of the ideal coastal ecosystem, including aspects of environment, government, education, and management. Vargas-Nguyen, et al (2024). The COAST Card Framework. Manuscript in preparation.*

Creating Shared Vision

In order to address complex socio-environmental issues, it is important to develop a holistic vision that identifies key environmental factors and considers essential elements.

Gathering information about the coastal conditions is an essential process that involves a variety of stakeholders. The ultimate goal of this process is to create a vision for the desired coastal zone. To accomplish this, workshops should be conducted with the involvement of various stakeholders described in the guidebook.

The diagram in Figure 1.3 illustrates an ideal coastal socio-environmental system developed by the COAST card research team. The vision statements were formulated by synthesizing the visions developed for each of the five study sites. As the COAST Card research teams continues to expand our stakeholder engagement, this vision diagram will be updated.

1.2 Transformation to More Inclusive and Innovative Societies

Who is Responsible for Mitigating Threats and Adapting to Changes?

Since 1994, the United Nations Convention on the Law of the Seas (UNCLOS)[5] has defined the responsibilities and rights of countries in relation to the ocean, including the high seas, exclusive economic zones and territorial waters. UNCLOS has established international jurisdiction and objective measures have been implemented through international treaties such as the Ramsar Convention on Biological Diversity, World Convention on Disaster Risk Reduction, and the UN Framework Convention on Climate Change. These are legal-based enforcement approaches.[6]

Another approach is the holistic approach, which seeks to achieve sustainable development, starting from Agenda 21 at the Rio Summit.[8] From 2015, the super year of the ocean and sustainability, the Sustainable Development Goals (Figure 1.5)[7] and the "Our Ocean Conference" were based on voluntary commitments. This represents a shift towards global action to combat climate change and achieve sustainable development.

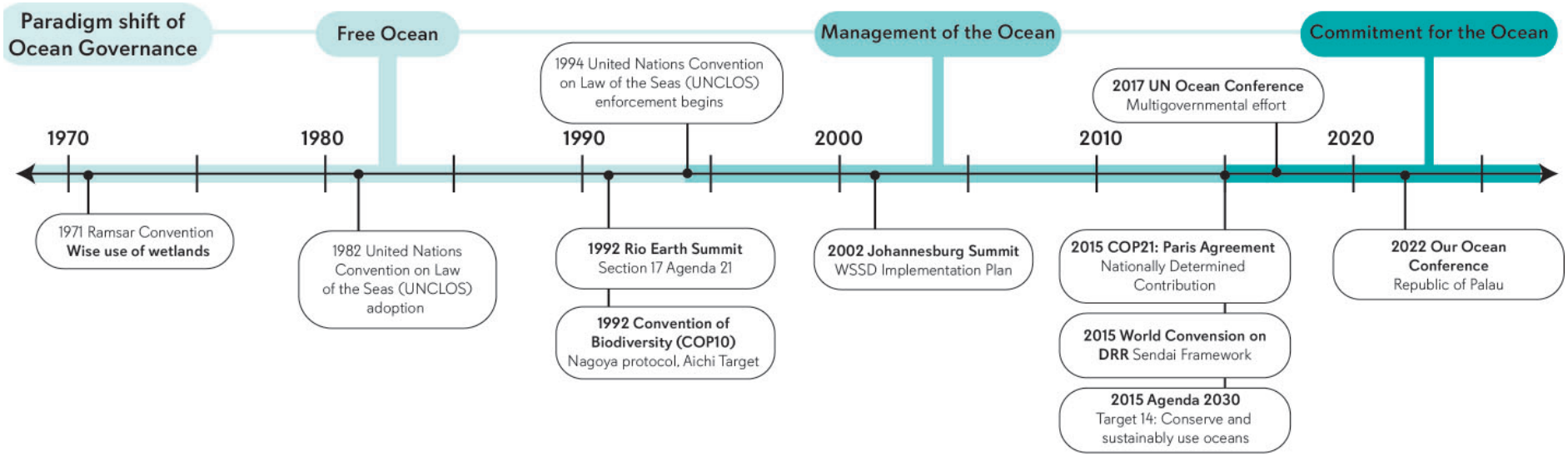


Figure 1.4 *Timeline of the evolution of ocean governance from enforcement to global actions.*

[5] United Nations. (n.d.). United Nations Convention on the Law of the Sea. In United Nations Convention on the Law of the Sea (p. 21).
[6] Borgese, Elisabeth Mann. The Oceanic Circle : Governing the Seas as a Global Resource. United Nations University Press, 1998.
[7] Goals Archive - The Global Goals. (2024, January 23). The Global Goals. https://www.globalgoals.org/goals/
[8] United Nations Conference on Environment & Development. (1992). Agenda 21. United Nations. www.un.org/esa/sustdev/agenda21.htm

International Treaties Have Laid the Groundwork

The Ramsar Convention of 1971 has given special attention to the conservation of international migratory bird flyways, and expanded its activities to include the idea of "wise use of wetlands." The Convention on Biological Diversity (CBD) of 1992 established clear targets under the Nagoya Protocol, known as Aichi Targets (2010). Post-Aichi Targets were established as Kunming-Montreal Global Biodiversity Framework. The World Convention on Disaster Risk Reduction (2015) established the Sendai Framework to tackle the problem in an integrated manner. The United Nations Framework Convention on Climate Change (UNFCCC) of 1992 has compiled the Paris Agreement (2015) to set goals and enforce the nationally determined contributions (NDCs) scheme for implementation.

Table 1.1 International Treaties and Agreements

Treaty Name	Agreements and Frameworks	Year
Ramsar Convention	Wise use of wetlands	2002
Convention of Biodiversity (CBD)	Nagoya Protocol named Aichi Target; Kunming-Montreal Global Biodiversity Framework	2010; 2022
World Convention on Disaster Risk Reduction (WCDRR)	Sendai Framework	2015
United Nations Framework Convention on Climate Change (UNFCCC)	Paris Agreement	2015
Intergovernmental Conference on Marine Biodiversity of Areas Beyond National Jurisdiction (BBNJ)	Agreement under the UNCLOS and Sustainable use of BBNJ	2023

Goals for Global Sustainable Development

The international conversation around sustainable development began with the Rio Earth Summit in 1992. This was followed by the WSSD in 2002 and Rio+20 in 2012. The 1992 Rio Declaration on Environment and Development already included the principles of intergenerational equity, common but differentiated responsibilities, as well as public participation and upward access. Agenda 2030 articulated 17 selected overall goals to achieve Sustainable Development[7] as well as a structure consisting of biosphere, social sphere, and economic sphere (Figure 1.5) according to the Stockholm Resilience Center in 2016. This shows that solving fundamental environmental problems, such as water resources and climate change, as well as societal issues like poverty and education, are necessary for healthy economic activities.

Figure 1.5 *The 17 Sustainable Development Goals and its relation to the biosphere, society, and economy. Credit: Azote Images for Stockholm Resilience Centre (CC BY-ND 3.0).*

1.3 Engaging Communities to Co-Produce Solutions

The New Way of Achieving Sustainable Development

Up until about 2015, global action has predominantly been approached from the top down. However, it has increasingly becoming apparent that to address complex socio-environmental issues, a community-based and ecosystem-based approach is required, especially at the local level. There's a growing emphasis on increasing stakeholder involvement and using stakeholder engagement strategies that are able to co-produce solutions as the degree of complexity and difficulty of issues increases (Figure 1.6). Throughout this engagement process, management entities can amplify actions by targeting specific groups, fostering collaboration, and co-creating holistic solutions to promote regional sustainability. Stakeholders are also evolving from passive recipients to active participants, initially engaging through communication channels established by management, transitioning to voluntary involvement, and eventually assuming leadership roles in co-producing solutions. Engagement activities serve as invaluable tools for enhancing and reinforcing these processes to achieve sustainable development.

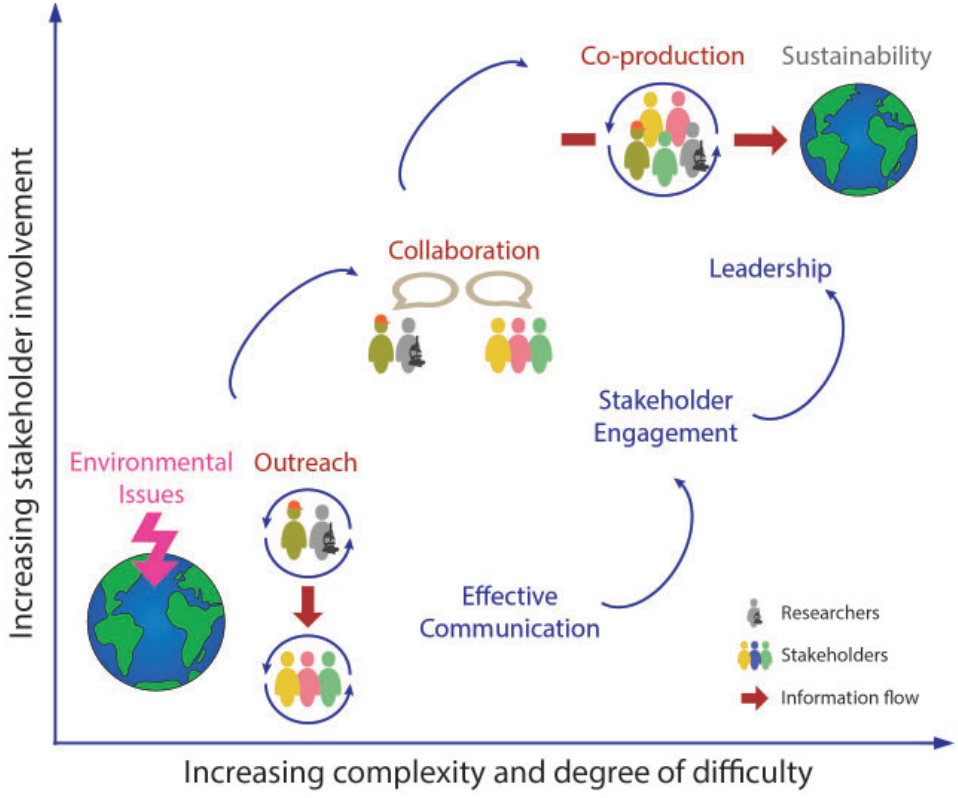


Figure 1.6 *Progress of stakeholder engagement process for socio-environmental problem solving, showing the relationship between management and learners to create effective engagement. Douglas et al. Transdisciplinary research: Aligning people, project and pathway to solve environmental problems. Manuscript in preparation.*

Figure 1.7 *An example of a field-based listening session that yielded results that were incorporated into the Stakeholder Network Analysis (SNA). Photo Credit: Vanessa Vargas-Nguyen*

Figure 1.8 *An example of a field-based workshop activity: a goby fishing census. Students deepen their understanding by conducting surveys and analyzing the data themselves. Photo Credit: Keita Furukawa.*

Figure 1.9 *A learning event for elementary school students to study about the SDGs as part of a series of fieldwork, classes, and eating. Diverse opportunities for participation will deepen their understanding of the subject. Photo Credit: Keita Furukawa.*

1.4 Who are Stakeholders?

Connecting Rights Holders and Duty Bearers

The word 'stakeholder' is commonly used to denote those individuals who either a) are affected by an environmental issue or b) can affect the degree or severity of an environmental issue. The term 'stakeholder' has been increasingly used by environmental groups, but it has connotations associated with colonial land claims. Thus, many groups are switching to using terms like constituency, community, interested parties, partners, research users, and research providers. Another tact is to use two different words to denote the different roles that people have associated with environmental issues. These terms are a) Rights Holders and b) Duty Bearers.

Rights Holders is a term that stems from the basic human rights promulgated by the United Nations, in particular, the United Nations Educational, Scientific and Cultural Organization (UNESCO). Human rights are universal rights inherent to all human beings, regardless of race, sex, nationality, ethnicity, language, religion or any other status.

On the environmental side, the right to life, liberty, and personal security could be interpreted as access to clean air and clean water. Human rights are divided into two categories:

1. Substantive rights which include the right to clean air and clean water
2. Procedural rights which define procedures that protect the substantive rights, like access to information and shared governance.

Rights holders are individuals who can exercise their right to a clean environment by their virtue of being human, and they have access to remedy where their rights have been breached. Rights holders need to demand or claim their rights from the relevant duty bearers.

Duty bearers are entities or individuals having a particular obligation or responsibility to respect, promote, and realize the rights of rights holders and to abstain from human rights violations. It is commonly used to refer to State actors, but non-State actors can also be considered duty-bearers. Depending on the context, individuals, local organizations, private companies, aid donors, and international institutions can also be duty-bearers.

The rights holders often do not have access to the duty bearers, and vice versa, the duty bearers have a difficult time accessing rights holders, particularly disadvantaged communities. A role for academia and non-governmental organizations is to facilitate the interactions between rights holders and duty bearers (Figure 1.10).

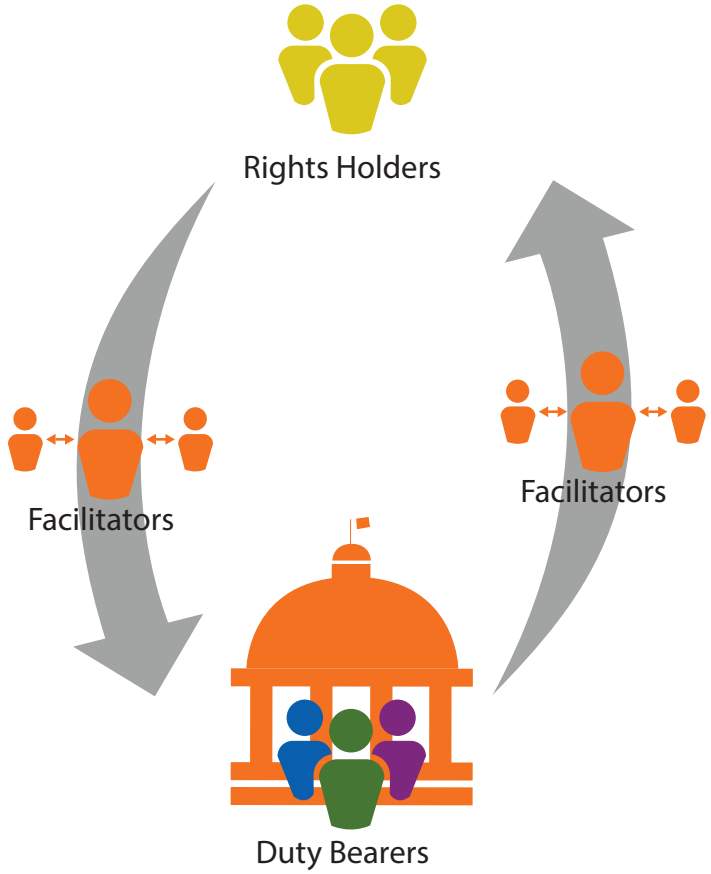


Figure 1.10 *Academia and NGOs can serve as facilitators to connect rights holders and duty bearers.*

1.5 Identifying and Mapping Stakeholders

Key Steps for an Inclusive Society

It is important to identify all stakeholders who may be affected or can affect socio-environmental issues. This includes both internal and external stakeholders, as well as direct and indirect stakeholders. Examples of stakeholders can include community members, government agencies, or environmental groups. It is also essential to understand the different stakeholders' needs, concerns, and expectations. This information can be used to develop effective engagement strategies and ensure all stakeholders are heard and considered. In addition, it's important to identify potential conflicts of interest and develop strategies to mitigate them. For instance, there may be stakeholders who are not in alignment with your goals or vision, in which case it's crucial to develop strategies to mitigate these conflicts and ensure all stakeholders have a fair voice in the engagement process. Finally, building relationships and trust with stakeholders is essential. By taking the time to understand and engage with stakeholders, you can create a more supportive environment for collaboration that can lead to better outcomes for everyone involved.

Mapping Stakeholders

Stakeholder mapping is a widely used exercise in which groups are classified according to their level of interest and influence. To perform this classification, a matrix is used that ranges from low to high interest and low to high influence (Figure 1.11). The resulting four quadrants aid in identifying communication and engagement strategies that can be used for each group. This information can help establish strong stakeholder relationships and build trust.

Groups that fall under the high interest/high influence quadrant can be considered influential champions while groups that fall under the low interest/low influence quadrant need support and encouragement to participate. Groups that fall under the high interest/low influence quadrant need to be empowered. On the other hand, the low interest/high influence quadrant needs to be further engaged to develop alignments.

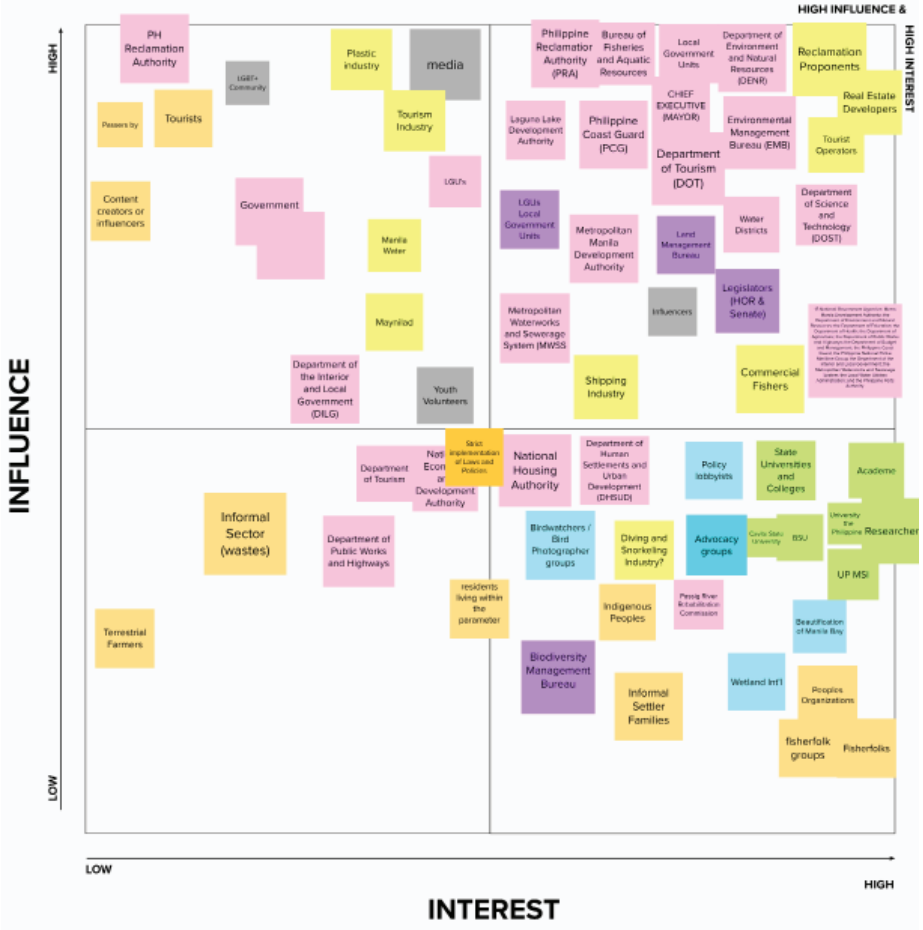


Figure 1.11 *Stakeholder map created during a hybrid Coastal Marine Spatial Planning Workshop held in 2021 using Mural, an online collaboration tool. Participants wrote stakeholder groups that are involved in Manila Bay restoration in a colored sticky notes representing a stakeholder category.*

1.6 Empowering Stakeholders to Take Action

Environmental Justice Issues Need to be Addressed

An essential part of the COAST Card project is developing a shared vision for each of our study sites. Although each location has its unique challenges and desired outcomes, several common themes go beyond geographical and cultural differences. One of these themes is social equity, which was expressed in various forms, such as environmental justice, fair and meaningful participation in decision-making, equitable resource management, and collaborative engagement. This theme reflects a basic human desire for fair and just socio-environmental governance. One way to achieve this is the development of Environmental Justice Indicators. While challenging, involving marginalized and vulnerable communities and incorporating their local and experiential knowledge to develop these indicators is crucial. It could prompt actions to establish policies and procedures that will result in more equitable and fair resource allocation to communities impacted by environmental degradation.

Environmental Justice Index (EJI) for the Chesapeake Bay and Watershed

Environmental justice considers various aspects of life, such as health, economy, social justice, and environmental quality. Therefore, addressing environmental justice is crucial for the long-term health and sustainability of the Chesapeake Bay watershed. In 2023, the Center for Disease Control's Environmental Justice Index (EJI) was used to map and characterize the cumulative impacts and patterns of environmental injustice across the Chesapeake Bay Watershed. The map shown in Figure 1.12 displays the EJI score for each census tract in the Chesapeake Bay Watershed, highlighting significant disparities between them. These differences could be due to various factors, as the EJI considers social vulnerability, health vulnerability, and environmental burden indicators. Urban and rural areas tend to experience higher relative impacts, while suburban areas tend to experience lower relative impacts.

[9] 2022 Chesapeake Bay and Watershed Report Card. 2023. IAN Press. https://ian.umces.edu/publications/2022-chesapeake-bay-and-watershed-report-card/

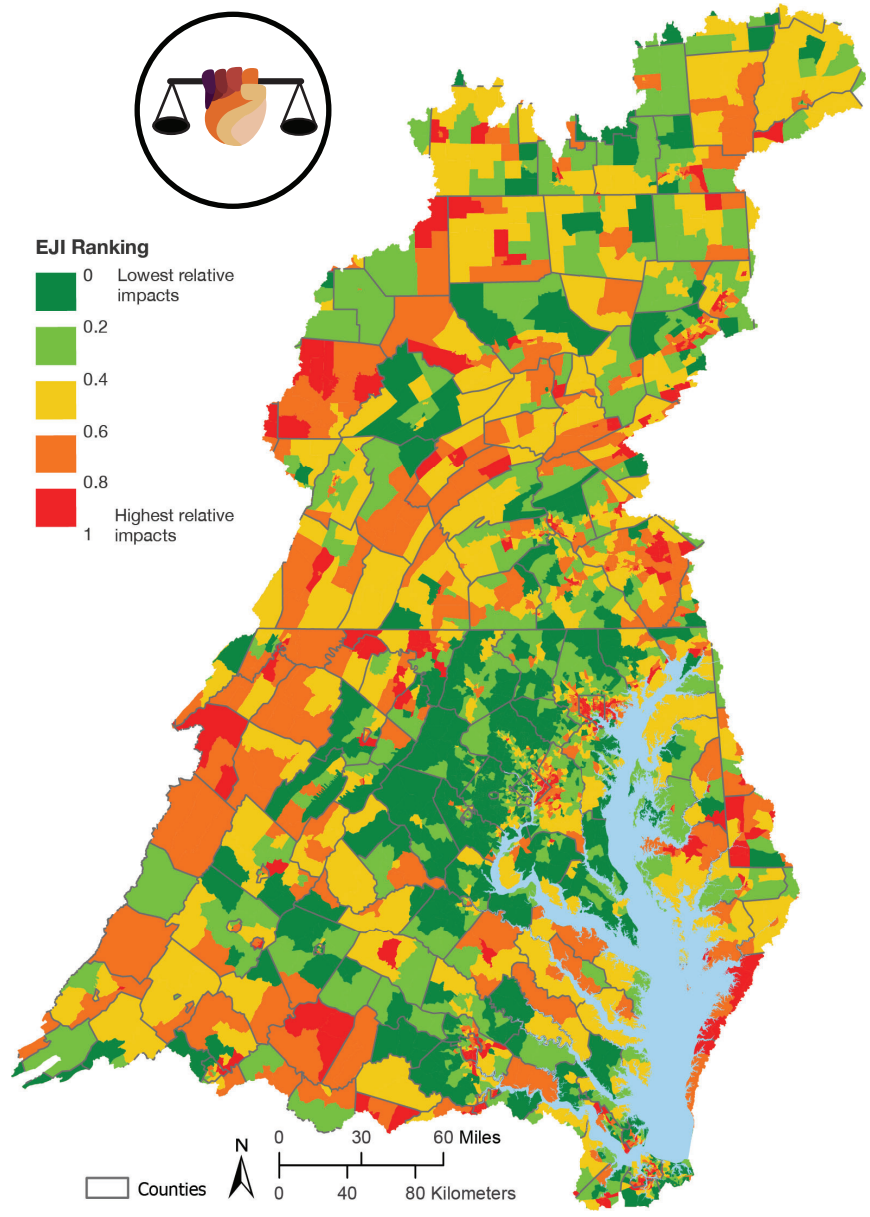


Figure 1.12 Environmental Justice Index for the Chesapeake Bay Watershed. Credit: IAN Press. [9]

Summary of Section 1

1.1 Coastal Systems are Key to Planetary Survival

- Global threats to our oceans have been long documented by scientists, and are caused largely by human activity.
- Local threats need to be monitored closely.
- Visions for Coastal Zones Must include local stakeholders so that the vision can be more holistic.

1.2 Transformation to More Inclusive and Innovative Societies

- Ocean Governance under UNCLOS is a baseline for sharing the ocean as a global asset.
- International Treaties and Agreements for Wise Use, Biodiversity, Disaster Risk Reduction, Climate Change, and BBNJ provide guidance on possible ways to approach the need for transformation.
- Structure of Sustainable Development Goals shows that people's economic activities are supported by their social equity and their environment.

1.3 Engaging Communities to Co-Produce Solutions

- Consider Environmental Project Management (Outreach, Collaboration, and Co-production).
- Envision development based on the Learning Journey (Communication, Engagement, and Agile Leadership).

1.4 Who are Stakeholders?

- The definition of a stakeholder.
- Stakeholders as Rights Holders, and Duty Bearers as groups or individuals with obligations to support rights holders.

1.5 Identifying and Mapping Stakeholders

- Key Steps for an inclusive society.
- Mapping stakeholders to gauge interest and influence of different groups and individuals.

1.6 Empowering Stakeholders to Take Action

- Addressing Environmental Justice Issues.
- Centering social equity and considering how that impacts the environment.
- The Environment Justice Index and how that is used in COAST Card.

Mangrove Island in Goa, India within the Zuari River Estuary. Photo Credit: Roshni Nair.

Tokyo Bay, Japan. Photo Courtesy of Thong Nguyen.

2 Planning

How Should Engagement Activities be Organized?

2.1 COAST Card Planning Primer

Facilitation, Communication, and Engagement Strategies

The COAST Card workshops are designed as engaging and collaborative sessions aiming to collect valuable information from stakeholders while fostering networking opportunities. The workshops are structured to be highly interactive and strategic within the allocated time frame. Table 2.1 highlights some of the important considerations for planning that will be further discussed in this section. Implementing these strategies and guidelines will streamline your COAST Card workshop planning, setting the stage for a productive and successful stakeholder engagement event.

