

Focus Area: **ECOSYSTEM AND NATURAL RESOURCE MANAGEMENT**

Market Segment: **MARINE ECOSYSTEM MANAGEMENT, CONSERVATION AND RESTORATION**

ISIC: n/a or 0210 (Forestry)

Segment Score: 23

Sample Investments:

- **Private:** Resorts investing for coastal resilience with coral reefs and mangroves
- **Public:** Establishing MPAs to run on a pay-for-use basis to dive operators, recreational fishing. Consider leasing to private park operators.
- **Public/Private:** Issuing environmental impact bonds to restore mangroves and seagrass, with repayments from credits sold on the voluntary carbon markets

1. Relevance to ADB Healthy Ocean Action Plan (Score: High=3)

- a. [Natural Capital Alliance](#), [TEEB](#) and other initiatives show that ecosystem management is essential for a healthy economy and society. Marine assets - or blue infrastructure - is the last segment of natural capital to gain attention from investors, risk managers and policy-makers. Forestry, water, wetlands, estuaries and land assets have been recognised as investable assets and conservation priorities for decades. These assets have conservation finance models that are being adapted to marine ecosystems - Payments for Ecosystem Services (PES) - so that they may be self-sustaining.
- b. Whilst DMCs have their priorities aligned with SDGs, they need to be more active in supporting them (Appendix, Figure2)

2. Positive Social Impacts? (Score: High=3)

- a. *Poverty:* When environmental protections are criticised for limiting jobs and wealth creation, this is a symptom of failed education and, sometimes, lack of transition management. Workers may need to be compensated for policies like “no fish zones and periods”. Workers may also need to be retrained to more sustainable practices in traditional industries (eg, fishing, tourism) or to replace destructive industries (oil/gas exploration, mining) with sustainable ones (eg, renewable energy, recycled and composite materials). Poverty accelerates when ecosystems are not managed properly because this reduces natural wealth that is the foundation of sustainable economic activity, not to mention health and climate resilience.
- b. *Gender:* Because of the strong connection between nature and every aspect of healthy society and family units, women should be in the forefront of ecosystem management. Women hold at least 50% of jobs in seafood and tourism, which depend on robust marine ecosystems. However, social customs often prevent women from leading on community decisions about ecosystem issues. Indigenous populations are also highly vulnerable to

environmental degradation because their traditions and livelihoods are profoundly dependent on healthy ecosystems. But often these voices are unheard when they conflict with the decisions of industry and policy-makers that are motivated by short-term profit.

- c. *Health/Covid19*: We know that Covid19 and similar viruses are ultimately a result of collapsing ecosystems (forest destruction, biodiversity loss, etc) so that nature is no longer able to self-regulate. In the marine environment, similar patterns are visible with species migration and extinction due to pollution and climate change. These imbalances will trigger human disease (witness plastic, mercury and other toxins ingested via seafood). It is imperative that we not wait for a marine-based pandemic to be the wake-up call for massive investment in MPAs and other marine projects (see *Figure5*). We need to protect and expand MPAs now. Some have suggested, however, that because of COVID-19 we must open up MPAs to industrial fishing. This would be folly. MPAs are long-term ocean investments that take decades to mature, but only days to erase. In addition to short-changing future fishers, dissolving ocean parks would be a blow to sustainable blue tourism.

3. Positive Environmental Impacts? (Score: High=3)

- a. Positive impacts include: climate adaptation & mitigation, biodiversity and sustainable livelihoods. Several assets need public-private finance to generate these benefits: coastlines, coral reefs, mangroves, seagrass, fisheries (see Segment 2), estuaries and wetlands. Projects may be implemented on a targeted basis for distinct assets and areas.
- b. The ocean is broadly stressed from problems like pollution, rising water temperatures, ocean acidification leading to collapse of ecosystems and biodiversity loss. Therefore, on a much larger scale than local ecosystem management, scientists agree that Marine Protected Areas (MPAs) need to be established for at least 30% of the ocean (from the current 7.4%). Benefits of MPAs have been well-documented for fisheries, tourism and carbon sequestration.

