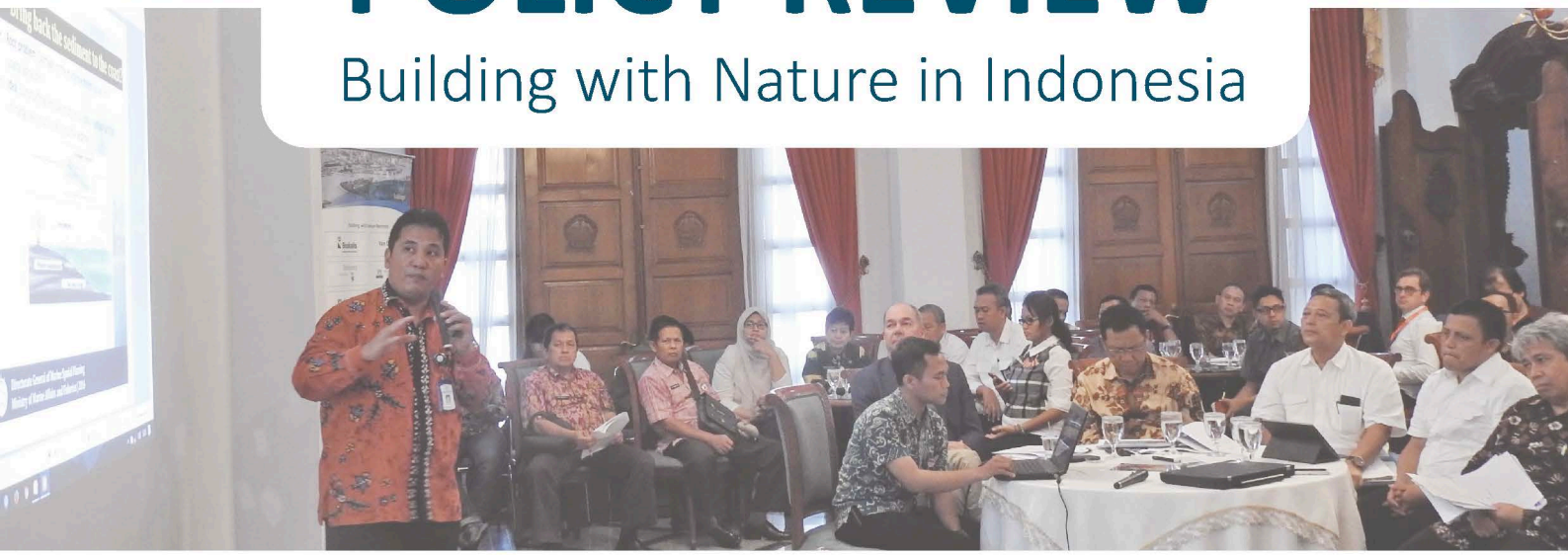
POLICY REVIEW

Building with Nature in Indonesia



Wetlands INTERNATIONAL
Yayasan Lahan Basah (YLBA)

THEWATERAGENCY

The Water Agency Disclaimer

This report is a summary of the policy reviewed for the **Policy Review: Building with Nature in Indonesia** project of Wetlands International Indonesia, known locally as Yayasan Lahan Basah (YLBA), part of Wetlands International (WI). The recommendations made by The Water Agency on this Policy Review are based on the conclusion drawn from information collated through secondary research, our knowledge of Indonesia's policy and discussion with relevant stakeholders, which also have been discussed, reviewed, and approved along the process with YLBA.

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This Policy Review is intended to review the active policies until August 2021; policies established after that period are not discussed and mentioned. All materials provided in this book shall not be treated as direct advice or rawly used as an advocation tool. Further analysis and context understanding are required before proceeding to the next detail and implementation level.

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Executive Summary

Building with Nature (BwN) is a holistic and inclusive approach that integrates Nature-based Solutions in water. Since 2015, Indonesia implements the BwN approach to restore its eroding coastline in Demak, Central Java. The project was managed managed by EcoShape and Wetlands International together with the Ministry of Maritime Affairs and Fisheries (KKP) and the Ministry of Public Works and Public Housing (PUPR). There is a rising interest in BwN to be mainstreamed in other locations and applications and at different levels as a way forward to build climate-resilient landscapes with multiple benefits to people and nature. The interest indubitably requires a transformation on how we develop marine and water infrastructures to address climate, environmental and development related challenges in Indonesia in parallel.

To support this objective, a policy review was conducted to support the mainstreaming of the BwN approach in Indonesia's water infrastructure sector. The report reviewed the national development plan, ministry/agency strategic plans, and strategies related to water infrastructures, climate change adaptation (CCA) and disaster risk reduction (DRR), natural resource management, and the spatial plan for 2020-2024.

The policy review demonstrates that Indonesia has adopted supportive principles embedded into policies and institutional setup at across government level, which supports its commitment to address climate change and disaster management while also developing sustainable infrastructures. These policies and institutional set-up could enable the mainstreaming of the BwN approach to be further implemented in Indonesia. From the financial perspective, the Government of Indonesia has built channels to fund programmes to enable NbS scale up, from both public and private fundings domestically and internationally. The opportunities from IFIs are there, on the banks that Indonesia is their member and these banks mentioned NbS and climate change as its priority.

In scaling up the BwN in Indonesia, the BwN concept is still facing a number of barriers, such as institutional and multi-stakeholder approach, concrete business case, unfamiliarity with the concept itself and the community capacity to implement the approach, procurement and contracting procedures.

However, the policy review shows that delivering policy changes to accommodate BwN requires multi-sectoral collaboration governance, both with a top-down and bottom-up approach to mainstream the concept across sectors and at multiple scales. As BwN comes as a fairly new concept, the approach has not been well-adopted into policies and programmes that are defined by existing names and codes, limiting the government spending budget towards the new approach. There are ample opportunities to introduce BwN to decision-makers in Indonesia as a cutting-edge approach providing ecosystem-friendly water infrastructure development, along with many socio-economic and environmental co-benefits, that is financially viable in both the short and the long term.

1. Introduction, Objective, and Methodology of Analysis

Building with Nature is a design approach to develop Nature-based Solutions for water-related infrastructure such as flood defences, sustainable port development and for the restoration of ecosystems. It supports water infrastructure development by combining ecosystem restoration and infrastructure in an optimal mix, involving a participative planning process amongst government agencies, communities and private sector. This report aims to indentify policy entrypoints for mainstreaming BwN in Indonesia.

The report reviewed the national development plan, ministry/agency strategic plans (Renstra), and strategies related to water infrastructure, CCA and DRR, natural resource management, and the spatial plan for 2020-2024. We identified government programmes and activities that can adopt BwN as an approach to address climate, environmental and development related challenges in Indonesia in parallel. Our methodology in this report is inspired partly by the German Agency for International Cooperation (GIZ) referred report. However, instead of quoting direct or verbal statements from political statements that might change with circumstances, our methodology focuses on the existing law and regulations.

Decision-makers in Indonesia and other parts of the world face the challenge of protecting coasts, deltas, rivers, and lakes while benefiting the society and nature. Large-scale development of infrastructure in both urban and rural areas supported economic expansion, lifting hundreds of millions of people out of poverty. Unfortunately, traditional single-solution hard infrastructure development has also caused increasingly devastating impacts on vital natural resources. The loss of natural buffers including mangroves, coral reefs, vegetated foreshores, peatlands, and salt marshes undermines community resilience and puts hard-won development gains at risk. This vulnerability is now rapidly exacerbated by climate change. A shift in thinking is required to address these complex challenges by recognizing that social, economic, and environmental dynamics are fundamentally interlinked.

BwN offers a more attractive and feasible alternative. BwN is a design approach that integrates Nature-based Solutions (NbS) in water engineering practice. It is an inclusive and multifunctional approach that can harmoniously blend economic and infrastructure development with climate adaptation and nature preservation, with lower investment and maintenance costs. As such, it can replace, complement or protect grey hydraulic infrastructure solutions (see Table 1.1). Co-benefits of BwN solutions include carbon emission reductions or carbon storage, for example, in mangrove forests, peatlands, salt marshes, sustainable livelihoods development, biodiversity enhancement, and conservation.

Table 1.1 Example of how green and grey infrastructure can complement each other

Service	**Grey infrastructure components**	**Examples of green infrastructure components and their function**
Coastal flood protection	Embankments, groynes, sluice gates	Mangrove forests: decrease wave energy and storm surges and thereby reduce embankment requirements
Urban flood management	Strom drains, pumps, outfalls,	Urban flood retention areas: store stormwater and thereby reduce drain and pump requirements
River flood management	Embankments, sluice gates, pump stations	River floodplains: store flood waters and thereby reduce embankment requirements

Water supply and sanitation	Reservoirs, treatment plants, pipe network	Watersheds: improve source water quality and thereby reduce treatment requirements

Source: Browder et al. 2019.

BwN has been implemented in Indonesia since 2015. BwN was first introduced to restore the eroding coastline in Demak, Central Java, by Wetlands International, EcoShape, the Indonesian government, local and international partners, and local communities. Hard infrastructures to protect the coastline from flooding exacerbated by erosion were unstable and expensive, yet failed to deliver vital services, such as fisheries, that the original mangrove belt provided. Communities suffered from extensive flooding, lost income, and were even evacuated. What started as a small experiment has grown into a large-scale initiative along a 20 km eroding coastline using BwN techniques in which coastal resilience is enhanced through mangrove restoration combined with the development of sustainable aquaculture and other livelihoods.

The problems in Demak—including demographic and economic developments, subsidence, and climate change—are typical of those found along the coast elsewhere in Java and Indonesia. As applied in Demak, solutions have already been replicated by the Government of Indonesia in other regencies and are applicable elsewhere at a larger scale in Indonesia. Moreover, the BwN approach can also be applied in riverine environments and estuaries, cities, lowland lakes, along sandy beaches, and port development. This is already demonstrated by other BwN projects developed worldwide (EcoShape n.d.), which have been thoroughly documented to show that BwN approach works and brings forward tools, knowledge products, business cases, as well as guidance to overcome existing barriers to implementation and scaling up technical guidelines.

Since 2018, the Building with Nature Indonesia programme has been supported by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety-International Climate Initiative (BMUB-IKI) funding to mainstream the approach in Indonesia's water sector. This has been realised through awareness raising, capacity building, knowledge distribution, and the exploration of new BwN applications together with the Government of Indonesia. The programme has also been supporting the creation of an enabling institutional environment for BwN. The approach has received a lot of political support in Indonesia, especially at the local and district level, and contributed such as to the Demak coastal Masterplan. Government partners (PUPR and KKP) support the initative by enabling the environment and aligning BwN with their field programmes.

To enable the wider adoption of the approach in water practices in Indonesia, further clarity is needed about the extent to which its regulatory and investment climate incentivises BwN and how policy opportunities can be supported in the years to come. Creating an enabling policy environment and connecting with the international developments are key to applying and implementing BwN. BwN should fit into the local institutional contexts, norms, and regulations. Meanwhile, policies and processes can be developed to support co-creation, partnerships, and funding schemes necessary to enable BwN implementation. It is essential to identify, understand and engage with regulatory and other aspects of the institutional context. Once the relevant institutional issues are identified, one can respond to any emerging barriers by providing practical solutions and inspiring legislators to develop an (international) enabling policy environment for more dynamic and multifunctional approaches to nature conservation and development.

To support this objective, a study was conducted on entry point analysis for mainstreaming BwN into decision-making and policy planning processes in Indonesia. This policy analysis was conducted as part of the new 'Building with Nature Asia' initiative to upscale the approach across Asia, also supported by BMUB-IKI. Similar policy analysis will be conducted in other Asian countries, allowing regional facilitation and exchange on BwN supportive policy reform.

In this study, we build on entry points identified by GIZ in their report 'Emerging lessons for mainstreaming Ecosystem-based Adaptation - Strategic entry points and processes', which they derived from assessments in five partner countries. GIZ (2019) defines entry points as 'windows of opportunities that help gain the interest of policymakers, stakeholders or the broader public for integrating NbS into ongoing national and subnational processes and harnessing synergies with other approaches'. Entry points are assessed at the national, sectoral, and local levels across climate, development and sectoral policy, plans, and budget allocations.

The BwN policy analysis largely follows this structure but focuses specifically on the Water Infrastructure sector at the sectoral level. Moreover, BwN also aims at infrastructure interventions with other primary purposes, such as economic development, transportation, and DRR. The entry points on the Local Level are not specifically analysed, though the role of local authorities as part of decision-making in this context is explained and illustrated. The analysis also explains what the entry-points enable on a subnational level, catchment, or programmatic level.

In addition, we build on insights from EcoShape—the innovation platform of the BwN approach which has identified barriers to a widespread uptake of NbS in public and private hydraulic engineering investments and provides suggestions on how we could overcome these barriers.

The reason to utilise Ecosystem-based Adaptation and NbS as a framework for building this entry point for BwN is that those approaches are interlinked. As an umbrella for approaches such as BwN and Ecosystem-based Adaptation, NbS encompasses measures for ecosystem restoration, infrastructure-related, ecosystem-based management, and other approaches (GIZ 2019), as depicted in Table 1.2.

Table 1.2 Categories of NbS approaches and examples

Category of NbS approaches	**Examples**
Ecosystem restoration approaches	• Ecological restoration • Ecological Engineering • Forest landscape restoration
Issue-specific ecosystem-related approaches	• Ecosystem-based adaptation • Ecosystem-based mitigation • Climate adaptation services • Ecosystem-based disaster risk reduction
Infrastructure-related approaches	• Natural infrastructure • Green infrastructure
Ecosystem-based management approaches	• Integrated coastal zone management • Integrated water resources management
Ecosystem protection approaches	• Area-based conservation approaches, including protected area management

Source: Cohen-Shacham et al. 2016.

For this study, three methodologies were used: (1) conduction of a comprehensive analysis of existing policies and opportunities; (2) interviews and focus group discussions were organised at the national and sub-national level among multiple institutions from ministries, regional and local governments, private companies, and universities; (3) drawing of lessons learned from the Demak project relevant to this study.

This report first discusses in Chapter 2 how BwN can help Indonesia face water infrastructure challenges and achieve policy commitments. This chapter concludes with possible motivations for individuals and agencies to support mainstreaming the approach in governance, institutional, and political structures in Indonesia. In Chapter 3, the policy landscape for water infrastructure planning, investment, and implementation, and how climate adaptation and disaster risk management policies and strategies affect this will be analysed. It also discusses various institutional barriers to overcome for the wide adoption of BwN. In Chapter 4, the entry points for mainstreaming BwN are identified. Per category, we discuss supportive policies and plans, hindering factors, and windows of opportunity to support, explaining how these enable the wider adoption of BwN. Chapter 5 discusses further barriers and enablers for mainstreaming the approach pointed out by interviewees or came forward as lessons from BwN project in Demak. Chapter 6 closes with recommendations on the way forward for mainstreaming BwN in Indonesia.

Figure 1.1 Roundtable discussions in Integrated water management planning Semarang-Demak

Source: Yus Rusila Noor.

Figure 1.2 Seminar on Land subsidence, organised by the Coordinating Ministry of Maritime Affairs and Investment's budget, Wetlands International, and the Partners for Resilience alliance in 2018

Source: Wetlands International.

2. Ways BwN Can Support Water Infrastructure Development & Climate Resilience in Indonesia

2.1 Trends and Opportunities

Indonesia ranks 40th among countries with a high-risk index due to its very high exposure and high vulnerability to disasters (Bündnis Entwicklung Hilft & Ruhr University Bochum - IFHV 2020), with over 75% being hydro-meteorological disasters such as floods, landslides, tidal waves, and abrasion (Bappenas 2020). Regarding climate risk, Indonesia ranks in the top third with high exposure to all types of flooding and extreme heat (World Bank Group & Asian Development Bank 2021). Climate change will also likely increase the intensity of these hazards so that further adaptation measures should be taken effectively. Without effective adaptation measures, the Indonesian population exposed to an extreme river flood will surge by 1.4 million by 2035-2044, and over 4.2 million people will be prone to permanent flooding by 2070-2100 due to sea-level rise.

Based on the understanding above, it is clear that Indonesia needs further infrastructure development to increase resilience towards disaster and build the environment. President Joko Widodo's views align well with these needs. The President's five main directives in achieving The President's vision of making Indonesia a developed country by 2045 are reflected well in the listed Development Agendas (DA).

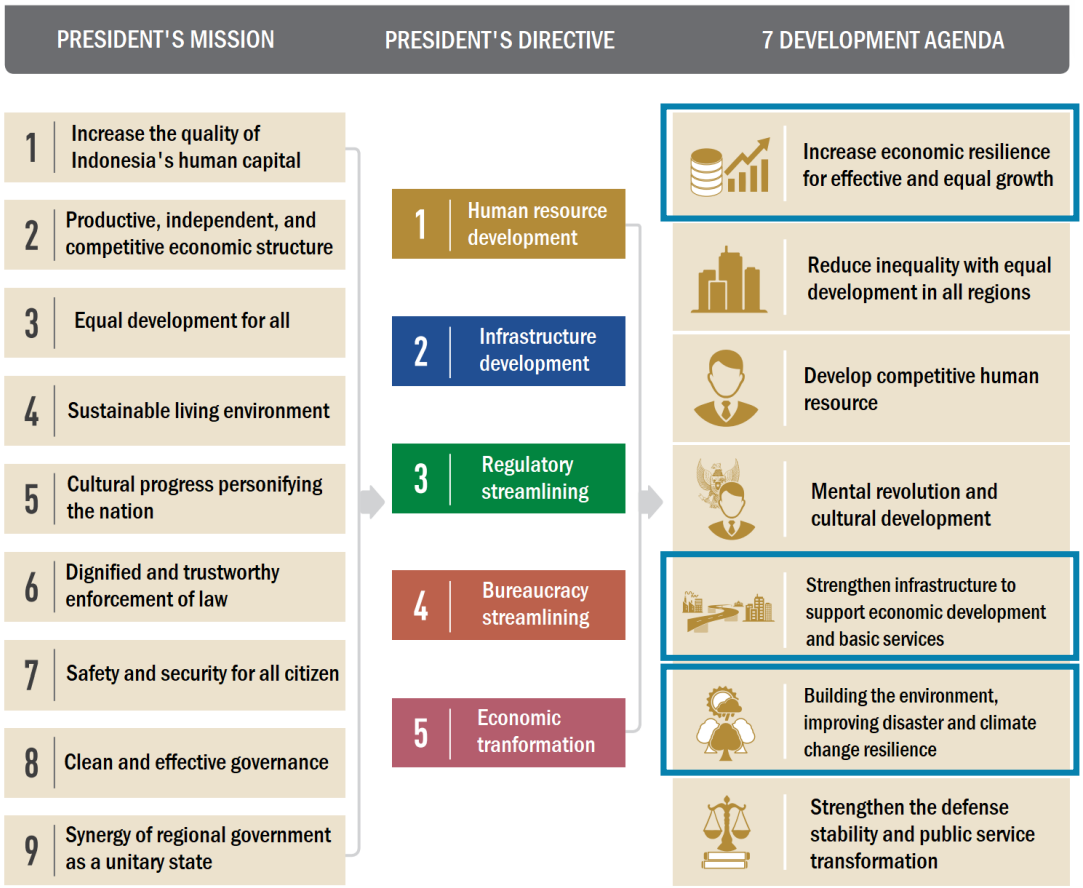

Figure 2.1 The seven Development Agenda from the 2020-2024 National Medium-Term Development Plan
Source: Bappenas 2020.

Based on the diagram above, three development agendas are highly relevant for mainstreaming BwN in Indonesia – the **First Development Agenda of Increasing Economic Resilience for Effective and Equal Growth**, the **Fifth Development Agenda of Strengthening Infrastructure to Support Economic Development and Basic Services**, and the **Sixth Development Agenda of Building the Environment, Improving Disaster Resilience and Climate Change**. Based on the selected Development Agenda, this report will focus on four issues: flood protection along coasts and rivers, water shortage, port development, and ecosystem recovery.

2.1.1 Flood Protection along Coasts and Rivers

Almost all regions in Indonesia are prone to flood risk, as shown in Figure 2.2 (BNPB 2018). The two ecosystems most impacted by climate change and disasters in Indonesia are coastal and riverine. As cited in Gallay et al. (2021), river floods are the world's costliest and most frequent natural hazards (Kousky & Walls 2014; Smith 2013). This is supported by World Bank (2019) that stated the required capital costs for river protection range on average from USD 20 billion to USD 280 billion per year, significantly higher compared to coastal protection range on average from USD 2 billion to USD 56 billion per year, between 2015 and 2030.