Table 2.1 Considerations in Workshop Planning

Pre-Event Timeline

Plan invitations and logistics, sending them out 10-12 weeks before the workshop, allowing for increased attendance and additional stakeholder suggestions.

Reminders a few weeks prior to the event solidify attendance and convey final meeting details.

Number of Participants

An ideal count of 40-50 stakeholders provides diverse representation without sacrificing interaction and inclusivity.

Event Duration

Spanning over two days, starting and concluding around midday, facilitates travel and enables social engagement through group dinners.

Event Location

Choosing a location close to the study area is ideal. A field trip to tour the location can set a promising tone for the workshop and the project, encouraging networking and collaborations among participants.

Venue Selection

The choice of venue significantly impacts the workshop's success. A spacious room with natural light, good ventilation, ample wall space for visual aids, and easily accessible amenities are key.

Room Setup

Round tables for 6-8 people, equipped with necessary supplies and access to breakout rooms, offer an ideal setup for discussions and activities.

Workshop Preparation

Detailed agendas, run-sheets, and facilitator roles are essential. Flexibility in the agenda allows for robust discussions and ensures inclusivity, especially for those traveling.

Introductions and Presentations

Commence with introductions, overview of objectives, and concise presentations by experts familiar with the study area, setting the tone for subsequent activities.

Networking and Breaks

Icebreaker activities, regular breaks, and a well-organized lunch foster networking and relationship-building opportunities among participants.

Key Elements for Workshop Success

Facilitation Team: A skilled facilitation team is pivotal for success. They ensure objectives are met, questions are addressed, and the workshop remains engaging and focused. Sharing facilitation responsibilities among 2-3 members maintains energy and momentum.

Preparation and Roles: Thorough planning, role assignments, and non-facilitation assistance (e.g., managing logistics, technical support) ensure a smooth and efficient process (Section 2.4).

Guiding Principles

Enjoyment: If the workshop ceases to be enjoyable, participants should feel comfortable notifying the facilitators.

Engagement: COAST Card activities require active engagement. Participants are encouraged to be present without distractions, fostering transparency and trust among participants.

Transparency: Hidden agendas contradict the open and transparent nature of the Report Card process, impacting the collective buy-in.

Open Sharing: Participants should express views without fear of judgment, blending professional and personal perspectives unique to their regional identity.

Figure 2.1 *Principal Investigators of each COAST Card country team participate in a panel discussion at the Manila Bay Stakeholders Conference and Workshop. Photo credit: Thong Nguyen.*

Workshop Structure

Introductions and Presentations: Allocate time for brief introductions and concise presentations about the region. Keep presentations brief (10-15 mins) to maintain participant attention.

Interactive Approach: Emphasize interactivity and collaboration to extract vital information. Utilize icebreakers, group games, and breakout sessions for active participation and discussion.

Enhancements and Engagement Tools

Breakout Groups: Accelerate outcomes by employing breakout groups, ensuring each group provides brief reports to the wider audience for comprehensive discussions.

Inclusion: Capture a group photo for and consider a guided field trip for a better understanding of the region.

Social Events: Organize social events to strengthen relationships and maintain momentum.

Closing and Next Steps

Finalizing the Workshop: Conclude by outlining the project timeline, inviting further participant involvement, and summarizing the accomplished milestones.

Memorable Closure: Incorporate unique elements like a summary poem or song to make the workshop memorable and engaging.

Post-Workshop Engagement: Distribute a workshop summary newsletter to participants and subsequent newsletters to keep them engaged with the COAST Card development progress.

Figure 2.2 *Attendees interacting between sessions. Photo Credit: Thong Nguyen.*

Figure 2.3 *Attendees of the Manila Bay Stakeholder Conference and Workshop discussing the results of the stakeholder engagement session. Photo Credit: Gil Jacinto.*

2.2 Purpose Of Communication

Clarifying the Objectives of the Engagement

Section 1 of this guide highlights the importance of engaging stakeholders. Workshops can serve various purposes, such as informing the public about an issue or encouraging immediate action. To ensure that the workshops achieve their intended goals and have a proper connection with subsequent workshops, it is crucial to set appropriate objectives for each workshop as illustrated in Figure 2.4. For instance, when the aim is to inform the general public about an issue, organizers must focus on information sharing and knowledge building. They should encourage participation and ensure that the participant's goals are met by attending the event.

On the other hand, when the objective is to encourage immediate action by participants, organizers should aim to encourage voluntary participation. This can be achieved by using more creative tools, such as idea mining or planning exercises, to facilitate innovation among the participants. Such engagement encourages the participants to come up with effective ways to implement the desired action. An effective workshop instills accountability in participants that could lead to long-term sustained actions

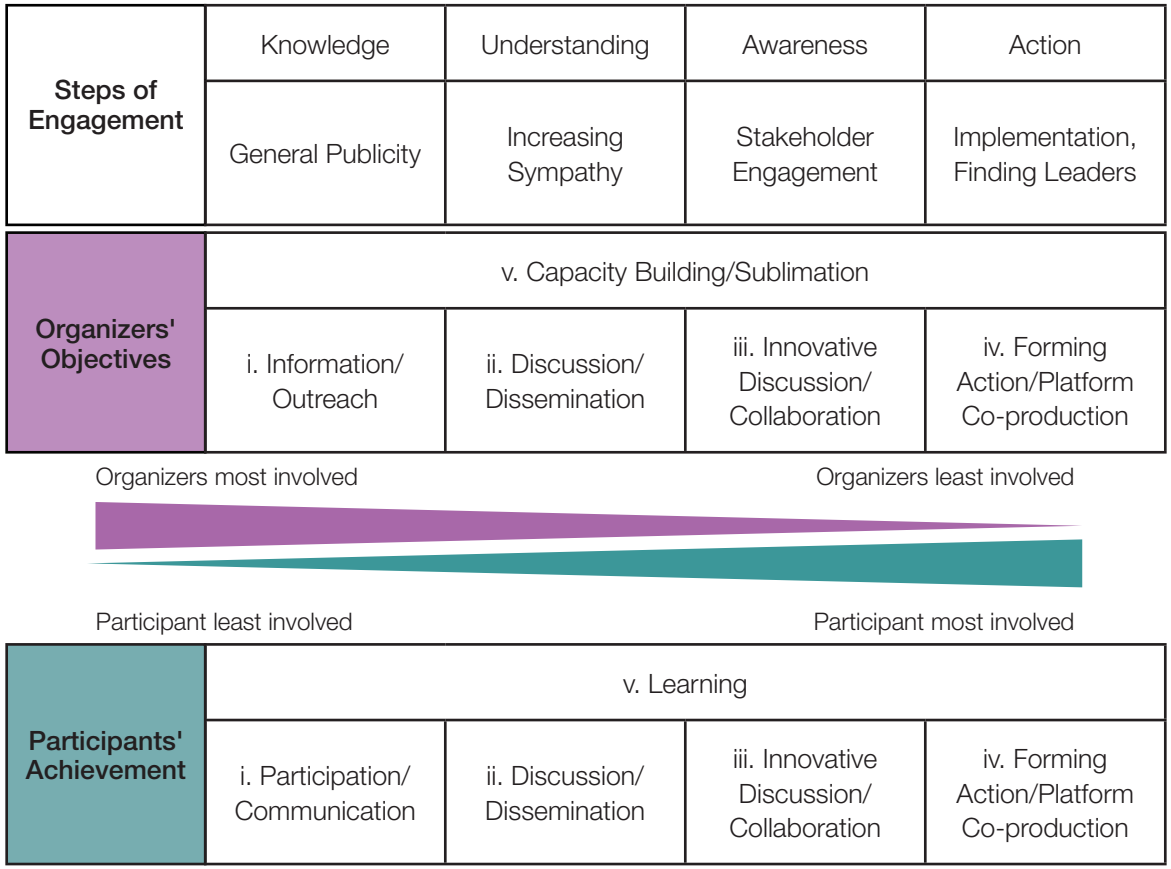


Figure 2.4 *Workshop is a form of constructing stakeholder based agile action. It can start from knowledge, understanding, and awareness which eventually leads to action.*

2.3 Role-Sharing

Who Should be Prepared?

A range of preparations is required in stakeholder engagement. You will need a coordinator to organize the workshop, a facilitator to lead the discussion, and experts to provide relevant information. Most importantly, it is necessary to invite appropriate participants that align with the objectives of the workshop. Figure 2.5 shows the types of roles and contributions needed for a successful engagement activity.

Figure 2.5 *These four groups are essential to any successful workshop because they bring a diversity of voices and perspectives to the larger conversation.*

1. Coordinator—Who Prepares the Platform?

In a workshop, the coordinator has the responsibility to organize everything. This includes preparing the platform, setting up audio-visual equipment, providing materials for discussion, and disseminating the workshop agenda. The coordinator also takes down participants' registrations and makes meeting notes, which serve as a record of the workshop proceedings and conclusions. The rest of section 2 gives more details on the responsibilities of the coordinator.

2. Facilitator—Who Guides the Discussion?

During a workshop, a facilitator plays a vital role in guiding and directing the discussion towards achieving the workshop's objectives. The facilitator uses a variety of tools and techniques to help participants engage in meaningful conversations and reach a consensus. They also ensure that the final outputs of the workshop are well-defined, achievable, and aligned with the goals of the workshop. Section 3 provides detailed information about the outputs that the facilitator is responsible for.

3. Experts/Lecturers—Who Supports the Workshop?

If the topic of the workshop is complex or unfamiliar to participants, facilitators can enlist the help of experts and lecturers to organize a discussion. It may be helpful to give a brief lecture on the topic before starting the discussion.

4. Targeted Participants—Who is Involved?

Conducting a thorough stakeholder analysis is essential when organizing a workshop (see p.11). Each stakeholder, whether they are representatives from the government, industries, private corporations, NGOs, academia, or researchers, possesses a unique set of interests and varying degrees of influence over the project's implementation. It is crucial to identify these factors to ensure that the workshop is tailored to meet the needs of all stakeholders and that their contributions are fully maximized. Additionally, it is important to consider inclusivity and environmental justice (see p.12) when selecting participants in order to transform our society.

Figure 2.6 *Stakeholder engagement session in the Chesapeake Bay where local stakeholders stopped to participate in activities. Photo credit: Veronica Malabanan Lucchese.*

Figure 2.7 *Local expert and COAST Card Coordinator speaking on Ishigaki Island, Japan. Photo Credit: Thong Nguyen.*

Figure 2.8 *Stakeholder engagement session in Goa, India that was attended by local students (participants) and COAST Card members and teachers (facilitators). Photo credit: Roshni Nair.*

Figure 2.9 *COAST Card organizers and experts talking in between session activities. Photo Credit: Gil Jacinto.*

2.4 Announcement and Invitation Strategies

How can we Reach Target Audiences?

To ensure participants can confirm their schedules, the meeting announcement should be made at least a month in advance. Leaflets and posters are effective ways to circulate complete information. You can also use them as reference materials for sharing information on social media and the web. This allows for open and easy access to the public domain.

The following information is important to remember for an upcoming workshop (see example 2.10):

- **Title and Purpose:** What is the theme and why is this workshop necessary?
- **Date:** When will the workshop take place?
- **Venue/Format:** Where will the workshop be held and what format will it take?
- **Agenda/Timetable:** Who will present and what issues will be discussed?
- **Organizers/Sponsors:** Who is responsible for the workshop and who is supporting it?
- **Registration:** Who is expected to attend, how can one join, is there a fee, and what is the registration deadline? Are there any limitations on participation (e.g. for family only, for scientists, etc.)?
- **Contact Information:** How can we obtain more information if needed?
- **Logo/Pictures:** Are there any visual representations available for the workshop?

Figure 2.10 *An example of a notification leaflet used for the Potomac Watershed Listening Session. Credit: IAN Press.*

The Announcement and Invitation Timeline

To make sure that all participants have ample notice to attend the workshop day, follow the invitation timeline (Figure 2.11). This timeline helps participants and facilitators to be fully prepared for the workshop day.

- **Announcement of the Upcoming Workshop:** In order to garner an expression of interest, please provide an overview of the event, including the dates, location, and detailed information on the preparation.
- **Application Guidelines of the Workshop:** To begin registration, publish a detailed procedure for registration and an agenda (including a speakers list).
- **Notification of Registration:** Upon acceptance of registration, participants will receive a reference number (optional), instructions for participation, and related materials (such as a book of abstracts).
- **Reminder:** A few days prior to the event, a "Notification of Registration" with updated information will be sent to remind participants about the workshop.
- **Report of the Workshop:** To disseminate the outputs/outcomes of the workshop to the public, a report and related materials (such as a declaration, notes, press release, etc.) will be provided not only to participants but also to a full range of stakeholders.

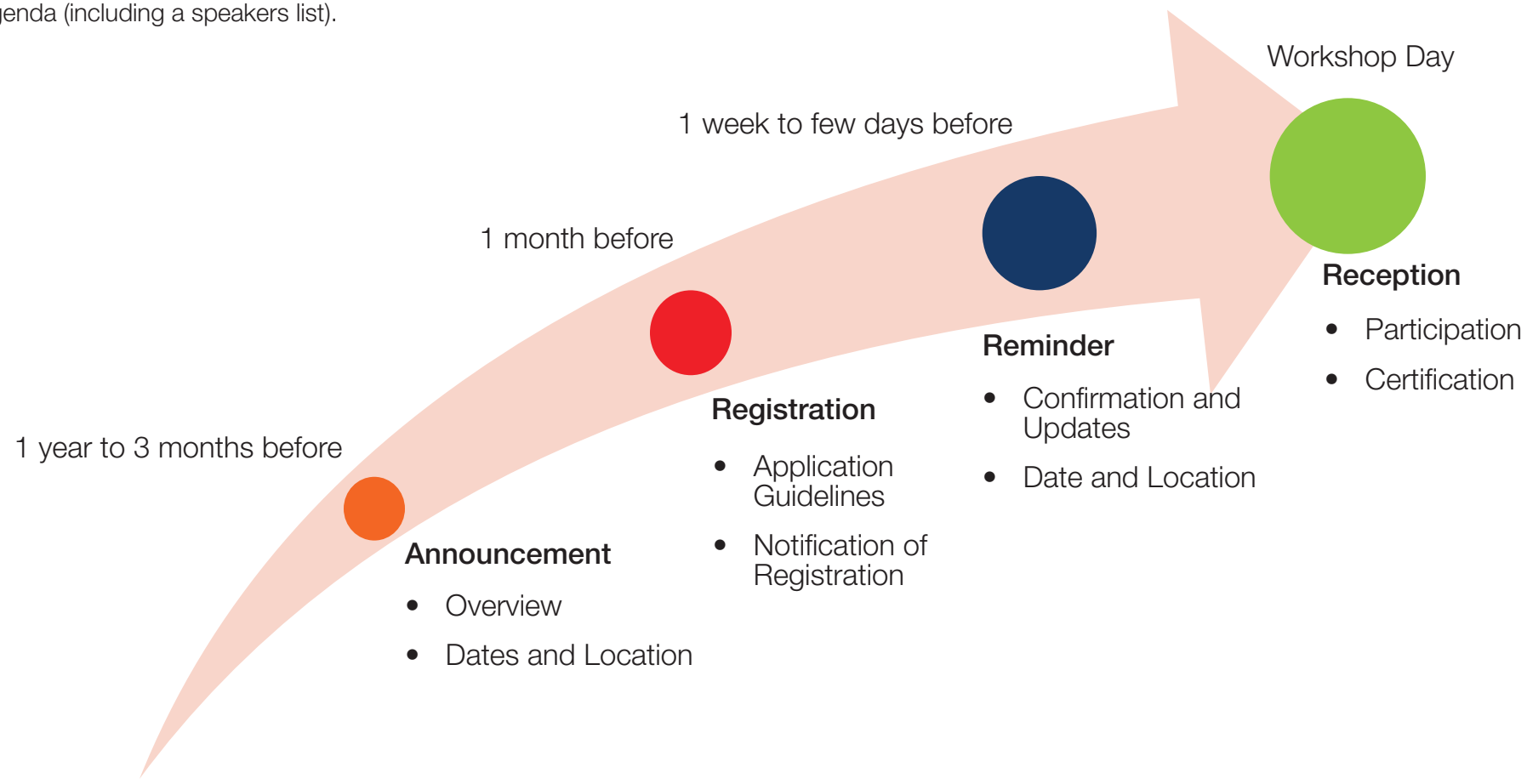


Figure 2.11 *Timeline of notification schedule.*

2.5 Workshop Format

How Should a Workshop be Prepared?

When planning a workshop, it is important to consider various factors such as the purpose of the event, budget, human resources, duration, and location which will be further discussed in this section.

Figure 2.12 *Facilitators engage with participants who attended an Open House event in Manila Bay. Photo credit: Gil Jacinto.*

Size

In order to ensure effective communication and a two-way flow of information between facilitators and participants, it is recommended to have a ratio of 5-7 people per facilitator (Figure 2.12). As the number of participants increases, the number of facilitators should also increase accordingly. For more informative sessions, such as outreach events, the number of participants can range from 100 to 500 people. However, if the workshop involves participatory activities, a smaller group of 30-60 people is ideal.

Duration

The recommended duration for a single session is 90 minutes. Longer events can be facilitated by having multiple sessions with breaks and refreshments in between. These breaks are important for the facilitators to review and improve their facilitation techniques, as well as to give the participants a chance to take a mental and physical break. It is advisable to provide a recap or summary before or after the breaks, which can include participants sharing their takeaways from the session. This would help in refreshing the learnings and ensure maximum retention of the contents.

Sessions

When you are thinking about dividing workshops into separate sessions, you can consider treating them like modules for a class. This could make it easier to tackle difficult and complex issues more efficiently. The intensity of a series of workshops may vary depending on whether they are provided in a single or multiple settings.

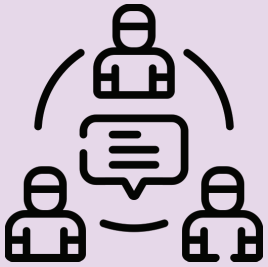
Choosing the Type of Engagement

When it comes to hosting workshops, there are three options to choose from: in-person, online, and hybrid (Table 2.2).

Table 2.2 Types of Engagement

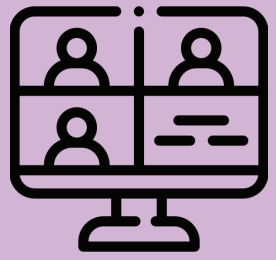
In-person

An in-person workshop can provide a more immersive and engaging experience, allowing for participants to actively interact with each other and the material being presented. To ensure the success of the workshop, careful consideration should be given to the size of the room, the layout of tables and chairs, the lighting conditions, and the quality of the PA system. By taking these factors into account and making the necessary preparations, the workshop can be a productive and enjoyable experience for all involved.



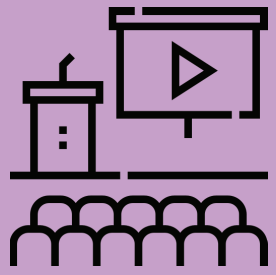
Online

Participating in a workshop online has several advantages. Firstly, it provides convenience as attendees can participate from the comfort of their own home or remote work locations. Secondly, it allows for the implementation of a variety of online tools that can enhance the learning experience. Finally, it enables anonymous participation, which can be beneficial for those who prefer to keep their identities private.



Hybrid

Hybrid workshop can be a viable alternative to traditional workshops, but they come with additional complexities and challenges. To successfully conduct a hybrid workshop, careful planning and organization are essential, as you need to ensure that both the in-person and virtual audiences are engaged and connected. Additionally, you need to have the necessary equipment and materials, such as audio and visual devices, to capture and broadcast the workshop sessions effectively. Despite the additional effort required, a hybrid workshop can provide a unique and inclusive experience for all participants.



2.5.A Online (Virtual) Meeting

Online Tools Give Freedom of Access

Online workshops also have their benefits, such as ease of attendance, a variety of online tools that can promote active engagement (Table 2.3), and the possibility of anonymous participation.

Online tools have proven to be an effective means for real-time communication. They offer easy accessibility to meetings and allow participants to communicate with each other from any location with an internet connection (Figure 2.13). There are several service providers such as Zoom, Webex, Google Meet, and Microsoft Teams that provide online meeting services. To fully enjoy their services, participants need to pre-register and ensure that their applications are updated. Also, they need to have a communication terminal equipped with sound (microphone and speaker) and visual (camera). For ideal participation, it is recommended to limit the number of participants to between 2 to 30.

Webinar service is a broadcasting service based on online meeting system (Figure 2.14). It allows for the organization and control of broadcasting views by the presenter. The presenter can also control who is visible to the public audience. This feature is particularly effective when preparing a panel-type discussion. Webinars are ideal for facilitating massive audiences ranging from 100 to 10,000 people. Some systems allow for limiting participants by pre-registering or charging a fee for participation.

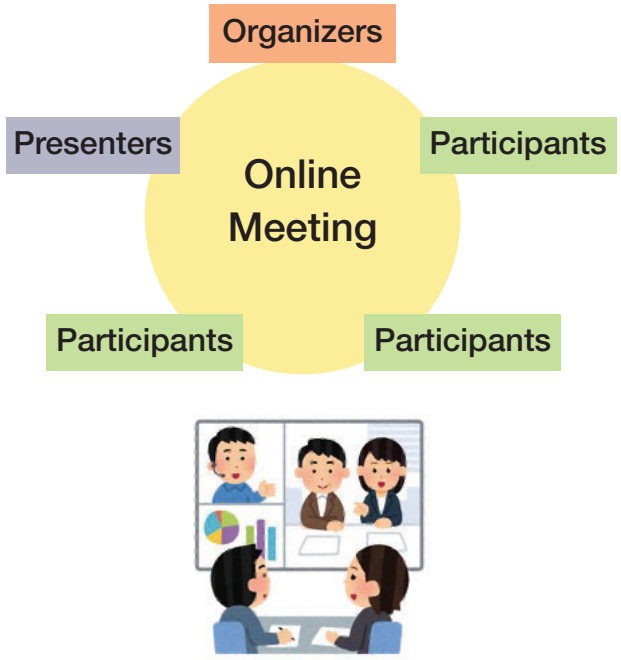


Figure 2.13 *Round table setting during an online meeting.*

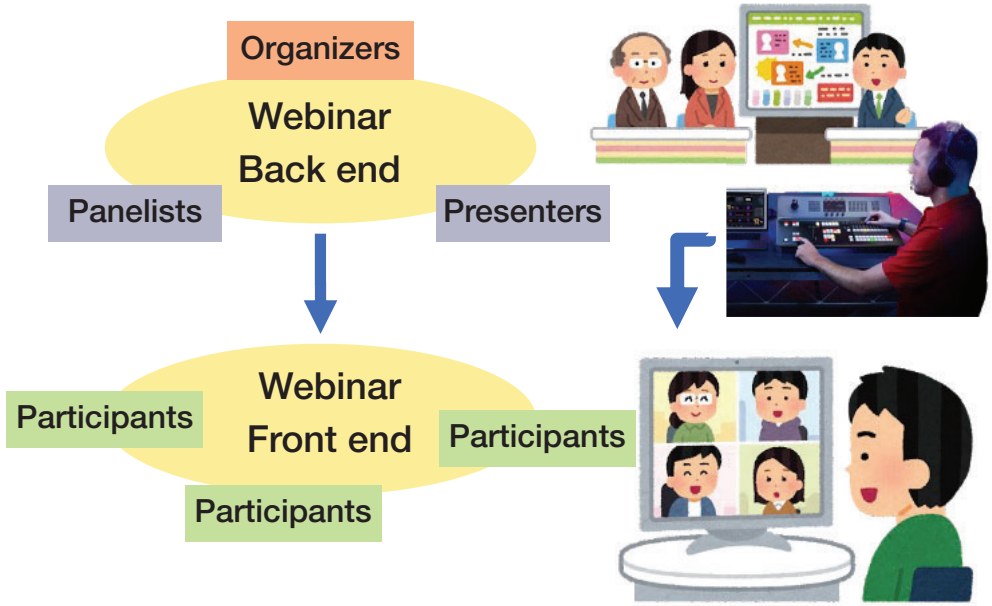


Figure 2.14 *Broadcasting by webinar system.*

Screen-sharing allows for slide-based presentations and facilitates closer communication. Another useful function is the ability to create breakout rooms, which can divide participants into smaller groups for more in-depth discussions. Organizers can choose automated or pre-assigned grouping to easily set up the breakout rooms. However, it's important to have effective management of conversations and presentations in order to ensure a smooth and productive meeting.

In addition to video conferencing tools, there are other supporting systems that can enhance the quality of online meetings and workshops. For instance, online survey tools like Mentimeter and Survey Monkey, and online boards such as Jam Board, Miro-Board, and Mural Board can be used as a whiteboard or workshop workspace in the meeting. These tools enable facilitators to gather feedback and input from participants and keep discussions dynamic. However, using these systems may require some proficiency and software installation, and it is necessary to ensure that participants can use the system without problems. For example, organizers can involve participants in a series of workshops or teaching sessions on how to use these systems.

Another powerful tool is the ArcMap/GIS system, which can be used to support the workshop if the theme is highly related to geographical context. It is useful to show a map or GIS data on the shared screen to facilitate discussion under a common understanding of the location, just like a physical map or chart in a face-to-face meeting. Not only the location but also some GIS formats (e.g. KML format) also allow the sharing of paths to take participants on a virtual tour.

Table 2.3 Summary Table of Meeting Tools

Tools	Feature
Online Meeting	Easy access, Breakout rooms (Zoom, Webex, Microsoft Teams, Google Meet)
Webinar	Separation of presenter and audience (Zoom, Google Meet, YouTube Live)
Survey Tools	Pre-set questionnaires, Idea/Word Mining, Statistics (Mentimeter, Survey Monkey)
Online Boards	Real time entry, Integration, Records (Jam Board, Miro-board, Mural Board)
Maps	GIS format (KML), easy to understand

2.5.B Archiving Online Engagement

Archives Allow Communication Across Time

Real-time online tools are often limited when it comes to archiving functions, making it difficult for participants to review and revisit important information from past meetings. To overcome this weakness, additional tools (Table 2.4) can be utilized to support and enhance real-time engagement, not only for online meetings but also for face-to-face meetings. These tools can also serve as independent dissemination tools for the wider distribution of meeting content (Figure 2.15 and 2.16). By using both real-time engagement and archives together, participants can better prepare for and recap after the engagement events, leading to a more effective and efficient outcome.