4. Potential for Market Scalability? (Score: Medium=2)

- a. Scaling conservation finance is a challenge that many are trying to solve. Whilst the need and possibilities are as vast as the planet, several hurdles must be overcome, which are examined at length by publications in our References. In summary, to scale conservation finance and ecosystem management, DMCs need to establish :
 - i. Supportive policy frameworks
 - ii. Project accelerators and Payments for Ecosystem Services (PES)
 - iii. Science-based usage and access plans
 - iv. Monitoring and enforcement capabilities
 - v. Impact Data: collection and distribution to stakeholders
 - vi. Access and tenure issues in favor of conservation
 - vii. Financial tools appropriate for the asset, tenor and goals
 - viii. Going beyond donor finance with finance and insurance tools
 - ix. Empowering communities to protect local ecosystems by restricting access to locals-only and sustainable-use only

- x. Educating communities about resilience and ecosystem values
- b. Part of overcoming the hurdles is to begin conservation projects with strong connections to usage rights and responsibilities by industries and communities. Many such connections are possible (see Appendix, Fig 3) without which ecosystem projects may never be financially sustainable. Following the example of the Seychelles Blue Bond, it is best to begin with this end in mind. Then governance, finance and community interests are aligned toward a common goal - as Seychelles recently announced it will go from protecting only 0.04% to 30% of its ocean territory. That's scalability!

5. **Capacity for Innovation & Growth? (Score: High=3)**

- a. Ecosystem Management is a field rooted in science which is evolving as new techniques and applications are discovered. Marine biology is the source of medical, nutrition and energy applications that have already been mentioned (algaculture, aquaculture). Marine energy, likewise, uses innovations that depend on sound management of ecosystems. Blue infrastructure uses natural marine defenses to strengthen climate resilience. All of these are career and community opportunities. The traditional Environmental Science degree has spawned specialty disciplines, including in the marine area, which are sought by industry and public authorities. For example, [3D printed corals are being created](#) as incubators for algae growth, with applications from coral creation to marine energy.
- b. Innovation in finance and insurance is trying to catch up with science-based projects for improved ecosystem management and, especially, coastal resilience. Groups like InsuResilience are creating hybrid strategies for long-term protection of coasts and islands. To a large extent, growth in this segment depends on close collaboration between science-finance-industry. The loss of coral reefs, productive fisheries and mangrove defenses make this an urgent call.

6. **Benefit from Regional Governance Frameworks? (Score: High=3)**

- a. Ocean ecosystems are, by definition, without boundaries. So regional governance is essential to manage them effectively. This is already embraced by governance frameworks with environmental initiatives, like:
 - i. [COBSEA](#)
 - ii. ADB Regional & SubRegional Offices
 - iii. UNDP & UN Environment
 - iv. [Pacific Island Forum](#)
 - v. [Pacific Community](#)
 - vi. [Secretariat of the Pacific Regional Environment Programme \(SPREP\)](#)
 - vii. [Commonwealth Blue Charter](#)
 - viii. [ASEAN](#)
- b. Collaboration among these regional and global organisations is also imperative. Notably, SoutheastAsia and SouthAsia cooperation on political and economic matters is explored in this [recent ADB Institute paper](#).
- c. Chinese state and industry interests are very active in Asia's blue economy and should be engaged constructively. This is particularly important for the environmental impacts of the [Maritime Silk Road Initiative \(MSRI\)](#), which involves port infrastructure and trade systems in many DMCs.

7. Opportunity for SMEs? (Score: High=3)

- a. Each blue economy sector relies on local enterprise engaging with the environment in sustainable ways. From harvested resources to pollution control to power sources to tourism, all require skilled and local talent. This is not only a SME growth opportunity but also a community opportunity, since most ecosystem assets are publicly-owned. Therefore, striking a balance between public ownership and private enterprise, as the Seychelles seems to have successfully done, is essential.
- b. Protecting marine assets for local SMEs and communities, as with fisheries and coral reefs, often involves limiting access by larger, foreign interests. Fishing quota management is a prime example. Local skills and values are the basis for ecosystem management and small enterprise opportunities. Yet local enterprises also need to be governed and held accountable to environmental best practices.