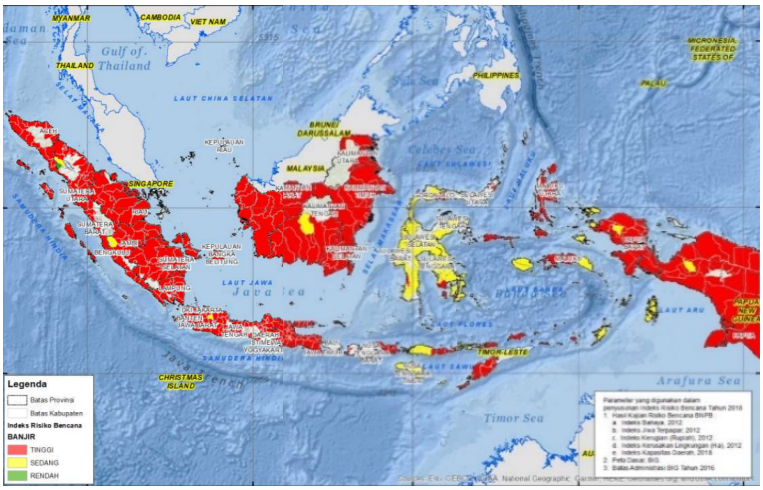

Figure 2.2 Map of flood risk index in Indonesia

Source: BNPB 2018.

The scientific analysis for the new National Adaptation Plan (RAN-API) also predicted that during the rainy season, the flood hazard in river areas on Java Island would increase in the 2020-2034 and 2031-2045 periods (Bappenas 2018). The integrated watershed management in 15 priority watersheds, reducing deforestation and forest degradation, and ecosystem conservation and restoration are also some of the main programmes in Indonesia's updated NDC (2021), which will be translated into the new RAN-API that is currently still being developed. Flood risks in both the northern coastal areas of Java Island and critical watersheds will be addressed through (a) improving the quality of disaster-resilient infrastructure and (b) developing disaster resilience infrastructure in the northern coastal areas of Java Island, Maminasata coasts in South Sulawesi, and other priority watersheds. Such strong emphasis on both mentioned measures is also reflected in the 2020-2024 National Medium-Term Development Plan (RPJMN) through the major project of Recovery of Four Critical Watersheds programme where each PUPR and Ministry of Environment and Forestry (KLHK) has allocated IDR 3.9 trillion budget. By the time this report is written, the other 11 priority watersheds in the National Action Plan (NAP) are not yet included in the 2020-2024 RPJMN.

In the context of flood risk in the coastal area, as the largest archipelagic country with one of the longest coastlines in the world, Indonesia's coastal area faces several hazards, particularly inundation and changing coastlines throughout the archipelago. The vulnerability of Indonesia's coastlines towards climate change is shown in Figure 2.3.

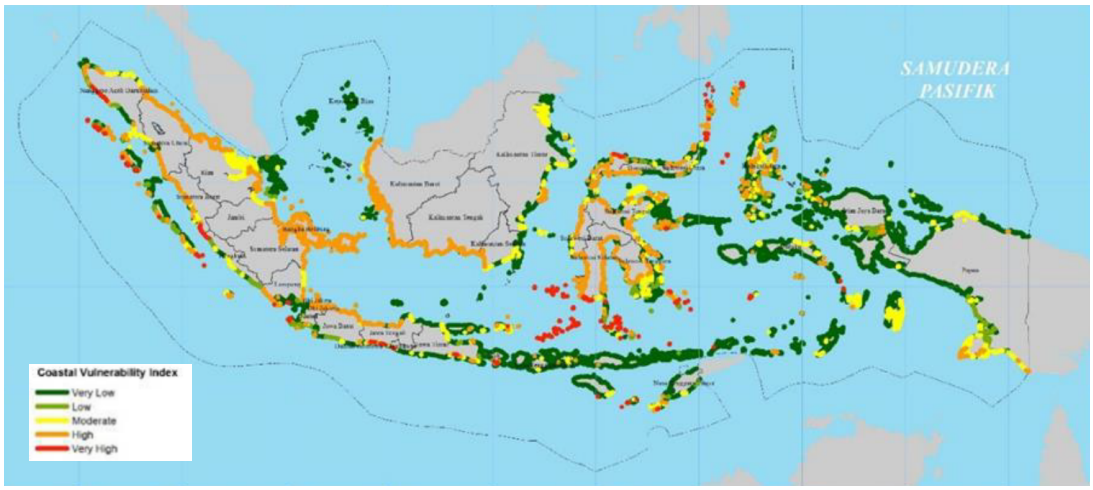

Figure 2.3 Indonesia's coastal vulnerability map

Source: Bappenas 2018.

The north coast of Java is among several other coastlines in Indonesia with a high vulnerability towards climate change. The impact of rising sea levels will be worsened by the land subsidence caused by deep groundwater extraction within this area, making the north coast of Java more vulnerable to coastal flooding.

The 2020-2024 RPJMN recognises coastal protection in five urban areas on the north coast of Java as one of its major projects with IDR 54.9 trillion in indicative funding. The five urban areas include Jakarta, Cirebon, Pekalongan, Semarang, and Cirebon, where coastal floods often occur. To cope with this coastal flood, this major project covers the 110.6 km construction of sea dike and coastal protection structure, installation of land subsidence and water quality monitoring equipments, construction of Semarang-Demak toll road, formulation of an integrated development plan for the north coast of Java, and enforcement of groundwater uptake regulations.

2.1.2 Water Shortage

The 2020-2024 RPJMN and Bappenas (2018) acknowledged that water shortage, amongst it are drought and floods in Java, Bali, and Nusa Tenggara would be increasing by 2030 as well as the proportion of areas with water shortage will grow from 6% in 2000 to 9.6% in 2045. Currently, the water availability in most Java and Bali Islands is categorised as 'scarce' to 'critical', and in 2045, it will also happen in Southern Sumatera, West Nusa Tenggara, and Southern Sulawesi (Bappenas 2020). As the home for 56.1% of Indonesian and where almost 60% of Indonesian Gross Domestic Product (GDP) comes from (BPS 2021a, 2021b), Java only holds one-tenth of the nation's water supply (Piesse 2016).

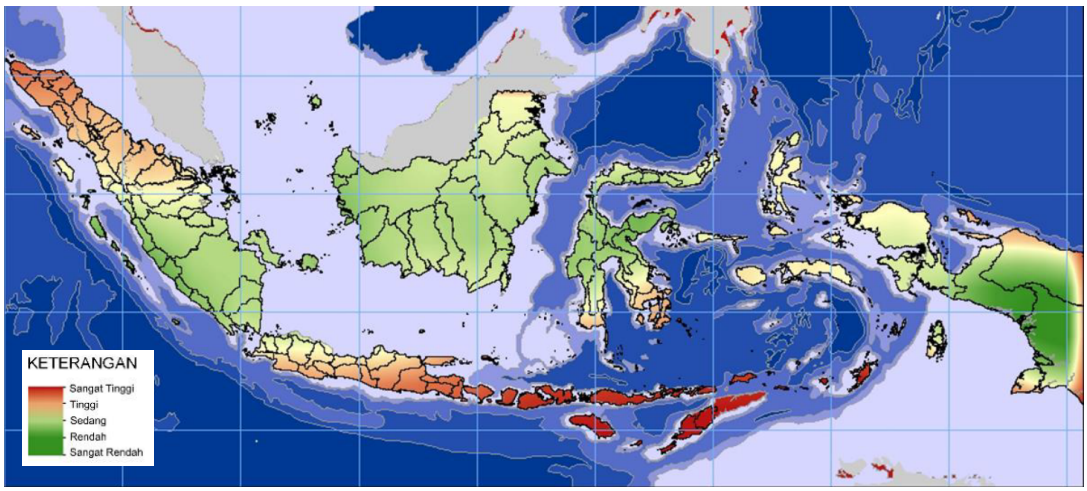

Figure 2.4 Map of projected drought in Indonesia in 2020-2034

Source: Bappenas 2018.

Figure 2.5 Map of projected decreased water availability (2020-2034)

Source: Bappenas 2021a.

In addition to climate-induced water shortage, the widely practiced groundwater abstraction is stressing the ecosystem and causing implications towards land subsidence and vulnerability to sea-level rise. Eventually, building more surface water reserves, such as reservoirs or dams, could ease the water shortage in Indonesia. In fact, almost half of water for domestic use in Indonesia comes from groundwater (Bappenas 2020).

As stipulated in the 2020-2024 RPJMN, there are several major projects related to improving water supply and access, i.e., building '18 multifunctional dams' to provide 23.48 m^3/s of water with IDR 92.9 trillion in indicative funding, as well as expanding 'access to piped water for 10 million houses' with IDR 123.5 trillion in indicative funding.

2.1.3 Port Development

Indonesia has outlined plans to upgrade or construct ports across the country in the coming years, from Sumatra to Papua. To realise this, Subagiyo from Transportation Ministry (as cited in Antara News 2020) stated that Indonesia requires USD 47 billion in investment based on the National Port Master Plan (RIPN).

Embodying the vision of Indonesia to become the world's maritime axis, port development has been included and involved in several major projects of the 2020-2024 RPJMN (Kemenhub 2020). The importance of port development is directly highlighted through 'an integrated port network in seven hub ports' major project. Several major projects are supported by port development, such as 'Priority Tourism Destinations in 10 locations', 'New Capital City', and 'Nine industrial areas outside Java and 31 Smelters'.

Likewise, as derived from the development agenda in the 2020-2024 RPJMN, several priority targets also acknowledge the importance of port, i.e. 'Climate and Disaster Resilience Improvement', 'Increasing Downstream-Based Industrialization of Natural Resources' including through the development of smelters and Industrial Estates Outside Java, as well as 'Destination Competitiveness Improvement and the Tourism Industry'.

2.1.4 Ecosystem Recovery

The increasing need for further flood risk protection and coastal adaptation, yet the growing demand for port expansion in Indonesia, will likely result in additional pressure on natural environments along coasts and rivers if these demands are met with conventional solutions.

Indonesia recognises the increased vulnerability to risk due to the loss and degradation of its coastal and terrestrial ecosystems. For example, its NDC highlights that the loss of forest ecosystems leads to the loss of critical environmental services, such as the provision of water catchment areas and prevention of erosion and floods (UNFCCC, 2016). In order to build climate resilience, Indonesia commits to protect and sustain the environmental services from its ecosystems by taking an integrated, landscape-based approach in managing its terrestrial, coastal and marine ecosystems. The priority actions in its NDC include ecosystem conservation and restoration, social forestry, coastal zone protection, integrated watershed management, and the creation of climate-resilient cities. For example, the new NDC mentions in Annex 2: implementation of ecosystem based adaptation in coastal zone development, implementation of integrated management of mangrove ecosystem, developing climate resilient watershed ecosystem management, and Improving functionality of integrated ecosystem to ensure improvement of essential services.

Developing adaptive, inclusive, and sustainable water infrastructure and repairing ecosystems will not only help Indonesia in achieving its NDC targets but also various other international agreements that the Government of Indonesia ratified, including the Sendai Framework for Disaster Risk Reduction (SFDRR), Ramsar resolutions, Aichi targets (Convention on Biological Diversity) and several Sustainable Development Goals (SDGs) as well as national policies and strategies that it developed to guide its natural resource management (see Chapter 3).

2.2 Integrating BwN in Water Engineering

BwN is a design approach that integrates NbS into water-engineering practice, such as flood protection along coasts and rivers, sustainable port development, and ecosystem recovery. In Indonesia, conventional grey infrastructure has been the default option for water engineering due to the mainstreaming of its applications. However, conventional infrastructure is typically designed for a single purpose, without or only to a limited degree, taking externalities such as biodiversity loss, social cost, and increased climate vulnerability into account. By occupying space and affecting natural processes, they often impair or destroy ecosystems. The guiding principle of BwN is to work with

nature, not against it. All solutions in BwN approach are holistic in nature - they are innovative, dynamic, and fit within the surrounding landscape.

Table 2.1 Examples of conventional infrastructure and their BwN alternatives in the context of coasts, rivers, and ports

	Conventional solution	**Building with Nature**
Flood protection	• Breakwaters • Dikes • Seawalls • Groynes • Conrete or rock embankments	• Mangroves • Coral reefs • Oyster beds • Seagrass beds • Sandy beaches and dunes • Shingle beaches • Salt marshes and other wetlands • Floodplain restoration
Port infrastructure	• Breakwaters • Dredging of navigation channels and basins • Quays and other conventional banks	• Design of breakwaters and dredging strategy to make use of natural currents to reduce sedimentation or to direct the flow of sediment to salt marshes and sandbanks • Vegetated revetments of conventional banks • Foreshores in the form of a sandbank, salt marsh, or mangrove • Creation or restoration of coastal ecosystems (salt-marshes, mangrove, reefs, dunes) to compensate for the losses caused by the port development • Creation of new habitats by trapping (dredged) sediment

Source: EcoShape 2021.

The Multiple Streams Model can be used as one of the references to explore windows of opportunities that escalate motivations of individuals and agencies for mainstreaming BwN in Indonesia, either by the perceived benefits or the applicability of the concept in their mandates, existing structures, programmes, or projects. Windows of opportunity are created in the presence of alignment between three streams.

Table 2.2 Multiple streams model for BwN in Indonesia

Problem Stream
Indonesia faces several water infrastructures and ecological challenges: • Increasing need for flood protection and coastal adaptation in response to climate change • High demand for port expansion • Uncertainties on climate change, e.g. in rate and magnitude of sea-level rise, can complicate decision-making on large-scale infrastructure investments (Pauw 2017). For example, a breakwater can be costly to remove if future insights or changing circumstances change functional requirements. • Risk of further loss of ecosystems caused by conventional water infrastructure, which only to a limited degree, takes externalities such as biodiversity loss, social consequences, and increased climate vulnerability into account. By occupying space and affecting natural processes, they often destroy or impair ecosystems. Summary: Indonesia faces the challenge of finding the alternative to the existing hydraulic infrastructure that could provide better services to society while enhancing the natural environment and increasing climate resilience.

Solutions Stream

Building with Nature solutions:

- Can assist or accompany hard water infrastructure like dams, dykes, levees, reservoirs, pumps, wells, etc.
- Can achieve the same risk reduction benefits (floods, droughts) as conventional infrastructure at a lower lifecycle cost, depending on the local circumstances and desired protection level. Particularly in locations with a relatively low flood protection goal, BwN can be cost-effective.
- Are more flexible and adaptive to changing circumstances (e.g. caused by impacts from climate change) than conventional infrastructure. This makes BwN attractive in decision-making on large-scale infrastructure investments.
- Use thorough stakeholder engagement in the design and implementation process
- Creates a wide array of co-benefits for nature and society, such as fish production, carbon storage, aesthetic quality of landscapes, and recreation opportunities.
- In most cases, the economic value of restoring such ecosystems significantly exceeds investment costs and leads to a high economic return on investment. These co-benefits can also help attract co-investment from non-conventional sources
- In the context of limited budgets, a vulnerable environment, large infrastructure development needs, and a wide range of development objectives, NbS can deliver the highest impact.

Summary: BwN solutions have various advantages compared to 'conventional' grey water infrastructure solutions to solve societal problems: they are able to deliver hydraulic infrastructure that provides better services to society as a whole, while enhancing the natural environment and increasing climate resilience. They can be cost-effective, more flexible, limit negative externalities and provide multiple benefits.

Table 2.2 Multiple steams model for BwN in Indonesia (continued)

Political Stream

Several national policies contain ambitious economic growth plans with a key role for coastal and water engineering while aiming for poverty reduction, environmental sustainability, and disaster resilience:

- Achieving targets under its Infrastructure Development Framework 2020-2024 (Integrated Solutions for Coastal Development and Urban Resilience, 2020-2024 RPJMN)
- Integrated, landscape-based approaches in managing its terrestrial, coastal, and marine ecosystems are recognised in several national plans
- Addressing pressing water safety issues in Indonesia high on the political agenda, e.g. the protection against inundation and coastal instability in low-lying areas and land subsidence
- Integrating disaster risk reduction, sustainable development, and climate change adaptation and mitigation with sectoral and local development policies and practices
- Achieving its commitments to multilateral environmental agreements that it ratified, such as SDGs, Paris Agreement, Ramsar Convention, Aichi targets, and SFDRR (see Chapter 5 and Appendix 2)

Summary: Development of adaptive, inclusive, and sustainable water infrastructure and repair of ecosystems will help Indonesia in several politically important national targets for which finance is already allocated or where there are opportunities for resourcing. The political momentum in Indonesia is very favourable for the wider adoption of BwN

2.3 Building with Nature in Demak

Table 2.3 Case study: BwN in Demak

Location	Demak, Central Java Province, Indonesia
Partnership	Wetlands International, EcoShape, KKP, PUPR, in collaboration with local and international partners and local communities
Context	Coastal territories impacted by floods resulted in destroyed infrastructure and productive land, reduction of income from aquaculture and natural resources
Hazards	Coastal erosion, sea-level rise, salt water intrusion
Objective	Increase the resilience of 20 km of coastline by halting land loss, restoring mangroves, and revitalising aquaculture.

Since 2015, Indonesia has been implementing the BwN approach in Demak, Central Java. Hard infrastructures to protect the coastline from flooding-exacerbated-erosion, were unstable and expensive, and failed to deliver vital services such as fisheries that the original mangrove belt provided. Communities suffered from extensive flooding, lost income, and were even evacuated. What started as a small experiment has grown into a large-scale initiative along a 20 km eroding coastline. The BwN Indonesia consortium designed an integrated solution to halt land loss and restore the mangrove belt that once protected the land combined with sustainable aquaculture and other livelihoods. Local communities were involved from the start in the design and implementation of measures and policy dialogue. Communities were also empowered to join policy dialogues to express their needs, successfully securing additional government support for these measures.

Figure 2.6 Local communities built natural structures to stimulate sedimentation (left), structures, and mangroves in Desa Bendono

Source: Wetlands International.

The pilot project in Demak acted as a change agent for local communities and local authorities: locals beneficiaries formed a community platform that supports and promotes BwN measures in Demak. Now that beneficiaries in Demak promote BwN approaches, the Demak Regency started resolving tidal flooding and abrasion problems and allocated a budget for the maintenance of BwN measures by community groups in the coming years.

The problems in Demak—including demographic and economic developments, subsidence, and climate change—are typical of those found along the coast elsewhere in Java and Indonesia (Deltares 2020), where the conservation and restoration of mangroves are flagged as a top priority to maintain coastal integrity. To support the sound replication of the approaches as applied in Demak in other

areas and at a larger scale, the project has therefore supported capacity building, knowledge distribution, and creating a more enabling regulatory environment.

BwN in Demak has resulted in several mainstreaming impacts, from national to sub-national levels:

- From 2015 – 2019, the government partner KKP funded a marine spatial management programme to restore eroding coastlines with more than 23 kilometres of permeable structures placed in no less than 13 sites within and outside Java, worth approximately EUR 2.5 million.
- Capacity building on 'BwN solutions' targeted government officials, the private sector, and 2500 students.
- Policy dialogue for improving coastal zone management in Demak and Central Java.
- Facilitation of policy dialogue on Land Subsidence, resulting in a National Roadmap and a Roadmap for Central Java Province with tangible solutions to adapt to and mitigate subsidence.
- Enhanced enabling policy environment at the national level (National Mangrove Strategy, RPJMN, Indonesia's country position to the United Nations Framework Convention On Climate Change (UNFCCC), United Nations International Strategy for Disaster Reduction (UNISDR), and Ramsar).
- Technical guidelines and scientific papers issued on technical and socio-economic interventions.
- Facilitation of the development of new BwN landscape propositions and rapid assessments in other areas and settings.

3. Policy and Financing Landscape Relevant to BwN

This chapter analyses the existing laws and regulations (policies, strategies, and programmes), institutional set-up, planning, and budgeting process relevant for mainstreaming BwN in the water sector and supporting climate resilience in Indonesia.