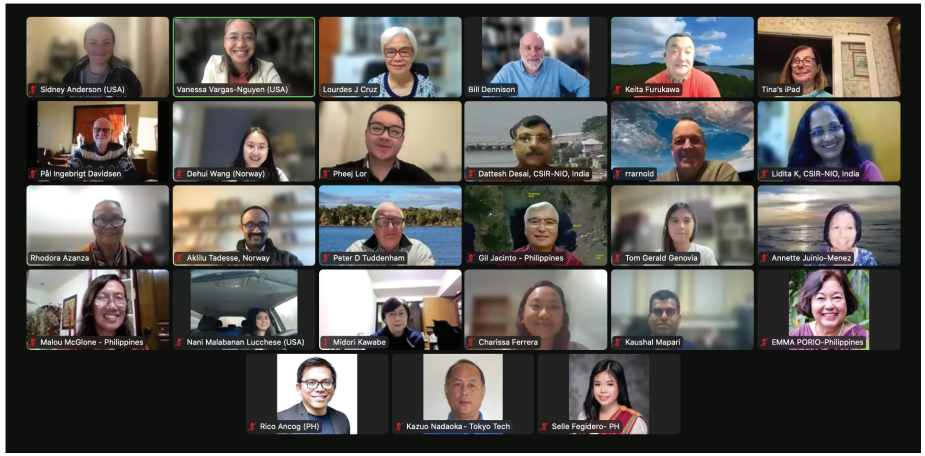


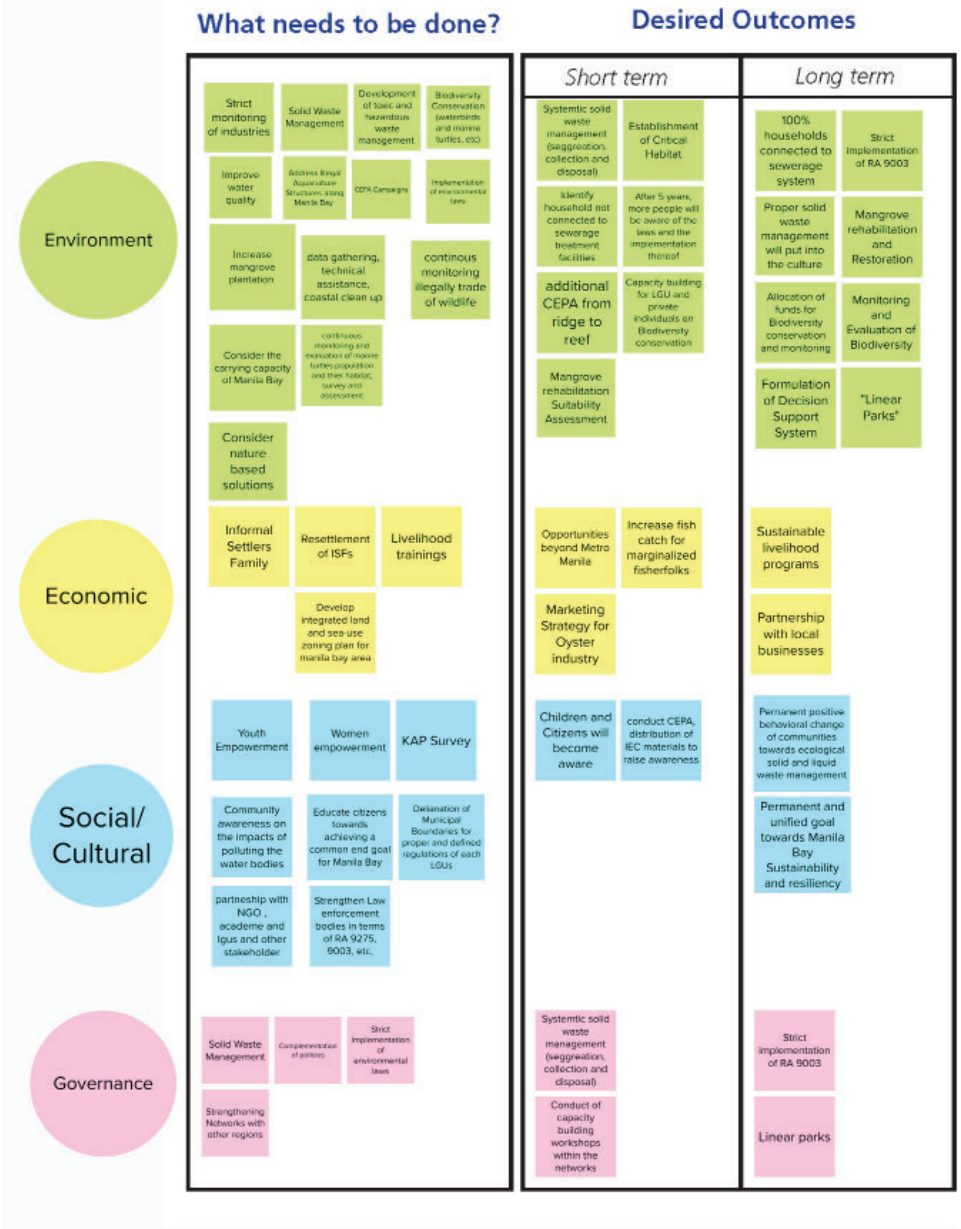
Figure 2.15 *Participants at the 2022 COAST Card Annual Meeting. Calls are recorded and images with all attendees are taken for posterity.*

Table 2.4 Summary Table of Data Archiving Tools

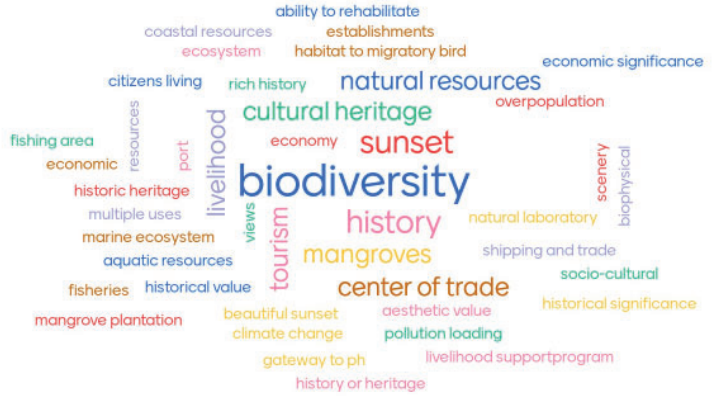
Tools	Feature
Social Network Systems	Easy access, Easy to get info (Facebook, X, Instagram, etc.)
Video	Massive information, Time-consuming to create and watch (YouTube, Vimeo, etc.)
Massive Open Online Course (MOOC)	Structured archives, Good references, High cost
Website	Easy to search, Medium cost
Online Boards	Real time entry, Integration, Records
Maps	GIS format (KML), Easy to understand

Theory of Change for Manila Bay:

How do we achieve a sustainable and resillient Manila Bay?



What do you value in Manila Bay?



Manila Bay Vision:

What is your vision for the future of Manila Bay?

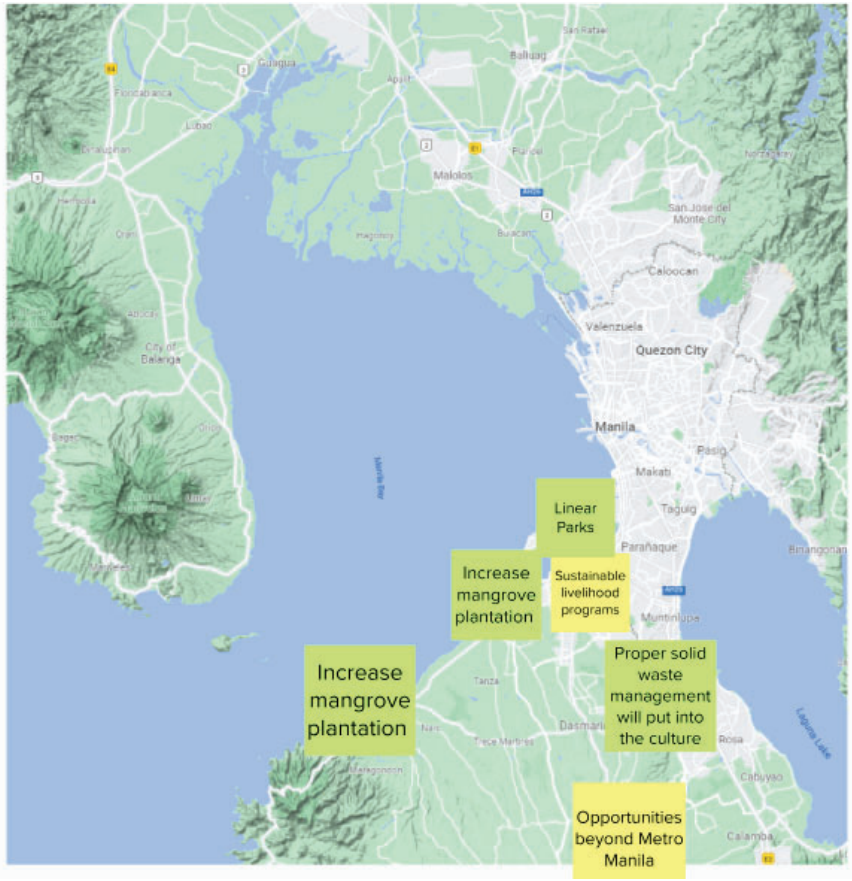


Figure 2.16 *Sample responses from the Online Mural board generated during the Coastal and Marine Spatial Planning Workshop in 2021. The board is still available and accessible online.*

2.5.C In-Person Meeting

In-Person Meetings Facilitate In-Depth Communication

An in-person workshop provides the opportunity for individuals to engage in face-to-face interactions, which can lead to a more meaningful and effective exchange of ideas (Figure 2.17). Since all participants are physically present, they can actively engage in activities such as group discussions, hands-on exercises, and networking opportunities. Such interactions can foster a collaborative environment that encourages participants to learn from one another, share experiences, and build relationships. Table 2.5 summarizes some important considerations in hosting in-person events.

Table 2.5 Considerations for Hosting On-Site Events

Meeting Format	Meeting Equipment	Field Equipment
Whether you are hosting a meeting, workshop, symposium, panel discussion, site visit, or any other activity, the success of your event depends largely on the meeting room arrangements you choose (Figure 2.18). By selecting the right meeting room setup, you can ensure that the participants have a comfortable and productive experience.	The set-up of the tables and chairs, and floor layouts, can greatly aid in creating a conducive environment for sharing information and meaningful discussions. The incorporation of audio-visual systems, personal computer projectors, whiteboards, and posters with icons and stickies can also enhance the collaborative process, allowing participants to share their ideas and perspectives.	For productive and safe outdoor meetings, essential tools include microphones, speakers, tents, first aid kits, and observation tools like hand nets, fieldscopes/microscopes, and sensors. These tools provide communication, shelter, and information-gathering capabilities to enhance productivity, safety, and knowledge of the environment.

Figure 2.17 *Small group and open panel discussion activities at the PhilCOAST Meeting in Manila, Philippines in February 2023. Photo credit: Gil Jacinto.*

Room Arrangements

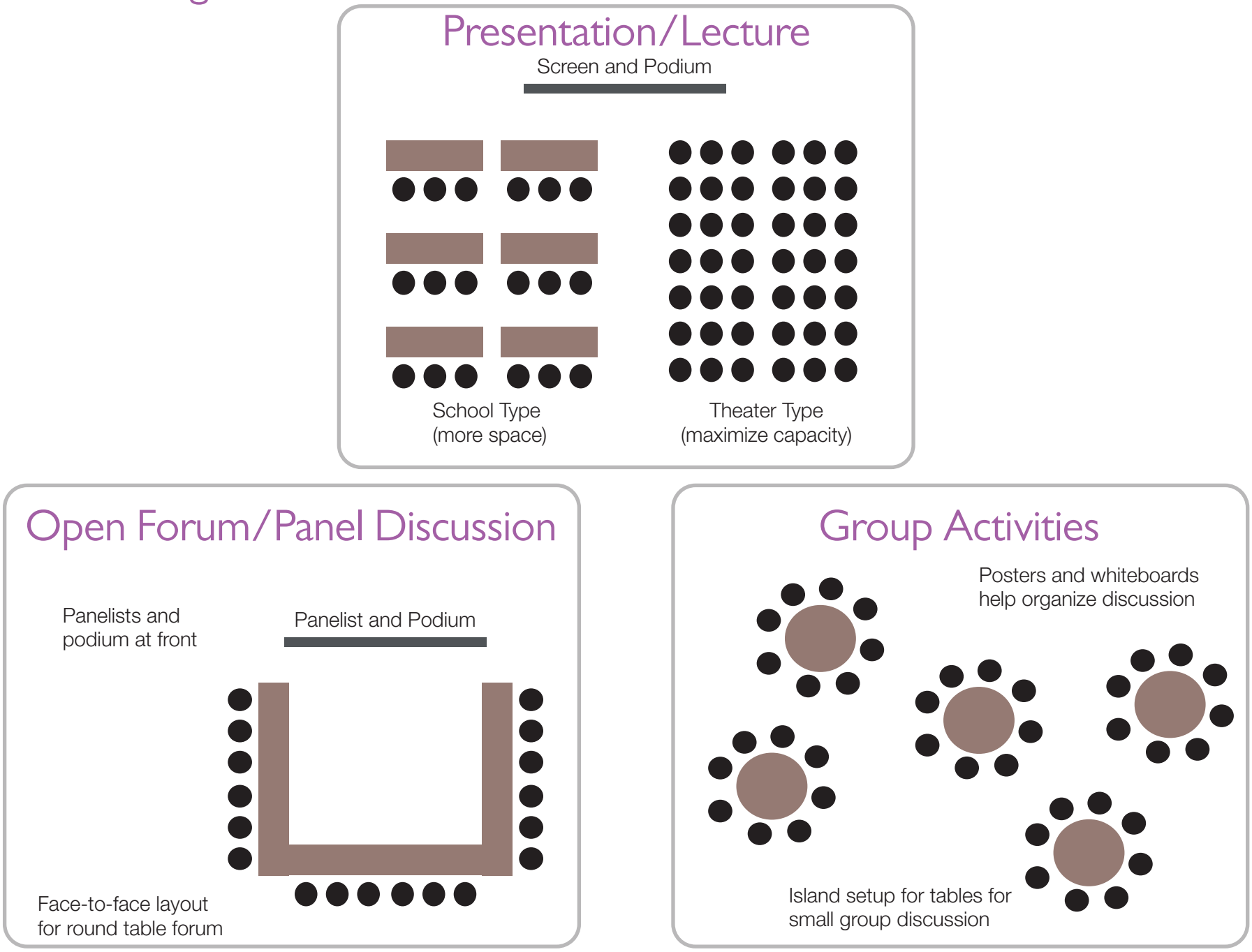


Figure 2.18 *Small group and open panel discussion activity grouping options depending on participant type, number of participants and the ultimate goal the of activity.*

2.5.D Hybrid Meeting

Broadcasting the In-Person Meeting

A hybrid type workshop is also an alternative option, but the preparation and organization can be more difficult and complicated. Careful preparations are required, especially since the system setting and operation are key components of the hybrid meeting.

System Setting

When arranging audio-visual equipment, it's important to ensure that the online and in-person components do not interfere with each other and that they share the same information. For instance, the microphone system should be unified, and other microphones in the room should be turned off. If in-person participants join as virtual participants, they should use headphones. To share online audio in the on-site meeting room, an audio mixer equipped with a "loop back" function should be used.

On the broadcasting console, there should be a broadcasting PC, a video switcher, and an audio mixer. These should be connected to the on site Audio/Visual (AV) system and video cameras. An example AV set-up is illustrated in Figure 2.19.

Operation

In hybrid settings, it is essential to have not only equipment operators but also a timekeeper and a participation manager who can coordinate complex operations. Adequate resources and simplification of the system should be considered for smooth functioning. The participation manager is responsible for controlling the participants' entry into the system from the beginning and monitoring their reactions during the session, especially if someone wants to ask a question or initiate a discussion.

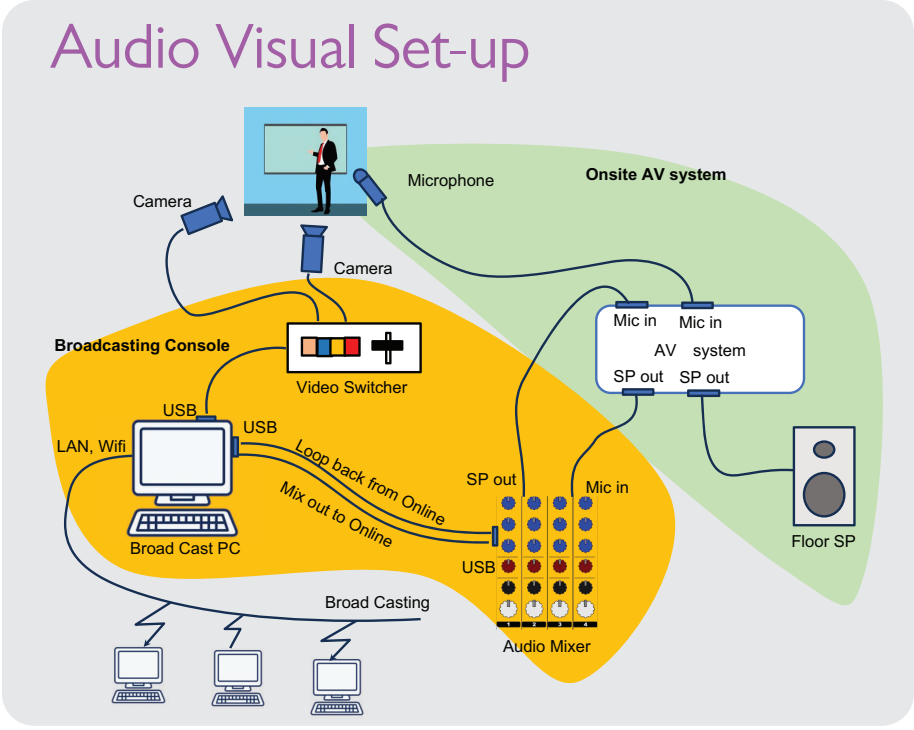


Figure 2.19 *Example of audio-visual setting required for a hybrid meeting.*

2.6 Facilitation Preparations

Creating Optimal Conditions for Success

Facilitators should plan their strategies well ahead of any workshops or engagement activities. This involves proactive preparation of all necessary materials, careful structuring of the session, ensuring the use of appropriate tools to maximize accessibility and engagement, and delineating desired workshop outcomes. Seeking support from experts can be also helpful. Anticipating and addressing potential technical or workshop-related issues beforehand is important for preventing unexpected disruptions. Figure 2.20 summarizes some of the important things that coordinators and facilitators should consider ahead of the engagement activities.

Preparatory Materials

- Agenda
- Participant List
- Handouts/Proceedings for Participants
- Website

Structure

- Presentation/Lecture
- Open forum/Panel discussion
- Group Activities

Workshop Materials

- Whiteboard/Writing panel with stickies
- Games/Communication tools
- Online Communication

Expert Involvement

- Include diverse experts to provide neutral and inclusive discussion

Outputs/Outcomes

- Declarations/Recommendations to Policymakers
- Executive Summary/Press Release to Mass Media
- Guidelines/Leaflets to Stakeholders

Troubleshooting

- Back-up of instruments
- Communication among staff

Figure 2.20 *Any coordinated event requires effort in various forms, from prepping, to troubleshooting.*

Summary of Section 2

2.1 COAST Card Planning Primer

- Some things to consider while planning a workshop or stakeholder engagement session such as timelines, number of participants, location and venue, duration of the event, room selection and set up, presentations and activities, and building in networking time and breaks.

2.2 Purpose of Communication

- Centering the objective of the workshop and following the steps of engagement (Knowledge, Understanding, Awareness, Action).
- Understand the differences between the organizer's objectives and participants' objectives.

2.3 Role-Sharing

- Coordinators for organizing logistics.
- Facilitators for organizing discussions.
- Experts/Tutors for supporting logical and scientific discussion.
- Participants should be carefully approached.

2.4 Announcement and Invitation Strategies

- Important information should be included on an invitation card.
- Step-by-step guide to registration, reminders and reception.

2.5 Workshop Format

- Size, Duration, and Place are crucial to deciding the format of the workshop.
- For complex issues, a series of workshops can be effective.
- On-site or off-site (online) may be selected as the meeting format. If sufficient AV equipment is available, holding a hybrid meeting can also help improve convenience for participants.

2.5.A Online (Virtual) Meeting

- Select suitable online meeting tools such as Zoom, Google meet, Webex or Microsoft teams.
- Real time meetings are ideal for panels or webinars, which can range from 30-10,000 participants.

2.5.B Archiving Online Engagement

- Select suitable online meeting tools for round table communication and broadcasting webinar.
- Prepare online archives for information sharing.

2.5.C In-Person Meeting

- Format of the meeting links with the meeting room arrangements.
- Presentation/Lecture.
- Open Forum/Panel Discussion.
- Group Activities.

2.5.D Hybrid Meeting

- System setting: getting a loop-back audio from online and input to the site AV system.
- Operation: equipment operators, timekeeper, and participation manager.

2.6 Facilitation Preparations

- Creating conditions for success by assigning roles and tasks to members of the facilitation team.
- Choosing an appropriate layout for the type of workshop or meeting being convened.

View of the Zuari River Estuary. Photo Courtesy of Dattesh Desai.

3

Facilitation

How Should Thoughts and Ideas be Integrated?

3.1 Ice Breaker

Setting the Stage for Productive Discussions

Ice-breaker activities are important in stakeholder engagement because they serve multiple purposes:

- Create a positive and welcoming atmosphere, which helps to put stakeholders at ease and makes them more receptive to participating in discussions and sharing their ideas.
- Help build relationships and trust among stakeholders, which are crucial for effective engagement.
- Increase engagement and participation, making the discussions more productive and meaningful.
- Promote collaboration and teamwork among stakeholders, allowing them to work together to develop solutions.

Some example icebreakers that are commonly used at COAST Card international meetings:

- An ice-breaker activity that involves sharing a favorite local dish.
- An ice-breaker activity that involves identifying on a map your favorite place to travel and your ideal destination (Figure 3.1).
- An ice-breaker activity that involves identifying on a map where participants live, work, and play.

When selecting ice-breaker activities, it's essential to consider the specific needs of the stakeholder group, such as their age, culture, and background. The activities should be relevant to the engagement process and appropriate for the participants.

Figure 3.1 *Virtual ice breaker conducted during the 3rd annual meeting for the COAST Card Project. Participants uploaded a picture of them in their studied watershed, along with their favorite thing to do there.*

3.2 Presentation

Share Basic Information for Discussion

Presentations are often given prior to workshops in the form of keynote speeches or other presentations. They serve as a good way to provide participants with information to base their discussions on and present the ideas of experts and scientists in the field. It is also useful to set aside time for individual presentations. This allows participants to share their respective positions, ideas, and practices in advance. However, it is important to avoid providing too much information or being too one-sided. Workshops are intended to be followed by discussions, and unlike symposiums and lectures, they require a balance. To achieve this, it is effective to limit the presentation time and use abstracts, slides, posters, and other visual aids to share the content of the presentations. Infographics, photos, and videos can also be used effectively to provide participants with stronger impressions and more detailed information (Table 3.1). The use of highly entertaining content, such as songs and dances, can strongly attract the interest of participants and foster a sense of unity in a workshop.

Table 3.1 Presentation Materials and Their Relative Impact

	Materials/ Contents	Type	Impacts	Preservability
Presentation Materials	Abstracts/Handouts	Resume, Abstracts and Papers	Low, firm science/ evidence based	High
	Slides	Presentation material (projection at the venue)	High, dependent on slide organization and presentation skills	Medium (needs additional explanation)
	Posters/ Pamphlets	Presentation material (posted at the venue)	Medium	Relatively High
Contents	Info Graphics	Materials for posters, leaflets, pamphlets, and slides	High	High
	Photos	Materials for presentation/ Social Networking	High	High in print; Low in presentation
	Video	Materials for presentation/ Social Networking	High, dependent on video length	High in long video, Low in short video;
	Entertainment (music, dance, etc.)	Materials for presentation/ Social Networking	High	Low

3.3 Conceptualization

Tools for Understanding Shared Values

Stakeholder engagement should be a process aimed at creating a common understanding and promoting collaboration on social and environmental well-being and resource conservation. By involving stakeholders from diverse perspectives, the ultimate goal is to establish a shared vision and ensure sustainable management and preservation of our environmental ecosystem. This section focuses on practical tools for facilitating collaborative discussions that go beyond simple information exchange and promote inclusivity and civic engagement.

- **Word Clouds:** Soliciting three descriptive words about the region from stakeholders helps generate word clouds. Words used for Potomac river included beauty, wildlife, and recreation but also political inaction, pollution and development (Figure 3.3). This exercise aids stakeholders in grasping the essential features of the system. Web-based programs such as Mentimeter can generate wordclouds and overlay them on shapes, such as the example shown in Figure 3.3.
- **Conceptual Mapping:** Using large maps with minimal geographic details, stakeholders annotate key features with markers, highlighting distinctions like protected lands or degraded sites. This map visualization is later integrated into a single conceptual map.
- **SNAP Exercise:** Participants write their three priority values on sticky notes. When common values arise, participants call out "SNAP," allowing the facilitator to cluster similar values. Group consensus then aids in placing these sticky notes, followed by a voting session to prioritize key values. This exercise can be repeated to identify major threats or visions for the future.
- **Stakeholder Mapping:** Visual representation or mapping of stakeholders and their relationships within the project helps understand their roles, interests, and influence. This aids in identifying potential collaborators and ensures diverse representation in the Report Card development process. For more information on stakeholder mapping, see Section 1.5.