8. Attract Private Investment? (Score: Medium=2)

- a. There is a conservation finance debate that simply shows a gap of understanding: Not enough projects, say financiers. Not enough finance, say project developers. But projects that are structured with investor's needs in mind, and to produce positive economic outcomes, will attract finance. Options vary by source of finance, type of instrument, environmental asset and region. Part of the structuring challenge is to reduce risk for investors with tools like blended finance, insurance, governance, transparency and proven business models. This is where ADB's Ocean Finance Initiative (OFI) comes in. Part of the financial sales challenge is to aggregate projects across regions and environments so that scale is reached (>\$10mn to start a conversation with investors), providing diversification and multiple cash flow streams.
- b. Climate Adaptation & Resilience (CAR) is likely to become the top sustainable finance theme in this decade, replacing climate mitigation (eg, renewable energy, etc). Climate Bonds Initiative has issued Climate Resilience Principles (CRP) to guide institutional investors who are keen to reduce the resilience finance and insurance gap - which is especially urgent in the case of island and coastal nations. Blue Infrastructure Finance has been outlined in a recent paper by IUCN with the same goal: attracting private investment in ecosystem management. With a \$200bn green bond market, \$500bn impact investments and 1300 investors committed to sustainability, the call is out for ecosystem projects to be structured and scaled up.

Focus Area: ECOSYSTEM AND NATURAL RESOURCE MANAGEMENT

Market Segment: RIVER TO CEAN MANAGEMENT, CONSERVATION AND RESTORATON

ISIC: n/a

Segment Score:

Sample Investments:

- **Private:** Develop market-based models (water quality credits and other PES) for watershed-scale restoration
- **Public:** Aggregating river and habitat restoration projects across ADB regions to achieve scale under models that attract private co-investment

Note: This segment shares most comments and research with Segment A, so we will not repeat similar points. We will provide information relating only to River issues and opportunities.

1. Relevance to ADB Healthy Ocean Action Plan? (Score: High=3)

- a. Rivers flowing to the ocean are the source of nutrients, toxins, commerce and transportation. All directly impact ocean ecosystems and the blue economy. Rivers face the same issues as the ocean: overfishing and habitat loss due to climate, traffic and pollution. In Asia, the seasonal nature of monsoons and storms creates high stress and change during certain times, which impact ocean life. One cannot secure healthy oceans without managing the river systems. Conservation and sustainable enterprise finance is therefore needed for river systems.
- b. This workstream may be structured in three categories:
 - i. Tibetan plateau river systems traversing across DMCs, eventually draining to Pacific and Indian Oceans: Anadyr, Amur, Huang He, Yangtze. Irrawaddy, Salween, Mekong, Red River, Chao Praya. The stability of runoff from the Tibetan plateau is now threatened by climate change. (We disregard Tibetan-sourced river systems draining north to the Arctic Ocean)
 - ii. Other major river systems draining into the Indian Ocean:
 1. The Indus, Nerbudda, and other rivers of Western India, draining into the Arabian Sea;
 2. The Cauvery, Krishna, Godavery, Ganges, Brahmapootra, and other rivers of Eastern Hindostan; The Martaban and Sitang, draining into the Bay of Bengal
 3. Australia's Murray River and its three principal tributaries draining to the Indian Ocean.
 4. Note: We disregard the Zambesi and Limpopo from Southern Africa, as they do not travers DMCs.
 - iii. Smaller river systems draining into Pacific and Indian Oceans from coastal and island nations. These require local/national project development.

2. Positive Social Impacts? (Score: High=3)

- a. Poverty: We depend on rivers to be the lifelines for communities. Agriculture is the main industry using rivers for irrigation, upon which all communities depend for nutrition and jobs. Transportation, tourism, energy also depend on the integrity of river systems in most DMCs. However, climate change and pollution threaten to forever change our assumptions about rivers. Flooding, drought and toxins can destroy livelihoods and communities. Many such disasters can be anticipated and measures established to protect communities and ecosystems.
- b. Gender: Similar comments as noted for Segment A. Also note [this case study](#) from Lao People's Democratic Republic: an urban water project helped women to become water engineers through scholarships, training, and mentoring.
- c. Health/Covid19: Health has long been negatively impacted by agricultural and industrial runoff into river systems. Easements and regulatory controls are among the tools needed to restore and protect watersheds, river basins and deltas. For Covid19, the same observations apply as noted for Segment A - with the same recommendation that now (and post-Covid19) is the time to tighten, not loosen, environmental controls across river ecosystems.

3. Positive Environmental Benefits? (Score: High=3)

- a. Inland and coastal communities are all highly impacted by river systems. Their interdependence with marine ecosystems requires investments to be considered as one. Likewise with direct runoff from land to sea from urban, agricultural and industrial sources. Any investment that benefits river ecology will benefit marine life. Seasonal rains and storms cause rivers to change shape, flood and disrupt adjacent communities.. This also requires investment in preventive measures.
- b. The case we have made for MPAs in Segment A is similar to the case for easements and other protections of river systems. Both are needed to protect the blue economy. Much attention has been recently given to the fact that 8 of the 10 rivers at the source of 90% of ocean plastics are in Asia. This calls for urgently making the river-marine connection and stepping up regional action.