The hierarchy or order of laws and regulations in Indonesia refers to Article 7 paragraph (1) of **Law on Establishment of Legislations (UU** No. 12/2011 tentang Pembentukan Peraturan Perundang-Undangan) as amended by **Law on Amendments to Law Number 12 of 2011 (UU No. 15/2019 tentang Perubahan atas Undang-Undang Nomor 12 Tahun 2011 Tentang Pembentukan Peraturan Perundang-Undangan)**, which reads:

Types of laws and regulations consist of (based on hierarchy):

a. The 1945 Constitution of the Republic of Indonesia;
b. Decree of the People's Consultative Assembly;
c. Laws/Government Regulations in Lieu of Laws;
d. Government regulations;
e. Presidential decree;
f. Provincial Regulations; and
g. Regency/City Regional Regulations.

3.1 The Commitment of Indonesia on Climate Change and Disaster Management

The Government of Indonesia ratified the UNFCCC, the Kyoto Protocol, and the Paris Agreement to combat climate change and its impacts. To support the commitments, three primary laws were issued:

Law on the Ratification of UNFCCC (UU No. 6/1994 tentang Pengesahan United Nations Framework Convention on Climate Change) emphasises climate change mitigation as a joint effort to reduce emissions. Together with the **Law on the Ratification of Kyoto Protocol to the UNFCCC (UU No.17/2004 tentang Pengesahan Kyoto Protocol to the United Nations Framework Convention On Climate Change)**, the basis for various efforts to address climate change has been developed, by also considering that climate change could increase disaster risk in Indonesia.

Under the **Law on the Ratification of the Paris Agreement to the UNFCCC (UU No. 16/2016 tentang Pengesahan Paris Agreement to the United Nations Framework Convention On Climate Change)**, Indonesia will have the benefits of: (1) increased protection of Indonesia's very vulnerable areas to the impacts of climate change through climate change mitigation and adaptation; (2) increased recognition of national commitments in reducing emissions from various sectors; (3) becoming parties that can participate (have voting rights) in decision-making regarding the Paris Agreement; and (4) having (easy) access to funding sources, transfer of technology, increasing capacity for implementation of mitigation and adaptation actions.

The initiative marking the development of climate change and disaster management in Indonesia is quite advanced, as shown in Figure 3.1.

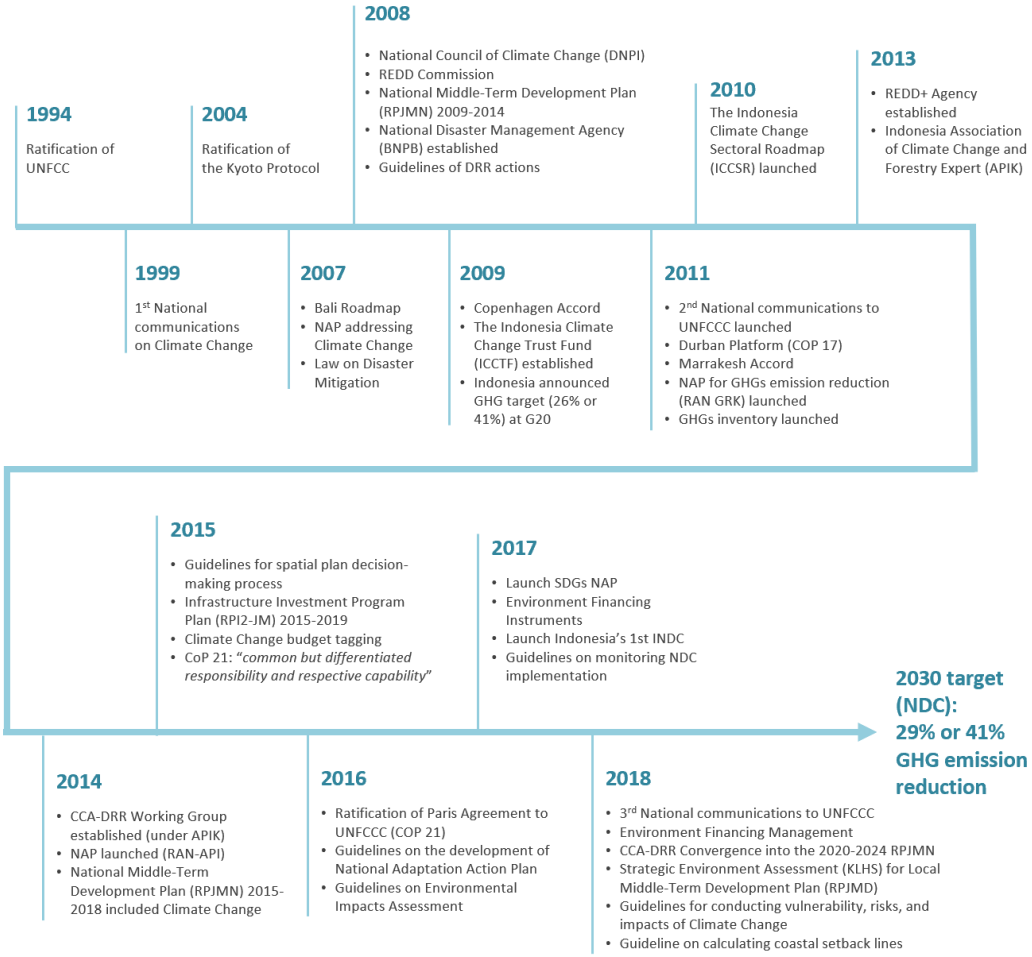

Figure 3.1 The development of climate change and disaster management initiatives in Indonesia

Besides three Laws ratifying the commitment to combat climate change, other laws which are relevant to climate change and disaster management in Indonesia include:

Law on Disaster Management (UU No. 24/2007 tentang Penanggulangan Bencana) underlies the implementation of disaster management in Indonesia and the establishment of the National Disaster Management Agency (BNPB). The law also mandates all national and district governments to make disaster risk analysis a prerequisite for development planning potentially posed by disaster risks. As part of DRR efforts, the need for law enforcement in spatial planning implementation is also mentioned in the Law.

Law on Housing and Settlement Region (UU No. 1/2011 tentang Perumahan dan Kawasan Permukiman) mentions flood-related disasters in vulnerable areas, such as watersheds, as potentially hazardous areas. The law focuses on two subjects: an attempt to reduce disaster risk caused by settlement patterns and post-disaster response through the resettlement of disaster victims.

Law on Water Resource (UU No. 7/2004 tentang Sumber Daya Air) is the framework law requiring government regulations to elaborate the general provisions further. On 18 February 2015, through its Decision No. 85/PUU-xI/2013, the Constitutional Court canceled the implementation of this Law, which contradicted the 1945 Constitution. Because of the legal vacuum during the drafting process of the new Law, the Constitutional Court reinstated the old Law on Water Resources (UU No. 11/1974 tentang Pengairan). In 2019, a new **Law on Water Resources (UU No. 17/2019 tentang Sumber Daya Air)** was issued.

Law on Management of Coastal Areas and Small Islands (UU No. 27/2007 tentang Pengelolaan Wilayah Pesisir dan Pulau-Pulau Kecil) emphasizes the vulnerability of coastal areas and islands and its potential to experience deterioration in quality due to human activities. This law also clearly stipulates institutions responsible for implementing DRR activities in accordance with the scale of their territories. Further, KKP issued **Ministerial Regulation on Disaster Mitigation for Coastal Areas and Small islands (Permen KKP No. 16/2008 tentang Perencanaan Pengelolaan Wilayah Pesisir dan Pulau-Pulau Kecil)**

Law on Meteorology, Climatology, and Geophysics (UU No. 31/2009 tentang Meteorologi, Klimatologi, dan Geofisika) mandates the Meteorological, Climatological, and Geophysical Agency (BMKG) to carry out data collection activities related to weather and climate (including extreme weather and climate) and sea waves used in climate risk and vulnerability assessment that at a later stage informs CCA planning and DRR efforts. BMKG also established early warning systems as part of disaster preparedness.

Law on Geospatial Information (UU No. 4/2011 tentang Informasi Geospasial) mandates the utilisation of geospatial information for a region experiencing climate-related disasters. The integrated basic and thematic geospatial information data in the One Map policy framework will be used to prepare marine spatial planning (Perpres No. 16/2017 tentang Kebijakan Kelautan Indonesia), RAN-API (Permen KLHK No. 33/2016 tentang Pedoman Penyusunan Aksi Adaptasi Perubahan Iklim), and disaster management (UU No. 24/2007 tentang Penanggulangan Bencana).

Law on Marine Affairs (UU No. 32/2014 tentang Kelautan) recognises climate-related disasters prevention, especially marine aspects and actions are undertaken. For example, prevention related to DRR. This Law also highlights the Blue Economy principle in marine management, ensuring the role of government at all levels. Blue Economy is a model of economic development that integrates land and sea development by considering the carrying capacity of resources and the environment, which is also one of Indonesian Maritime Policy principles (Perpres No. 16/2017 tentang Kebijakan Kelautan Indonesia).

Law on Local Government (UU No. 23/2014 tentang Pemerintahan Daerah) regulates the roles and responsibilities of the national, provincial, and district/city government affairs on nautical miles. There seems to be a multi-interpretation on how this Law limits the involvement of the district government in the planning processes of the 12 miles of sea. Indonesian Marine Policy National Document (p. 23), as the Annex 1 of **Presidential Regulation on Indonesian Maritime Policy (Perpres No. 16/2017 tentang Kebijakan Kelautan Indonesia),** states that: (1) to realise the maritime decentralization movement, provincial governments are given the authority to manage marine resources, including small islands within a radius of 12 nautical miles; (2) district/city governments are entitled to receive revenue from the management of marine resources within an area of 4 nautical miles; (3) local governments and communities are also involved in monitoring marine areas. The authority of all the different levels of government in marine management that should be based on the Blue Economy principle is also regulated in the **Law of Marine (UU No. 32/2014 tentang Kelautan**). This needs to be considered in the relationship between government and local government and the community regarding the design of central and regional institutions.

Law on Job Creation (UU No. 11/2020 tentang Cipta Kerja) is the omnibus law aligning 82 Laws to increase job creation which covers the improvement in investment and business climate, research and innovation support, land procurement, economic zones, state investment, and the acceleration of

national strategic projects. Amongst 82 Laws, this Omnibus Law revise these Laws relevant to climate change and disaster management in Indonesia:

- Law on Housing and Settlement Region (UU No. 1/2011 tentang Perumahan dan Kawasan Permukiman Perumahan)
- Law on Water Resources (UU No. 17/2019 tentang Sumber Daya Air)
- Law on Management of Coastal Areas and Small Islands (UU No. 27/2007 tentang Pengelolaan Wilayah Pesisir dan Pulau-Pulau Kecil)
- Law on Geospatial Information (UU No. 4/2011 tentang Informasi Geospasial)
- Law on Marine Affairs (UU No. 32/2014 tentang Kelautan)
- Law on Local Government (UU No. 23/2014 tentang Pemerintahan Daerah).

Apart from Indonesian laws on climate change and disaster management, we also identified international frameworks relevant to climate change and disaster management:

Indonesia's commitment under **Convention on Biological Diversity (CBD)** in increasing conservation areas has a strong linkage with adaptation efforts, particularly in achieving ecosystem and landscape resilience, which will positively affect economic resilience and social and livelihood resilience (Secretariat of CBD 2000). Social forestry, Coastal zone protection, Ecosystem conservation, restoration, and Integrated watershed management are the key programmes of Indonesia's NDC to achieve Ecosystem and Landscape Resilience that provides potential synergy with CBD and SFDRR.

Conserving and managing wetlands as well as addressing the drivers of wetland loss and degradation links adaptation and the **Ramsar convention** on Wetlands in Indonesia. The Ramsar Strategic Plan 2016-2024 provides a tool towards wetlands conservation and management to the further development of policies and tools of the Convention and their application at the national and local levels to assist Indonesia to deliver conservation and wise use on the ground and meet their obligations under the Convention (Ramsar 2015).

The implementation of **Sendai Framework on Disaster Risk Reduction (SFDRR)** has a strong synergy with adaptation efforts to reduce risks and losses caused by natural disasters through enhanced climate literacy, risks management, and disaster preparedness (UNDRR 2015). Climate literacy is one of the eight strategies for NDC implementation in Indonesia, whereas risk management and disaster preparedness have been integrated into Indonesia's development plan and further translated into sectoral plans and national action plans.

3.2 Institutional Setup for Climate Change and Disaster Management

Institutions involved in implementing the commitment of Indonesia to combat climate change and disaster management are the Coordinating Ministry of Maritime Affairs and Investment, the General Directorate of Climate Change Control, and the National Disaster Management Agency.

Coordinating Ministry of Maritime Affairs and Investment (Kemenkomarves). Through Presidential Regulation on Coordinating Ministry of Maritime Affairs and Investment (Perpres No. 92/2019 tentang Kementerian Koordinator Bidang Kemaritiman dan Investasi), the Coordinating Ministry is responsible for coordinating, synchronizing, and controlling the affairs of ministries in the administration of government in the maritime and investment sector. Kemenkomarves is also authorised to oversee national priority programmes (the Major Project) and other President's policies in the cabinet meeting. Ministries/agencies under the coordination of Kemenkomarves include: Ministry of Energy

and Mineral Resources (Kemen ESDM), Ministry of Transportation (Kemenhub), Ministry of Tourism and Creative Economy (Kemenparekraf), Ministry of Marine Affairs and Fisheries (KKP), Ministry of Public Works and Housing (PUPR), and Ministry of the Environment and Fisheries (KLHK), Investment Coordinating Board (BKPM), and other agencies deemed necessary.

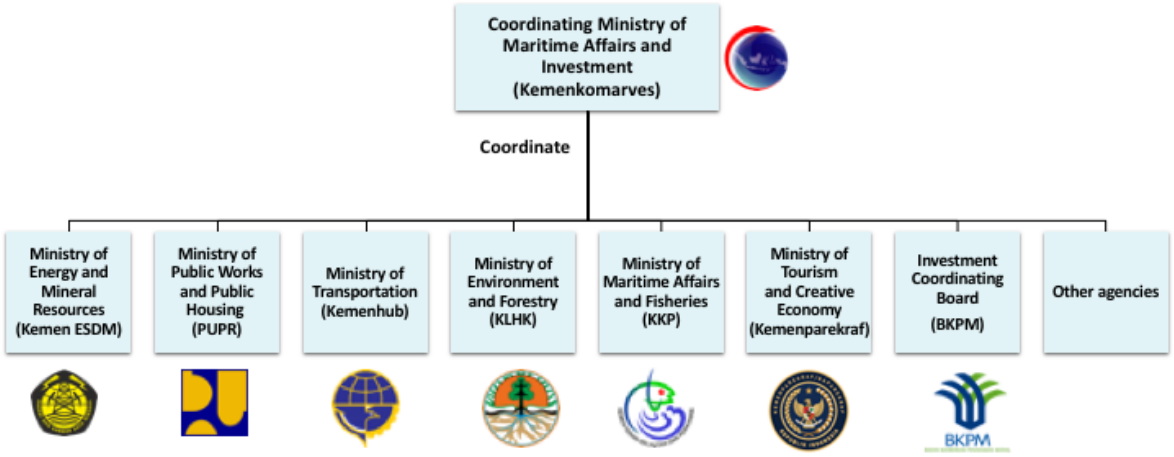

Figure 3.2 Kemenkomarves and ministries under its coordination

Directorate General of Climate Change Control (Ditjen PPI). According to Presidential Regulation on the Ministry of Environment and Forestry (Perpres No. 92/2020 tentang Kementerian Lingkungan Hidup dan Kehutanan), KLHK through Ditjen PPI holds the mandate to formulate and implement the policies in climate change (control). In addition, the formulation implementation of policies in the conservation of natural resources and their ecosystems, increasing the carrying capacity of a watershed, and forest rehabilitation is also the responsibility of KLHK. As a National Focal Point in managing climate change control, KLHK collaborates with various ministries/agencies (stakeholder parties) and other stakeholders such as development partners, the private sector, local governments, universities, and NGOs (non-party stakeholders). KLHK also synergizes with the Ministry of National Development Planning (Bappenas) and the Ministry of Finance (Kemenkeu) in coordinating the NDC implementation strategy related to national development achievement targets and budgeting.

National Disaster Management Agency (BNPB) was established in 2008 as the issuance of Presidential Regulation on National Disaster Management Agency (Perpres No.8/2008 tentang Badan Nasional Penanggulangan Bencana) and as mandated by Law on Disaster Management (UU No. 24/2007 tentang Penanggulangan Bencana). BNPB holds the mandate to coordinate disaster management activities in a planned, integrated, and comprehensive manner. BNPB consists of the Head of BNPB, the Management and Operational Committee, and the Policy Implementation Agency. The role of the Management and Operational Committee is to advise and consult with the Head of BNPB. It consists of ten ministries (Ministry of Home Affairs (Kemendagri), Ministry of Social Affairs (Kemensos), Ministry of Public Works and Housing (PUPR), Ministry of Health (Kemenkes), Kemenkeu, Kemenhub, Kemen ESDM, Police and Armed Forces) and nine other experts. Meanwhile, the Policy Implementation Agency is in charge of increasing preparedness, emergency response, relief, and reconstruction. In addition, it is also mandated to establish the Regional Disaster Management Agency (BPBD).

Based on the NDC Roadmap Strategy, 17 ministries or agencies, with support from non-party stakeholders, are tasked with implementing CCA in Indonesia. According to their tasks and responsibilities, the stakeholders are categorised as shown in Table 3.1 (KLHK 2020).

Table 3.1 In-charge stakeholders for implementing CCA in Indonesia

Scope	Stakeholders	Tasks and responsibilities
Planning	• KLHK • Bappenas	• Conducting policy formulation related to NDC Adaptation • Prepare the NDC Adaptation roadmap • Support in coordinating with other Ministries/Agencies Approve the annual plan prepared by implementing ministries/agencies • Integration of the NDC roadmap preparation process into RPJMN and RAN-API
Budgeting	• Bappenas • Kemenkeu	• Provide regulatory and administrative support for grant issuance to sub-national levels under climate change financing mechanisms • Coordinate with implementing Ministries/Agencies for the preparation of budget documents and budget implementation processes • Carry out adaptation budgeting
Research	• LIPI • BPPT • LAPAN • Kemenristek	• Implementation of research and development activities in their respective fields in support of the NDC roadmap • Utilization and dissemination of information needed to support the NDC roadmap
Data provision	• BIG • BPS • BMKG • BNPB	• Data and information services in the field • Implementation, development, and control of observations, as well as data and information processing in the field • Guidance and facilitation of agency activities government in the field
Implementation	• KLHK • KKP • PUPR • ATR/BPN • BNPB • Kemen ESDM • Kemendagri • Kemenkes • Kementan • Kemendag • Kemenkumham • Kemensos • Kemenperin • Kemen PPPA • Kemendes	• Act as the central agency for the implementation of the NDC Adaptation roadmap strategy • Coordinate with central, provincial, and regional implementation teams on various strategy implementations. Marking budgets for activities implementation • Monitor and report physical progress and finance various strategy implementation
Supervision	• KLHK • Bappenas	• Monitor the progress of programme implementation • Provide a resolution about the problem implementation through cross-sectoral coordination • Carry out independent monitoring and evaluation to the development of the programme

Source: KLHK 2020.

In addition to the ministries and agencies, the Government of Indonesia also creates national platforms for climate change and disaster management, such as the CCA-DRR Working Group, National DRR Platform, and the Climate Change Mitigation and Adaptation and Disaster Risk Reduction Team.

CCA-DRR Working Group (Pokja API-PRB). First started in 2014, the initiative of converging CCA and DRR efforts was pioneered by the Association of Climate Change and Forestry Experts (APIK) (Ditjen PPI 2017a). KLHK with BNPB are in the lead of the Working Group of CCA-DRR convergence, and in involving relevant stakeholders, they have developed a CCA-DRR Convergence framework (Ditjen PPI 2017b). This initiative also works with and through the Secretariat of RAN-API, Bappenas, BNPB, and DRR National Platform (Planas PRB). Until the time of this report write-up, there is no information on whether a regulation has supported the establishment of this working group.

National DRR Platform (Planas PRB). Planas PRB, a multi-stakeholder body to advocate DRR, was established in April 2009 (Statuta Platform Nasional Pengurangan Resiko Bencana n.d.) to expand the cooperation among sectors through providing coordination, analysis, and advice to participating stakeholders, including community groups and DRR forums or platforms. Planas PRB also engages in education and training to promote local communities' capacity to identify, monitor, and deal with existing natural hazards.