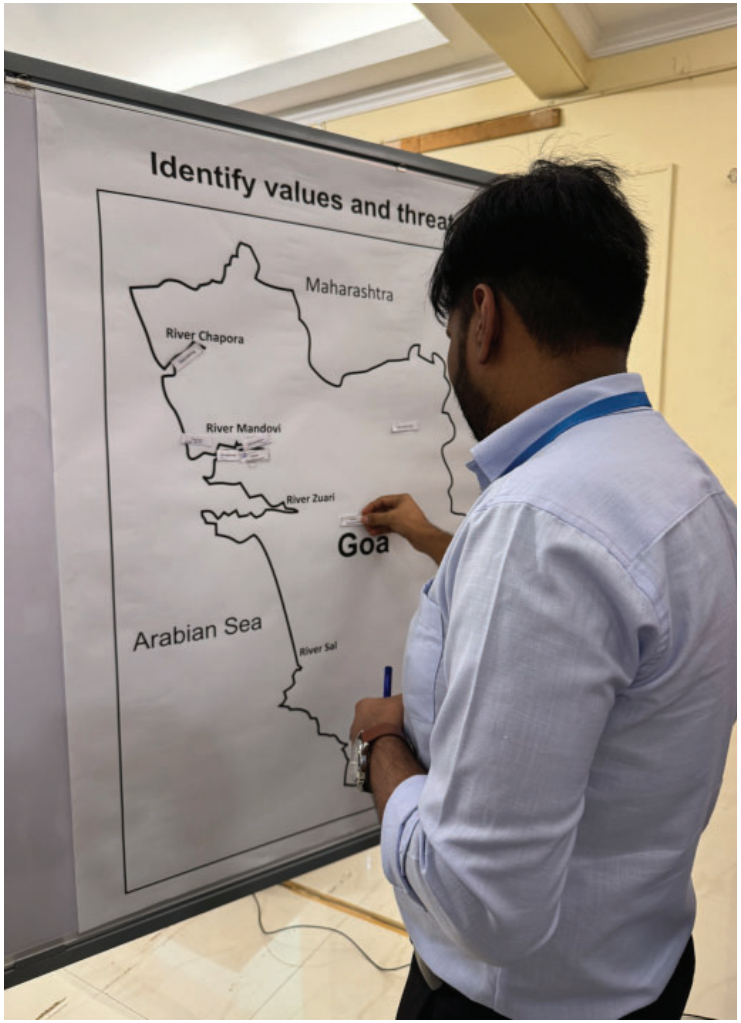


Figure 3.2 *A student identifying values and threats in the COAST Card Bharat listening session in Goa, India. Photo Credit: Roshni Nair.*

[10] 2022 Middle Potomac Listening Session. 2022. IAN Press. https://ian.umces.edu/publications/middle-potomac-listening-session/

- **Role-Playing Games**: Role-playing activities enable stakeholders to embody different perspectives, encouraging a deeper understanding of various viewpoints and enhancing empathy. It promotes discussions, problem-solving, and decision-making in a dynamic and engaging manner. See Section 4.1 to learn more about "Get the Grade", a role playing game we used to understand the importance of the report card process.
- **Environmental Literacy Principles:** Development of essential information about the region—geographic setting, relevance, key features, threats, human interactions, and unique aspects—is shared and refined through iterations, often resulting in a blog post or videos. Please visit our website at coast-card.org and learn about the environmental principles of each of our study sites.
- **Visions and Actions:** This exercise allows stakeholders to consider their vision (Figure 3.4) for the future of their system and the actions needed to achieve it. Involving stakeholders in this process of establishing a collective vision fosters a sense of ownership and provides them with the motivation to take action.

By employing methods like highlighting keywords, constructing conceptual maps, prioritizing values and threats, and establishing environmental literacy principles, the objective is to unify stakeholders in the pursuit of a common goal.

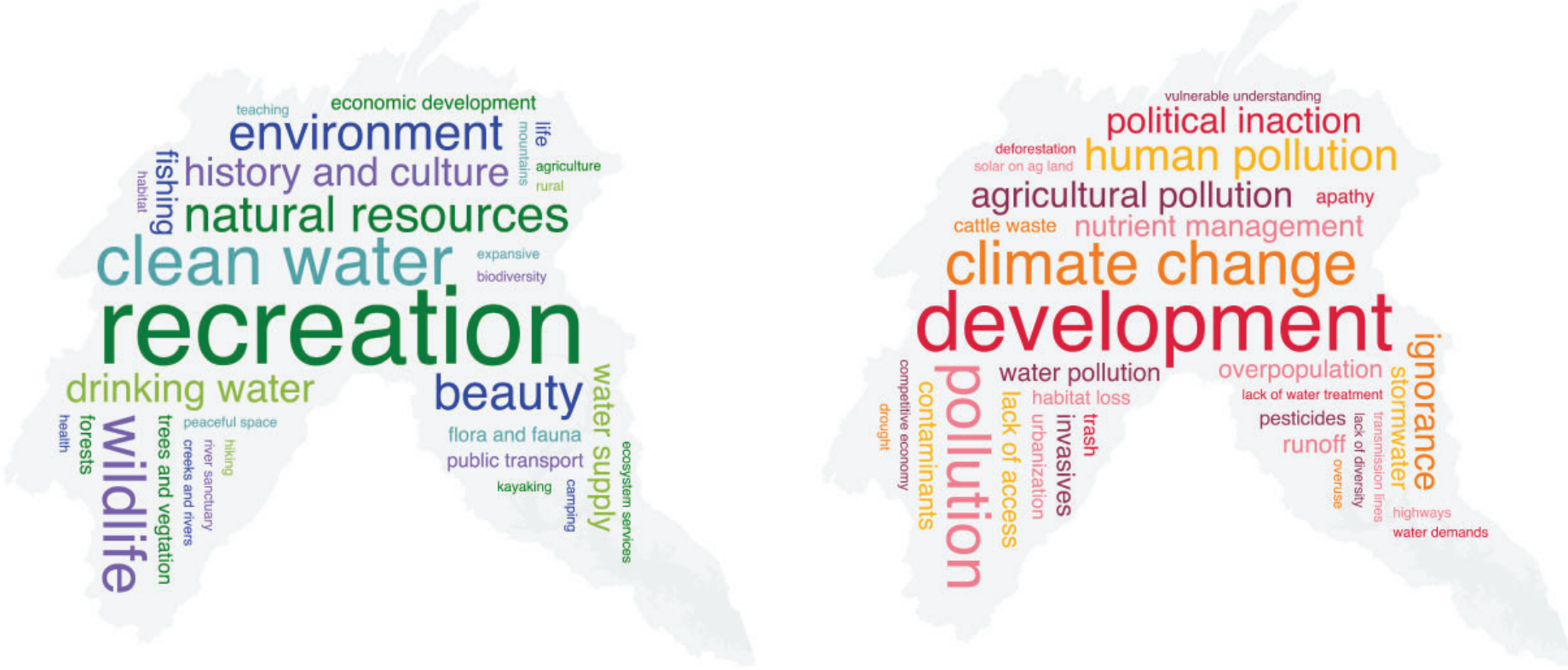


Figure 3.3 *Example of word clouds by asking local stakeholders about values and threats during the Middle Potomac Listening Session. IAN Press.* [10]

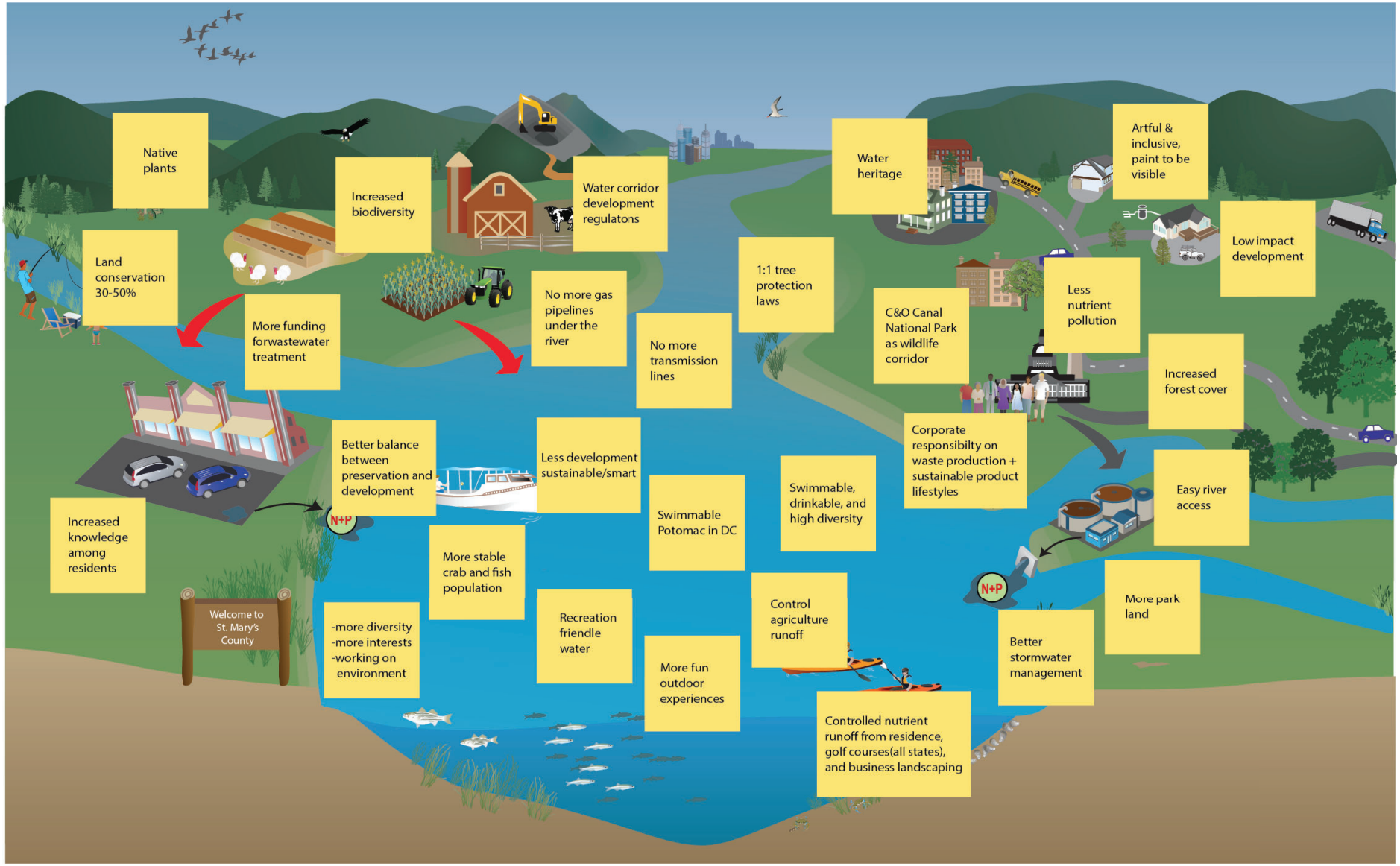


Figure 3.4 *Vision diagram created during the Potomac Listening Session held at the Hood College in Frederick, Maryland. Participants placed sticky notes of characteristics for their ideal watershed to create a shared community vision among all attendees.*

3.4 Idea Mining

Building on Ideas Through Discussion

In a workshop, it is crucial to encourage participants to share their ideas freely and constructively, which can lead to finding innovative solutions through discussions. A helpful approach is to establish a structured framework (Table 3.2) and then integrate the participants' suggestions within the framework. The SWOT (Strengths, weaknesses, opportunities, threats) method is a well-known method in the business world, which has a clear and structured framework and is an easy way to generate and summarize ideas. Other methods, such as mind mapping, scenario creation, and the KJ method, allow for free-flowing ideas and require active participation from both the participants and the facilitator to summarize the ideas effectively.

Table 3.2 Tools for Idea Mining

Method	Type	Engagement Type	Facilitation Skills
Strengths, Weaknesses, Opportunities, and Threats (SWOT)	Highly structural framework for targeting discussion	Small group, in-depth discussion	Calm situation analysis
Mind Map	Extensible format for free mining of ideas	Free discussion with various stakeholders	Flexible and open-minded idea mining
Scenario Planning	Connect environmental factors based on practical perspectives	Comparative discussion for prepared scenarios	Emotional integration of ideas
KJ Method	Building up integrated images by collecting small pieces of ideas	Fit on small group work	Logical integration of ideas

3.4.A Strengths, Weaknesses, Opportunities, Threats (SWOT)

Visualizing Group Perspective

A SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis is a tool used to identify the strengths, weaknesses, opportunities, and threats of an organization, initiative, or group. The analysis should be based on factual and quantitative assessments, using a SWOT matrix and cross-correlation analysis.

SWOT Matrix

The SWOT matrix (Figure 3.5) is divided into positives and negatives, and inner and outer environments. The inner environments represent the situation of the issue or group itself. When positives are combined with inner environments, they reveal the strong points of the issue or group, which can be used as clues for project implementation. When negatives are combined with inner environments, they reveal the weak points of the issue or group that need to be addressed to minimize internal risks. The outer environments represent the surrounding situation outside of the issue or group. When positives are combined with outer environments, they reveal opportunities for the issue or group to develop. When negatives are combined with outer environments, they reveal threats that the issue or group should be prepared or mitigated for.

SWOT Cross-Analysis

In cross-correlation analysis, each SWOT component is cross-related to form Strength/Opportunity, Weakness/Opportunity, Strength/Threat, and Weakness/Threat strategies (Figure 3.6). The SO strategies are the most positive strategies that aim to maximize the strengths of the issue or group under good opportunities. The WO strategies focus on improving the weaknesses of the issue or group. The ST strategies require taking a different approach using the strengths of the issue or group to overcome difficulties in the surrounding environment. The WT strategies are the most difficult situations, so the issue or group should consider drastic decisions such as taking a defensive or scaling down activities.

Figure 3.5 *The SWOT Matrix.*

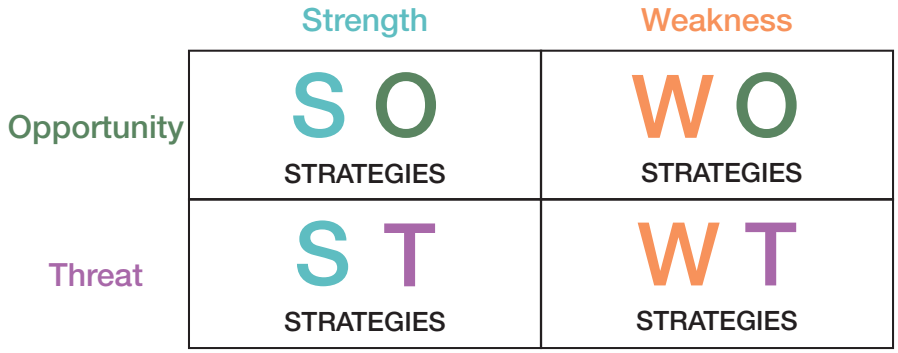


Figure 3.6 *The SWOT Cross-Analysis Matrix.*

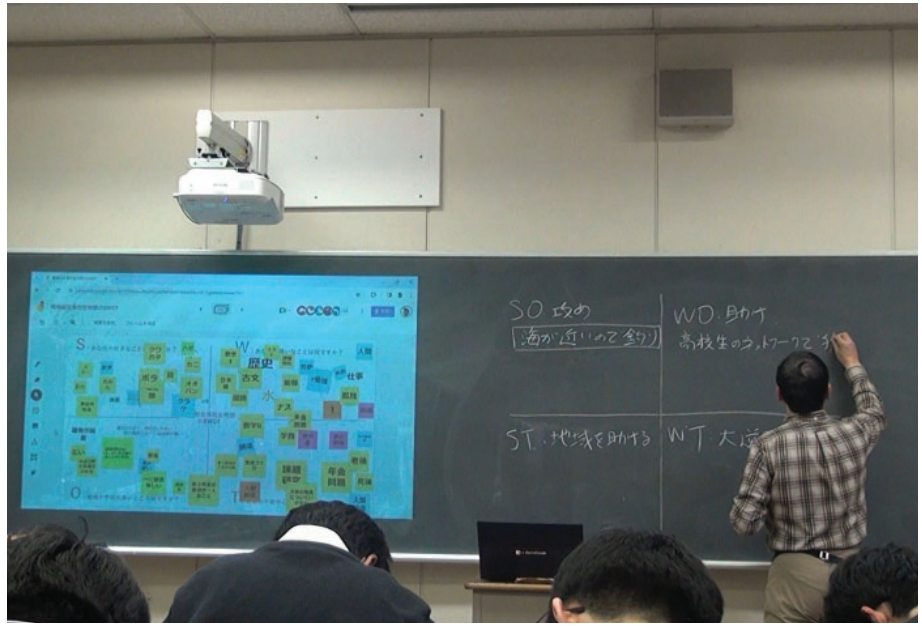


Figure 3.7 *Photos from SWOT Workshops conducted with a group of stakeholders (top) and high school students (bottom) in Tokyo Bay.* ***Photo Credit: Keita Furukawa.***

3.4.B Mind Mapping

Organizing and Structuring Ideas

Mind mapping is a way to organize and structure ideas and information that helps people think visually. It starts with a main idea or topic and then goes off in different directions with related thoughts, ideas, or subtopics. Table 3.3 list some topics that can be discussed using mind mapping. An example mind mapping exercise is shown in Figure 3.8.

Mind mapping can help get people involved in a workshop by giving them a visual representation of their ideas and thoughts, encouraging collaboration and communication, and encouraging active participation and problem-solving. Mind mapping makes it easy for people to talk about their ideas and help everyone understand what's being discussed. Mind maps can also help keep the discussion organized and on track, making it less likely that the group will get off track.

There are both free and paid softwares for mind mapping. FreeMind, XMind, MindNode, and Coggle are some of the most popular free mind-mapping programs. Most of these free options offer basic mind mapping tools, like making nodes, adding text, and making links between nodes. There is also paid software like Mindjet MindManager, iMindMap, and NovaMind with more advanced features. Paid options usually have extra features like tools for working together, more advanced formatting options, and the ability to export mind maps to other formats.

Mind mapping works well with people of all educational levels as it is a visual and intuitive tool that requires little technical knowledge or education. Participants can show their ideas and thoughts with simple drawings, symbols, and words, so a wide range of people with different levels of education and experience can use it. The power of mind mapping lies in its ability to help individuals and groups organize and visualize information and ideas and to facilitate communication and collaboration.

Table 3.3 Example Mind Mapping Topics for Discussion

Coastal Erosion: to brainstorm and categorize the causes of coastal erosion in a specific area and visualize and prioritize potential solutions.
Fishing Community: to discuss the challenges faced by fishing communities in the area and to develop strategies for improving their livelihoods and preserving the local marine ecosystem.
Mangrove Restoration: to visualize the benefits of mangrove restoration, as well as the resources and steps needed to implement a restoration project successfully.
Coastal Pollution: to identify sources of coastal pollution and develop strategies for reducing and managing the pollution.
Disaster Risk Reduction: to identify the risks posed by natural disasters in the coastal area and to develop plans for reducing the impact of these disasters on the local community.

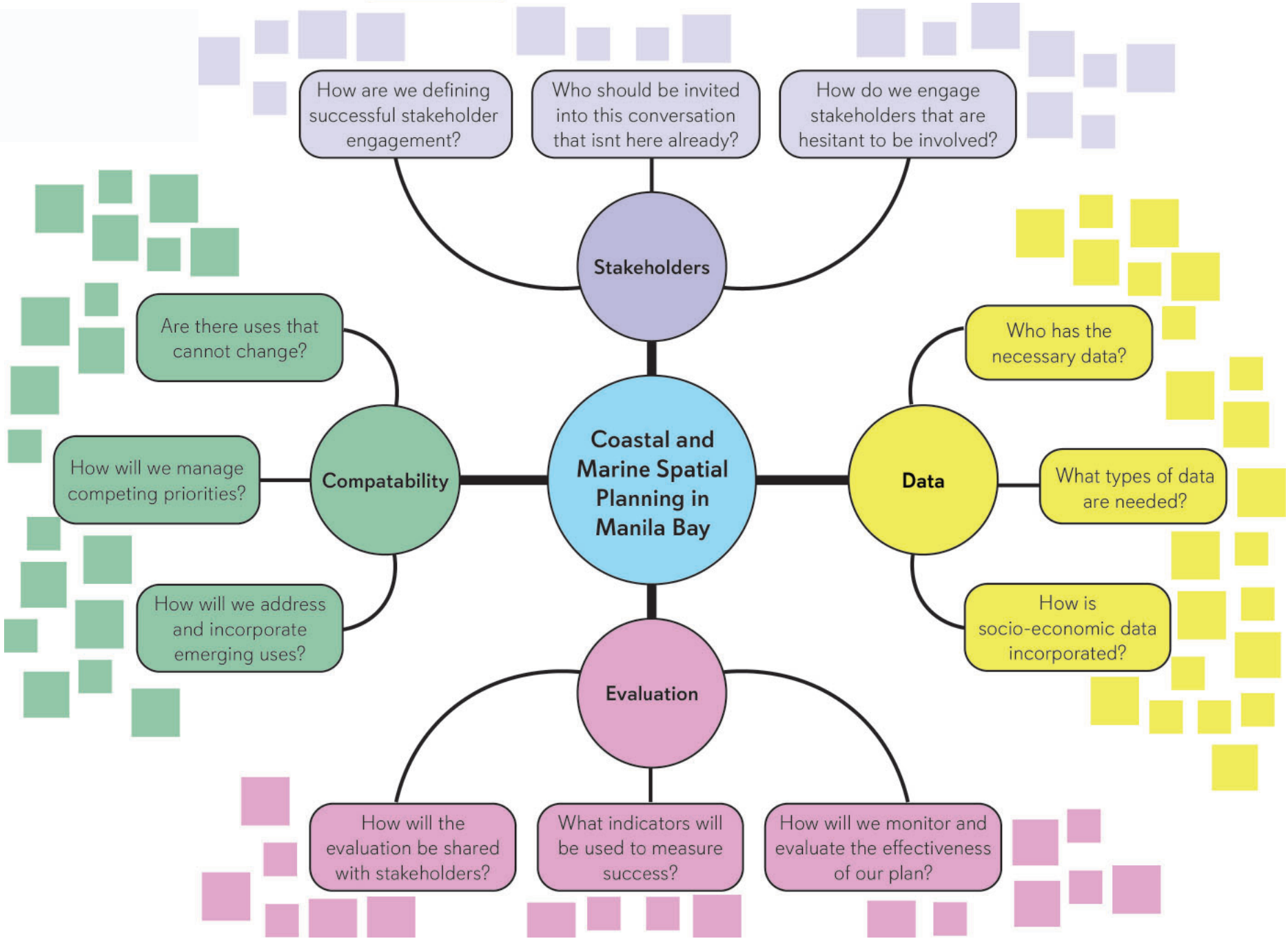


Figure 3.8 *Adapted from the Mind mapping exercise conducted at PhilCOAST about coastal and marine spatial planning. The small colored squares represent the answers generated by the group as a response to the larger questions that were asked.*

3.4.C Scenario Planning

Compare Scenarios for Better Facilitation

Scenario planning, coupled with futures thinking, empowers stakeholders to strategically navigate the complexities of the future while maintaining a delicate balance with present realities and historical perspectives. This collaborative process involves dissecting prevailing worldviews, interrogating deeply held values, and scrutinizing ingrained narratives. By challenging existing beliefs and assumptions about what is conceivable or inconceivable, stakeholders gain insight into the range of possibilities and can chart a course forward that is informed, adaptive, and resilient.

Conducting a Scenario Planning Workshop

A scenario planning workshop is a collaborative process to explore potential future scenarios and their implications. Here are some key steps:

- **Preparation**: The organizers will prepare the necessary materials and resources for the session, including background information on the topic, relevant data, and tools or frameworks to facilitate the workshop activities.

- **Setting the Tone**: The facilitator provides an overview of the current situation or trend being examined and explains why scenario planning is valuable for addressing uncertainty and complexity. For example, a Mentimeter survey to gauge participants' awareness and engagement in future-related activities can be conducted. Use a thought-provoking question such as, "Is thinking and planning 'outside the box' part of your daily life?" to better understand the group's knowledge and composition.

- **Scenario Development**: Participants engage in activities to develop plausible future scenarios. This often involves brainstorming potential drivers of change, such as technological advancements, social trends, economic shifts, or environmental factors. Small groups may work together to flesh out these drivers and develop narrative descriptions of distinct future scenarios.

- **Scenario Analysis**: Once the scenarios are developed, participants analyze each one to understand its potential implications and consequences. This may involve identifying key uncertainties, assessing risks and opportunities, and exploring how different stakeholders might be affected.

- **Discussion and Debate**: Participants engage in facilitated discussions to debate the merits of each scenario and its implications for decision-making. This may involve challenging assumptions, exploring alternative interpretations, and considering how to respond to different future possibilities.

- **Integration and Synthesis**: The workshop concludes with synthesizing the insights gained from the scenario analysis. Participants identify common themes, emerging trends, and strategic priorities that can inform future planning and decision-making.

- **Action Planning**: Finally, participants discuss the next steps and identify actions to be taken based on the insights generated during the workshop. This may include developing contingency plans, revising existing strategies, or conducting further research to better understand critical uncertainties.

Scenario planning discussions could explore a range of scenarios, including Disowned, Outlier, Preferred, and Integrated Futures (Table 3.4). To illustrate, let's consider examples of these scenarios that emerged from a scenario planning workshop focused on environmental and climate change, conducted as part of the preparation for "Pagtanaw 2050: The Philippine Science, Technology, and Innovation Foresight [2]" (Figure 3.9).

Table 3.4 Scenario Planning Example

Disowned 2050: Never. Never. Never. The country is plagued by frequent flooding and stronger storms in the disowned future scenario. The government ignores the effects of climate change and relies on foreign-owned technologies. Inappropriate and outdated technologies persist despite environmental challenges, and the digital divide weakens community-level support.
Preferred 2050: Teach them well and let them lead the way. The country has successfully managed environmental degradation and climate change in the preferred future scenario. The education sector is critical, scientific, creative, and highly collaborative, and all sectors and communities turn to science for improved decision-making. The country harnesses the potential of space technology to improve the management and monitoring of territories and boundaries.
Outlier 2050. There can be miracles. In the outlier future scenario, a scientist becomes the President and leads the country towards higher investments in STI, eliminating corruption, repositioning the country in the global economy, and mitigating all climate change impacts. Despite most jobs being automated and dependent on Also, no Filipino is unemployed, and anthropogenic environmental effects are under control.
Integrated 2050: What a wonderful world. The future society rests on four pillars: a reinvented Philippine STI system, science-driven policies and adaptive resource management, proactive measures to curb climate change, and progressive space technology. The STI pillar will introduce agility, promote a productivity-based economy, harmonize overlapping mandates of government agencies, and define constitutional and legislative changes. This will pave the way for a sustainable and equitable allocation of natural resources, bio-economy, bio-capacity, ecosystem and natural resources monitoring, and law enforcement and accountability mechanisms.

Figure 3.9 *Cover of the Pagtanaw 2050 Report on Scenario Planning Workshop.* [1]

[1] Cruz,S.O. and H. Mendoza. 2022. Report on Scenario Planning Workshop for the NAST Pagtanaw 2050 Project (unpubl.) 54 pp.

[2] National Academy of Science and Technology -Philippines (NAST) 2022. Pagtanaw 2050:Philippine Science, Technology Foresight . NAST, DOST Compound, Bicutan, Taguig, Metro Manila. 350 pp. (Azanza,R .V and W.G.Padolina, eds.)

3.4.D KJ Method

How can we Integrate our Thoughts in Text?

The KJ method, also known as Affinity Diagrams, was devised by Kawakita Jiro. It is an integration methodology that uses small pieces of ideas called BDAs (Brainstorming and Discussion Aids). The method usually involves three steps: 1) Idea mining (data sampling: Pre-KJ process), 2) Visualization (KJ-A process), and 3) Compilation to text (KJ-B process) (Scupin, 1997[11]) (Table 3.5). Figure 3.10 shows the sample output generated during a stakeholder engagement session in Tokyo Bay using the KJ method.