4. Potential for Market Scalability? (Score: Medium=2)

- a. Scaling conservation finance for river systems has had more traction than for marine systems, due to the historically stronger connection of river systems to urban centers and agriculture. Making the new connection between inland waterways and marine ecosystems, in fact, is the key to scaling both to new levels of investor participation.
- b. These [Blueprints for Investment in Watershed Management](#) provide cases and guidelines for restoration of rivers and wetlands.

5. Capacity for Innovation and Growth? (Score: High=3)

- a. Technology innovation is helping to reduce river ecosystem damage. Each of these trends is a driver for opportunities for investors and local enterprises:
 - i. Waste management (see Sector 5: Pollution Control)
 - ii. Hydro-electric power generation
 - iii. Zero-emission vessels (inland waterways are leading this important trend)
 - iv. Water treatment systems
- b. Innovation is also happening with financial tools like [Water Quality Credits \(WQC\)](#) that calculate and quantify the ecological recovery achieved through environmental restoration projects. In this way, river projects create water quality credits that can be

traded or purchased by wastewater treatment facilities, power plants, developers, and other entities that need to meet regulatory compliance requirements and mitigate negative environmental impacts. The purchase of these credits is then used to finance environmental interventions by landowners or NGOs – such as planting trees near rivers and streams to filter water and lower water temperature. This solution is a win-win since these natural restoration methods offer greater environmental benefits at a significantly lower cost than traditional engineering interventions that are currently used. ([Case Study Source](#))

6. Benefit from Regional Governance Frameworks? (Score: High=3)

- a. Major river systems have long been a focus of regional governance, as they traverse multiple countries. Their importance is seen in the needs of urban centers, agriculture, energy, transportation and tourism. Competition for water rights has always been present and may escalate with climate change.
- b. ADBs is supporting the Government of Bhutan to implement an Integrated Water Resources Management (IWRM) approach. This is a governance model to harness and sustainably manage water resources. However, the connection to marine resources needs to be made by ocean and island governance frameworks.

7. Opportunity for SMEs? (Score: High=3)

- a. Because of the multi-sector usage of river systems, SMEs participate in many activities. Each of the blue economy sectors is active in river systems.
- b. Conservation and ecosystem management by such SMEs is an emerging opportunity, particularly in areas like marine energy, aquaculture/algaculture and pollution control. Asian developing countries have a competitive advantage in the first two of these sectors, and a high responsibility to participate in solutions to pollution control with the 8 rivers that are major contributors to plastic waste in the ocean.

8. Attract Private Investment? (Score: Medium=2)

- a. The same issues noted under marine ecosystem investing apply to river investing. Most investment depends on proven public-private models, from blended finance to regulatory controls, PES and Water Quality Credits. Aggregating projects between river and marine systems is the next phase of meeting the substantial needs of this segment with the requirements of private investors.
- b. The other key to market scalability of river investments is risk management. Traditional flood risk is a well developed insurance specialty. With increased climate-driven flood risks, resilience insurance is increasing the focus on river systems with groups like [InsuResilience Global Partnership](#). Drought reduction is the twin of flood management, also the focus of hybrid insurance-finance products. Adding to this the river-marine interdependence, risk managers are becoming a more visible presence in structuring private investment in river systems.

REFERENCES: MPAs, REEFS, MANGROVES

[TEEB: The Economics of Ecosystems and Biodiversity](#)
[Natural Capital Finance Alliance](#)
[Blue Natural Capital Financing Facility](#). IUCN