The Climate Change Mitigation and Adaptation and Disaster Risk Reduction Team (Tim MAPI dan PRB) is established to support PUPR in achieving its climate and disaster targets through a Ministerial Decree (Kepmen PUPR No. 334/2016 tentang Pembentukan Tim Mitigasi dan Adaptasi Perubahan Iklim dan Pengurangan Risiko Bencana Kementerian Pekerjaan Umum dan Perumahan Rakyat, referring to the Perpres No. 15/2015 tentang Kementerian Pekerjaan Umum dan Perumahan Rakyat).

Climate-resilient development is part of the SDGs, in which the President is the SDGs Steering Council and Bappenas acts as the Implementing Coordinator. Relevant ministries, agencies, and institutions will have their respective roles according to the four priority sectors: marine and coastal, water, agriculture, and health, which can be seen further in the following figure (Bappenas 2021b).

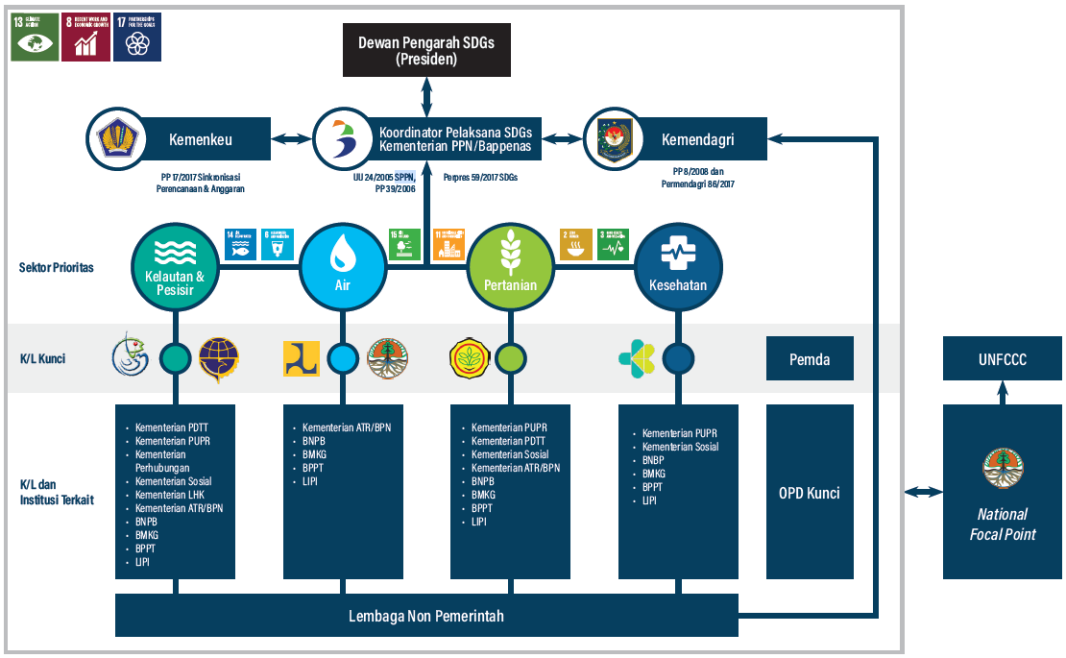

Figure 3.3 Stakeholders implementing climate resilience actions within the framework of the SPPN and SDGs

Besides having a key role in the water sector, KLHK will also act as a National Focal Point, which is to be responsible for and communicate activities related to UNFCCC at the national level.

The number and support of NGOs implementing adaptation measures in the four priority sectors in Indonesia is also encouraging as shown by the table below:

Table 3.2 Recapitulation of Non-Governmental Institutions in the Priority Sector of Climate Resilience

No	Organisasi	Sektor Prioritas Ketahanan Iklim															
		Kelautan dan Pesisir				Air				Pertanian				Kesehatan			
		I	T	PK	TKP	I	T	PK	TKP	I	T	PK	TKP	I	T	PK	TKP
1.	Aisyiyah			✓	✓			✓	✓			✓	✓			✓	✓
2.	ABC										✓	✓	✓				
3.	IFRC			✓	✓		✓	✓	✓			✓	✓			✓	✓
4.	IR Indonesia		✓	✓	✓				✓		✓	✓	✓				✓
5.	Kemitraan				✓			✓	✓				✓				✓
6.	KONSEPSI			✓	✓			✓	✓			✓	✓			✓	✓
7.	LPBI NU	✓		✓	✓	✓		✓	✓	✓		✓	✓	✓		✓	✓
8.	MUI			✓				✓				✓				✓	
9.	MCI		✓	✓	✓		✓	✓	✓		✓	✓	✓		✓	✓	✓
10.	Muhammadiyah			✓				✓				✓				✓	
11.	Oxfam										✓	✓	✓				
12.	PMI		✓	✓	✓		✓	✓	✓		✓	✓	✓		✓	✓	✓
13.	Rainforest Alliance											✓	✓				
14.	RARE Indonesia	✓	✓	✓	✓												
15.	SNV Indonesia						✓	✓	✓			✓			✓	✓	✓
16.	WVI											✓					
17.	WWF	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓			✓
18.	Yayasan Bintari	✓	✓	✓	✓		✓	✓			✓	✓	✓		✓	✓	✓
19.	Yayasan KARINA				✓				✓				✓				✓
20.	YKAN				✓				✓				✓				✓
21.	Yayasan Kota Kita			✓	✓			✓	✓			✓	✓			✓	✓
22.	YLBA	✓	✓		✓												
23.	Yayasan Obor Tani					✓				✓							
24.	UCLG ASPAC			✓	✓				✓	✓		✓	✓			✓	✓

Keterangan
I : Infrastruktur
T : Teknologi
PK : Peningkatan Kapasitas
TKP : Tata Kelola & Pendanaan

Source: Executive Summary of Climate Resistant Development Policy (Bappenas 2021c).

Further, Bappenas has also mapped the priority locations both where these NGOs are implementing their adaptation projects as well as locations identified as Super Priority, Top Priority, and Priority requiring appropriate interventions.

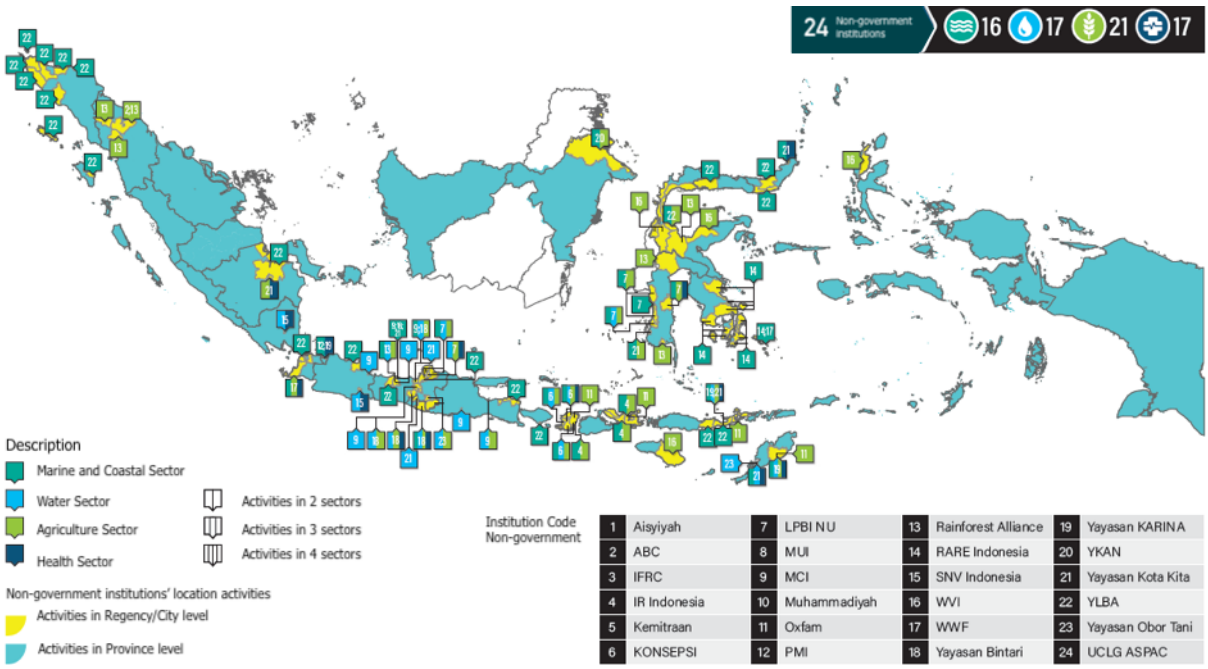

Figure 3.4 Non-Governmental Organisations Intervention Area

Source: Bappenas 2021a.

The contribution of YLBA as one of the members of the BwN consortium implementing the BwN approach in the Demak district is also acknowledged by GoI. It is listed as one of the NGOs supporting the GoI in achieving its climate adaptation and disaster management targets. Following the methodologies set up by the GIZ in identifying entry points for BwN, mapping and categorising stakeholders as initiator, follower, and sustainer of BwN is an important stage of the process. Therefore, all these stakeholders identified in this report are crucial to be involved in such process conducted by BwN in the future. In addition, the priority locations identified in Buku 1 Daftar Lokasi & Aksi Ketahanan Iklim (Bappenas 2021d) could inform BwN on the suitable locations and further identify BwN approach applicable to address climate-related challenges in these selected sites.

3.3 Planning, Budgeting Flow, and Procurement Process in Indonesia

With the adoption of **Law on National Development Planning System (UU No. 25/2004 tentang Sistem Perencanaan Pembangunan Nasional)** and **Law on State Finance (UU No. 17/2003 tentang Keuangan Negara)**, the Government of Indonesia has two separate development planning and budgeting processes. Ideally, a budget should reflect the government programmes articulated in the development planning document but synchronizing them has been challenging. The timeline of the budgeting process often overlaps with the fiscal year, which then complicates the planning and budgeting flow (Wasono & Maulana 2018).

Law on National Development Planning System (SPPN) stipulates that SPPN outlines the scope of national development plan into: (1) National Long-Term Development Plan (RPJPN) that sets forth the 20-year development vision and mission; (2) National Medium-Term Development Plan (RPJMN) that breaks down Long-Term Development Plan (RPJP) into a five-year plan; and (3) short-term Government Annual Work Plan (RKP) planned annually at all levels of ministry and agency from RPJMN. Similarly, regional development plans consist of long-term (RPJPD), medium-term (RPJMD), and short-term (RKPD) plans. Law on SPPN also mandates that the central and government development plan be synergized. The planning process is led by Bappenas formulating all three

national development planning documents. However, the involvement of Bappenas in the budgeting process stops at formulating the indicative budget cap.

On the other hand, Law on State Finance stipulates the State Budget (APBN) and the Regional Budget (APBD) as the central and local government annual budget plans must be approved by the national or local House of Representatives (DPR/DPRD). APBN and APBD hold authorization, planning, monitoring, appropriation, distribution, and stabilization functions and are integral to the national development planning system. APBN and APBD are formulated in reference to the RKP and the Regional Work Plan (RKPD). Both SPPN Law and Finance Law regulate community participation in the planning process via Development Consultative Forum (Musrenbang) at the national and regional level to inform RKP and RKPD. In reality, it is not a straightforward process (Wasono & Maulana 2018). According to Law on State Finance, the budgeting process for APBN and APBD is led by the Ministry of Finance. Meanwhile, coordination between central and regional government is under the authority of Ministry of Home Affairs, referring to Ministerial Regulation on the Implementation of Government Regulation (Permendagri No. 54/2010 tentang Pelaksanaan Peraturan Pemerintah) also complicates the process.

Based on Law on SPPN and Law on State Finances, Figure 3.5 below summarizes Indonesia's planning and budgeting processes. In addition to the above laws, other laws such as **Law on the 2005-2025 National Long-Term Development Plan (UU No. 17/ 2007 tentang Rencana Pembangunan Jangka Panjang 2005-2025), Law on Regional Government (UU No. 23/2014 tentang Pemerintahan Daerah)**, and **Law on Villages (UU No.6/2014 tentang Desa)**, as well as their implementing regulations, such as ministerial regulations, also influence the processes. The Law on Village regulates RPJM and RKP in village level as the basis of formulating the village budget (Anggaran Pendapatan dan Belanja Desa). The Law on Regional Government further regulates that the Regional Government must harmonize development planning and its associated budgeting process among regencies/municipalities, and between provincial regions and regent/municipal regions in their respective regions. Sustainable development, climate change, and disaster management are part of the development plan and hence is mainstreamed into these planning documents through such planning and budgeting process as depicted below.

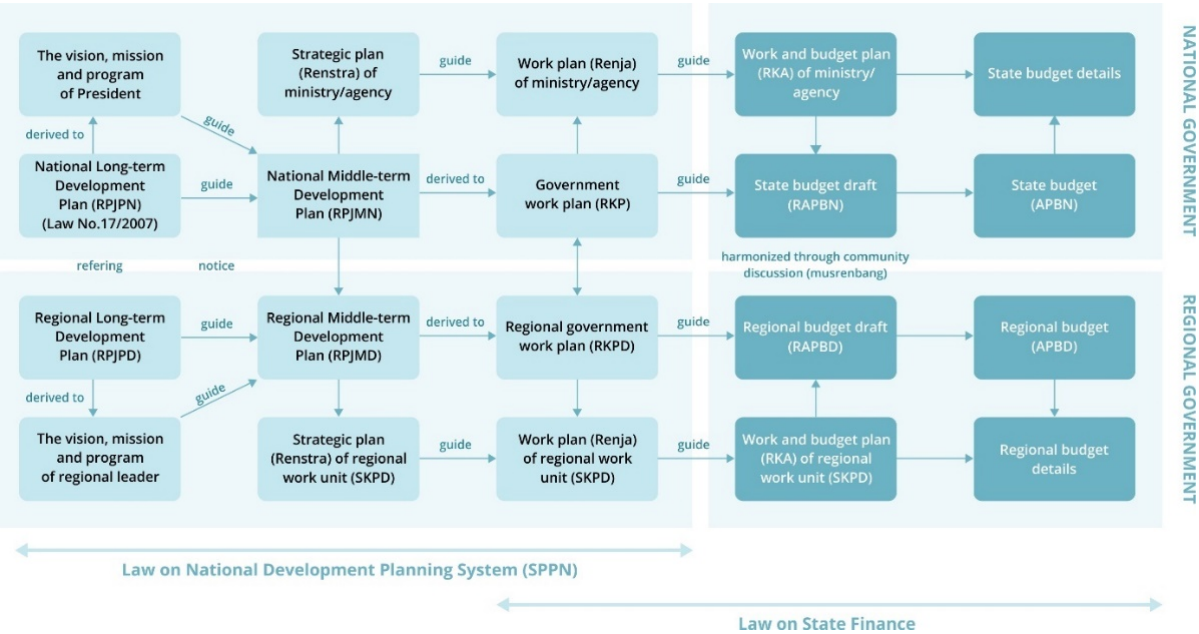

Figure 3.5 Planning and budgeting flow in Indonesia

Source: adapted from Kemenkeu 2015 as cited in Wasono and Maulana 2018.

An analysis by OECD (2007) suggested that the Paris Declaration served as tool for participating countries to measure their success, or failure, in making aid more effective related to climate commitments. In addition, one of the indicators to determine the achievement of SDGs goals particularly related to SDG 10 is the implementation of open contracting (Open Government Partnership, 2021).

Lembaga Kebijakan Pengadaan Barang/Jasa Pemerintah or LKPP (also known as the National Public Procurement Agency/NPPA) was established following the Presidential Regulation No.106 of the year 2007. It is a non-departmental government agency that is under and responsible to the President (art 1) and is the only government agency that has the task of developing and formulating policies for the procurement of government goods/services art 2(2), coordinated by the Minister for National Development Planning (art 4). This task includes, among others (art 3):

(1) Formulation and formulation of strategies as well as determination of policies and standard procedures in the field of procurement of government goods/services, including procurement of business entities in the framework of cooperation between the Government and business entities
(2) Guidance and development of information systems and supervision of the implementation of electronic procurement of government goods/services (electronic procurement)

According to Presidential Regulation No.106 of the year 2007, in formulating policies and strategies in government procurement of goods/services, LKPP will receive direction from Ministry of National Development Planning/National Development Planning Agency (art 27). In formulating policies for the procurement of government goods/services for the implementation of Ministry/Agency Work and Budget Plan (RKAKL) in coordination with the Ministry of Finance and the Ministry of National Development Planning/National Development Planning (Article 28). In carrying out its international relations and cooperation as well as negotiations with related Foreign Loans and Grants (PHLN) in the field of procurement of goods/services, LKPP coordinates with the Ministry of Finance, Ministry of Foreign Affairs, Ministry of Trade and State Ministry of National Development Planning/Development Planning Agency National (art 29). Whereas the function of, among others, providing technical guidance and advocacy to all stakeholders related to the rules/regulations for the procurement of government goods/services (art 22) are the duties of the Deputy for Legal Affairs and Settlement of Disputes (art 21).

In 2018, the Presidential Regulation on Public Procurement (PP no. 16/2018) was issued with a mandate to integrate the Electronic Procurement System (EPS) – building on the existing system established in 2008 and that has been adopted by public institutions across Indonesia. The role of such procurement reform is reflected in the first and seventh agenda of the RPJMN 2020-2024, referencing the need to enhance high value-added exports, manufacturing competitiveness, good governance, and the rule of law. However, there was no procurement document available to be published to allow transparency, accountability, and public participation in public procurement process: planning, preparation, open call for proposals, proposal selection, contracting, and implementation (Open Government Partnership, 2021). For procurement funded by foreign loans/grants, to strengthen the monitoring system mandated by the regulation LKPP should involve as many national providers of goods/services as possible (Presidential Decree or Kepres no. 80/2003 on Guideline for Public Procurement), including Civil Society Organisations or CSOs, described by Presidential Regulation no. 16/2018 as Swakelola Tipe III (art.18 (6c)).

Recently the GoI issued a Presidential Regulation Number 12/2021 on Public Procurement that contains changes on a number of articles in PP no. 16/2018 and at the same time mandates the improvement of Sustainable Procurement (art 4a) as one of its objectives through the implementation of the Electronic Procurement System (EPS) integrating planning program process, budgeting, up to monitoring and evaluation. This regulation also recognises Sustainable Procurement - in this regulation defined as "the Procurement of Goods/Services which aims to achieve an economically beneficial value not only for Ministries/Institutions/Regional Officials as users but also for the community, as well as significantly reducing negative environmental and social impacts in the overall cycle of its operation" (art 1(50)).

Since procurement should be an integral part of its budget planning process and initiation of procurement actions which utilise public funds, it should not take place without existing budget appropriations or allocations, and contract execution should be subject to budgetary controls to ensure sufficient contract funding. However, procurement of other goods/construction works/services in certain circumstances are made possible through direct appointment as the selection method (article 38 (1c)). Example of this includes organising sudden preparations of activities to follow up on international commitments attended by the President/Vice President (art 38 (5a)).

In addition, perhaps it is worth investigating Indonesia's current procurement policies relevant to BwN. For instance, one of OECD's (2007) criteria for Indonesia's reform of national public procurement has included a regulation(s) on emergency procurement, where reduced timeframes may be applied if GOI declares an emergency in a particular region. Suppose said the specific region has been affected by a natural disaster. In that case, its subsequent documents, such as (i) National Model (Standard) Bidding and Contract Documents and (ii) National Procurer/User's and Supplier/ Provider's Guides or Manuals, which explain the various procedures, can follow the emergency procurement process. This LKPP-led process on this might provide opportunities for BwN through the inclusion of nature-based solution as one of the criteria for procurement for natural disasters followed up by adoption of government institution and provision of technical guidance and advocacy to all stakeholders relevant to BwN mainstreaming in Indonesia.

3.4 Climate Resilience in the Development Plan

Current national development plans have embedded climate change as one of the priorities in sustainable development (Figure 3.6). For example, in the 2020-2024 RPJMN, climate change adaptation has been listed in Development Agenda No. 6 (DA6) Building the Environment, Improving Disaster Resilience and Climate Change. The target of achieving CCA is increasing climate resilience carried out by implementing RAN-API in priority sectors, including in marine and coastal sectors and the water sector. The development agenda also specifically targets to reduce the potential loss of GDP in sectors affected by climate hazards by 0.34% in 2020 and 1.15% in 2024.