Table 3.5 The KJ Method is a Three Part Process

Idea Mining

Pre-KJ Process

Once the objective of the discussion is agreed upon, participants are requested to generate as many BDAs (Brainstorming and Discussion Aids) as possible through a research phase.

- In the generation phase, BDAs can be written on sticky notes or paper. Typically, a few people can generate 200—300 hundred BDAs in an hour.
- In the organizing phase, BDAs should be grouped based on their relationships, and grouping should be done based on attribution rather than a pre-given framework (this is an essential feature of the KJ method).
- First grouping should be done through a bottom-up process to prevent people from being influenced by preconceptions.
- Some BDAs may not fit into a group; in such cases, independent BDAs should be kept separate until they can be incorporated into a larger group.

Visualization

KJ-A Process

Groups:

- Each group should have a short and appropriate title.
- Visualize relationships between groups using lines, arrows and bounding lines.
- If the relationship between groups starts to become unclear, revise the title and grouping to ensure that the idea is presented in a consistent manner.
- Once the relationships are visualized on a group level, start mining the relationships between BDAs in the group using a top-down process.
- Visualizing top-down processes is a critical preparatory step before moving onto the next phase.

Compilation

KJ-B Process

Text-based information:

The final phase of the KJ method is to interpret visual figures as text-based information.

This process helps to:

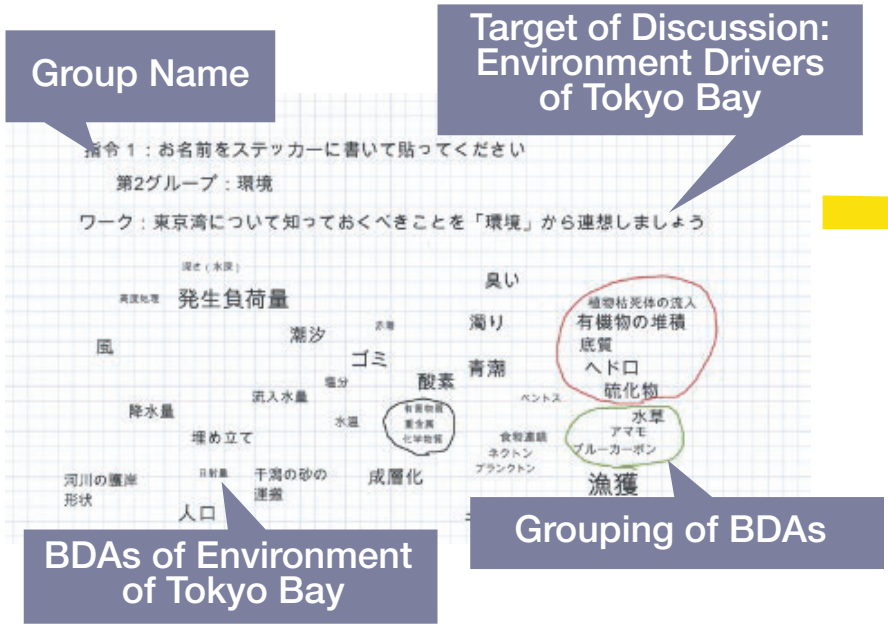
- Clarify relationships between groups.
- Integrate the action plan needed to achieve the target goal.

If the process requires some trial and error, use any of the following program management methods:

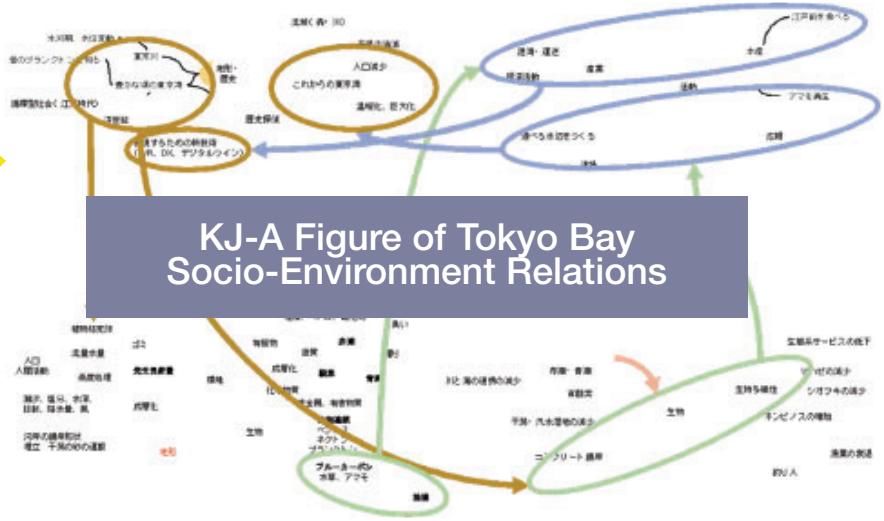
- PERT (Program Evaluation Review Technique)
- PCM (Project Cycle Management) See Section 3.5.

KJ Method in Practice

1 Pre-KJ Process



2 KJ-A Process



3 KJ-B Process

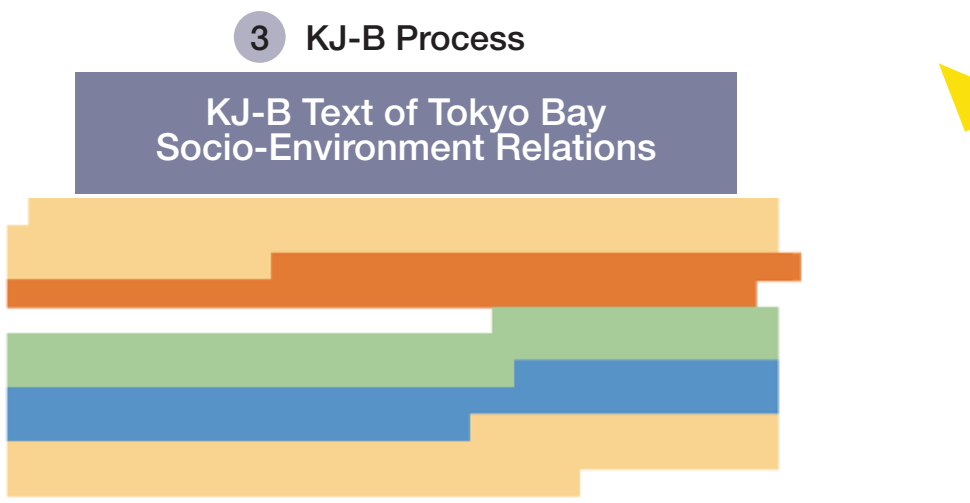


Figure 3.10 *Example of KJ Methods Output. Top Left: Pre-KJ Process; Top Right: KJ-A Process; Bottom: KJ-B Process.*

[11] Scupin, R. (1997). The KJ Method: A Technique for Analyzing Data Derived from Japanese Ethnology. Human Organization, 56(2), 233–237. http://www.jstor.org/stable/44126786

3.5 Idea Integration

Integrate Ideas for Implementing Action

To create a thorough plan for an activity or project, it is crucial to bring together the key elements, organize them cohesively, and express them clearly. The processes of gathering and articulating ideas are closely linked, as demonstrated in methods such as SWOT and KJ. This section will delve into project integration, structuring, and articulation. It will cover the PCM method for project planning and management, DPSIR (Drivers-Pressures-States-Impacts-Response) for assessing causes, consequences, and responses to change, the Casual Loop of System Dynamics Modeling for illustrating cause-and-effect relationships, and the use of SMART indicators. The importance of reflection, review, and storyboarding at the end of the workshop will also be covered.

Table 3.5 Correlation of Engagement Types and Skills Needed

Method	Type	Engagement Type	Facilitation Skills
Project Cycle Management	Project integration	Project planners and implementers take major role for discussion	Deep knowledge on the issues surrounding situations
DPSIR	Domain Models	Various stakeholders should be involved	Deep knowledge on the issues surrounding situations
System Dynamics Modeling	Process Models	Interactive engagement of participants and facilitator	Strong background of model development and scientific knowledge
SMART indicators	Indicator Development	Creation of performance indicators to monitor the project	Attitude for preparedness
Storyboarding	Workshop Wrap-up	Confirmation of results and motivation for next time	Encourage and motivate participants

[12] Daniel Svoboda et.al. (2018) Handbook on Project Cycle Management of Development Projects, Czech University of Life Sciences Prague, Czech Republic. p 113.

3.5.A Project Cycle Management Method

How can we Integrate an Action Plan?

The Project Cycle Management (PCM) method[12] is a methodology for specifying the cause of problems, visualizing the benefit of the project, and planning specific actions to solve the problem. The first phase is the Logical Framework Analysis (LFA) to jointly assess the critical problems and their causes (problem analysis), agree on the objectives of the intervention (objective analysis), and identify stakeholders and target groups. The second phase, the Logical Framework Matrix (LFM), is used to figure out the specific engagement of target groups and set accountability to donors.

Problem Analysis

The problem tree approach usually starts with the team brainstorming on all key problems identified in the given area (using both scientific evidence and personal observation). In further steps, the team continues through grouping the problems by identifying the most significant issues and by recognizing the causal relations between these issues. The result should be a scheme of the central problem, its causes, and the effects.

Objective Analysis

Whenever the problems and their causes are clearly identified, it is usually simple to get agreement on what should be the result of the intervention, i.e. on the idea of how the negatives (problems) can be transformed into positives (objectives), using the same causal relations like in the problem analysis. However, the formulation of objectives is not so easy since all stakeholders must understand them in the same way and that the results must be monitored.

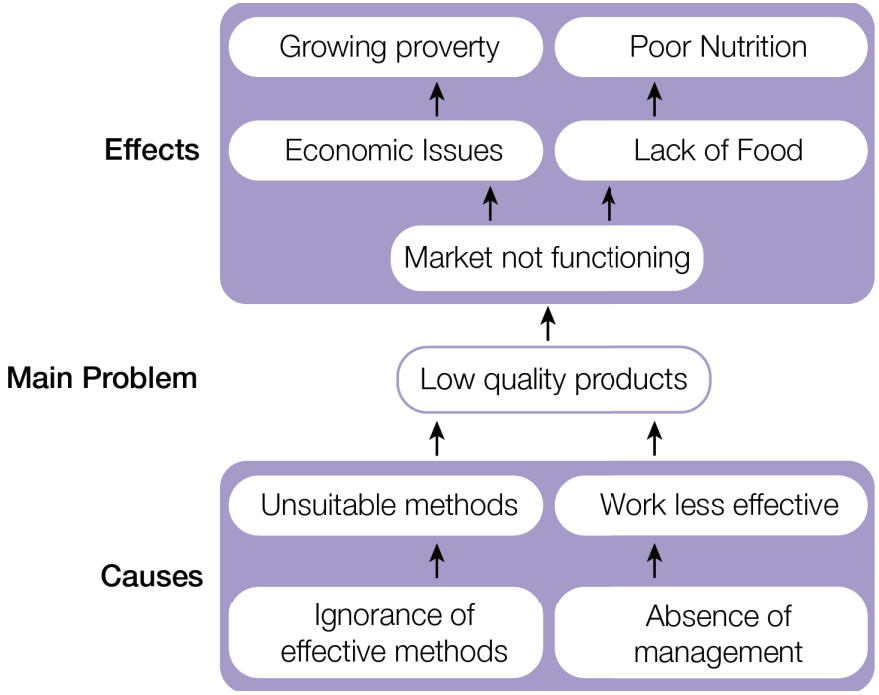


Figure 3.11 *Example problem analysis logic.*

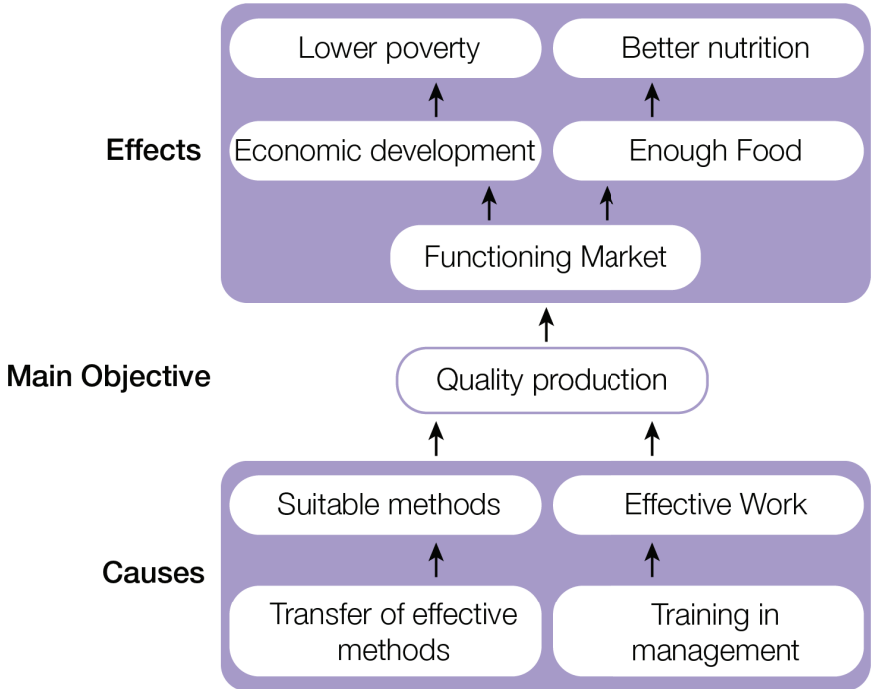
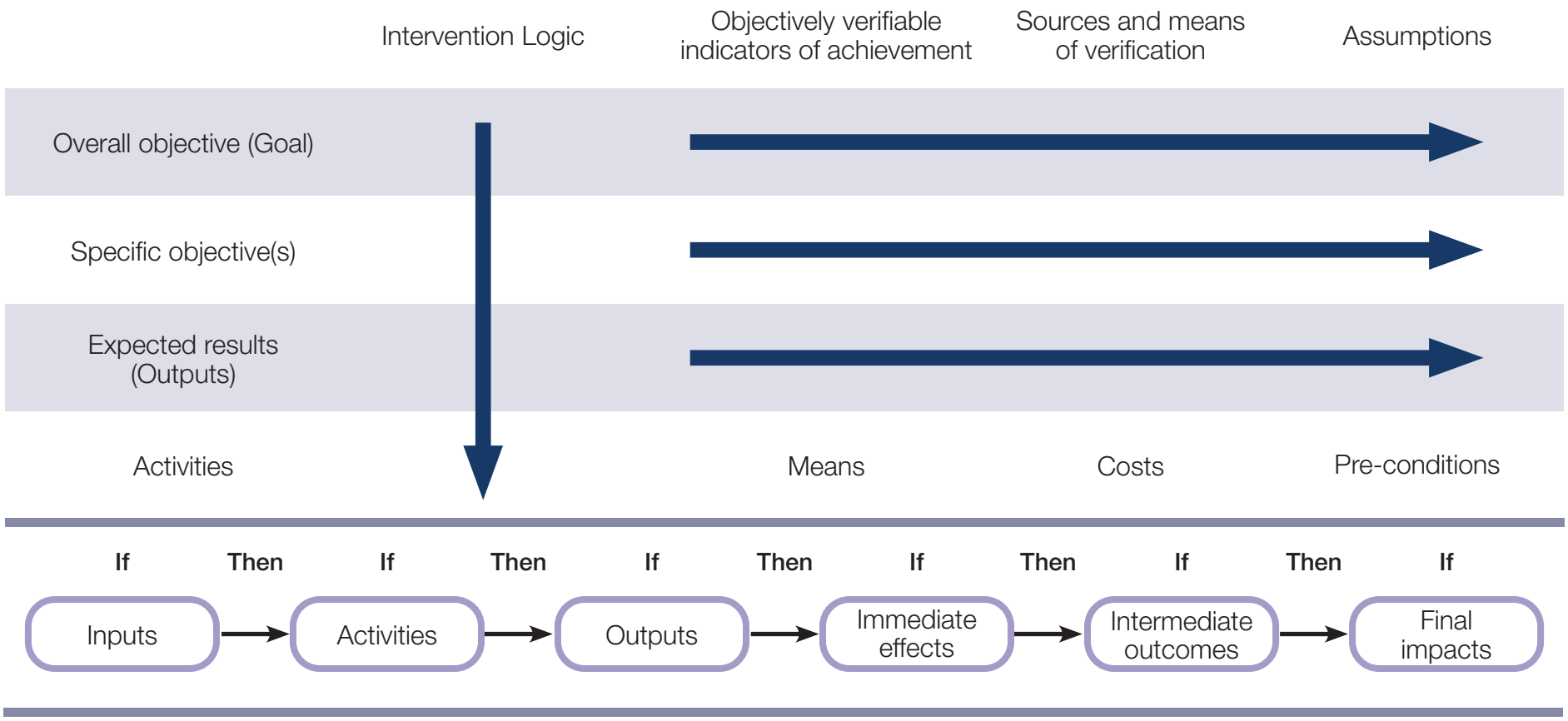


Figure 3.12 *Example objective analysis logic.*

Process Planning

The simplified version of the Logical Framework Matrix (LFM) represents another expression of the Theory of Change. The vertical logic ↑ corresponds to the universal structure of the resulting chain (impacts—outcomes—short-term effects—outputs). The horizontal logic → then includes indicators, sources and means of verification, and assumptions at specific levels of the result chain.

Table 3.6 Logical Framework Matrix—Simplified Version



3.5.B Drivers, Pressures, States, Impacts, Responses (DPSIR)

Integrate Ideas for Implementing Action

The marine environment is a complex system formed by the interaction between ecological structures and socioeconomic systems. Management of the marine environment requires an integrated approach that considers the environmental, economic, and social impacts of all activities. When managed sustainably, the marine environment provides a variety of ecosystem services. To understand the complexity of this system, the DPSIR[13] (Drivers—Pressures—States—Impacts—Responses) has been developed and used to comprehensively assess the causes, consequences, and responses to change.

DPSIR Framework

It is a valuable problem-structuring framework used for:

- **Drivers:** The activities or the sectors giving rise to the use of marine resources.
- **Pressures:** The mechanisms of change, the activities, or the sectors.
- **States or state changes:** The characteristics of the environment (natural science) or the change in the characteristics of the natural environment (social science).
- **Impacts:** The impact of the pressures on the state (natural scientists) or the resulting effect of the state change (social science).
- **Responses:** The actions performed to reverse adverse changes resulting from human use of marine resources.

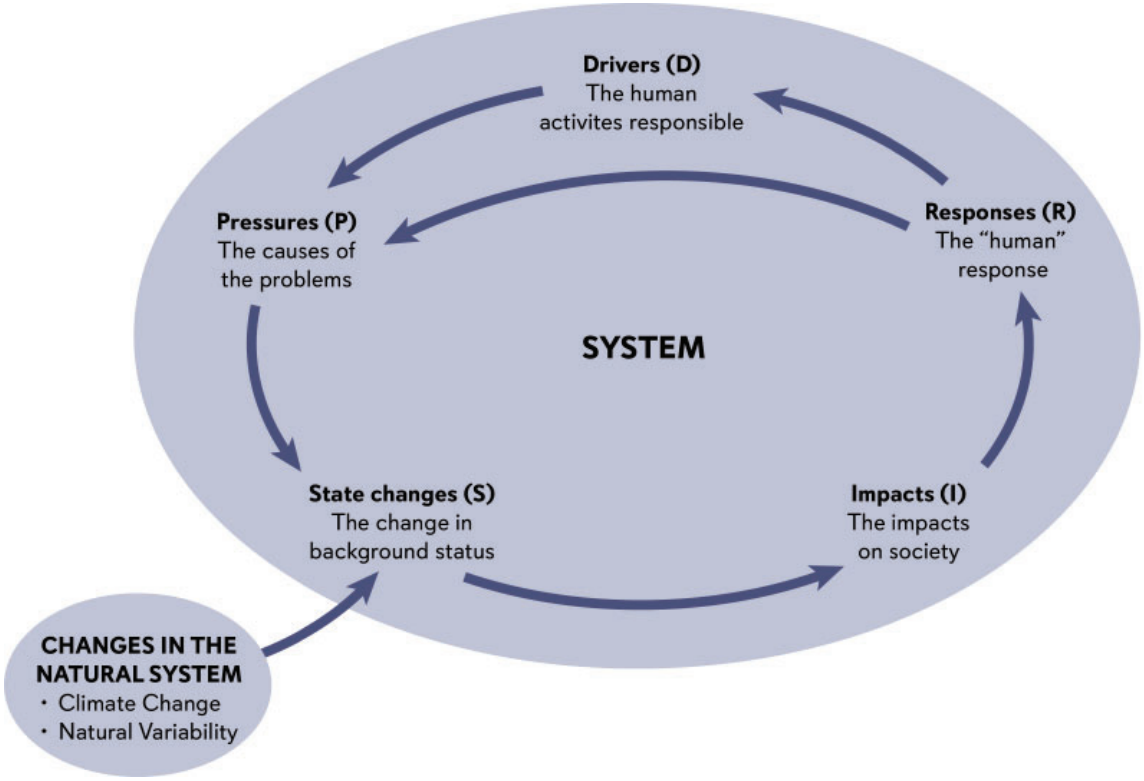


Figure 3.13 *Adapted from The DPSIR framework as a cycle and system in the environment (Atkins et al., 2011).*

[13] Atkins, J. P., Burdon, D., Elliott, M., & Gregory, A. J. (2011). Management of the marine environment: integrating ecosystem services and societal benefits with the DPSIR framework in a systems approach. Marine pollution bulletin, 62(2), 215–226. https://doi.org/10.1016/j.marpolbul.2010.12.012

3.5.C Modeling Complex Systems

Tools for Mapping Causal Relationships

In complex, dynamic systems such as non-linear feedback systems, it may be difficult to understand the relationship between structure and dynamics. It is challenging to identify the structural origin of unfavorable dynamics and strategies that can turn the dynamics favorable. This is because in non-linear feedback system, the system's structure governs its dynamic development. This development typically feeds back to modify the relative significance of the various structural components of the system, causing a shift in the feedback loop dominance, which then changes the subsequent dynamics of the system.

To increase our understanding of this relationship between structure and dynamics, system dynamics models use causal loop and stock-and-flow diagramming techniques, which effectively communicate with stakeholders and experts when eliciting their insights across the variety of sectors and disciplines they represent. Causal loop diagrams (CLDs) depict the perceived cause-and-effect relationships between variables (Figure 3.14) while stocks represent the state (magnitude) of variables. The level of a stock changes through its flows.

To validate the model effectively, simulation is used in the knowledge elicitation process to "confront" the participants with the dynamic consequences of their structural assumptions. System dynamics models can also be turned into Interactive Learning Environments (ILE) that "challenge" stakeholders and experts with different knowledge and opinions in different roles (influencers, managers, advisors, etc.). An ILE may take the form of a Management Flight Simulator (MFS) or a Serious Game (SG), through which participants can interact to fertilize the spread of knowledge, accentuate the formation of arguments and opinions, make explicit the identification of conflicts and disagreements, and, if possible, find compromises and consensus.

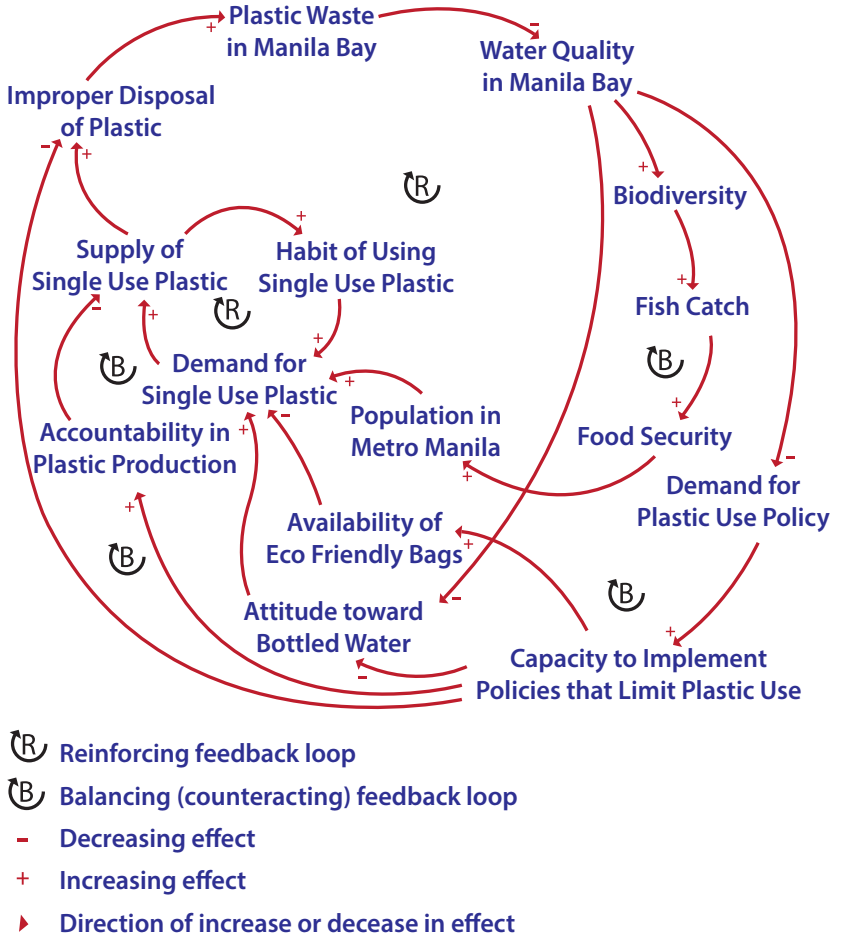


Figure 3.14 *Causal Loop Diagram created by stakeholders for plastic waste problem in Metro Manila.*

3.5.D SMART Target

Using SMART for Goal Setting and Indicator Selection

In adaptive socio-environmental management, SMART targets are used to create clear and adaptable objectives. Goals become structured yet flexible, facilitating ongoing learning and improvement while adapting to changing conditions and new information. The acronym SMART stands for:

- **S**pecific (simple, sensible, significant)
- **M**easurable (meaningful, quantitative, qualitative)
- **A**chievable (agreed, attainable)
- **R**ealistic (reasonable, relevant, results-based)
- **T**ime-bound (time-based, time-limited, time/cost limited, timely, time-sensitive)

Applying the SMART criteria can help create structured and accountable engagement processes that meet stakeholder expectations, incorporate diverse ideas, and achieve shared objectives. SMART Targets can also serve as evaluative indicators during project implementation as part of the adaptive management process, fostering efficient and practical execution.

SMART can also be used as a framework for selecting indicators when developing socio-environmental report cards (Table 3.7).