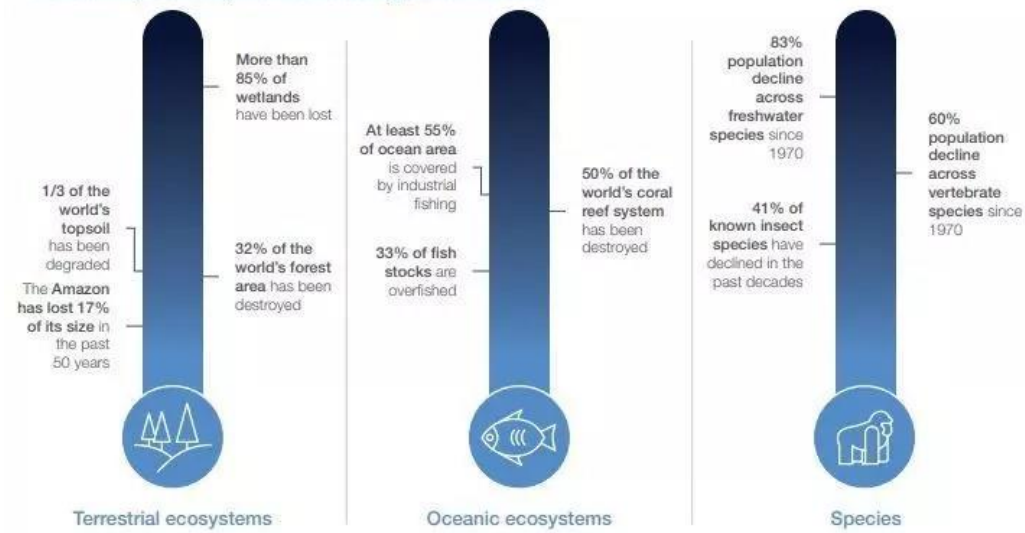
[The Coalition for Private Investment in Conservation: Conservation Investment Blueprint: Public-Private Partnership for Marine Protected Areas](#)
[Gender and Natural Resource Management](#). Earthscan Publishing.
[Covid19 and Nature are Linked](#). World Economic Forum
[Will Covid19 Help or Hinder Efforts to Develop Natural Climate Solutions?](#) Ecosystem Marketplace
[Nature Risk Rising](#) World Economic Forum
[Capitalising Conservation](#). WWF, Clarmondial
[Connecting Finance and Natural Capital](#). Natural Capital Coalition and UNEP-FI
Conservation Finance: The Building of an institutional asset class. Credit Suisse
[Ocean Protection](#). NatureVest
[Seychelles Dramatically Expands its Protected Ocean](#). UNDP Stories, May 2020
[Climate Resilience Principles](#)
[Blue Infrastructure Finance](#)
[Finance Resilient Atolls: Strategies & Tools for Success](#). [Ocean Assets Institute](#),
Presentation to ADB High-Level Dialogue for Resilient Atoll Nations, Aug 2019.

REFERENCES: RIVERS

Catalogue of rivers for Southeast Asia and the Pacific. [IHP Regional Steering Committee for Southeast Asia and the Pacific](#)
[River System of the Indian Ocean](#)
[The Freshwater Trust: Investing in River & Stream Restoration](#). Packard Foundation
[Water Quality and Security in Asia and the Pacific ~ What 3R and Circular Economy can Offer?](#) Prof. C. Visvanathan. UN Centre for Regional Development. 2018
[Financing Water: Risks & Opportunities](#). UNEP-FI Issues Paper.
[World Water Development Report on Nature-based Solutions to Water, 2018](#). UN Water.org
[Blueprints: Green Infrastructure for Watershed Management](#), CPIC
[Tapping Into the Potential of Women in the Water Sector](#). Development.Asia
[Taking a Sustainable and Holistic Approach to Water Resources Management](#).
Development.Asia
[90% of plastic polluting our oceans comes from just 10 rivers](#). [WE Forum](#). 2018

APPENDIX

FIGURE 1:
Human activity is eroding the world's ecological foundations



Source: IPBES, 2019, "Global assessment report on biodiversity and ecosystem services"; Maria-Helena Semedo of the Food and Agriculture Organization (FAO) at World Soil Day 2014; The Economist, 2019, "On the brink – The Amazon is approaching an irreversible tipping point"; WWF, 2018, "Living planet report – 2018: Aiming higher"; F. Sánchez-Bayo and K.A.G. Wyckhuys, 2019, "Worldwide decline of the entomofauna: A review of its drivers", Biological Conservation.