Climate change response has also become a priority to establish the main goal of SDGs No. 13 on Climate Action. In addition, at the national level, DRR has also been integrated into the policy framework at the national and regional government level for preparedness, emergency response, and post-disaster recovery. Policies related to disaster management, including that of DRR, have been instituted in the 2015-2019 RPJMN and RKP.

The NDC roadmap is a directive for the NDC document as an umbrella in preparing RAN-API document, which is currently being updated as a strategic action to prepare development plans that are resilient

to climate change and encourage the need to assess the contribution of adaptation in national development planning. As a directive document, the NDC roadmap needs to provide a design for the programmes of CCA action.

Components in the NDC can also be further elaborated into related sectors in RAN-API. Furthermore, the strategic pillars of the roadmap can be used as a direction for planning adaptation action programmes in RAN-API with risk codes and target areas based on climate change hotspots.

Figure 3.6 Climate change in the development plan, SDGs, and National Adaptation Plan

Source: adapted from KLHK 2020.

3.5 Policies and Programmes on Water and Maritime Sectors in Indonesia

The 2020-2024 RPJMN issued by Presidential Regulation (Perpres No. 18/2020 tentang RPJMN Tahun 2020-2024) has four pillars. One of the mainstreams correlates with this policy review's focus, i.e., Sustainable Development, in which Disaster Resilience and Climate Change have been embedded. The RPJMN also categorises the Development Agenda (DA) into seven categories; three of them are highly relevant for mainstreaming BwN in Indonesia, i.e., DA1 Increase Economic Resilience for Effective and Equal Growth, DA5 Strengthening Infrastructure to Support Economic Development and Basic Services, and DA6 Building the Environment, Improving Disaster Resilience and Climate Change.

The RPJMN also identified 41 Major Projects that will be implemented cross-sectorally by relevant ministries and agencies. This report will then focus on these pillars and development agendas to identify relevant policies and programmes for up-scaling BwN in Indonesia in water infrastructure, port development, CCA-DRR, nature resource management, spatial plan, and others. **Considering BwN's core approach, this report will focus on relevant regulations implemented by seven relevant ministries: Bappenas, Kemenkomarves, KLHK, PUPR, KKP, BNPB, and ATR.**

3.5.1 Water Infrastructure

It has been widely acknowledged that disasters may hamper the achievement of Indonesia's national development. Two of Indonesia's development agendas, i.e., DA1 Increasing Economic Resilience for Quality Growth and DA5 Increased provision of basic service infrastructure, allow the utilisation of water infrastructures to achieve economic resilience. The executive summary of RAN-API (Bappenas 2019) further suggests that "infrastructure must have a climate-resilient, ecosystem-based, and retrofit to face the challenges and impacts of climate change". Green infrastructure is part of the solutions proposed to reduce multi-hazards and risks and to be fully integrated with the national development plans and SDGs. In this section, this policy review discusses three major types of water infrastructures, i.e., flood risk protection (along coasts and rivers), port development, and water shortage stipulated in the existing regulations.

Along with supportive regulation, there are two platforms relevant to water. At the national level, based on the Ministerial Decree (Kepmen PUPR No. 463/2013), the **Center for River Basin Organization and Management (Pusat Tata Kelola Wilayah Sungai)** provide services to develop capacity on water resource management and knowledge management in organisations and river basins for all stakeholders in Indonesia and countries in the Asia-Pacific region. At the regional level, there is **Asia-Pacific Water Forum**. Asia-Pacific Water Forum is an independent and not-for-profit network organisation aiming to raise the priority of tackling water security issues highlighted in the Asia-Pacific region's development agenda to improve people's livelihoods and the environment.

3.5.1.1 Flood Risk Protection (Along Coasts and Rivers)

Among seven ministries reviewed, PUPR, KLHK, and Kemenkomarves own responsibilities for flood risk protection.

According to the **Presidential Regulation on Ministry of Public Works and Public Housing (Perpres 27/2020 tentang Kementerian Kementerian Pekerjaan Umum dan Perumahan Rakyat),** PUPR is responsible for the formulation, stipulation, and implementation of policies in the field of, among others, water resources management including conservation and utilisation of water resources (including ground water), as well as controlling the destructive power of water (including ground water) under the provisions of laws and regulations.

As stipulated in the **Ministerial Regulation on Ministry of Public Works and Public Housing's strategic plan for 2020-2024 (Permen PUPR No. 23/2020 tentang Rencana Strategis Kementerian Pekerjaan Umum dan Perumahan Rakyat Tahun 2020-2024**), PUPR has laid out several measures related to flood risk protection, notably in the first strategic goal (SS-1). Under SS-1, to increase water infrastructure service for disaster resilience, PUPR through the Directorate of Rivers and Coasts plans to build 2,100 kilometres of buildings preventing water-induced disasters and 62 units of complementary buildings preventing water-induced disasters. PUPR also targets to reduce 101,500 hectares of area affected by floods, build or improve 1,853 kilometres of flood control buildings, build or improve 62 units of flood control buildings by 2024.

Further, all these targets were included under several programmes managed by the Directorate General of Water Resources Management, i.e.: (1) development of groundwater and raw water networks; (2) multi-purpose dams; (3) infrastructure disaster resilience;(4) flood control, lava, main urban drainage management, and coastal protection; (4) development of dams, lakes, and other water reservoir structures

To contribute to DA1, KLHK also offers opportunities to implement flood risk infrastructures as stipulated in the **Ministerial Regulation on Ministry of Environment and Forestry's strategic plan for 2020-2024 (Permen KLHK No.16/2020 tentang Rencana Strategis Kementerian Lingkungan Hidup dan Kehutanan Tahun 2020-2024**), such as: (1) increasing the quantity/water security to support economic growth implemented by maintaining, restoring, and conserving water resources and their ecosystems through green infrastructure; and (2) maintenance, restoration, and conservation through lake revitalisation of 15 national priority lakes, namely: Lake Toba, Lake Maninjau, Lake Singkarak, Lake Kerinci, Lake Rawa Danau, Lake Rawa Pening, Lake Batur, Lake Sentarum, Lake Kaskade Mahakam (Semayang-Melintang-Jeumpang), Lake Tondano, Lake Limboto, Lake Poso, Lake Tempe, Lake Matano, and Lake Sentani.

Besides the mentioned technical ministries, Kemenkomarves also plays a crucial role in overseeing the implementation of national development. As stipulated in the **Ministerial Regulation on Coordinating Ministry of Maritime Affairs and Investment's strategic plan for 2020-2024 (Permenkomarves No. 6/2020 tentang Rencana Strategis Kementerian Koordinator Bidang Kemaritiman dan Investasi Tahun 2020-2024**), relevant programmes and activities include: (1) increasing water quantity/security to support economic growth (DA1); (2) improvement of maritime, fisheries and marine management (DA1); and (3) coordinated priority programmes in basic service infrastructure, economic infrastructure, and infrastructures to support urban areas (DA6).

3.5.1.2 Port Development

To grow the marine economy, one of the strategies from the Government of Indonesia is building and developing marine and maritime infrastructure to increase connectivity and development within the Indonesia-centric approach. Referring to the National Document of Indonesian Marine Policy, Annex 1 of Presidential Regulation on Indonesian Marine Policy (**Perpres No. 16/2017 tentang Kebijakan Kelautan Indonesia)**, Pillar 4 on the Marine Infrastructure and Economy, and Welfare Improvement is related to port development.

Several strategies to implement Pillar 4 will be done through several programmes: (1) maritime economics by building marine economic zones which are integrated with Blue Economy; (2) maritime infrastructure by developing national maritime transportation connectivity system and seaport infrastructure. These strategies were further elaborated in the 5-year National Action Plan of Indonesian Marine Policy for 2020-2024 to develop 24 strategic ports integrated into the marine highway concept, consisting of a feeder port and a hub port that can be traversed by large ships weighing 3,000-10,000 TEUs.

3.5.1.3 Water Shortage

Ministerial Regulation on Ministry of Public Works and Public Housing's strategic plan for 2020-2024 (Permen PUPR No. 23/2020 tentang Rencana Strategis Kementerian Pekerjaan Umum dan Perumahan Rakyat Tahun 2020-2024) also lays out several measures to address water shortage issues and contribute to achieving DA1 and DA5, i.e., increasing raw water availability for domestic and industrial use by 50 m^3/s, or from 81.4 m^3/s in 2019 to 131.4 m^3/s in 2024.

In addition, the development of dams and revitalisation of retention basins aims to tackle flood risks also serves to prevent water shortages as these water reservoir structure-function to regulate water. Similar to flood risk protection, under SS-1 Increasing Water Availability through water resources infrastructure, PUPR aims to increase water reservoir capacity to 58.5 m^3/capita in 2024 by building 61 multifunction dams and 470 retention basins throughout 2020-2024.

In addition, KLHK includes one of the ministry's agenda to prevent water shortage caused by climate change in its strategic plan **(Permen KLHK No.16/2020 tentang Rencana Strategis Kementerian Lingkungan Hidup dan Kehutanan Tahun 2020-2024)**. The prevention efforts include corrective steps related to Land and Forest Rehabilitation (RHL) prioritised on target locations, i.e.:

- 108 watersheds and 2,145 watersheds that are included in the watershed classification that must be restored to their carrying capacity
- Locations prone to floods, droughts, and soil landslides

- Watershed locations can save catchment areas, springs, vital facilities in the form of reservoirs/dams, lakes, and downstream watersheds prone to tsunamis, seawater intrusion, and coastal abrasion.

3.5.2 CCA and DRR

The 2020-2024 RPJMN describes CCA activities in Indonesia under DA6 Building the Environment and Increasing Resilience to Disasters and Climate Change by targeting climate resilience. In increasing climate resilience, efforts will be carried out by implementing RAN-API in several priority sectors, including the marine and coastal sector, water sector, agricultural sector through geospatial data and information, and health sector.

RAN-API and NDC Roadmap include some strategies to support CCA-DRR in Indonesia, i.e. (1) strengthening policy instruments for CCA and DRR; (2) integration into development planning and financial mechanisms; (3) improved climate literacy on vulnerability and risk; (4) landscape-based approach for comprehensive understanding; (5) strengthening local capacity on best practices; (6) improved knowledge management; and (7) stakeholder participation.

Several strategic documents embedded policies relevant to CCA and DRR are described as follows:

Ministerial Regulation on Coordinating Ministry for Maritime Affairs and Investment's strategic plan for 2020-2024 (Permenkomarves No. 6/2020 tentang Rencana Strategis Kementerian Koordinator Bidang Kemaritiman Dan Investasi Tahun 2020-2024) states that Kemenkomarves contributes to DA6 by coordinating several programmes, including: improving the quality of the environment, improving disaster and climate resilience, and low-carbon development

Ministerial Regulation on Ministry of Environment and Forestry's strategic plan for 2020-2024 (Permen LHK No. 16/2020 tentang Rencana Strategis Kementerian Lingkungan Hidup dan Kehutanan Tahun 2020-2024) mentions the contribution of KLHK on DA6 through:

- Increasing disaster and climate resilience to reduce the potential loss of GDP in sectors affected by climate hazards by 1.15% in 2024. To accomplish this target, disaster management and climate resilience should be enhanced. Disaster management can be carried out by strengthening the DRR plan at the national and regional level to be integrated into RAN-API and integrating inter-regional cooperation regarding disaster risk-based spatial planning and policy and disaster management. Whereas improving climate resilience can be carried out by implementing RAN-API in priority sectors
- Low-carbon development by cutting Green House Gasses emissions in the coastal and marine sector to 7.3% in 2024, and restoring mangrove and coastal ecosystem from 1,000 to 5,000 hectares by 2024.

Under KLHK, Ditjen PPI has responsibilities to formulate and implement policies in climate change control (Perpres No. 92/2020 tentang Kementerian Lingkungan Hidup dan Kehutanan). As stipulated on **Ditjen PPI's Regulation on Directorate General of Climate Change Control's strategic plan for 2020-2024 (Perdirjen PPI No. 9/2020 tentang Rencana Strategis Direktorat Jenderal Pengendalian Perubahan Iklim Tahun 2020-2024**), targets for Ditjen PPI under the Disaster Resilience and Climate Change programme relevant to BwN are under the first activity target (SK-1) "Improving Regional Climate Resilience" with two activity performance indicators (IKK):

- IKK 1-1 The availability of data and information on climate change risk and vulnerability, yet recommendations for regional climate change adaptation, can be achieved through:
  - Providing data and information on climate change risk and vulnerability via Information System for Vulnerability Index Data (SIDIK). In the future, SIDIK will be integrated with the thematic climate risk and vulnerability data of sectors/fields, for example certain ecosystems (forest, coastal, watershed) and other fields (agriculture, water resources, health, etc.)
  - Assisting in the formulation of CCA strategy or action plan. NDC implementation requires alignment between NDC adaptation and development policies in related ministry programmes and activities. The coordination and institutional strengthening in regions related to climate issues, including the formation of working groups, will be part of these activities
- IKK 1-2 The number of climate-resilient villages can be achieved through the Climate-resilient Village Programme (PROKLIM). PROKLIM is one of the strategic activities from KLHK to involve communities in supporting Indonesia's NDC target at the village level.

Ministerial Regulation on Ministry of Marine Affairs and Fisheries' strategic plan for 2020-2024 (Permen KKP No. 17/2020 tentang Rencana Strategis Kementerian Kelautan dan Perikanan Tahun 2020-2024) states that KKP's contribution on DA6 includes strategies for area conservation and protection of biodiversity on land and coasts, protection of coastal vulnerabilities and the marine sector, and low-carbon development of coastal and marine areas. This is reflected in the third strategic goal (SS-3) to be achieved, i.e., "sustainable marine and fisheries resources" with performance indicators: the area of marine conservation areas, from 23.4 million hectares in 2020 to 26.9 million hectares in 2024.

Management of marine areas, coastal areas, and small islands is carried out with strategies, including:
- improvement of sustainable coastal area management through disaster mitigation and climate change adaptation efforts and low-carbon coastal and marine development
- repair and improve the quality of damaged coastal ecosystems through ecosystem rehabilitation activities in coastal areas and small islands
- handling marine pollution and plastic waste
- improvement of management and utilisation of conservation areas
- sustainable waters, mangrove rehabilitation, and coral reefs
- improved management of protected, preserved, and/or utilised of aquatic biodiversity
- strengthening networks, partnerships/cooperation, and the role of KKP in marine biodiversity conservation convention
- improving the management of small/outermost islands.

Ministerial Regulation on Guideline on the Development of the National Adaptation Plan (Permen LHK No. 33/2016 tentang Pedoman Penyusunan Aksi Adaptasi Perubahan Iklim) outlines the guideline for the Government and Local Governments in preparing climate change adaptation actions and integrating them into development plans for a specific region and/or sector. Specific sectors addressed in this regulation include coastal and small islands as well as infrastructures. Government and Local Governments will involve registered experts from relevant government agencies, universities, and local community representatives (from not-for-profit institutions formed by the community or the general public) in the process.

The steps for identification of specific regional and/or sector coverage targets and preparation of climate risk and vulnerability studies are regulated in the **Ministerial Regulation on Guideline for**

Assessing Vulnerability, Risk, and Impact of Climate Change (Permen LHK No. 7/2018 tentang Pedoman Kajian Kerentanan, Risiko dan Dampak Perubahan Iklim) providing guidelines for the Government, Regional Government, and community to: (1) determine the scope of analysis, selection of methods, indicators, indicator data, and data sources in the preparation of the study of vulnerability, risk and impact of climate change; and (2) determine the criteria for verification of the results of the study of vulnerability, risk, and climate change Impact.

The results of setting priorities for climate change adaptation actions will be integrated into: (1) regional spatial plan (RTRW) along with plans in detail, the long-term development plan (RPJP), and the national, provincial, and district/city medium-term development plans (RPJM); and (2) other policies, plans, and/or programmes that are potentially affected by climate change. The final results of the preparation of climate change adaptation actions will be integrated into (1) Environmental Protection and Management Plan national, provincial, and district/city level; and (2) Strategic Environmental Assessment (KLHS).

Regulation of the National Disaster Management Agency on National Disaster Management Agency's strategic plan 2020-2024 (Peraturan BNPB No. 5/2020 tentang Rencana Strategis Badan Nasional Penanggulangan Bencana Tahun 2020-2024): this Strategic Plan 2020-2024 is a planning document for BNPB for 2020-2024. In achieving DA6 Building the environment, increasing disaster resilience, and climate change, BNPB's strategies include:

- Improvement of the quality of the environment is carried out by integrating efforts to prevent, control, and recover environmental pollution and damage and institutional strengthening and law enforcement in the environmental sector.
- Increasing disaster and climate resilience are carried out through strengthening the convergence between disaster risk reduction and climate change adaptation.
- Low-carbon development is carried out through efforts to reduce emissions and emission intensity in priority areas that include energy, land, waste, industry, and marine sectors.

Several programmes to implement these strategies include:

- Optimising the preparation of regional-based thematic disaster risk maps
- Disaster Resilient Villages/Urbans (DESTANA) and capacity building at the family level through the Disaster Resilient Family (KATANA)
- Disaster emergency infrastructure support at the national, provincial, and district/city levels
- Physical recovery (settlements, public facilities, and social facilities), social, economic, natural resource productivity, and public services
- Facilitation for areas that need assistance in budgeting for rehabilitation and reconstruction through rehabilitation and reconstruction grants.

PUPR's Policy Direction and Strategy for Mainstreaming Disaster-Resilient Infrastructure includes **Ministerial Regulation on Ministry of Public Works and Public Housing's strategic plan for 2020-2024 (Permen PUPR No. 23/2020 tentang Rencana Strategis Kementerian Pekerjaan Umum dan Perumahan Rakyat Tahun 2020-2024):**

- Provision of standard Norms, Standards, Procedures, and Criteria (NSPK) for infrastructure building safety, including anticipation of disasters such as buildings, roads, long-span bridges, and dams

- Development of connectivity infrastructure by taking into account disaster-prone zones, according to hazard conditions and characteristics of disaster-prone areas
- Development of transportation infrastructure that can also function as disaster mitigation buildings (For example, roads built as embankments in coastal areas to reduce the impact of tidal floods or tsunamis)
- Arrangement of buildings and residential environments located in disaster-prone locations
- Maintenance and arrangement of the environment around watersheds (DAS).

Ministerial Regulation on Climate Village Programme (Permen KLHK No. 84/2016 tentang Program Kampung Iklim). PROKLIM is one of the strategic activities of the KLHK that can be carried out by the community in supporting integrated and sustainable adaptation and mitigation efforts at the site level in supporting Indonesia's NDC achievement targets.

In order to achieve the target achievement as intended, at the initial stage in 2021, the PROKLIM Roadmap prepared in 2017 will be updated by detailing the strategic steps to strengthen PROKLIM, as well as identifying opportunities for support and synergy with various parties in early 2021. This is to improve the implementation of PROKLIM in 1,680 locations (with location units at Village/District /RW) and 20,000 locations with support from other stakeholders by 2024.

On the other hand, besides national platforms and policies for CCA, relevant platforms were also set up at the global and regional level agreeing on:

- UNFCCC/Paris Agreement
- Sustainable Development Goals
- UN Resolution: government commitment, community empowerment, reduction of victim and loss due to disaster impacts
- Yokohama Strategy: integrate DRR into development to improve community resilience to disasters
- Hyogo Framework for Action: integrate DRR into development, strengthen mechanism, and comprehensive institutional approach
- United Nations Convention on the Law of the Sea 1982.

The regional platforms include:

- Beijing's Action Plan (Asia's Agreement for DDR as the main priority; conduct regional cooperation in DDR).
- ASEAN Regional Agreement: regional cooperation for DDR and mitigation of disaster emergency.
- Australia-Indonesia Facility for Disaster Reduction (AIFDR) – Phase II, SC-DRR (Safer Community through Disaster Risk Reduction).
- Japan International Cooperation Agency (JICA), University of Hawaii on Managing Partner of the Pacific Disaster Center.
- Asian Development Bank (ADB) on Regional Assistance for Developing a Disaster Risk Financing Project.
- Indonesia Multi Donor Fund Facility on Disaster Recovery (IMDFF-DR), expanding its scope at preparedness, early warning, though it still focuses on recovery and Global Fund for Disaster Risk Reduction (GFDRR).