Table 3.7 Qualities to Look for in Indicators

Specific: An indicator should be clear and not open to different interpretations. For example, GDP may not be the most appropriate measure for a local community as it can be influenced by factors beyond their control. A more suitable indicator for such a scenario could be the percentage of locally-owned businesses.
Measurable: An indicator should be something that can be reliably and accurately measured. The measurements should be precise and consistent. For instance, if we consider the locally-owned businesses indicator, calculations would be relatively straightforward and consistent if business ownership data are available.
Attainable: Indicators should be practical, cost-effective, and easily measurable for better spatial coverage and frequency. Complex and expensive indicators may not be sustainable under budget and personnel constraints. Sediment toxicity may not be the best choice for indicators that require good spatial coverage and annual updates due to its expensive analysis and infrequent measurements.
Relevant: An indicator should align with the project's objectives and address the stakeholders' priorities identified in the values and threats exercise. For example, sediment toxicity might be highly relevant to project goals and stakeholder concerns. Even if it's expensive to analyze or is not updated as frequently as desired, it may still be worth including.
Time-sensitive: Indicators should respond to changes over time and their response time should be considered. Avoid slow indicators if you want to motivate stakeholders, or use the opportunity to educate them about the long-term nature of restoration.

Selecting Report Card Indicators

Indicators are an essential part of Report Cards as they offer valuable insights into a system. However, it's important to keep in mind that they can't capture every aspect of the system. Usually, a single indicator provides a limited view of a specific system component. The goal is to identify a group of indicators that, when combined, offer a comprehensive understanding of the system's condition.

There are many checklists available to outline the desirable qualities of indicators, and one such checklist is the SMART indicators checklist (Table 3.7). Finding indicators that fully meet the SMART qualities can be challenging. Therefore, the SMART framework should be viewed as a guiding principle rather than a rigid checklist that all indicators must strictly adhere to in order to be useful.

For the first Potomac River and Watershed report card[14], scores were calculated (Figure 3.15) using indicators that was used for the Chesapeake Bay and Watershed (Figure 3.16). Additional indicators that are more suitable to the Potomac River Watershed is currently being evaluated using the SMART framework.

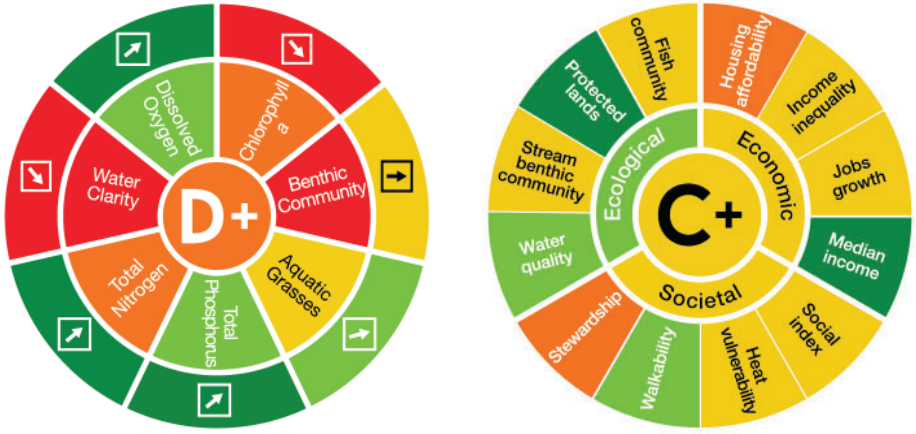


Figure 3.15 *Indicator wheels shown from the Potomac River Watershed Report Card 2022, with a D+ score for the River (left), and a C+ score for the Potomac watershed (right).*

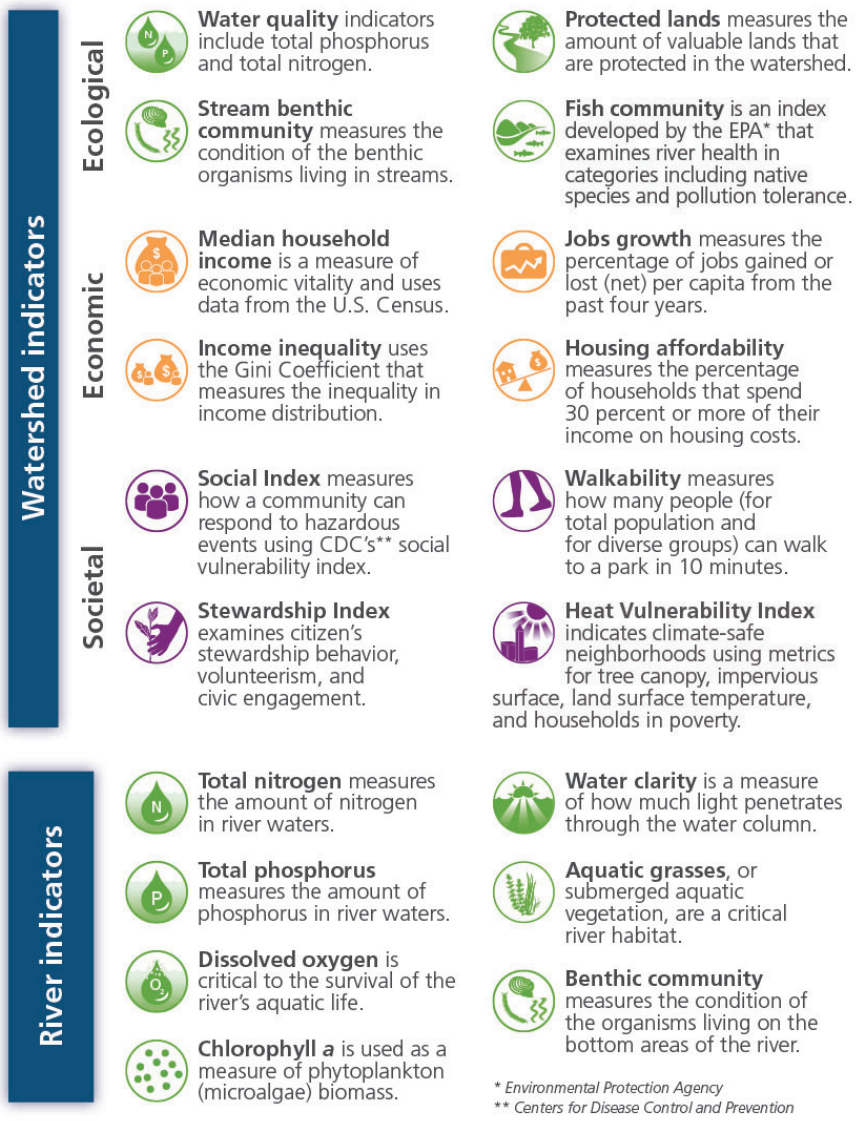


Figure 3.16 *List of indicators used in the Potomac River Watershed Report Card 2022. Credit: IAN Press.*

[14] 2022 Potomac River and Watershed Report Card. 2023. IAN Press. https://ian.umces.edu/publications/2022-potomac-river-and-watershed-report-card/

3.5.E Storyboarding

Enhancing Stakeholder Engagement Through Visual Communication

Storyboarding serves as an important link between conceptualizing ideas and crafting a structured, informative communication product. By employing this technique, stakeholders gain shared ownership over the content, ensuring its alignment with their diverse needs and preferences.

- **Organizing Complexity:** Before concluding a workshop, storyboarding aids in structuring intricate information into a clear, coherent narrative. It provides a visual framework, laying out the vital components in a logical sequence, thereby presenting data, outcomes, and insights effectively.
- **Fostering Engagement:** This technique leads to the development of more interactive and personalized content, accommodating the preferences of various stakeholders. Storyboarding also offers an initial draft for stakeholder feedback, allowing for refinements and modifications before the final product is developed.
- **Action-Oriented Insight:** Through visual representation, storyboarding highlights areas that need action or improvement, guiding stakeholders toward meaningful strategies for impactful outcomes.
- **Alignment with Workshop Goals:** Storyboarding ensures that the communication product resonates with the workshop's objectives and outcomes, maintaining consistency in conveying the discussed information.

The process of storyboarding transforms data and insights into an engaging, visually appealing narrative that is easy to comprehend. It fosters stakeholder engagement by offering a well-structured, comprehensible communication format catering to diverse audience preferences.

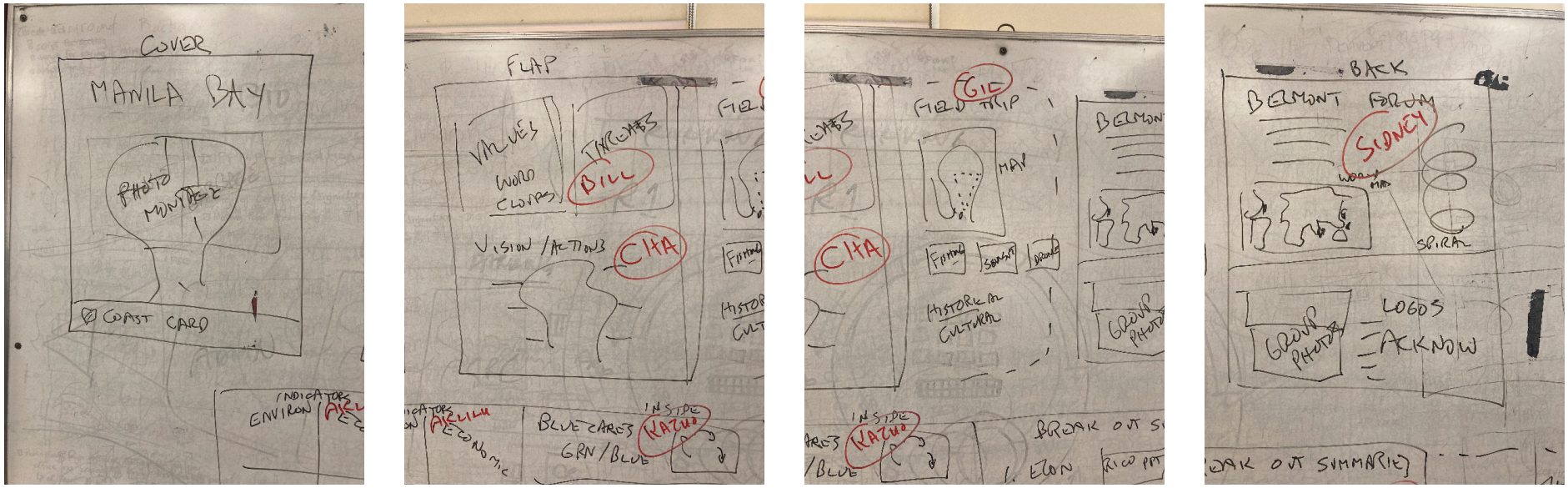


Figure 3.17 *Example of storyboarding a write up for the Manila Bay Workshop held in February 2023.*

Developing a Tangible Product Post-Workshop: A Step-by-Step Guide

Creating a physical product that stakeholders can collectively own involves a series of steps that serve as a road map for populating visual elements and text in the final communication tool, starting from the initial sketches in the storyboarding phase and concluding with the finished product.

- **Start Simple:** Begin with pen and paper or a whiteboard for initial sketches. This allows for flexibility and creativity in the early stages of brainstorming and organizing your ideas. Group thinking in storyboard sessions can enhance creativity, but it's advisable to conduct short sessions to prevent mental fatigue.
- **Utilize Limited Real Estate:** Visualize your content within a limited space to structure and prioritize content. Mapping out the space for visual elements in the initial storyboard helps allocate room for text, supporting word count estimations for text sections.
- **Mock-ups and Transition to Production:** Transition from hand-drawn sketches to a digital version, often using tools like PowerPoint to create a preliminary layout. It's a useful intermediate step before importing the material into document production software, such as Adobe InDesign, for the final layout and design phase.
- **Visual Elements:** Obtaining suitable photographs for communication products can be more difficult than expected, especially when dealing with workshop participants. This often involves obtaining permissions and attributions, as well as ensuring the quality of images. In such cases, conceptual diagrams can be used instead, or professional photographers can be hired to provide high-quality images.
- **Text Population and Evolution:** Populating text elements often involves group authorship production, starting with draft text for efficient editing. Maintaining a consistent vocabulary and voice throughout the document streamlines the editing process. Writing and revising the text can be time-consuming, but it is crucial for ensuring clarity and conciseness in the final product.
- **Refinement and Selection:** Refining content is a vital part of the process. It signifies a thoughtful selection and winnowing of information to produce a concise and clear end product. Despite the frustration of a prolonged process, the resulting concise, clear document results from an intensive collaborative effort.

By following these structured steps, organizers can turn the ideas generated during the workshop into a clear and concise communication product that engages stakeholders and promotes shared ownership. Figures 3.19 to 3.21 shows the progression of the storyboarding process for the Amamo 2023 and JCOAST newsletter.

Figure 3.18 *Cover of write up on the Manila Bay Stakeholder Conference and Workshop for distribution to all attendees following the conclusion of the event. Credit: IAN Press.*

Figure 3.19 *The storyboarding process from the J-COAST conference as all the facilitators sit and plan the layout and information that will be included in the newsletter about Amamo 2023 and J-COAST. Photo credit: Keita Furukawa.*

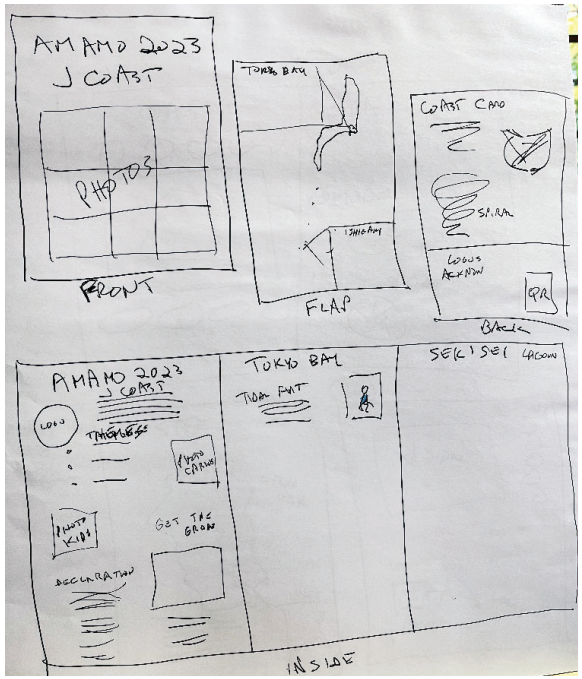


Figure 3.20 *Hand drawn sketch of the storyboard for the newsletter about Amamo 2023 and J-COAST. Photo credit: Vanessa Vargas-Nguyen.*

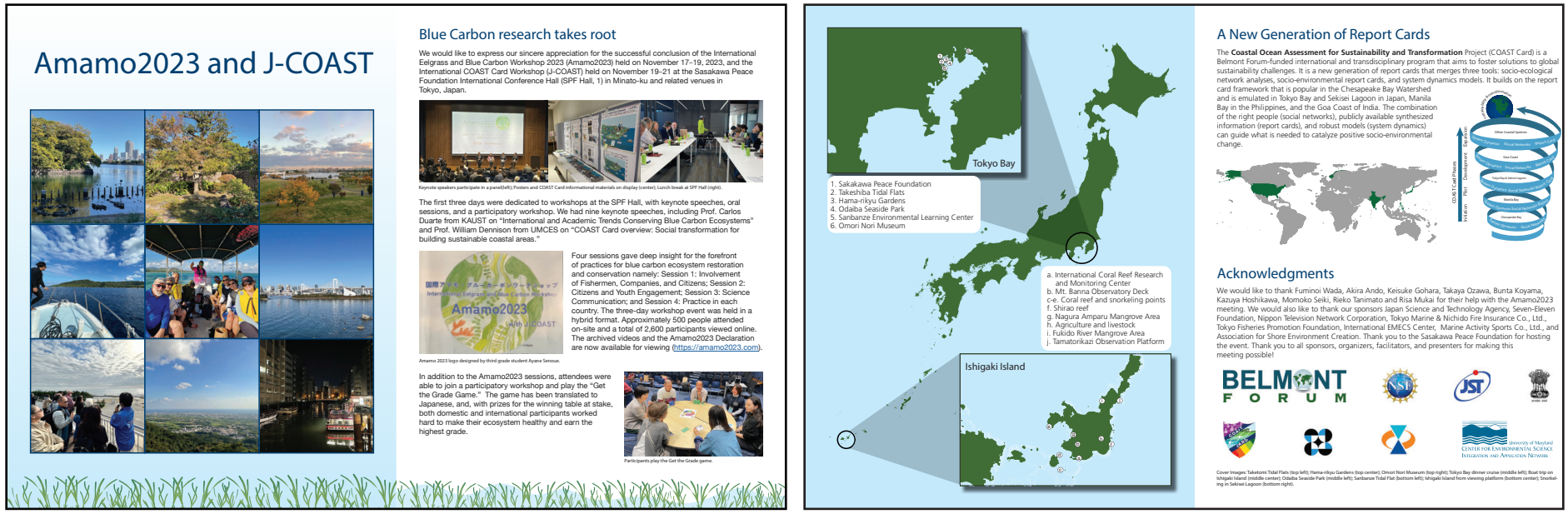


Figure 3.21 *The final newsletter layout produced for Amamo 2023 and J-COAST. Credit: IAN Press.*

Summary of Section 3

3.1 Ice Breaker

- The goal of an icebreaker is to create a positive atmosphere, help build trust amongst people of different backgrounds, increase comfortability and engagement, and promote collaboration to develop solutions.

3.2 Presentation

- Presentation will provide participants with base information for discussion.

3.3 Conceptualization

- Conceptualization tools can be used to facilitate collaborative discussions that go beyond simple information exchange.
- These activities are designed to develop a shared understanding and foster a collective vision among stakeholders.

3.4 Idea Mining

- SWOT (Strengths, Weaknesses, Opportunities, Threats) visualized group perspectives through the SWOT Matrix and Cross-Analysis Matrix.
- Mind-mapping is a way to structure ideas visually in a manner that is easy to understand and build on.
- Scenario Planning enables stakeholders to navigate future complexities while balancing present realities and past perspectives.
- KJ Method involves three steps: 1) Idea mining 2) Visualization, and 3) Compilation to text.

3.5 Idea Integration

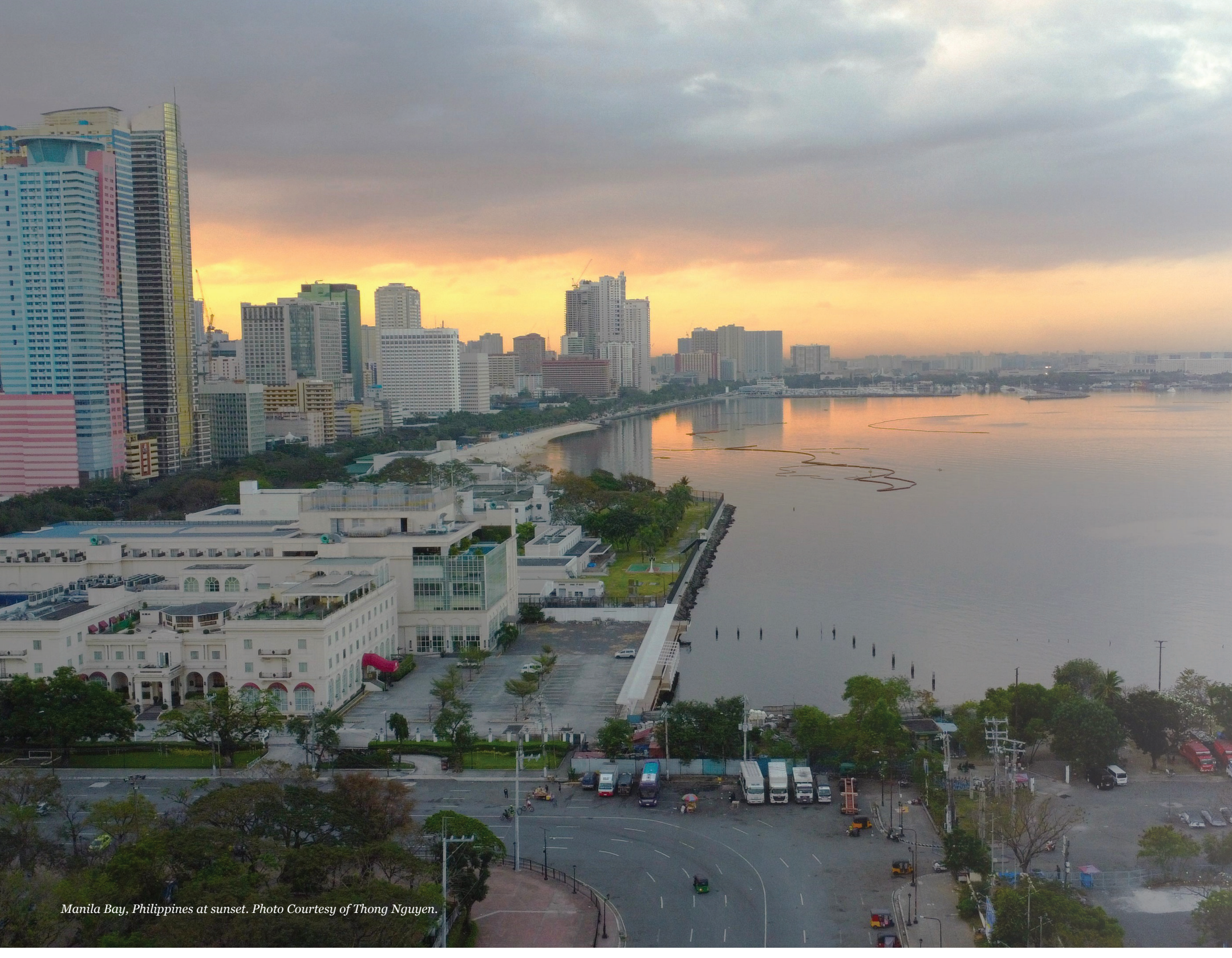
- Project Cycle Management is a methodology for specifying the causes of problems, visualizing the benefits of the project, and planning specific actions to solve the problem.
- DPSIR (Driving Forces—Pressures—States—Impacts—Sustainability) is used to comprehensively assess the causes, consequences, and responses to change.
- Causal loop diagram depicts the perceived cause-and-effect relationships between variables, and stocks represent the state (magnitude) of variables.
- SMART (Specific, Measurable, Achievable, Realistic, Time-based) is an acronym utilized for setting project targets, offering clear and achievable indicators for adaptive management.
- Storyboarding serves as an important link between conceptualizing ideas and crafting a structured, informative communication product.

Annual COAST Card meeting and stakeholder engagement session conducted in Goa, India in 2024. Photo Credit: Dattesh Desai.

Stakeholder Engagement session conducted in the Chesapeake Bay in 2021. Photo Credit: Sky Swanson.

Stakeholders in Ishigaki, Japan, attending a meeting at the 2nd Yaeyama SDGs Symposium hosted by the Yaeyama Local SDGs Council in 2023. Photo Credit: Kazuo Nadaoka.

Members of COAST Card team with local stakeholders in Manila, Philippines in 2023. Photo Credit: Gil Jacinto.



Manila Bay, Philippines at sunset. Photo Courtesy of Thong Nguyen.

4

Case Studies

Learning from experiences

CASE STUDY

4.1 Get the Grade!

Helping People Embody Stakeholder Motivations and Partnerships

The primary objective of this activity is to allow participants to understand the motivations and behaviors of various stakeholders by playing a character assigned in the game. After drawing a random character, the participant must negotiate deals, create partnerships, and vote in favor of their character's interests while taking into consideration the needs of other stakeholders at the table. The group is then scored on how well they work together and maintain the highest score overall by working together.

Broadening Perspectives Through Role-Playing

Role-playing activities enable stakeholders to embody different perspectives, encouraging a deeper understanding of various viewpoints and enhancing empathy. It promotes discussions, problem-solving, and decision-making in a dynamic and engaging manner.

Materials List

Per table:

- 1 Report Card Board
- 1 Basin deck (30 Cards)
- 1 Consequence Cards deck
- 12 Character Cards
- 6 Voting Cards (Yes/No)
- 6 Value Placards
- 1 Bag (for Grading Dice)
- 15 Grading Dice
- Table Score Card
- Number Cards (optional)
- Lanyards for name tags (optional)

Figure 4.1 *Example of Get the Grade Board in Japanese. This game can be translated into any language and is currently available in English, Spanish and Japanese.*

Playing the Game

1. Each player chooses a face down character card. Players will play the game as this character.

2. Players introduce themselves as their character.

3. Players with the same value sit next to each other to form a duo (some values will only have one player). Each value (player or duo) gets 1 value placard and 1 vote card. Each value (player or duo) randomly picks one die from the bag.

4. Each player rolls their die and hides it behind their value placard. The numbers on the dice track improvements or deductions to the status during game play. More importantly, the colors represent the current status of the value:

- Green = Great
- Yellow = Needs Improvement
- Red = Bad

5. Begin the game by moving clockwise around the table, players take turns drawing and reading aloud cards from the basin deck.

- All players (or duos) take turns drawing 1 card.
- Based on the card type, players must take different actions that affect the dice.
- Players should make changes to their dice as discreetly as possible.

6. When the room facilitator announces the Report Card, each value places their die on their value on the game board, revealing the sub-basin's Report Card:

- The players will fill out a sub-basin scorecard and give it to the facilitator.
- The facilitator will hold up the sub-basin's current score.
- (Optional) Corresponding colored stickers may be placed on the grade for each value on the game board so that players can track how the grade for their value changes.

7. All further changes to the dice are made on the game board for all to see.

Figure 4.2 *Group of stakeholders playing Get the Grade game at PHILCOAST conference held in Manila Bay. Photo credit: Jhon Darryl Lagdameo.*

Rules of the Game

1. The game consists of 3 rounds that are each 10-15 minutes long.

2. Players should make decisions that they think will most benefit their character.

3. Consequences for VOTE and DECISION cards can be found in the corresponding deck.

Scan here to request a copy of Get the Grade!

Card Types

Partnership Card

These cards represent the formation of stakeholder partnerships and the alliances that can bring lasting results. The player that draws this card role plays with a different value player to their left and right. The players to the left and right pitch why they should be the ones to form a partnership with. The player who drew the card decides who has the best pitch and gives them this card. The card is kept until the player who won it wishes to play it. It can be used for 1 of these 2 effects:

- Overturn a vote: when a vote card is drawn by any player
- Mitigate a disaster: by protecting 2 dice from its effects

Vote Card

These represent policy decisions. Players vote on whether the actions on the card will happen or not. Every player (or duo) gets 1 vote by displaying either the YES or NO on their vote card. If the group votes YES, take the actions on the corresponding card from the consequence cards. If NO, then no action is taken. In case of a tie, the tie is broken by the player who drew the card.