Figure 2: Variation in DMC priority levels - SDG14. [Taking Stock of Asia's Response to Environmental Sustainability. Development.Asia](#)

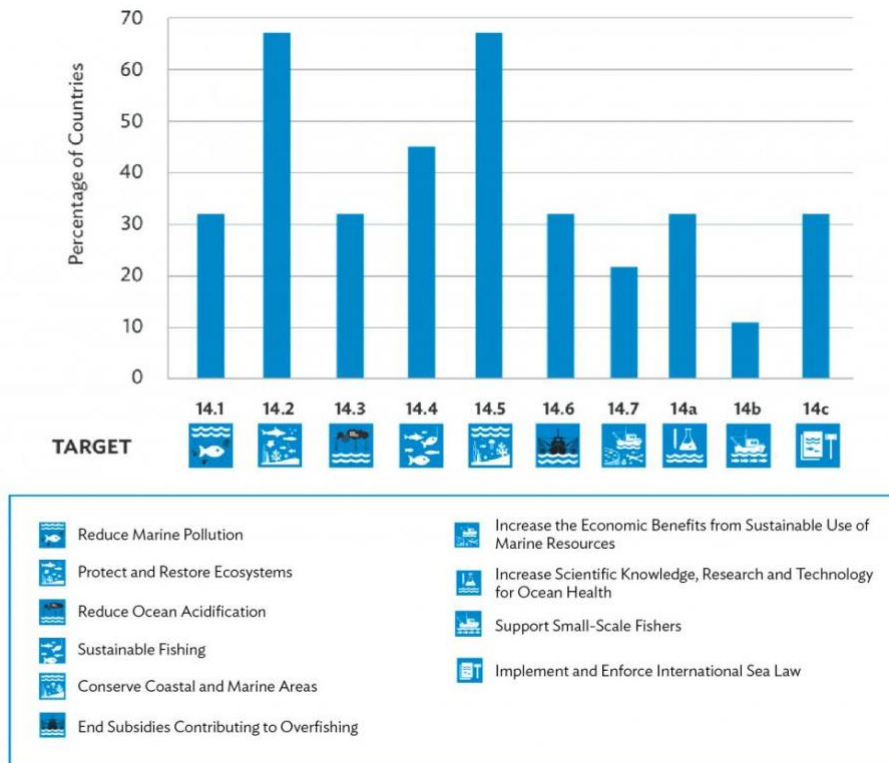


Figure 3: Coastal Ecosystem Services
 Source: [Blue Natural Capital Finance Facility](#)

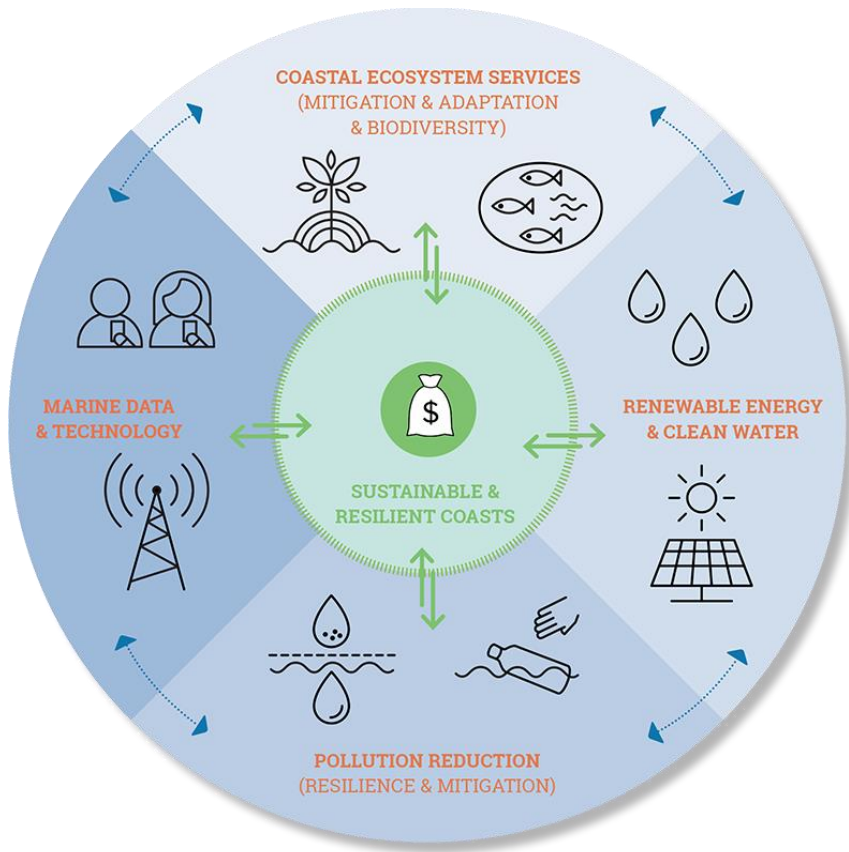


Figure 4: Identified Challenges at Different Stages of the Policy Cycle. [Development.Asia](#)