- Asia Pacific Ministerial Conference on Disaster Risk Reduction: aims to promote coordination and cooperation across the region and assesses progress made in the implementation of SFDRR, the global blueprint to reduce disaster risk and losses, at the regional level.

Relevant platforms were also set up at the global and regional level agreeing on the United Nations Convention on the Law of the Sea 1982 include:

- Archipelagic and Island State Forum: a forum where island states and archipelagic countries taking part in a collective forum addressing challenges of ocean resource usage for sustainable economic growth, climate change resiliency, ocean pollution, emergency management, and the enhancement of sustainable fisheries. Kemenkomarves represent Indonesia's leadership of this forum.
- Coral Triangle Initiative for Coral Reefs, Fisheries, and Food Security: This is a multilateral partnership of six countries working together to sustain extraordinary marine and coastal resources by addressing crucial issues such as food security, climate change, and marine biodiversity.
- International Coral Reef Initiative (ICRI) is an informal partnership between Nations and organisations that strive to preserve coral reefs and related ecosystems worldwide.

3.5.3 Natural Resources Management

Law on Environment (UU No. 32/2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup) emphasises that increased global warming has resulted in climate change that aggravates environmental degradation. While Indonesia's commitment to natural resources management is also mainstreamed in DA6 of RPJMN, commitments can also be found in **Presidential Regulation on Indonesian Maritime Policy (Perpres No. 16/2017 tentang Kebijakan Kelautan Indonesia).**

The policy consists of two documents, i.e., the National Document of Indonesian Marine Policy and the NAP of Indonesian Marine Policy. Referring to the National Document, relevant opportunities for BwN can be found in Pillar 1 on Marine Resource Management and Human Resource Development and Pillar 5 on Marine Spatial Management and Marine Environmental Protection. Several relevant programmes under Pillar 1 are: (1) increasing protection for the preservation of marine biodiversity through ecosystem conservation, type, and genetics; (2) improving the management and utilisation of coastal and small islands resources in a balanced and sustainable way. Meanwhile, Pillar 5 offers several supportive programmes to BwN towards:

- Strengthening the management of watershed areas (DAS), coasts, seas, and small islands through integrated and sustainable management.
- Strengthening conservation of ecosystems, species, and genetics.
- Prevention, response, and recovery of impacts pollution and damage to the marine environment.
- Marine disaster management.
- Development of coastal and marine use and sustainable infrastructure.
- Development of bilateral, regional, and global cooperation in marine environment management.

Further, the National Action Plan also covers priority programme clusters, namely:

- Priority Programme A Maritime Boundary, Sea Space, and Maritime Diplomacy covers the Marina Spatial Management Priority Activity that: (1) prepare support for the development of coastal and

marine natural resource activities, as well as environmental protection functions and; (2) maintain and improve the sustainability of the coastal and marine environment

- Priority Programme C Marine Natural Resources and Services Industry and Marine Environmental Management covering Priority Activity e.g. (1) water conservation to fulfill Indonesia's commitment in the field of conservation by becoming a member of the Convention on Bio-Diversity (CBD); (2) rehabilitation, marine and coastal pollution to tackle marine debris, wastewater, coastal sedimentation, coral reef destruction, coastal abrasion, and coral bleaching in Indonesia; (3) management of small islands that serves as the location of the base point for the delineation of the sea boundary line and its strategic value in various aspects including the environment, marine services and others that need to pay attention to basic infrastructure issues.

Until this report write-up, the Presidential Regulation on Indonesian Maritime Policy 2021-2025 and its NAP has not been published.

3.5.4 Spatial Planning

The Ministry of Agrarian Affairs and Spatial Planning (ATR/BPN) is responsible for the formulation and implementation of land management policies according to the spatial plan and the determination of coastal areas and small islands, borders, and specific areas. This is in line with the **Government Regulation on Marine Spatial Plan (PP No. 32/2019 tentang Rencana Tata Ruang Laut)** that serves as a reference document for all ministries/agencies implementing marine development and spatial planning. This is in line with the ATR/BPN's role in contributing to the landscape-based approach for comprehensive understanding as one of the NDC strategies through the integration of land and coastal and marine spatial development policies.

On the **Ministerial Regulation on ATR/BPN's strategic plan for 2020-2024 (Permen ATR No. 27/2020 tentang Rencana Strategis Kementerian Agraria dan Tata Ruang/Badan Pertanahan Nasional Tahun 2020-2024),** the Ministry laid out its contribution to DA1, DA5, and DA6 include**:**

- DA1 Strengthening Economic Resilience for Quality Growth will be operationalised through Spatial Planning and Land Management.
- DA5 Infrastructure to Support Economic Development and Basic Services will be achieved through quality and reliability of Land Administration and Spatial Planning.
- DA6 Building the Environment, Improving Disaster Resilience and Climate Change through a strong and just land and spatial planning policy. Land Use and Spatial planning also integrate Strategic Environmental Assessment (KLHS), Disaster Risk Studies (KRB), Disaster Management Plans, and Master Plans for Geo-Heritage Tourism Areas.

The Implementation of Spatial Planning and Land Management is carried out through:

- Programme A Land Management and Services:
  - The adoption of land use and spatial plan will ensure the realisation of spatial planning that can realise sustainable development, including disaster mitigation and climate adaptation.
  - Implementation of land acquisition for the development of National and Provincial Strategic Projects to reduce development inequality between regions, ease of access between regions, investment, tourism which in turn contributes to economic growth.
- Programme B Implementation of spatial planning:

- Improving the quality and availability of spatial plans and realising an orderly and controlled use of space.
- Monitoring of the use of space, including the conversion of land functions in order to achieve orderly space.

However, the above land use and spatial management only cover less than 30% of Indonesia's total area, and the Strategic Plan has not yet covered marine spatial planning. Several opportunities to accommodate improved marine spatial planning can be found in the Presidential Regulation on **Indonesian Maritime Policy (Perpres No. 16/2017 tentang Kebijakan Kelautan Indonesia)** such as:

- Acceleration of the issuance of the national marine spatial plans.
- Acceleration the issuance of zoning plans for coastal areas and small islands.
- Acceleration of the completion of strategic area zoning plans national, specific national strategic area zoning plans and inter-regional zoning plans.
- Provision of basic geospatial information data and integrated thematic geospatial information within the One Map policy framework for the preparation of marine spatial planning.

3.6 Funding Opportunities

Firstly, funding for water infrastructures would refer to the laws and regulations optimising marine development financing sources such as APBN (Anggaran Pendapatan dan Belanja Negara / National Budget), APBD (Anggaran Pendapatan dan Belanja Daerah / Regional Budget), and contributions from the private sector, banks, and non-bank financial institutions. Non-government funding sources were leveraged by increasing the utilisation of the Public-Private Partnership (PPP) scheme or cooperation between the government and the private sector/non-governmental organisations, Corporate Social Responsibility (CSR), direct lending from development partners to State-Owned Enterprises (BUMN) and Municipal Development Fund.

Secondly, for CCA, the sources of funding for climate and disaster projects in Indonesia in general come from APBN, APBD, community (covering individuals, business institutions, non-government organisations, both domestic and overseas) as well as other legal and non-binding funds in accordance with the provisions of the legislation.

Thirdly, for DRR, the main source of funding for implementing BNPB Programmes and activities for the years 2020-2024 comes from the APBN. Other sources include foreign grants in the form of services, including: (1) strengthening disaster risk management from America (USAID) and Australia; (2) community-based disaster management from the Caritas Germany Institute; (3) emergency response and adaptive social protection systems of the World Food Programme. In 2020 BNPB initiated a loan from the World Bank in the form of the Indonesia Disaster Resilience Initiatives Project (IDRIP) Programme for activities to increase knowledge of disaster risk, service quality of early warning systems for multi-hazard disasters, and increase disaster response capabilities. This Programme was initiated and implemented together with BMKG.

Other funding sources for climate, disaster, and conservation activities can be channeled through domestic funding sources, overseas funding sources, and national investment mechanisms.

3.6.1 Domestic Funding Source

Domestic funding sources could come from APBN and domestic private investment.

APBN reflects the budget allocated for Programmes in the 2020-2024 RPJMN that further directs the five-year Strategic Plan and Annual Work Plan of the ministry/agency. Funding for climate change adaptation (and mitigation) can be identified through the Climate Budget Tagging using KRISNA, an online platform. In line with the efforts of the national government, the local governments also allocate budget for CCA programmes in the APBD channeled through many mechanisms such as Co-administration Fund (DTP), Deconcentration Fund (DD), General Allocation Fund (DAU), Regional Grant (HD), Revenue Sharing Fund (DBH), Special Allocation Fund (DAK).

Down at the village level, infrastructures can also be funded as it is one of the priority activities that the Village Fund can fund (PP No. 8/2016 tentang Perubahan Kedua atas PP No. 60/2014 tentang Dana Desa yang Bersumber dari APBN). The Village Fund should be in line with the Village Mid-Term Development Plan and annual work plans.

Meanwhile, domestic private investment offers opportunities for fundings from banking, non-banking, Corporate Social Responsibility (CSR), carbon trading, and green bonds.

According to Tänzler and Maulidia (2013), at least 27 regional development banks provide financing for local infrastructure projects, small and medium enterprises, environmental, and agricultural activities for **banking**-related funds. The criteria for accessing this funding would be for the activities to have high financial returns.

Funding can be sourced from **non-banking** sources, like the domestic capital market, insurance, financial institutions, and pension institutions. Similar to funding from the banking system, the activities need to have high financial returns to be able to access the fund.

Law on Environmental Management and Protection (UU No. 32/2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup) and Government Regulation on Social and Environmental Responsibility of Limited Company (PP No. 47/2012 tentang Tanggung Jawab Sosial dan Lingkungan Perseroan Terbatas) have regulated **CSR** funding mechanism as a contribution from business entities in the context of their obligations to make a positive contribution to the surrounding community and preserve the environment.

Carbon trading, either domestic or international carbon trading, is a form of implementation of Article 6 of the Paris Agreement. The development of mechanisms for carbon trading or carbon pricing has not been so advanced in Indonesia; therefore, to fulfill its international climate commitment to the Paris Agreement, the government of Indonesia is working with the Carbon Disclosure Project.

The Regulation of Financial Services Authority OJK Regulation on Green Bond (Peraturan OJK No. 60/2017 tentang Penerbitan dan Persyaratan Efek Bersifat Utang Berwawasan Lingkungan) regulates **green bonds** are to be allocated to finance various sectors, such as renewable energy, environmentally-friendly transportation, water supply, and waste water management. Indonesia has developed green sukuk as an instrument to support green projects that contribute to climate change adaptation, mitigation, and SDGs.

3.6.2 Overseas Funding Source

Funding sourced from private investors can also be utilised through incentive policies for those who support climate change control.

Global Environment Facility (GEF), Green Climate Fund (GCF), and Adaptation Fund (AF) are among the funding institutions that have provided climate funds for Indonesia. Besides direct access to these funding agencies, financing opportunity is also available through international support through the **Indonesia Climate Change Trust Fund (ICCTF)**. The ICCTF is the first trust fund managed by the government, chaired by Bappenas, that acts as an accountable institution that represents the Government of Indonesia in implementing activities and managing the Climate Change Control grant fund in accordance with the provisions agreed in the grant agreement **(Permen PPN No. 3/2013 tentang Pembentukan Lembaga Wali Amanat Dana Perwalian Perubahan Iklim Indonesia/ICCTF)**.

Several donors of the ICCTF include the United States Agency for International Development (USAID), the Kingdom of Denmark, United Kingdom Climate Change Unit (UKCCU), the Climate Development and Knowledge Network (CDKN), ADAPT ASIA, GIZ INFIS, United Nations Office for Project Services (UNOPS), UNEP DTU Partnership, and the Ministry of Industry, and private sector/business in Indonesia. Its funding is intended for Programme financing and strategic as well as innovative activities aiming to: (1) reduce greenhouse gas emissions; and (2) increase community resilience to the impacts of climate change on agriculture, forestry and peatland, industry, energy, and transportation, waste, and other sectors.

The proposed activities must be: (1) based on RPJMN; (2) considering the purpose of using the Grant and the principles of acceptance of the Grant; and (3) taking into account the achievement of the thematic objectives of the Trust Fund. ICCTF funds can be channelled directly to activity implementers consisting of Ministries/Institutions, Regional government, Non-Government Organisations, Private institutions, and/or universities.

3.6.3 International Funding Institutions

This section provides an additional analysis on financing matching to ensure BwN upscaling and sustainability in Indonesia. We identified Indonesia's needs for implementing BwN in water infrastructures sector reflected in a number of entry points discussed in Chapter 4. Here, we provide a review on available financing opportunities provided by a number of International Financing Institutions (IFIs), which Indonesia is listed as its member as well, that can support scaling-up BwN across the country.

3.6.3.1. Indonesia's Needs to Scale-Up BwN in Indonesia

As BwN aim to contribute to the achievement of NDC, NAP, and other relevant development and climate strategies and action plans, especially in the water infrastructure sector, a number of needs become integral to its successful implementation. A number of needs reflected in Indonesia's strategies and plans to achieve its development and climate goals then become relevant to scaling-up BwN in Indonesia. This includes:

1. **Funding**

Closing water infrastructure gap requires funding for implementing water infrastructure projects. In Indonesia, potential funding resources may come from domestic (public and private) financing and international financing (public and private through bilateral or multilateral cooperation) – see Chapter 3. Incorporating BwN criteria in investments and decision-making process would help leverage financial resources. In addition, obtaining funding for technical assistance and capacity-building programmes is also crucial to support BwN, as it is needed to develop comprehensive strategies for engaging with and accessing international climate finance sources.

2. **Technology Transfer**

Indonesia will need international support and collaboration in research, development and demonstration (RD & D) of innovative technologies. Examples of the use of international support on technology development and transfer could be directed to address possible risks of the selected technology and constraints in the implementation process of technology transfer and collaboration. It could also be used to highlight the risks and opportunities that climate change poses to the environment and beneficiaries of its projects, and put in place necessary measures to mitigate and actively manage these risks.

3. **Policy, regulatory, and institutional support**

It is widely understood that NDCs, NAP, and other development and climate-related strategies and action plans documents are often higher-level strategies which lack concrete and actionable details on how to turn these plans and ambitions into actions. Therefore, it is required to fund technical assistance and advisory activities to aid them in updating and improving these policy documents, as well as translate them into policies/strategies and actions. It is important to do this as it allows for adopting the BwN approach in several policy documents such as national climate policies, government procurement and budget, spatial plan, and regional development plans. In addition, policy support that can create enabling environment for (green) investment is also a pre-requisite for ensuring BwN scale-up and sustainability in Indonesia.

4. **Knowledge, Capacity Building and Technical Assistance**

Infrastructures, including water infrastructures, are exposed to climate change risks and thus need to either contribute to or help mitigate climate change risks. Developing water infrastructures projects such as sustainable infrastructures and green infrastructures may become complex as well. Capacity building, training and technical assistance on, for instance, sector-level climate risk assessments utilising reliable climate information in national planning and project design would help Indonesia develop projects and obtain investments in projects delivering climate co-benefits. In addition, promoting as well as production and dissemination of knowledge products and best practices of BwN as employing appropriate technology and as a best practice through workshops and country dialogues would enhance coordination among stakeholders, fostering exchange on best practices on BwN mainstreaming, adoption and implementation.

3.6.3.2 Financing Support

Financing support available from a number of IFIs providing support to Indonesia can be utilised to address identified needs to scale-up and ensure sustainability of BwN in Indonesia. We limit our analysis on four (4) Multilateral Development Banks (MDBs) that has been providing financing support to implement development and climate projects in Indonesia.

1. The World Bank Group (WBG)

In general, The World Bank Group (WBG) focus on two ambitious goals, which are "to end extreme poverty by reduce the percentage of people living on less than $1.25 a day to 3 percent by 2030", and "to promote shared prosperity by promote income growth of the bottom 40 percent of the population in every developing nation" (World Bank Group 2013).

In World Bank Group Climate Change Action Plan 2021 – 2025 (World Bank Group, 2021), they mentioned the importance of Nature-based Solutions (NbS) as critical elements of the food, water, and land systems transition. They also believe investment in NbS green infrastructure (such as mangroves, wetlands, and watersheds), could deliver 37% of the cost-effective climate mitigation needed through 2030 by protect, sustainably manage, and restore ecosystems.

Based on International Bank for Reconstruction and Development (IBRD) and International Development Association (IDA), as agencies under One World Bank Group, NbS also included as one of World Bank focus developments, which are environmental protection and consciousness. Engaging with the Sustainable Development Goals, IBRD issues bond, namely World Bank Sustainable Development Bonds, aim to support the financing of a combination of green and social projects, programs, and activities in member countries. In September 2021, World Bank launches initiative to issue USD 10 billion in sustainable development bond to engage investors in raising awareness for the urgency to integrate climate change considerations into country's development strategies. As an sustainable management strategy, NbS has a big potential to be integrated into country development as one of the climate change strategies.

2. Asian Development Bank (ADB)

As the region transform, the vision of Asian Development Bank (ADB) is also expanding. Based on their strategy 2030 (ADB 2018), ADB will sustain its efforts in combating extreme poverty as well as expand its vision to achieve a prosperous, inclusive, resilient, and sustainable Asia and the Pacific. To achieve this vision, ADB will focus on Seven Operational Priorities (Figure 3.7).

Figure 3.7 Seven Operational Priority Areas to Achieve Startegy ADB 2030's Vision

One of the Operational Priorities, Tackling Climate Change, Building Climate and Disaster Resilience, and Enhancing Environmental Sustainability, has one program namely Ensuring Environmental Sustainability. In this program, ADB will assist Developing Member Country (DMC) in improving the country's environmental management, and invest in the conservation and restoration of natural

capital. In this program, ADB also mention NbS as one of the approaches to prevent ecosystem degradation and mitigate pollution impacts.

In Indonesia, ADB current operations are guided by the country partnership strategy 2020 – 2024 that aims to support inclusive, competitive, and sustainable development. It is focused on supporting the country to arise stronger from the COVID-19 pandemic by using three strategies: improving well-being, accelerating economic recovery, and strengthening resilience.

Strengthening resilience will concentrate in strengthening Indonesia's resilience level to natural disasters, diseases outbreak, and climate change. One of its priority is environmental sustainability and green recovery, where ADB will help catalyse investments environmental sustainability projects in Indonesia. Similar with their Operational Priorities program, NbS is one of the green approaches that the ADB will promote and support. As NbS already mentioned in the ADB programs and approaches, it would highly possible to integrate NbS into government program by using recommendation from the ADB.

3. Asian Infrastructure Investment Bank (AIIB)

Through its Infrastructure for Tomorrow initiative (I4T), AIIB is investing in infrastructures that address climate change and connect Asia and the world. Two (2) of its strategies are relevant for Indonesia to scale-up BwN include AIIB Water Strategy and AIIB Sustainable City Strategy.

Through its Water Strategy, AIIB is committed to supporting its members' efforts to ensure the availability and sustainable management of water and sanitation for all, in line with the SDGs. The Bank's water sector is divided into three (3) categories, i.e. improving access to water services, increasing availability and quality of water through improved resource management, and improving resilience to the impact of water-related disasters.

Figure 3.8 AIIB Water Strategy Investment Focus

The Bank will finance projects that follow principles such as promoting sustainable infrastructure (have a positive impact on sustainability, address climate change adaptation and mitigation and maximize environmental and social outcomes in line with the objectives of the SDG), integrated resource management, and adopting innovative technology (such as green technology and nature-based solutions). One of its short-term implementation approaches is for stand-alone financing the

Bank will seek investment-ready projects where institutional and implementation capacity has been well demonstrated.

Recognising Asia's unprecedented urbanising speed and scale AIIB also provides financing for developing sustainable cities in the region, guided by its Sustainable Cities Strategy for developing sustainable cities that are green, resilient, efficient, accessible and thriving in Asia. This long-term aspiration is in line with the Sustainable Development Goals, New Urban Agenda, Paris Agreement on Climate Change and Sendai Framework for Disaster Risk Reduction. Investment areas include improving basic infrastructure and city resilience aiming to, among other objectives, enhance resilience against climate change and natural disasters, including through nature-based solutions where feasible, within urban boundaries. In terms of government financing, the Bank will support subnational entities with higher implementation capacity through subnational finance without sovereign guarantee.