Event Card

Event cards represent major occurrences that impact the entire sub-basin. Players must do what the card says. If a player has won a partnership card, it can be used to mitigate the negative effects of an event card.

Decide Card

These cards represent how values are connected, and that decisions made in isolation still affect others who share the same water resource system. The player (or duo) empowered to decide may solicit input from any other values but can make whatever decision they want.

A Note on the Dice

- The dice represent indicators chosen by stakeholders at a local workshop.
- Rolling the dice represents gathering data for those indicators.
- The dice have differing amounts of red, yellow, and green stickers, representing how some indicators are more resilient than others.
- The color on the dice represents the result or status of the indicator. The numbers are only to help with the game play.

Figure 4.3 *A group of participants playing Get the Grade game at J-COAST conference. Photo credit: Takashi Kimura and Pheej Lor respectively.*

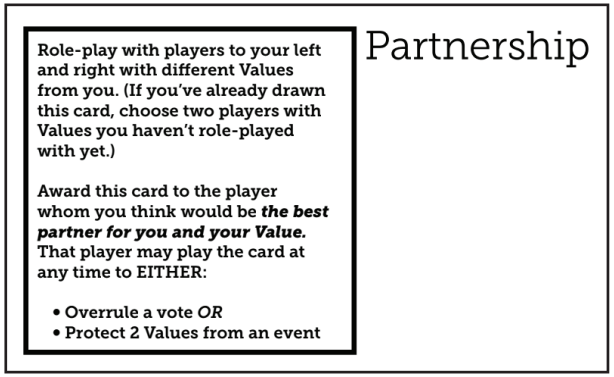


Figure 4.4 *Example cards from each category of cards in Get the Grade. Each of the cards have a consequence associated with the event or action taken.*

CASE STUDY

4.2 EdX Course at UMCES

How can we Empower Local Leaders?

Massive Open Online Classes (MOOCs) are an excellent way to engage stakeholders due to their accessibility, flexibility and interactive features. MOOCs are typically free or low-cost and can be accessed from anywhere in the world as long as there is an internet connection. This makes MOOCs an ideal option for stakeholders who may not have the time or resources to attend traditional training programs. Additionally, MOOCs are self-paced, allowing stakeholders to learn at their own pace. This is particularly important for busy stakeholders or those who need to learn at a different pace than others.

University of Maryland Center for Environmental Science (UMCES) has developed MOOCs that could count towards a professional certificate program in Environmental Management for Sustainability as part of its COAST Card project. These courses (Figure 4.5 and Table 4.1) offer an excellent opportunity to engage stakeholders and cover a wide range of topics related to environmental management, including sustainability, climate change, and resource conservation. They were designed to help learners gain knowledge about environmental issues, learn to make informed decisions based on data, and effectively communicate environmental policies.

Various stakeholders such as government officials, business leaders, and community members could take these courses which includes interactive elements such as discussion forums, quizzes, and assignments. This makes it possible for participants to engage with the material and each other, fostering collaboration, and building relationships.

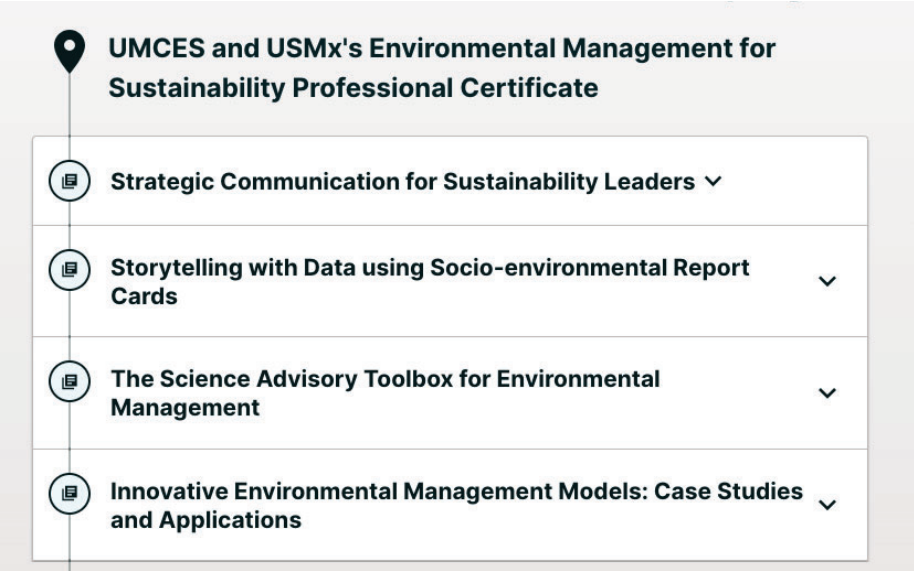


Figure 4.5 *Online interface of Massive Open Online Courses produced by UMCES.*

Scan Here to View Available UMCES EdX Courses!

Table 4.1 Massive Open Online Courses (MOOC) Developed by the University of Maryland Center for Environmental Science (UMCES)

"Strategic Communication for Sustainability Leaders" aims to impart skills crucial for engaging stakeholders effectively. By focusing on clear, concise scientific communication, data visualization, and storytelling techniques, the course enables participants to build trust, engage diverse stakeholders, adapt messaging for various audiences, and foster productive dialogue. These skills equip learners to be adept science communicators and effective stakeholder engagement practitioners.	**"Storytelling with Data Using Socio-Environmental Report Cards"** teaches effective communication of environmental and social issues through data. You will learn to create socio-environmental Report Cards and use storytelling techniques to engage audiences and motivate them to take action. The course equips learners with skills to develop engaging and persuasive stakeholder engagement materials, create a Report Card for their community, and use storytelling techniques in presentations and workshops.
"Science Advisory Toolbox for Environmental Management" is designed to provide insights into various environmental management principles, with a focus on science-based decision-making and collaborative problem-solving. Socio-environmentalism demands a science-based, grassroots movement to ensure healthy ecosystems and environmental justice. Overall, this course provides valuable knowledge and skills for effective stakeholder engagement in environmental management.	**"Innovative Environmental Management Models: Case Studies and Applications"** explores various ecosystems and assesses their management given the unique challenges they face. The course also introduces the COAST Card framework as a stakeholder-driven approach to managing complex socio-environmental systems. It provides learners with a range of practical approaches to address diverse sustainability and resiliency issues at different scales.

CASE STUDY

4.3 The Listening Session Model

How do we Engage Across all Levels of a Community?

Stakeholder engagement techniques are continually evolving to better reach all levels of a community. Addressing this challenge, the US COAST Card Team and the Global Sustainability Scholars, developed the Listening Session model in the summer of 2022 (Figure 4.6). This model has been used across the Chesapeake Bay watershed (Figure 4.7) and adapted at various COAST Card study sites to engage stakeholders effectively.

The Listening Sessions are designed to be open forums held in public spaces, inviting all community members to participate. Unlike traditional workshops and town halls, which often only involve specific managers or organizations, Listening Sessions are inclusive and encourage general public participation. This inclusivity provides unique insights into watershed characteristics and management. The sessions are continually adapted to be more accessible, especially to underrepresented communities and stakeholders of all ages, including children.

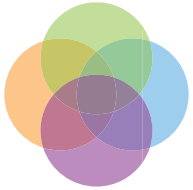
Figure 4.6 *Facilitators of the first Potomac Listening Session. Photo credit: Sky Swanson.*

Figure 4.7 *Facilitators interacting with participants at events hosted across the Chesapeake Bay. Photo credit: Lili Badri and Emma Gee and Sky Swanson respectively.*

The primary goal of these Listening Sessions is to inform the application of the COAST Card framework to a particular area, incorporating the daily experiences and concerns of local stakeholders. Participants engage in a series of stations (listed below) to provide feedback on valued characteristics of their watershed, perceived threats, desired future conditions, and actions needed to achieve their vision. This process captures how residents interact with their watershed and how management actions might affect their lives.

Why should you care?

Establishing a shared understanding with stakeholders and identifying their perspectives on current conditions, including values and threats facing the watershed is important for the COAST Card framework.

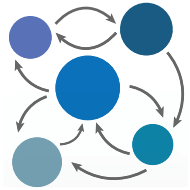


What do we measure?

After taking stakeholder perspectives into account, the next step in the framework is identifying social, cultural, economic, and governance indicators in order to create an inclusive socio-environmental Report Card.

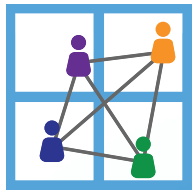
Where do we go?

Developing a shared vision and path forward for the watershed is necessary to ensure that the Report Card will be useful to the community.



What can be done?

Using system dynamics modeling, actions are ranked by quantifying indicator relationships, assessing management scenarios, and making recommendations for better outcomes.



Who should be involved?

Identifying stakeholders involved in Potomac watershed issues and determining who else should be included to improve collaborations through social network analysis.

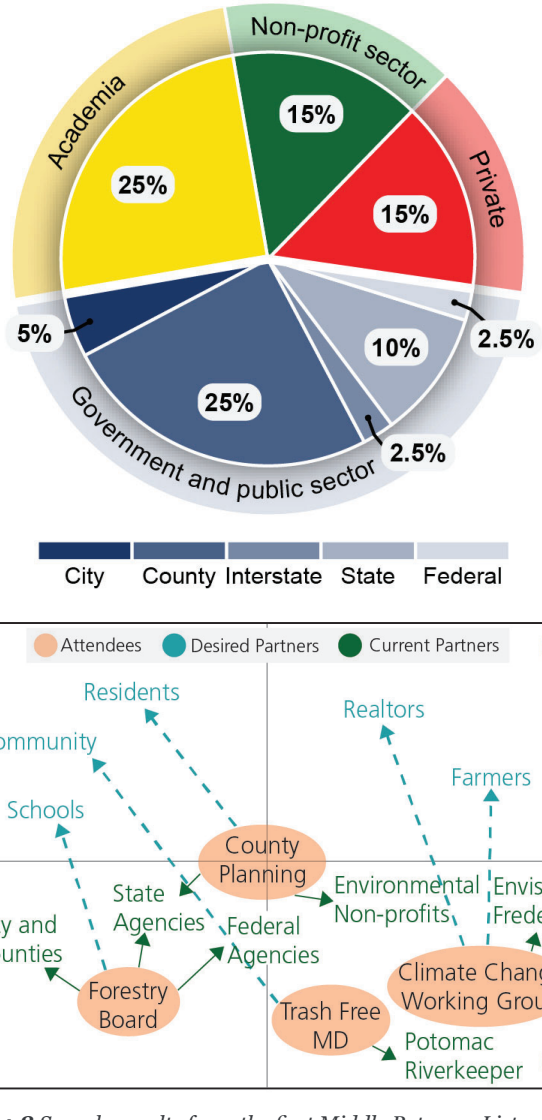


Figure 4.8 *Sample results from the first Middle Potomac Listening Session. The top diagram illustrates the distribution of attendees based on affiliation, and the bottom diagram is a representative stakeholder map that was generated during the event. Credit: IAN Press.*

CASE STUDY

4.4 Tokyo Bay Study Group in Japan

What Immediate Actions are Needed to Restore Tokyo Bay?

From October to December 2021, six participatory study sessions were held by volunteers with the aim of strengthening cooperation among people involved in a more comprehensive Tokyo Bay restoration and supporting project implementation. Table 4.2 describes the different considerations for each phase of Edo-mae Study groups, which included the objectives, planning, tools for engagement, and tools for facilitation. At the study sessions, topics were presented to deepen knowledge of Tokyo Bay, and workshops were held to discuss perspectives and objectives, stakeholder participation, impact transmission, and specific actions for the future regeneration of Tokyo Bay. As a result, the workshop concluded that actions based on a "vision of what Tokyo Bay should be," the creation of a mechanism for "information sharing" for this purpose, and a forum for discussion.

Recognition of Current Status and Expectations for Tokyo Bay

Responses to new issues in Tokyo Bay are needed. The participants hope to continue to hold study sessions and establish a forum for discussion.

Vision and Aim of Tokyo Bay Regeneration

A questionnaire was sent to participants at the first study session regarding the current image of Tokyo Bay and the desirable form of Tokyo Bay, and five points were indicated: Activity, Environment, Livelihood, and Biomass/Biodiversity.

In the second study session, we took the example of "balancing conservation and development" and analyzed its purpose and causes. As a result, it was extracted that the purpose of "balancing conservation and development" is to realize the richness of nature, spirit, and society/economy, and as a means to achieve this goal, it is necessary to formulate goals and visions, enhance data, and create opportunities for participation by all concerned. In the fourth study session, the participants were divided into four groups to discuss "what we need to know" in the restoration of Tokyo Bay: environment, organisms, activities, and topography/history. The results were organized as the Tokyo Bay Mandala, and the actions to be taken are summarized as follows:

- Let's envision what Tokyo Bay should be like.
- Let's centralize and systematically acquire biological data on Tokyo Bay.
- Let's create a forum for dialogue on new issues.

Scan Here to Learn More About the Edo-mae Study Group

Table 4.2 Edo-mae Study Group - Tokyo Bay, Japan

Phase	Item	Description
Objective	Situation Understanding	In Tokyo Bay, the first restoration action plan (RAP) was implemented by governments (Tokyo Bay Renaissance Conference: TBRC) in 2003, but it is not well-linked with academia, private sector and citizens. The second RAP was enacted in 2013, and the Public Private Partnership Forum for Tokyo Bay Restoration (TBPPF) was established. Nevertheless, an actual restoration project is not yet fully implemented. To understand risks and opportunities of the Tokyo Bay, a series of lectures were given to the participants on: Legislation / Restoration Action Plan, Planktons, Fisheries, Citizen participation and Ecosystem networks
Planning	Target Setting	The aim of the Study Group is to compile a specific action plan to enhance and accelerate the Tokyo Bay restoration.
	Role Sharing	Coordinator: COAST Card Japan / TUMST Edo-mae ESD Facilitator: COAST Card Japan Experts: TUMST Edo-mae ESD, TBRC, TBPPF, FRA Participants: Government, Private sector, Citizens & NPOs, Researchers, Students Observers: unknown (web viewer)
	Format	Online: 30-40 participants/session Archives: 30-190 view/session 90 minute session with two-week interval Series completed in 6 sessions (total 190 participants and 440 views)
Tools for Engagement	Facilitation Strategies	Set website for archives
	Type of Engagement	Online
	Tools to be used	Zoom, Breakout Room, Mentimeter, Jamboard, Slides
Tools for Facilitation	Notification	Leaflets are circulated by mailing lists
	Ice Breaker	Self-introduction in breakout room
	Presentation	Slide presentation
	Idea Mining	KJ Methods, PCM
	Recap	Video archives, Web reporting

CASE STUDY

4.5 PhilCOAST: The Manila Bay Experience

Engaging Locally and Internationally

Over the years, the state of the Philippine coastal and marine domains has been deteriorating, attributed mainly to natural hazards and different anthropogenic pressures that affect the sustainability of its resources. With the rapid increase of the Philippine population, various threats have emerged such as pollution, overfishing, and destruction of marine ecosystems especially in critically important areas such as Manila Bay. Despite the threats and risks, the bay has served as a socioeconomic and cultural hub in the Philippines, as well as a major international and local seaport. Its coastlines are bounded by three politico-administrative regions namely, 1.) The National Capital Region (NCR: 16 cities, one municipality); 2.) Region III: Central Luzon (five provinces, 13 cities, 81 municipalities); and 3.) Region IV-A: CALABARZON (three provinces, 13 cities, 54 municipalities). Human activities such as land reclamation and aquaculture could have largely changed the physical features of Manila Bay.

From 2021 to 2022, the Philippine Coastal Ocean Assessment for Sustainability and Transformation (PhilCOAST) conducted several activities linking various stakeholders in Manila Bay. These activities included stakeholders' consultations and workshops via Zoom and face to face platforms. A webinar and a customized training activity suited to the request and needs of the Department of Environment and Natural Resources (DENR) was

Figure 4.9 *A group playing get the grade at PHILCOAST. Photo Credit: Jhon Lagdameo.*

also conducted. Other government agencies such as the Department of Interior of Local Government (DILG)/ Local Government Units (LGUs) and the Philippine Coast Guard (PCG) were also involved together with representative farmers and fisher-folks from three study sites.

Close collaboration was forged and covered by "Memoranda of Understanding" with the Department of Environment and Natural Resources' Manila Bay Coordinating Office and the Philippine Coast Guard. With the support and participation of the aforementioned, international (i.e., the First COAST Card meeting) and local trainings and workshops were carried out. The COAST Card Collaborative Research Agreement (CRA) was presented and approved by the National Academy of Science and Technology- Executive Committee (NAST-Execom), the PhilCOAST implementing agency, in 2023. In addition, the following tasks will be completed in 2023-2024: 1.) Completion of the "State of the Manila Bay" report update, 2.) Development of the Manila Bay System Dynamics Model, 3.) Creation of the Manila Bay Ecosystem Health Report Card; and 4.) Participation in the 2nd and 3rd Belmont Forum-COAST Card (hosted by Japan and India, respectively).

Figure 4.10 *The Philippine Coast Guard ship that took COAST Card members and PhilCOAST attendees around Manila Bay and Corregidor Island. Photo credit: Thong Nguyen.*

Figure 4.11 *As part of the first global COAST Card meeting, a listening session workshop was held in February 2023 at the Philippine Coast Guard Headquarters in Manila Bay. Photo Credit: Gil Jacinto.*

CASE STUDY

4.6 J-COAST: Blue Carbon & Youth Engagement

How do we Engage Stakeholders that are K-12 Students?

Youth engagement was an important theme at the International Amamo Blue Carbon Workshop 2023 (Amamo2023/J-COAST), and two sessions were dedicated to it. One session focused on citizen/youth collaboration (Figure 4.14), and the other on science communication (Figure 4.12).

In Session 2, elementary school students in Osaka presented what they had noticed in their engagement with local fishermen's activities and marine environmental education. The elementary school students participated in the restoration works of eelgrass in Osaka Bay and learned experientially about the functions and benefits of eelgrass, such as carbon sequestration and habitat provision, as well as the life history of eelgrass and its relationship with fish and their juveniles. The second half of Session 2 consisted of presentations by a group of high school students who are working to restore the natural beauty of the coasts. They were selected from high schools that participated in the National Eelgrass Summit held in Japan. One high school girl from Okayama tried her hand at brewing soy sauce using eelgrass seeds to explore various uses for eelgrass. Another high school student from Fukuoka developed a method for regenerating eelgrass that suits the characteristics of the regional environment, a member of the forestry department from Kumamoto has been involved in eelgrass regeneration for many years at the request of local fishermen. A group of students from Osaka introduced their activities to teach elementary school children about the ocean and eelgrass. They were engaged with various stakeholders in the community and worked hard to make the ocean and "something for everyone (Minnano Mon)" by taking the issue into their own hands.

Figure 4.12 *Students and panelists at Amamo 2023. Photo credit: Pheej Lor.*

Scan Here to Learn More About Amamo 2023

In Session 3, the moderator, who is also an active announcer and researcher of science communication at the university leads the discussion (Figure 4.12). In the presentation, the opinions of university students and elementary school students from their respective perspectives were well-fitted within professional presentation e.g. the Integration and Application Network (IAN) science communicators from UMCES and divers who use video to communicate about Fukuoka's ocean. The university students are practicing their role of connecting university students with citizen groups engaged in activities related to the conservation and restoration of Tokyo Bay by sharing information through Social Network Systems (SNS) and emphasizing the importance of increasing the number of young people participating in environmental activities. In the process, she has realized the importance of carefully answering simple questions that beginner members have and is challenging herself to create her own workshops and teaching materials. A girl in the fourth grade of elementary school has challenged herself to create infographics and a picture book made by folding a sheet of paper, based on the difficulty she experienced when she learned about blue carbon and the realization that it is important to deliver on the same generation (Figure 4.13). In her presentation, she appealed to the audience, "Please don't withhold information from children just because it is difficult to explain."

Figure 4.13 *Student known as AmamoGirl pictured with her book about eelgrass. Photo credit: Takashi Kimura.*

Figure 4.14 *Students presenting at Amamo 2023. Photo credit: Takashi Kimura.*

CASE STUDY

4.7 J-COAST Ishigaki Island and Sekisei Lagoon

Toward Sustainable Island Society and Environmental Management

The coral reef ecosystems in Ishigaki Island and Sekisei Lagoon have degraded mainly due to terrestrial red silt and nutrient runoff, predatory crown-of-thorns starfish (COTS) outbreak, and coral bleaching. Emerging threats include coral disease, intensified typhoons, and a rapid increase in tourists and related unsustainable tourism developments. The recent declining trend of the resilience of coastal ecosystems after devastating disturbance events like massive coral bleaching is a serious issue. To improve the resilience, it is recommended that anthropogenic impacts be controlled.

Socio-economic developments in the past decades have caused a "phase shift" of the social system from a nearly self-sustaining and closed island system with low population pressure to an open island system with largely increased population, tourists, markets, economy, etc. This has led to rapid developments in the agriculture, fishery, and tourism sectors, causing significant anthropogenic impacts, which include terrestrial runoff from agricultural and livestock development, overfishing, and direct and indirect impacts from unsustainable tourism development.

The Sekisei Lagoon Nature Restoration Committee was established in 2006 under the Law for the Promotion of Nature Restoration (2002). It includes stakeholders such as governmental bodies, local governments, NPOs (Non-Profit Organizations), fishery associations, dive shop associations, private companies, local citizens, schools, and researchers. Despite various efforts like reduction of terrestrial runoff of red-silt and nutrients, implementation of marine protected areas, COTS removal, enhancement of public awareness, and environmental education, island-scale joint actions to control anthropogenic stresses have been limited, leading to the continued decline in reef ecosystem resilience.

Figure 4.15 *Inauguration ceremony of the Yaeyama Local SDGs Promotion Council held in Ishigaki City in December of 2022. Photo Credit: Kazuo Nadaoka.*

For example, the farmland in Ishigaki Island (Figure 4.16) and Sekisei Lagoon areas are the primary source of red-silt runoff. Although many technical measures have been developed to reduce soil erosion in farmland and subsequent runoff, their implementation by farmers has been limited despite repeated campaigns by various governmental sectors and NGOs. This is mainly because most farmers cannot afford to allocate their efforts to environmental conservation activities due to their poor status in income, aging, etc. Therefore, for extensively engaging farmers to realize island-scale joint actions, we need to vastly improve such an unsustainable agriculture situation, including its economic aspect. Similar conditions are present in the fishery and marine tourism sectors, where daily practices have damaged the reef ecosystems.

A key to changing tide for realizing a sustainable and resilient socio-ecological system at the island-scale is to vastly improve or renovate various industry sectors, including agriculture, fisheries, and tourism, and closely link among them with suitable support by governmental sectors, NGOs, etc. To achieve this, local stakeholders in Yaeyama, the region including Ishigaki Island and Sekisei Lagoon, established the Yaeyama Local SDGs Promotion Council in December 2022 (Figure 4.15). This council is primarily driven by private sectors collaborating with local governments, in contrast to the Sekisei Lagoon Nature Restoration Committee, which is mainly managed by the Ministry of the Environment. The council comprises several working groups: Education, Sustainable Tourism, Digital Transformation (DX), Biodiversity & Reef Conservation, Regional Circular & Ecological Sphere, and Sustainable Agriculture.

In December 2023, a panel discussion titled "Toward Sustainable Agriculture in Yaeyama" occurred during the 3rd Yaeyama SDGs Symposium. It was confirmed during the session that introducing the concept of "6th-order industry" could be a promising key step towards achieving sustainable agriculture. This term was proposed by Dr. Naraomi Imamura, an agricultural economist in Japan, and refers to business models that link the primary industry, such as agricultural and fisheries production sectors, with secondary industry (processing sectors) and tertiary industry (marketing or tourism sectors). It was also recognized that the "Yaeyama-style 6th-order industry" should be developed by incorporating environmentally friendly businesses, which can significantly reduce environmental impacts on reef ecosystems, thus creating high-added value and branding for agricultural products.

Following the success of the panel discussion, a series of meetings were held to provide a mini-round table-type platform. Participants from various sectors that are expected to be part of the Yaeyama-style 6th-order industry exchanged their experiences and ideas and discussed future visions. Similar mini-round table-type platforms are expected to be established to realize sustainable marine tourism and other industries.

Figure 4.16 *Agriculture is a massive industry in Ishigaki (top photo) and experts are collaborating with COAST Card members to create a more sustainable socio-ecological systems on the island (bottom photo). Photo Credit: Kazuo Nadaoka and Thong Nguyen respectively.*

CASE STUDY

4.8 COAST Card: Goa, India

Community Organization Focused on Environmental Management

The state of Goa has several village-level units called '*panchayats,*' and each of these units is the custodian for a particular village. The primary function of the Panchayat is to make provisions to promote health, safety, education, comfort, and overall well-being of the inhabitants of that area. These units make provisions and contributions for exhibitions, conferences, and seminars. They also have the responsibility to manage forests, wastelands, and pasture lands within their jurisdiction. Each of the villages has a 'Biodiversity Management Committee – BMC.' The BMC meets regularly to discuss the issues related to the biodiversity and development works proposed in the village which might harm or disturb the biodiversity of that region. Participation in such meetings and engaging the members of the BMC and local people will provide insights into the problems the villagers are facing towards the restoration of the clean environment and maintenance of biodiversity. There are 198 BMCs across different villages of Goa covering the entire watershed. Engaging the stakeholders during such meetings and asking them about the values and threats about the particular region and obtaining the information on possible vision for sustainable management of the resources of a particular village will lead to the generation of data required for creating Report Cards and developing SNA.

Figure 4.17 *COAST Card collaborators range across village panchayats, academics, and government officials. Photo credit: Dattesh Desai and Roshni Nair respectively.*

Gram Sabha: Village Counsel

'*Gram Sabha*' is the general assembly of all the people of the village, who have attained the age of 18 years. The Gram Sabha meets 2-4 times a year and the people of the village use this forum to discuss local governance and development and make need-based plans for the village. Such platforms will be utilized to engage the people who are the area's stakeholders to avail information on the environment, health, and socio-economic aspects. The information on the village-level units can also be obtained by having meetings with only the elected representatives of the village panchayat and the members of the BMC.

Listening Session

Listening sessions for the school and college students and officials from the Government departments were organized to obtain data from a wide range of stakeholders in the region. The participants were requested to respond to a series of questions that asked what they value in the state of Goa, what the potential threats are to those values, and what their ultimate vision is for the well-being of Goa's ecosystem and sustainability. They were also asked to point out the areas of Goa that they lived in, worked, or went to school in, and what areas they enjoyed recreationally. Furthermore, they suggested indicators that they would like to see included in the report about the state of Goa, which included answers such as acreage of non-development zones, and turnout for local festivals that bring awareness to fisheries. The responses collected in this listening session reveal a clearer picture of the environmental, socio-economic, and cultural aspects of the region that the stakeholders value.