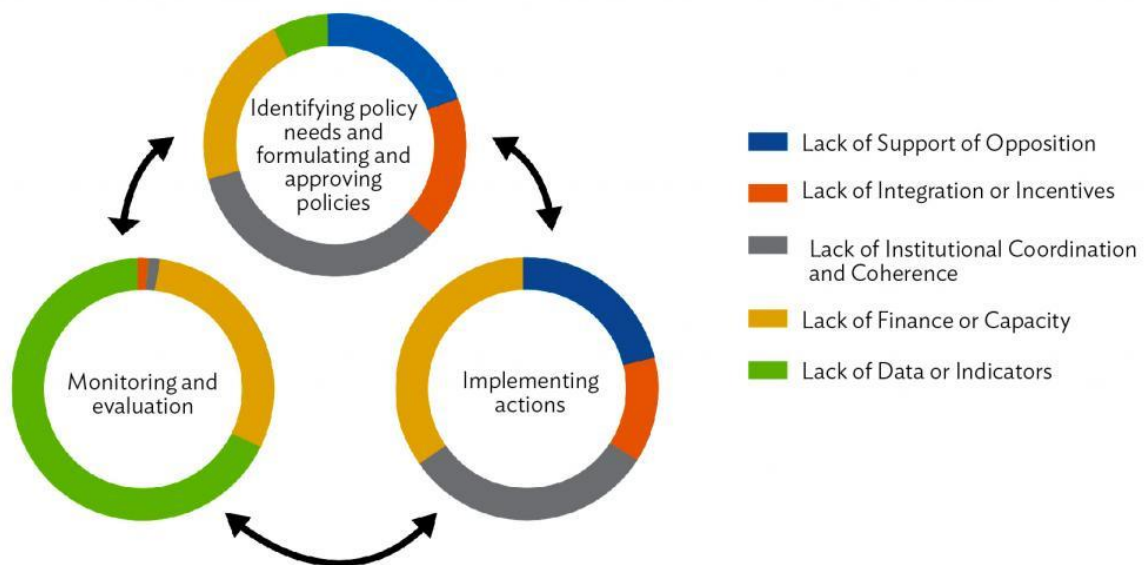


Figure 5: Covid19 Impact on Awareness of Natural Solutions, Ecosystem Marketplace

Impact on Awareness of Climate Challenge and Solutions

In percent

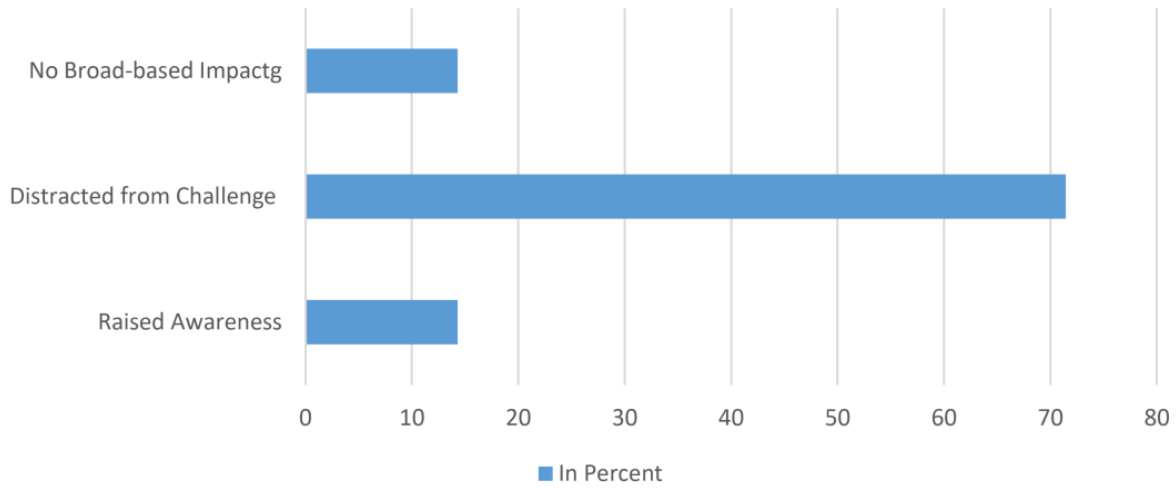


Figure 6: Financing for Water Cycle and SDGs (*Financing Water SDGs, 2018*)