4. Islamic Development Bank (IsDB)

IsDB is the largest South-South development bank focuses on stimulating economic and social development in its member countries (MCs) – 57 in total including Indonesia. In 2019, the Bank developed its Climate Change Policy (CCP) aiming to: 1) support the Bank develop low-carbon and resilient projects in MCs in infrastructure, water and sanitation, agriculture, urban services and other sectors, and 2) provide IsDB with a target-oriented framework to support its MCs in developing and implementing their sectoral and national development plans that take climate change into account, in line with the Paris Agreement.

To support CCP implementation, the Bank developed its 2020-2025 Climate Action Plan (CAP) – a five-year plan to align its operation with climate actions and to support MCs like Indonesia to transition to a more resilient and sustainable economies. The implementation of CCP has started in 2020 and will continue until 2025 in which several opportunities found for Indonesia through its four (4) pillars:

1. Pillar 1 Mainstreaming climate action into the Bank's operations: the Bank will provide support for the improvement and operationalization of MCs' NDCs, NAP, and other relevant strategies and plans.
2. Pillar 2 Promoting climate change resilience in MCs: the Bank will assist MCs in building their resilience and reducing their vulnerability to climate change risks in a number of ways, including:
   (i) sectoral approaches and interventions:
      - invest in projects with 'climate co-benefits' and help build-in resilience of, or through, projects across all sectors.
      - support the promotion of appropriate technologies and best practices including nature-based solutions, climate preparedness, and disaster response activities
      - promote development and strengthening of green infrastructure for increased resilience.

   (ii) policy-level approaches and interventions to support regulations and standards, specifically in infrastructure development, and city-level planning and design that includes climate considerations.

   (iii) technical assistance tailored to adaptation and resilience
3. Pillar 3 Supporting the transition to green economy in MCs: the development of low-carbon development plan and strategies at all levels, series of studies on economics of climate change, utilise its partnership with other MDBs to help MCs like Indonesia mainstream climate change

mitigation strategies through specific investments, knowledge and capacity building programs, and leverage funding in addition to its own to create enabling environment for green investments.

4. Pillar 4 Leveraging resources to implement climate-related activities: the Bank is well position to leverage funding from ordinary capital resources (OCR), multi and bilateral development agencies, private sectors, philanthropic foundation such as the Bill & Melinda Gates Foundation-funded Lives and Livelihoods Fund (LLF), Sustainable Finance Framework, its own Climate Change Fund that will be set up.

3.6.4 National Investment Mechanism

Environmental Fund Management Agency (BPDLH) was established to implement Government Regulation on Economic Instrument for Environment (**PP No. 46/2017 tentang Instrumen Ekonomi Lingkungan Hidup**) and President Decree on Environmental Fund Management (**Perpres No. 77/2018 tentang Pengelolaan Dana Lingkungan Hidup**). BPDLH is the first government trust fund managing international funds. This scheme provides funding opportunities for relevant climate mitigation and adaptation as well as disaster measures in the form of loans, subsidies, grants, and other mechanisms under statutory regulations. In particular, Payment for Ecosystem Services (PES) is highlighted as the mechanism for disaster management and adaptation measures.

Types of environmental services that are compensated/reimbursed for inter-regional environmental services include:

- water management protection
- protection of biodiversity
- carbon sequestration and storage
- preservation of natural beauty
- other environmental services.

In implementing inter-regional environmental compensation, Environmental Service Providers and Environmental Service Beneficiaries may request assistance from facilitators, i.e., individuals, environmental organisations, universities, or other agreed organisations.

The environmental fund management steering committee includes the Coordinating Ministry of Economics (Kemenko Perekonomian), KLHK, Kemenkeu, Kemenhub, Kementan, Bappenas, Kemenperin, and KKP.

The mechanism of climate funding in Indonesia can be shown in Figure 3.9.

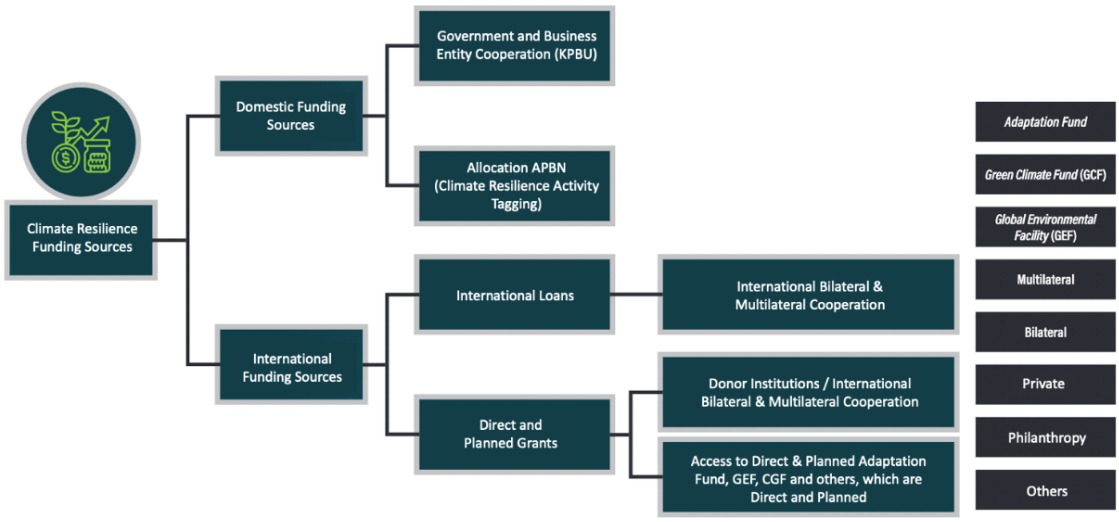

Figure 3.9 Climate resilience action funding mechanisms and sources

Source: Bappenas 2021e.

3.7 Institutional and Funding Barriers in Implementing BwN

Advocating for NbS, the BwN approach fits into the local institutional contexts, norms, and regulations. Meanwhile, policies and processes can be developed further to support co-creation, partnerships, and funding schemes necessary to enable BwN implementation. During Focus Group Discussions organised to input into this report, stakeholders identified several institutional barriers to the wider adoption of BwN in Indonesia. Also, during the BwN project in Demak, various lessons were learned on institutional barriers. These barriers are summarised in the below points:

1. **Lack of practical knowledge among decision-makers on NbS for hydraulic engineering.** For decades, grey infrastructures have been used in the construction world, including hydraulic infrastructure. Consequently, engineers are more familiar with designing grey hydraulic infrastructures rather than with the BwN approach.

2. **Lack of policy targets and specific laws and regulations on NbS or natural capital in general and in infrastructure projects.** New concepts like BwN are not easily absorbed into policies and programmes, which are organised by existing names and codes, which causes limitations for the Government to spend the budget. Some exceptions, such as the Guidelines for the Development of CCA Action, promote Ecosystem-based Adaptation as one of the priorities (Permen KLHK 33/2016 tentang Penyusunan Aksi Adaptasi Perubahan Iklim).

3. **Lack of integration and synchronisation of planning and implementing water infrastructure projects between sectoral plans, regional development plans, and spatial plans.** Synchronisation is severely challenged by the large number of planning documents issued by various agencies at all levels of governance and by the absence of a single sectoral planning reference document. Examples of coordination challenges include:
   - Poor alignment between cross-level governments. For example, the Regional Regulation of Central Java on Zoning Plan of Coastal Areas and Small Islands in the Central Java Province in

2018-2038 (Perda Jateng No.13/2018 tentang Rencana Zonasi Wilayah Pesisir dan Pulau-Pulau Kecil Provinsi Jawa Tengah Tahun 2018-2038). During its implementation, the regulation is being misinterpreted on who between the district and city government has the authority to plan the coastal area within two nautical miles, limiting their participation. In fact, both governments could contribute to coastal planning by following the regulated cooperation and coordination procedures between the government at the national and regional levels.

- Lack of coherence between different major projects results in disruptions of measures in place that support BwN, for example, the development of Semarang-Demak toll road. While aiming to integrate road infrastructure (toll road) and coastal protection (seawall), the development of the Semarang-Demak toll road disturbs an existing mangrove rehabilitation area.

4. **Need for more BwN pilots with long-term funding and alignment with government programmes**. More pilot projects are needed to introduce BwN as a feasible alternative and build awareness about the overall design approach. Compared to conventional infrastructure, the knowledge on the effectiveness and long-term costs of BwN is still limited. As there are insufficient projects to build a solid evidence base, lessons learned are often location-specific, and permanent and consistent monitoring is often lacking. This reinforces the inclination of decision-makers to implement the more familiar and proven conventional infrastructure solutions. The pilot in Demak acted as a change agent for local mainstreaming and national mainstreaming, particularly as it was aligned with government priorities and ministerial field programmes, which reduced permitting challenges. Nature restoration, like mangrove recovery, need long-term financial support, including from the private sector, to enable long-term maintenance and construction contracts.

5. **Lack of regulations on land subsidence caused by groundwater extraction.** Land subsidence is a key concern in cities, coastlines, and delta's in Indonesia and Asia and a barrier to full landscape recovery along vulnerable coastlines. The rate of land subsidence, taking on board the lessons learned from Demak, should be a key element in risk analysis and system analysis, and preliminary studies for assessing the feasibility of BwN measures. The adoption of a national roadmap by a presidential task force in 2019 (led by Kemenko Maritim) and a provincial roadmap for Central Java (in progress) is a step in the right direction.

Furthermore, we can learn from the experiences from the BwN Innovation Platform EcoShape, building on 12 years of experience in integrating NbS in hydraulic engineering, including from Indonesia (EcoShape 2021, n.d.). EcoShape identifies that in general:

> "*The multifunctional and dynamic nature of BwN solutions are not mainstreamed in decision-making on hydraulic infrastructure. Institutional incentives remain geared towards conventional infrastructure*."

Traditional institutional structures are mainly designed to facilitate static and monofunctional hydraulic infrastructure and thus have difficulties enabling dynamic, multifunctional BwN approaches. The short-term and compartmentalised nature of public sector decision-making hinders the longer-term and integrated planning perspective needed to appreciate the benefits of NbS**.** Typical barriers identified by EcoShape, include:

1. **Policy goals on NbS or natural capital inclusion in infrastructure projects.** Lack of or no regulation adopting BwN contributes to the difficulty in scaling up the approach in and across Indonesia (see point 2 on funding barrier above).
2. **Longer-term projects with a broader scope**. For an integrated basin-wide or long coastal stretch Building with Nature approach, more time and a wider project scope is required, including long-term benefits of ecosystem enhancement in terms of biodiversity and services..
3. **Cross-sectoral collaboration** (multiple ministries and municipalities). Most current institutional systems organise environmental issues and infrastructure separately, while cooperation is needed to embrace the benefits of BwN fully. In addition, the involvement of many government stakeholders to help sort out parts of the legislation with which they are familiar due to the application of a wide range of laws due to the multiple functionalities of BwN. Even different departments from one institution may need to communicate and work together to implement a BwN project, which generally occupies a larger area, spanning both land and sea, and often cross jurisdictional boundaries, which brings additional complexity in project formulation and implementation stages, in terms of land ownership and stakeholder engagement. To be successful, the implementation of BwN requires active cooperation between many stakeholders, whose priorities and interests may not align or may even conflict.
4. **Local enabling institutional frameworks,** e.g., PPP- legislation and municipal budget rules, are typically splintered, with the majority of economic power centered with engineering/civil works departments rather than disaster management and environment. In practice, this prevents the optimisation of infrastructure for a broader range of benefits. This may be partly due to the lack of regulations on PPP schemes, although private sector and banking institutions have been mobilised to support development, CCA, and DRR measures in Indonesia.
5. **Procurement and contracting procedures incentivise NbS.** Lack of pilot projects showcasing Building with Nature causes the stakeholders to have limited awareness and technical capacity towards the approach. It is still difficult for stakeholders to estimate the tangible benefits of BwN structures due to the unstable nature of the material of BwN structures. Until now, NbS is also not mandatory for procurement and contracting procedures, and unless it is explicitly mentioned, it will be hard to propose NbS pilot projects funded by the government budget.

4. Entry-points to Enhance the Regulatory and Investment Climate for BwN in Indonesia

Mainstreaming multiple agendas, such as infrastructure development, CCA, and DRR requires alignment across levels of government. In order to mainstream BwN at the national, sectoral, and local levels, BwN should be embedded at different governance levels, as shown in Figure 4.1.

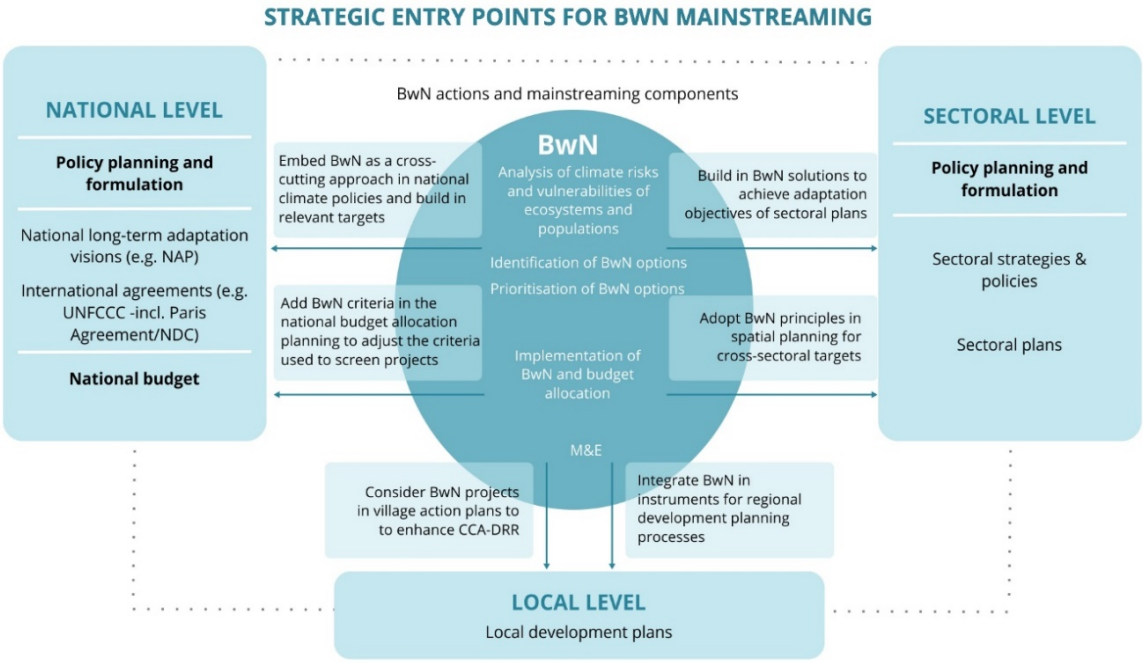

Figure 4.1 Key entry points for BwN mainstreaming at different governance levels

Source: adapted from GIZ 2019.

Building on our desk review of policies as well as institutional and investment barriers in Chapter 3 and focus group discussions with stakeholders, we use above model to identify six entry-points for creating a more enabling regulatory environment that incentivises BwN in Indonesia within national planning and development processes, sectoral policy and regulatory frameworks, as well as local and community planning processes.

4.1 National Planning and Development Process

4.1.1 Entry Point 1: Embed BwN as a ross-cutting approach in national climate policies and build in relevant targets

Indonesia's updated NDC is predicated on principles i.e. employing a landscape approach, highlighting existing best practices, mainstreaming climate agenda into development planning, and promoting climate resilience in food, water and energy. Further, these principles are translated into key programmes, strategies and actions on adaptation laid out in the NDC aim at reducing drivers of vulnerability to climate change impacts, responding to climate change impacts and managing risks, enhancing capacity of communities and sustainability of ecosystem services, and enhancing engagement of stakeholders at all levels in building climate resilience. All these principles and actions call for cross-sectoral that must be integrated in national, sectoral and local plans as well as policies.

As mentioned in RAN-API's Executive Summary (Bappenas 2019a), Climate Change Adaptation Strategies will focus on four priority sectors within 2020-2045. Two of the priority sectors are potential for BwN to contribute, i.e., water as well as marine and coastal sectors. BwN offers opportunities to both the water as well as the marine and coastal sectors to develop or revise the adaptive Engineering Design/technical standards through the BwN technical guidelines derived from key learnings in the Demak pilot project.

The principle of BwN-approach is that (surface) water infrastructure development works with nature rather than against it (Ecoshape, 2021). BwN principles are distinctive in that they require understanding of system functioning, system's envisaged function, natural processes, governance process, and monitoring (during and after project completion). For Indonesia, BwN potentially delivers a sustainable option in the water sector to develop or revise the adaptive Engineering Design/technical standards. In marine and coastal sectors, BwN offers climate-resilient, ecosystem-based, and retrofit to face the challenges and impacts of climate change, including hybrid structures and soft structures (like mangrove or coastal vegetation, see **Table 2.1**), to develop climate-resilient coastal areas. Specifically for muddy mangrove coasts, 5 technical guideline were developed. So first general as we promote the overall BwN approach, then specific for one BwN solutions that has already been piloted.

BwN has also implemented Coastal Field School where local communities were encouraged to apply ecosystem-based coastal management, also favored in the Executive Summary. This activity is in line with the RAN-API that encourages local community involvement in ecosystem-based coastal management. Community involvement is central to the Building with Nature approach, which relies on inputs of and creates outputs for multiple stakeholders and their functions within the system context. Moreover, local involvement of community and stakeholders is critical as they will benefit from the solutions once implemented, and sometimes even maintain them. Without community support and involvement, Building with Nature cannot be successful.

Being parallel to achieve targets in two RAN-API priority sectors Bwn has identified process of RAN-API and NDC roadmap as its entry point. With Indonesia's updated NDC in place, there are two possible options to integrate BwN within NDC. Firstly, BwN approach could be integrated into RAN-API as a cross-cutting approach, then policies and sectoral and local plans will integrate with them. Secondly, BwN approach could be integrated into the evaluation and revision phases of the NDC document in 2024.

Bappenas' Decree on the Establishment of a Strategic Coordination Team for Wetland Management for Achieving SDGs and Low Carbon Development (Kepmen PPN No. 89/2020 tentang Pembentukan Tim Koordinasi Strategis Pengelolaan Lahan Basah untuk Pencapaian Pelaksanaan Tujuan Pembanguan Berkelanjutandan Pembangunan Rendah Karbon) is another entry-point for BwN. As part of the EcoShape consortium, Wetlands International (Yayasan Lahan Basah) was appointed as a member of the Working Group for Synchronizing Multi-Stakeholder Policies and Supporting Data and Information. This will be a concrete step forward with YLBA being part of the Working Group, YLBA can promote BwN approach and have it mainstreamed in relevant policies, supported by its experience implementing the pilot in Demak, thus taking a bigger role on CCA and DRR in Indonesia, especially on the new low carbon development initiative through mangrove restoration.

New concepts like BwN are not easily absorbed into policies and programs due to the need for reliable data and tangible result as the basis of BwN. It will affect how the Government spends the budget organised by existing programme names and codes, worsens by the organisation of policies and programme with rigid n programme ames and codes. The recognition of the role of ecosystem in RPJMN 2020-2024 (DA6), SDGs (number 13), NDC, and the future NAP is strongly emphasized to achieve Indonesia's development goals. The process of developing NAP that, during the time of writing this report, is currently ongoing offers an opportunity for BwN concept to be mainstreamed in activities addressing climate-related problems in Indonesia. At the same time this will ensure budget allocation for BwN pilot implementation in Indonesia. Although by practice BwN is not included among the existing program names and codes referred to by GoI when developing strategic documents such as NAP, being involved in national climate polciies such as NAP development serve as an opportunity to also introduce and mainstream BwN into other development and sectoral plans.

In addition, providing technical guidelines could help standardise the approach or workflow to be easily absorbed into programs, notably in water infrastructure. The consortium of BwN Indonesia has released five technical guidelines providing key learning from the pilot project in Demak with technical and socio-economic measures that, in combination, help restore eroding muddy tropical coasts. There are two possible ways for the technical guidelines to influence standardising government's approach or workflow: 1) embed them in the curriculum for training and capacity building programs; 2) make these guideline owned by the government as their knowledge products that can be used in technical trainings they provided to contractors they hire to implement infrastructure projects.