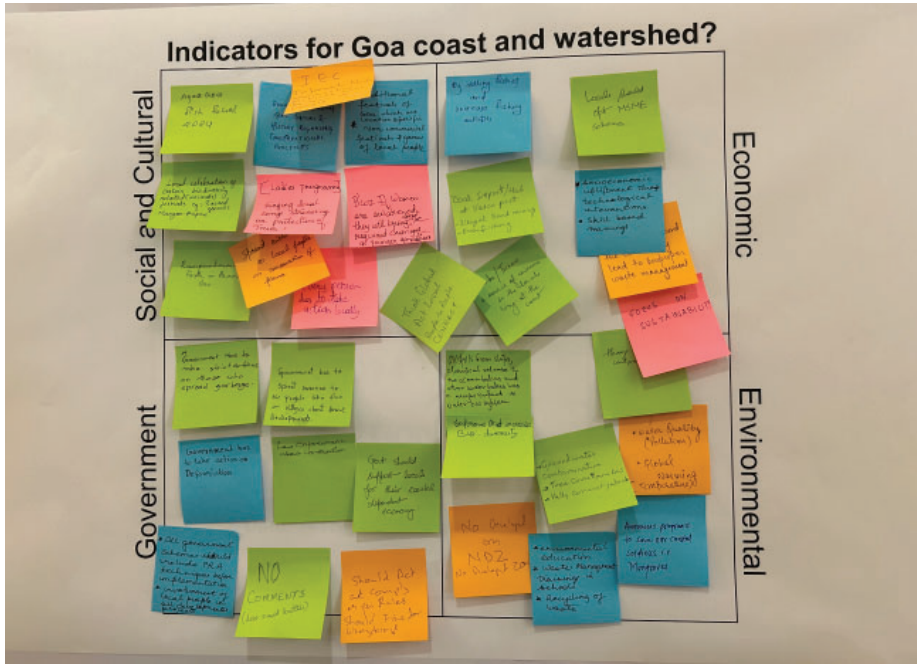


Figure 4.18 *Stakeholder input from the COAST Card conference held in Goa, India. Photo credit: Dattesh Desai.*

Figure 4.19 *Students giving their input at the stakeholder engagement session in Goa, India. Photo credit: Roshni Nair.*

CASE STUDY

4.9 Resource-Based Approach to Modeling

Qualitative Reasoning for Stakeholder Engagement

Using examples of stock and flow structures from the ongoing studies, the resources based approach will be explained in this section (see section A.3 and Section 3.5.C). These examples are meant to serve as the foundation for system dynamics models (SDM) of the five study sites as well as other similar sites in the future. The focus will be on how these structures interact and give rise to dynamics, and how the knowledge gained from this analysis can be applied to current issues and policy design. The modeling process starts with workshops that engage stakeholders and experts to understand their visions and concerns. These workshops provide an informal overview of the issues at hand, including identified problems and proposed solutions. Resources are critical in enabling the processes to unfold, and their capacity determines if they will be consumed or left untouched during the process. For each study site, the investigation covers the private, public, social, and environmental sectors, the services they offer, and their interrelationships. The private sector offers capital, the social sector offers the workforce, the public sector offers education and healthcare, and the environmental sector offers food production, recreation, and mining. Figure 4.20 illustrates how each sector interacts. The environmental sector provides services, the private sector generates revenue, the social sector acquires workforce, and the public sector uses taxes to finance infrastructure. After covering expenses, profit may be spent on dividends.

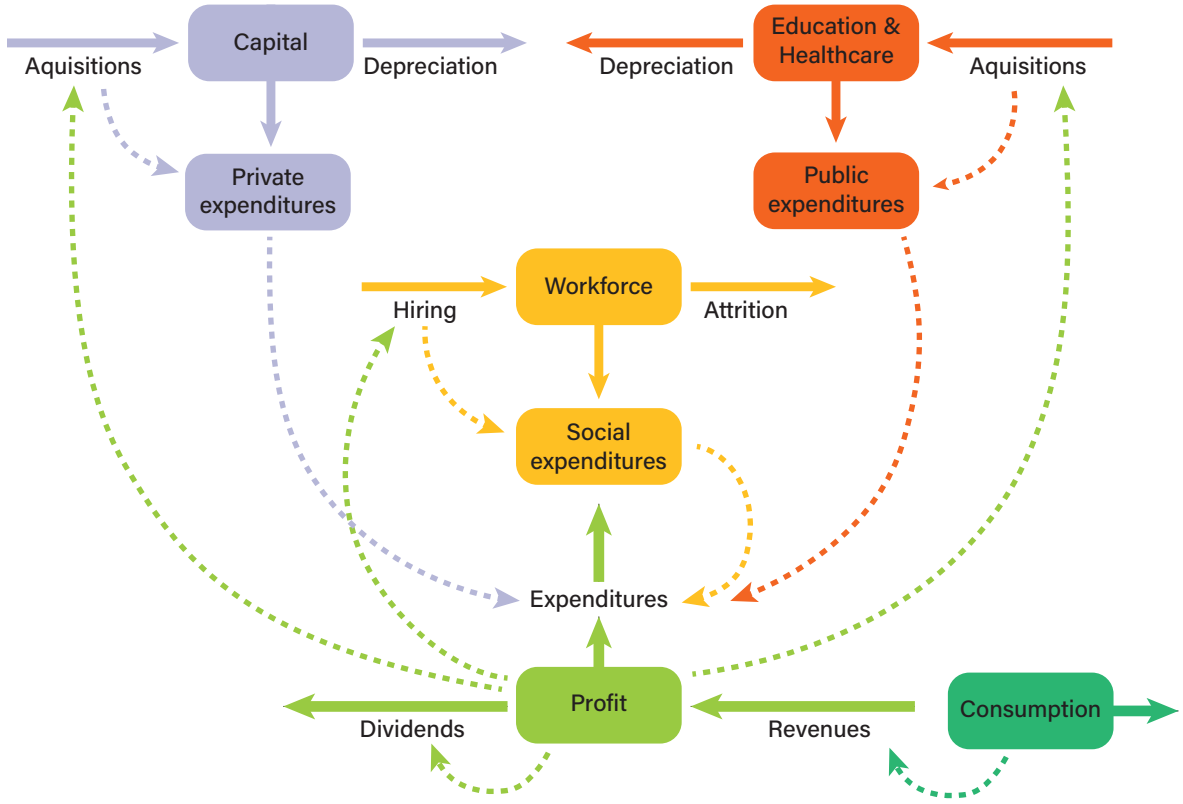


Figure 4.20 *An example of the inter-relationship between the private (purple), social (yellow), public (orange) and environmental (green) sectors.*

More food is produced to compensate for the supply-line losses, which causes more waste to accumulate and the waste absorption process to speed up, leaving the environment with less waste absorption capacity. Reducing food production would decrease the need for land rotation and leave more land available for recuperation. More natural nutrients would thus be produced and accumulate in the soil, and the need for artificial fertilizers would diminish. Less artificially applied nutrients would be accumulated, consumed by food production, or wasted by runoffs, reinforcing the beneficial effect of waste production from food consumption (Figure 4.21).

Increased waste production and food consumption may pose health issues resulting from pollution and lifestyle. The public healthcare sector could address each case as it matures. The social sector could also consume less food, while the public sector could increase its waste disposal capacity. To reduce pollution, the public sector may limit the use of artificial fertilizers or impose regulations on the velocity of land rotation, allowing the natural fertilization process to play out. Education is required for these preventive policies to take effect, a service also offered by the public sector.

Now having demonstrated the resource-based approach to modeling—an approach that facilitates qualitative reasoning during stakeholder engagement activities and that leads up to formal modeling, simulation, and analysis by way of system dynamics, which is the next step on the research agenda.

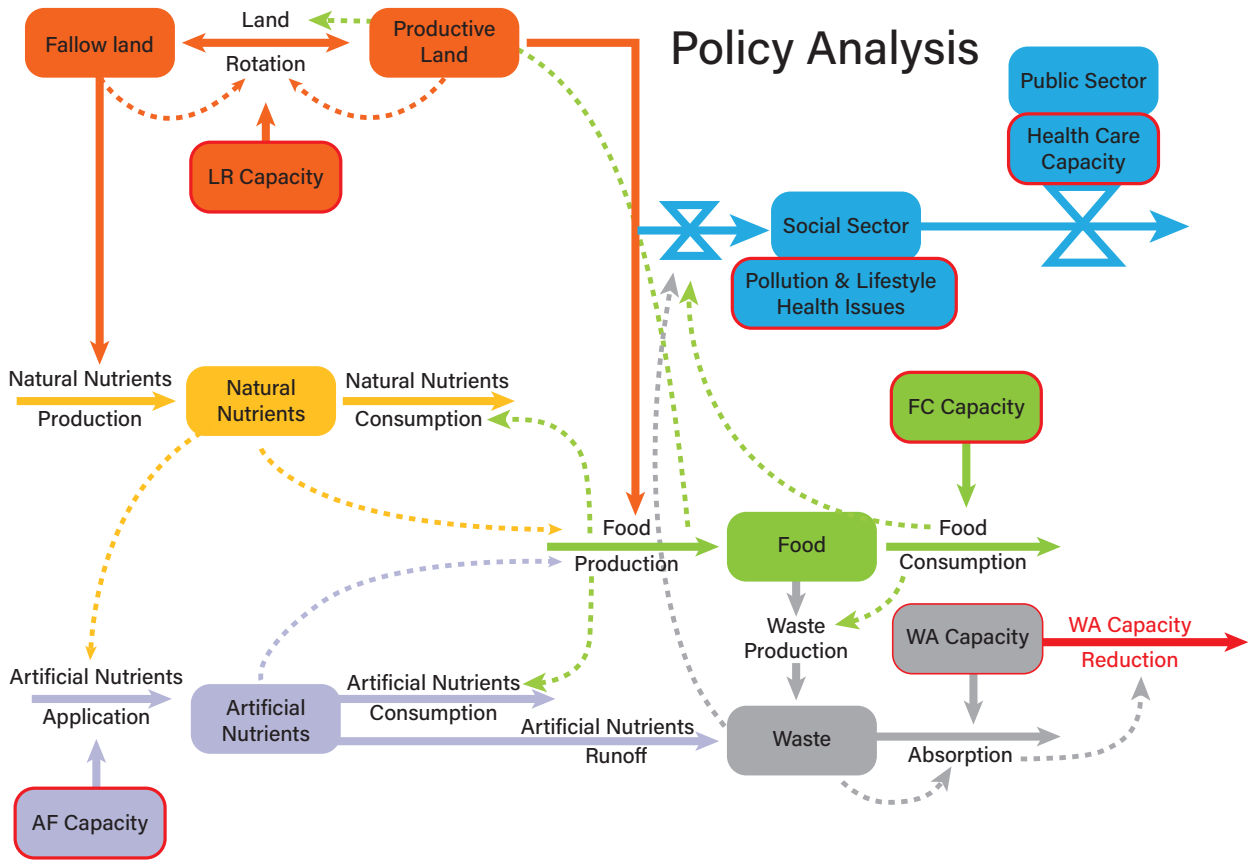


Figure 4.21 *A case study based on a qualitative, resource based analysis.*

Using Causal Loop and Stock-and-Flow Diagrams

To illustrate, we apply a resource-based approach in COAST Card. Resources must be preserved and nurtured to ensure a sustainable development over time. As illustrated in the stock and flow diagram (S&FD) in figure 4.24, the magnitude of a resource is represented by a stock, say a fish stock, that regenerates at an inflow rate governed by a positive feedback loop that is characterized by the fish fertility, and is depleted at an outflow rate that is governed by a negative feedback loop, characterized by the fish mortality.

If the fertility is permanently larger than the mortality, then the positive feedback process dominates the negative one and the fish stock grows exponentially. In the reverse case, the fish stock decays exponentially (i.e. is depleted). In reality, the marine environment it characterized by its carrying capacity, a stock, that defines how large a fish stock that the environment can entertain.

The implication is that, as the fish stock grows towards that carrying capacity, stress builds up, causing its fertility to diminish and its mortality to increase (dotted relationships). Thus, the regeneration rate diminishes and the depletion rate increases. These flow rates balance when the fish stock reaches the carrying capacity of the environment, bringing the stock to an equilibrium. Needless to say, that carrying capacity may also be subject to change over time (say, due to pollution or restoration), i.e. it may improve (an inflow) or deteriorate (an outflow).

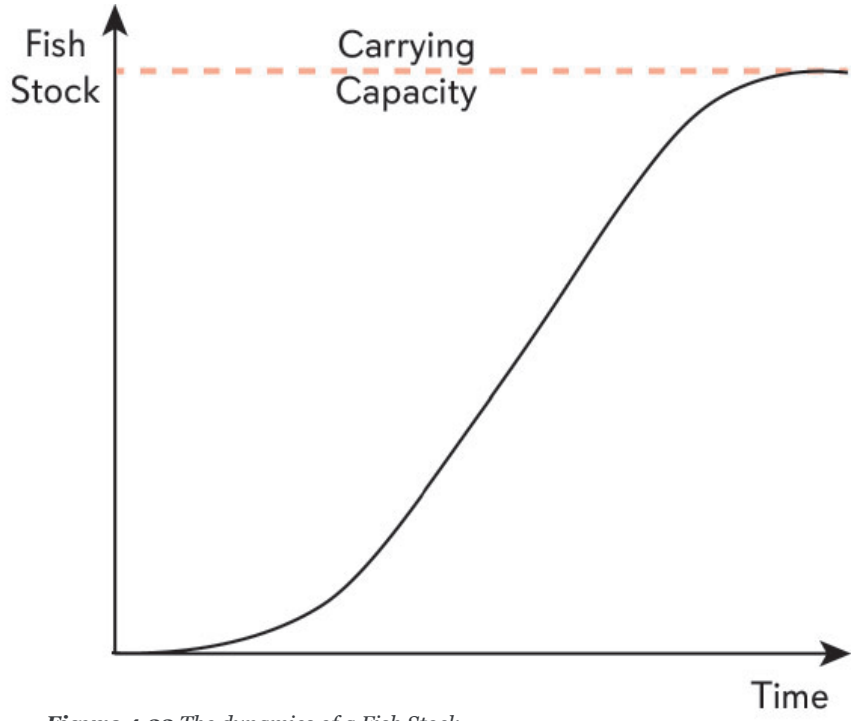


Figure 4.22 *The dynamics of a Fish Stock*

Figure 4.23 *A generic representation of a resource's stock and flow structure.*

Building on Causal Loop Diagrams

Using the causal (feedback) loop perspective illustrated in figure 4.25, the original two feedback loops can be visualized, highlighting their relative significance, characterized by the fertility and mortality, respectively, are governed by two additional (negative) feedback loops; one that causes the fertility to diminish and one that causes mortality to increase, due to the increased stress resulting from an increased fish stock.

The degree to which stress builds, is determined by the carrying capacity of the environment. This diagram constitutes and excellent point of departure for discussions with stakeholders and experts regarding factors that threaten the carrying capacity of our environment and ways to address those threats. Figure 4.22 illustrates the resulting dynamics, - i.e. how the fish stock develops over time, caused by the underlying feedback structure described in figures 4.24 and 4.25.

Up to an inflection point, the fish stock experiences increased growth, dominated by the original, positive feedback loop. Thereafter, it experiences diminishing growth, dominated by the original, negative feedback loop. In short, there is a shift in feedback loop dominance facilitated by the two outer, negative loops that involves stress, - a kind of shift that is only found in complex (non-linear) systems.

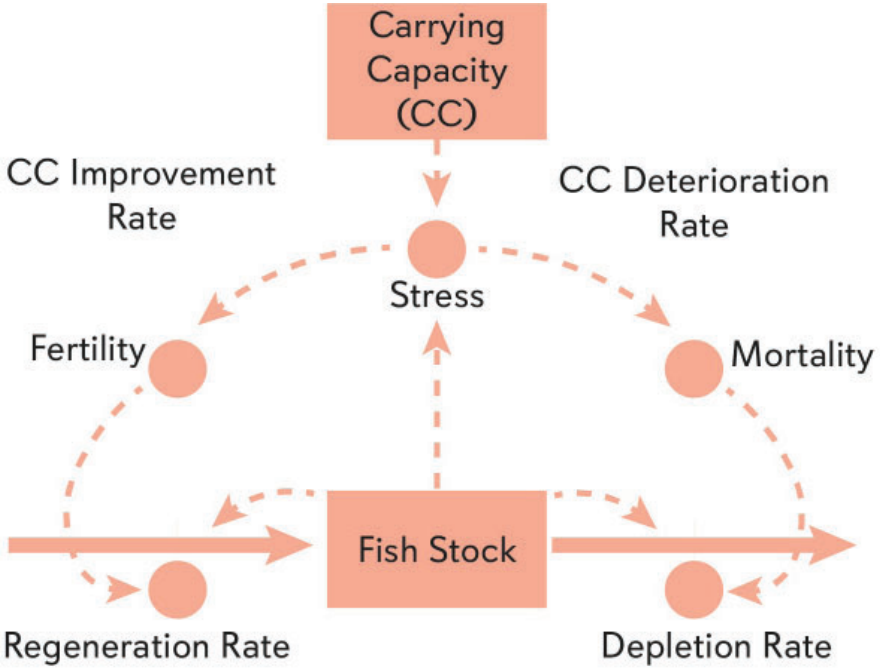


Figure 4.24 *A Stock-and-Flow Diagram of Fish Stock structure*

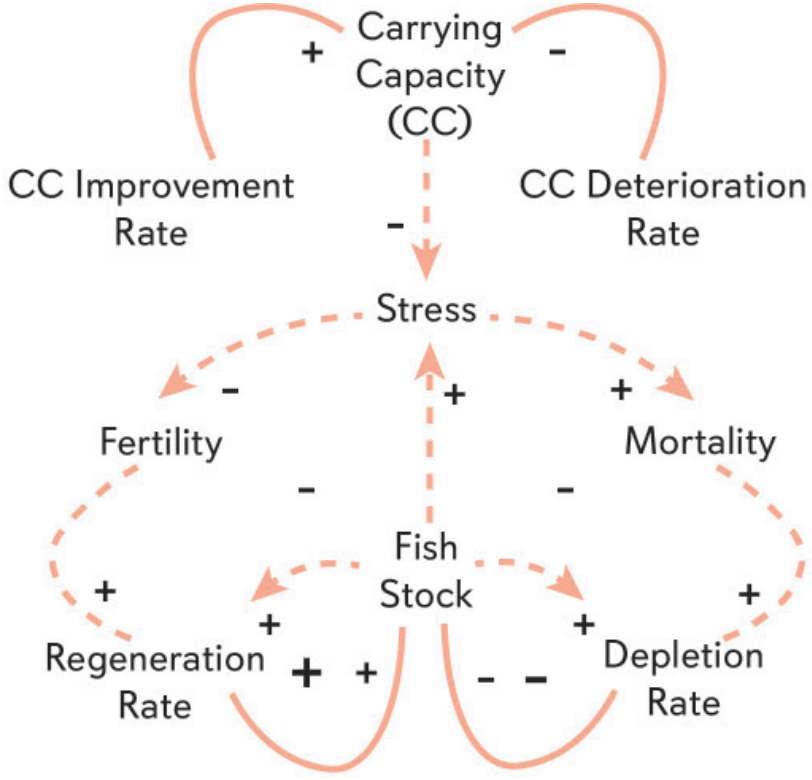


Figure 4.25 *A causal loop diagram of Fish Stock structure*

Summary of Section 4

4.1 Get the Grade!

- Role-playing activities like the “Get the Grade” game enable stakeholders to embody different perspectives, encouraging a deeper understanding of various viewpoints and enhancing empathy.

4.2 EdX Course at UMCES

- MOOCs are an excellent way to engage stakeholders due to their accessibility, flexibility, and interactive features.
- UMCES’s professional certificate program in Environmental Management for Sustainability covers a wide range of topics related to environmental management, including sustainability, climate change, and resource conservation.

4.3 The Listening Session Model

- Listening Sessions are meant to inform the development of the COAST Cards incorporating input from the people who live and experience that area every day.
- Participants provide input on characteristics they value about their watershed, characteristics they view as threats to its future, characteristics they want to see in its future, and actions that could achieve that vision.

4.4 Tokyo Bay Study Group in Japan

- Study groups were held to strengthen cooperation among people involved in more comprehensive Tokyo Bay restoration.
- Topics were presented to deepen knowledge of Tokyo Bay, and workshops were held to discuss perspectives and objectives.

4.5 PhilCOAST: The Manila Bay Experience

- The PhilCOAST conducted activities linking various stakeholders in Manila Bay, including consultations, workshops, webinars, and customized training activities.
- Close collaboration was forged with government agencies, farmers, and fisher-folks from three study sites.

4.6 J-COAST: Blue Carbon & Youth Engagement

- Youth engagement was a key theme at the International Amamo Blue Carbon Workshop 2023, with two dedicated sessions.
- Passing information to children is crucial, and young people should be encouraged to participate in environmental activities.

4.7 J-COAST: Ishigaki Island and Sekisei Lagoon

- For engaging and linking various stakeholders to realize island-scale joint actions, we need to largely improve the unsustainable situation of agriculture, fishery, marine tourism, etc., including their economic aspects.
- A promising key step for realizing sustainable agriculture is to introduce “6th-order industry” of Yaeyama style incorporating environmentally friendly businesses, which may largely improve agricultural industry and reduce environmental impacts on reef ecosystems.

4.8 COAST Card: Goa, India

- Goa has village-level 'panchayats' that promote the well-being of the inhabitants with their own 'Biodiversity Management Committee' and 'Gram Sabha' for local governance and development discussions.
- Organizing engagement activities for different stakeholder groups can provide insights into the region's environmental, socio-economic, and cultural aspects that stakeholders value.

4.9 Resource-Based Approach to Modeling

- Resource-based approach facilitates qualitative reasoning during stakeholder engagement activities leading formal modeling, simulation, and analysis by way of system dynamics.
- Causal loop and stock and flow diagrams help to identify the relationships between ecosystems, carrying capacity and demystify the underlying forces that impact the availability of any given resource.

Fishing Boats on the Zuari River at sunrise. Photo Credit: Dattesh Desai.

Paddling in the Potomac River. Photo Courtesy of Thong Nguyen.

Participants at the Manila Bay Stakeholder Conference and Workshop in Manila Bay, Philippines in February, 2023, including COAST Card Partners and local stakeholders.

BELMONT FORUM

INDIA: Ministry of Earth Science, Govt. of India

JAPAN: Japan Science and Technology Agency

NORWAY: Research Council of Norway

PHILIPPINES: Department of Science and Technology

UNITED STATES OF AMERICA: National Science Foundation

COAST CARD

University of Maryland
CENTER FOR ENVIRONMENTAL SCIENCE
INTEGRATION AND APPLICATION NETWORK

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Front Cover Photos:

Top: Field trip with the Philippine Coast Guard around Manila Bay. Photo Credit: Gil Jacinto.

Middle Left: Gobi eating workshop in Japan as part of a fishing, class, and eating engagement event. Photo Credit: Keita Furukawa.

Middle Right: Sampling on the Zuari River in India. Photo credit: Dattesh Desai.

Bottom Left: Stakehodler Listening Session in Cumberland, Maryland, Photo Credit: Llli Badri.

Bottom Right: System Dynamics Modeling workshop held at the Univeristy of the Philippines in February, 2023. Photo Credit: Gil Jacinto.

Back Cover Photos:

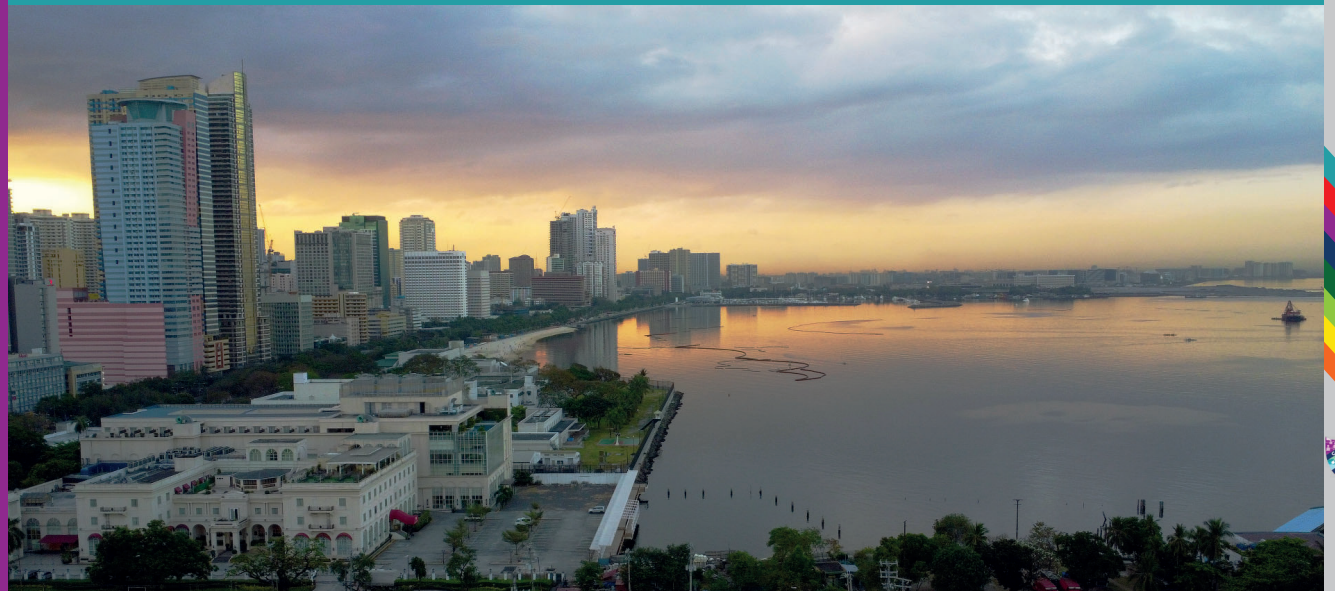
Top: Blackwater Wildlife Refuge in the Chesapeake Bay. Photo credit: Jane Thomas.

Middle Left: View overlooking the River Zuari Delta in Goa, India. Photo Credit: Roshni Nair

Middle Right: View of Tokyo Bay Skyline. Photo Credit: Thong Nguyen

Bottom Left: Mangrove islands on Ishigaki Island. Photo Credit: Vanessa Vargas-Nguyen.

Bottom Right: Manila Bay at sunset. Photo Credit: Thong Nguyen.



Tool Guide for Stakeholder Engagement in Coastal Communities