4.1.2 Entry Point 2: Add BwN-relevant criteria in the national budget allocation planning and the screening process of projects

APBN (National Budget) comes as one of the fiscal instruments to actualise Programmes in the 2020-2024 RPJMN as well as to achieve Indonesia's NDC target in 2030. To ease tracing fiscal policies and monitoring outputs that contribute to climate adaptation and mitigation, the concept of Climate Budget Tagging (CBT) has been introduced and implemented in APBN since 2016. From 2016 to 2020, the Government of Indonesia has poured funds IDR 256.7 trillion for climate change mitigation and IDR 75.9 trillion for climate adaptation (Kemenkeu 2021a).

Both national and regional governments have strategic roles in improving economic and social welfare, ensuring inclusive development, maintaining environmental quality, and managing climate change. Thus, the Ministry of Finance initiates CBT at the regional level, and the progress started at the end of 2019 by developing a guidebook for Regional CBT. In early 2020, 11 pilot areas tried to implement regional CBT, whereas in 2021, regional CBT will be carried out in six new pilot areas. In implementing the regional CBT, the national government through Kemenkeu expects to encourage local governments to formulate appropriate regional fiscal policy proposals, as well as identify adequate and effective financial resources to fund climate change actions (Kemenkeu 2021b). There are channels in which APBD could be allocated for CCA programmes, such as Co-administration Fund (DTP), Deconcentration Fund (DD), General Allocation Fund (DAU), Regional Grant (HD), Revenue Sharing Fund (DBH), or Special Allocation Fund (DAK). One criterion to be eligible to access these financial resources is for a program to aim for increasing the involvement of the community and other stakeholders to strengthen adaptation capacity to the impacts of climate change. A good example of such programs is PROKLIM that has been implemented by KLHK. One strategy to mainstream BwN

could be through having the concept be adopted by major program like PROKLIM that is targeting to achieve 20,000 implementation locations by 2024.

Besides fundings from APBN or APBD, through the Government Regulation on Economic Instrument for Environment (PP No. 46/2017 tentang Instrumen Ekonomi Lingkungan Hidup) and the Presidential Regulation on Environmental Fund Management (Perpres No. 77/2018 tentang Pengelolaan Dalam Lingkungan Hidup), climate mitigation and adaptation, as well as disaster measures, could be funded by international funds managed by BPDLH. This scheme provides potential fundings for BwN. However, it must be noted that the implementation of the Presidential Regulation requires: (1) development of general policies in the management of environmental funds; (2) development of technical policies to be funded; and (3) evaluation of the implementation of policies.

4.2 Sectoral Policy and Regulatory Frameworks

4.2.1 Entry Point 3: Build in BwN to achieve adaptation objectives of sectoral plans (e.g., water, protected areas, DRR)

BwN offers a solution for cross-cutting sectoral targets, such as infrastructure development, climate adaptation, and disaster management. BwN, by replacing or complementing grey infrastructure development, could be an alternative to hinder the negative externalities from climate change and disasters. Of four pillars embedded in the 2020-2024 RPJMN, one pillar is highly relevant as it is related to BwN, sustainable development, with disaster resilience and climate change already embedded in the pillar. BwN also could help the Government of Indonesia to achieve three of seven Development Agenda's (DA) in the 2020-2024 RPJMN, which are DA1 Strengthening Economic Resilience for Growth Quality, DA5 Strengthening Infrastructure to Support Economic Development and Basic Services, and DA6 Building the Environment, Improving Disaster Resilience and Climate Change.

The 2020-2024 RPJMN already includes one main pillar and three development agendas (DA1, DA5, and DA6) to which BwN is relevant. To support the implementation of the development plan, BwN could target the annual revision of sectoral targets and indicative funding reflected in the ministry's annual work plan. As implementation tools in ensuring the regulation and funding allocation in the RPJMN, government annual work plan (RKP) and APBN, Major Projects whose fundings requiring updates through Ministry/Agency annual work plans provide opportunities (see Section 3.3), such as coastal protection for five urban areas in the North Coast of Java to address coastal flooding, and 61 multipurpose dams for water, irrigation, and flood control. According to Bappenas 2021a, at the time of implementation of RKP for year 3 of ministry/agency workplan coincides with the mid-term review – this is an entry points for BwN to be adopted into the RKP.

In DRR, BwN could target in developing disaster resilient infrastructure for 20 provinces with high disasters experience through: (1) integrated programme in disaster risk management, specifically flood risk in urban areas, with a combination of structural and non-structural approaches including green infrastructure; (2) development of regional policies and master plan for disaster resilience and the strengthening of disaster resilience infrastructures; (3) recovery of the four critical watersheds to reduce the impacts of flooding in the provinces of Banten, DKI Jakarta, West Java, and North Sumatra.

In developing nature while improving resilience in disaster and climate change, BwN has prospects to contribute in the DA6 (Bappenas 2020), i.e., in area conservation and protection of endangered

biodiversity both on land and in water, provision of biodiversity and ecosystem diversity data, and information, as well as strengthening DRR Plans through: (1) national and regional DRR action plans that will be integrated with the CCA action plan; (2) coastal and marine sector vulnerability protection in the form of strengthening infrastructures through ecosystem-based adaptation, community awareness, technology development, and diversification of coastal livelihoods; (3) protection of water security in climate risk areas, through increased supply of raw water and protection against water disasters; (4) restoration of mangrove and coastal ecosystems to reach low-carbon seas and coasts.

4.2.2 Entry Point 4: Adopt BwN principles in spatial planning for cross-sectoral targets

The integration of cross-sectoral targets within spatial planning remains a challenge for the Government of Indonesia. For example, the Government has several commitments and targets in CCA, DRR, development plans, NDC, and multilateral environmental agreements like CBD, Ramsar Convention, and SFDRR. To address those challenges, adopting the BwN approach in spatial planning becomes promising as BwN provides better services to society while enhancing the natural environment, increasing climate resilience, and reducing disaster risk. To support the adoption, there are several entry points from which BwN could start: (1) the Middle-Term Integrated Planning and Investment Programme for Infrastructures (RPI2JM) as a document integrating spatial policies and sectoral policies; (2) the Indonesian Biodiversity Strategy and Action Plan to be mainstreamed into the national development plan and RKP from KLHK, LIPI (now under BRIN) and KKP (focusing on cross-sectoral issues of disaster management, climate change adaptation and mitigation) as well as indicative funding sources.

The Law on Spatial Planning (UU No. 26 Tahun 2007 tentang Penataan Ruang) has the principal on designing with nature. Some articles, in particular, give the mandate that spatial planning must consider the capacity of the environment, which creates opportunities for BwN approach: (1) 30% of a watershed land cover should be for the forest; (2) 30% of green open space in urban areas; (3) local protected areas including beaches, which could be translated that beach border should be planted with mangroves; (4) spaces that are allocated for natural space to reduce future disaster risks (geology or slow onset like climate change).

As mandated by the Ministerial Regulation on the 2012-2020 RAN-API within PUPR (Permen PUPR No.11/2012 tentang Rencana Aksi Nasional Mitigasi dan Adaptasi Perubahan Iklim Tahun 2012-2020 Kementerian Pekerjaan Umum), the integration of green infrastructure, like BwN, into spatial planning responsive to the impacts of climate change could be done through: (1) identification of districts or cities affected by climate change and thus requires revision of vulnerability mapping and spatial planning; (2) mainstream the city concept and community role who have the endurance to climate change impacts/climate change resilience through the responsive-detailed spatial plan; (3) improve integrated Infrastructures and spatial planning that is responsive to the impacts of climate change e.g. green infrastructures, climate change-responsive regional development concept; (4) inputs into spatial planning (taking into account the integration of DRR, spatial guidelines, and the Guidelines for Integrating Climate Change Adaptation (API) into spatial planning; (5) acceleration of revision of RTRW province/district/municipal level; (6) the development of Detailed Spatial Plan (RDTR) by Sub-directorate of Spatial Plan (PUPR) and Ministry of Agrarian Affairs and Spatial Planning.

4.3 Local and Community Planning Processes

4.3.1 Entry Point 5: Consider BwN micro-projects in village action plans to enhance CCA-DRR

BwN has been enhancing CCA-DRR as coastal protection in Demak since 2015. The eroding muddy tropical coasts are being restored by employing a nature-based technical approach combined with the introduction of sustainable aquaculture model. Considered a best practice in the application of Integrated Risk Management, the BwN project in Demak was included in the 2019 Indonesia's Voluntary National Reviews because of efforts in protecting the coastline while also raising local livelihoods and capacity (Bappenas 2019b).

Challenges as in Demak commonly occur in many coastlines in Indonesia, and thus, mainstreaming the approach becomes probable if integrated into village action plans and funded by the Village fund. As such happened in Demak, the project is not only integrated with the Village Fund, and in line with Village Regulations, the BwN Programme has also been replicated by members of the consortium (KKP and PUPR) in many other regions throughout Indonesia.

In Demak, village development plans and land-use regulations incorporating Building with Nature have been adopted by communities and formalised within local government. These developments have received government support and resulted it enhanced funding for the maintenance of permeable structures, mangrove rehabilitation and improved aquaculture. But continued success is not guaranteed. Despite the plans, there has been growing pressure to zone land in severely eroded areas of Demak for industrial development. Speculators have bought up land from villagers suffering from flooding. Industrial developments will likely involve heavy investment in hard structures to prevent flooding. While such investment might be cost-effective for the developer, it would damage the wider environment and communities by abstracting more groundwater, accelerating subsidence, and increasing land loss and flooding along the coast of Demak.

To further mainstream best practices from BwN in Demak, Building with Nature solutions should be registered to the National Registration System (SRN) and AKSARA. SRN is a web-based system for managing data and information on mitigation, adaptation, and means of implementation (finance, capacity building, and technology transfer and development) managed by KLHK so that its impacts could be tracked and the transparency principle could be implemented. SRN accommodates implemented actions and supports climate change adaptation and mitigation in its system, providing potential for mainstreaming BwN. Registering BwN mangrove restoration effort (mangrove map) and approaches used in Demak like Coastal Field Schools, the Bio-rights mechanism, and technical solutions shows that BwN can be applied in other landscapes for different challenges where Nature-based Solutions can be integrated with water infrastructure development.

In addition, the AKSARA platform managed by Bappenas - a mechanism for monitoring, evaluation, and reporting of climate resilience measures (Bappenas 2021f). This is an integrated process from planning, budgeting, monitoring and evaluation, to reporting, and involves all relevant Ministries/Agencies, Local Governments, and Non-Governmental Institutions. However, accoding to the ExSum KPBI (Bappenas 2021a), until now, this process is only applied to programs and activities of Ministries/Institutions (K/L).

4.3.2 Entry Point 6: Integrate BwN in instruments of regional development planning processes

Integrating BwN in regional development planning needs support from regional governments and alignment between national and regional governments. However, stakeholder alignment remains a challenge as such happened in the implementation of the Regional Regulation of Central Java on Zoning Plan of Coastal Areas and Small Islands in the Central Java Province in 2018-2038 (Perda Jateng No.13/2018 tentang Rencana Zonasi Wilayah Pesisir dan Pulau-Pulau Kecil Provinsi Jawa Tengah Tahun 2018-2038). Although the district and city government also have the authority to collaborate in coastal development along with the Provincial government in the 12 miles from the coastline, in fact, the misinterpretation limits the involvement of the district government in planning processes. Thus, entry point to integrate BwN approach in regional development planning, notably for coastal development, is through the Revision of the attachment of Law on Regional Government (UU No. 23/2014 tentang Pemerintahan Daerah) which regulates the roles and responsibilities of the central, provincial, and district/city government affairs concerning the nautical miles.

One of the development agendas in the 2020-2024 RPJMN is building the environment while enhancing disaster resilience and climate change. To support the implementation in the regional level, BwN could target: (1) Revision of Government Regulation on Implementation of Disaster Management (PP No. 21/2008 tentang Penyelenggaraan Penanggulangan Bencana); (2) Revision of Government Regulation on Procedure for Determination of Carrying Capacity (PP Tata Cara Penetapan Daya Dukung dan Daya Tampung).

5. General Barriers and Enablers for Mainstreaming BwN

There are six categories of barriers and enablers identified that can aid in creating, implementing, and upscaling NbS through the BwN approach (EcoShape n.d.). These are instrumental in addressing the unique characteristics of BwN projects and are based on the experiences of over a decade of learning-by-doing, intersectoral collaboration, multidisciplinary fundamentals, and applied research. During focus group discussions and interviews with stakeholders about institutional barriers, barriers in six categories were shared. Because Chapter 3 already discusses institutional barriers and enablers, this chapter will elaborate on the other five barriers and enablers as they influence the creation of an enabling policy environment or what needs to be enabled by policy to support mainstreaming.

Figure 5.1 Six categories of barriers and enablers for mainstreaming BwN

Source: EcoShape n.d.

5.1 Multi-stakeholder Approach

As the BwN approaches heavily rely on local stakeholders' involvement and commitment to continue in the long term, close engagement with the local community is a prerequisite for successful BwN. Successful projects require stakeholder engagement from the start throughout the design, implementation, operation, and maintenance phases. Here are some barriers to the multi-stakeholder approach:

1. **Silos between government institutions**. Each institution has different working dynamics and works allocation. Thus, stakeholders mapping is needed to understand who/which institution by regulation is in charge of certain things, lead the sector, have the authority to make decisions, and is the second-in-command.
2. **Lack of multi-way systems in which all stakeholders could involve.** Although involving multiple stakeholders, each stakeholder often works in a single-sided way. This disables the development of multi-way systems where all stakeholders could create enabling ecosystems to mainstream the BwN approach.
3. **Lack of engagement with local communities**. Infrastructure development in Indonesia frequently comes with a top-down approach causing local communities to have limited access to engage and involve. Having inadequate engagements with local communities, stakeholders might lose the

chance to grasp local specialties or build the co-ownership needed to sustain the BwN project. For instance, the first three-year of mangrove restoration is critical, and support from local communities is needed to help speed up the critical time by nurturing an ideal condition for the mangrove to sprout.

Stakeholders raised several suggestions in relation to multi-stakeholder collaboration that could be enabled through policy and the design of new BwN programmes:

1. **Public-Private Partnership**. A Public-Private Partnership BwN platform in Indonesia facilitates various multi-stakeholders in mainstreaming the BwN, e.g., government, NGOs, private sector, academics, and communities.
2. **Uptake of community engagement approaches in government programmes supporting BwN**. It will facilitate support from local communities and local authorities. This may include:
   - Field schools that introduce and improve best practices and enthuse local stakeholders, such as the Coastal Field School approach introduced by BwN Indonesia
   - Integration of product innovations using local techniques, especially related to food security and local livelihoods
   - Enabling dedicated local field teams for community engagement in the project area to build relationships, engage them in understanding risks and design solutions, and assist in implementation and monitoring.
   - Bio-rights, an innovative financing mechanism for reconciling poverty alleviation and environmental conservation, enables local communities to refrain from unsustainable practices and actively participate in environmental conservation and restoration. It was considered highly successful in the Demak project and can be adapted for future projects.
3. **Uptake and use of practical guidelines developed by BwN projects in government guidelines.** The multi-stakeholder collaboration can be used as a mechanism to promote knowledge of BwN approach and use of practical guidelines developed by BwN projects. Considering that government is one of the key stakeholder, this will further help with adoption of the practical guidelines.

5.2 Business Case and Finance

Being multi-functional assures that BwN provides many added values for society. It is crucial to quantify all avoided costs and provided benefits as reasonably as possible to be part of the business case. However, there are some barriers in business cases and finance diagnosed during the focus groups:

1. **High preference for hard infrastructures in response to disaster and climate risks.** The rehabilitation of natural ecosystems and their ecosystem services is still considered a cost and not an investment for people and nature. The infrastructure cost should be analysed comprehensively by assessing the initial investment and other possible costs in the future, such as maintenance cost and disaster recovery cost if the grey infrastructure fails to adapt to climate change and disasters.
2. **Need for long-term maintenance and construction contracts**. Ecosystem restoration, such as the recovery of green mangrove belts, takes time and needs long-term financial support to enable long-term maintenance and construction contracts.

3. **Fiscal gap to fund infrastructure investment.** In emerging economies, infrastructure investment is generally so high that it cannot be met only by the State Budget and multilateral development bank but also requires private funding (Thiele et al. 2020). The potential to attract private co-investment to ease the pressure on limited public infrastructure budgets has not been capitalised well.
4. **Higher social cost**. Acknowledging the natural ecosystem as its core approach, green infrastructure like BwN might require more spacious land to be relocated. Local communities might lose their social capital within settlements, i.e., current livelihood and supportive neighborhood, and need a good and sustainable alternative. In some cases, local communities prefer to deal with disaster recovery costs rather than losing social capital.
5. **Lack of reliable data on reducing uncertainty cost**. To gain public and private sector support, stakeholders raised that more evidence is required to prove that the solution is sustainable in the long run and lower the cost of building hard infrastructures to cope with the climate change adaptation.

Despite those barriers, these enablers reduce ambiguity and improve imperfect knowledge on the financial and economic aspects of BwN:

1. **Diversification of local livelihood.** It is vital to explore the diversification of income from ecosystem services, such as food products from different species of mangroves or tourism supported by the Tourism Department or Tourism Office. Support for BwN projects will also increase when they can create jobs in the long term, thus supporting the local economy. Interviewees raised that awareness-raising about the added values and co-benefits of BwN will help adopt the BwN concept at the national level and avoid rejection of funding proposals.
2. **Develop business case that includes economic co-benefits for local communities.** In Demak, the investments in climate adaptive coastal protection measures using the Building with Nature approach in combination with revitalization of aquaculture ponds are economically sound and outweigh the investment costs. No coastal protection investments or traditional investments would have caused the loss of productive aquaculture land (avoided costs). The direct benefit is the creation of sustainable and productive land (aquaculture) along with several additional income generating benefits such as the increase of wild catch, tourists and recreation, timber and non-timber products and biodiversity conservation.
3. **Initiatives for carbon-based financing instruments and climate funds.** To cope with the fiscal gap for infrastructure development, both financing instruments offer potential funding for green infrastructures like BwN. BwN can help provide blue carbon—the carbon stored in coastal ecosystems like mangroves, salt marshes, and seagrass beds— for the growing demand for carbon offsetting (Sapkota & White 2020) through Blue Carbon initiatives and Blue Carbon Resilience Credit. Similarly, BwN also comes as part of climate change mitigation approaches funded by climate funds, such as the Global Environment Facility, Green Climate Fund, and Adaptation Fund.
4. **One door system for procurement and contracting.**

5.3 Capacity Building

Capacity-building among policymakers, industry managers, and the local community is critical and takes place through education, training, and knowledge sharing. People familiar with the BwN philosophy are more likely to support it and take part. This will help scaling-up and is critical for proper maintenance of NbS. Barriers related to capacity building:

1. **Unfamiliarity that grey and green hydraulic infrastructure can co-exist**. Most stakeholders do not grasp the idea that grey and green hydraulic infrastructure can co-exist, such as for port development or flood reduction. Green infrastructure is always considered as something to replace grey infrastructure. While that is one option, green infrastructure can also protect, assist or accompany grey infrastructure in an optimal mix. However, the concepts of hybrid engineering and BwN are not widely known and not well understood. Moreover, nature development or restoration is also considered a conflict of interest with existing local economic interest in the implementation area.
2. **Unfamiliarity to design green hydraulic infrastructure like BwN**. For decades, grey infrastructures have been used in the construction world, including hydraulic infrastructure. Consequently, engineers become more familiar with designing grey hydraulic infrastructures rather than combining those with BwN approach. To fill the knowledge gap, disseminating studies on the effectiveness of BwN could help engineers become more knowledgable so that hybrid engineering will be more widely used.
3. **Lack of continuous capacity building within stakeholders**. The concept and design approach of BwN need further familiarisation among stakeholders to be implemented in different settings, beyond the pilot project in Demak where BwN was applied to halt coastal erosion and recover mangroves. While stakeholders familiar with hybrid infrastructure are limited, periodical job rotation often causes high turnover, which in some cases, those equipped with proper knowledge and interest in hybrid infrastructure must be moved to another department. This condition might hamper the creation of continuous knowledge sharing and capacity building among stakeholders.
4. **Diverse social and economic background within local communities**. BwN needs local involvement and participation as a critical element to sustainably maintain the infrastructure. However, local communities have diverse backgrounds, such as education and economic status, which might affect their ability to be involved in the projects effectively.

Five enablers in capacity building were recognised during the focus group discussion amongst stakeholders:

1. **Merdeka Belajar programme**. Merdeka Belajar programme encourages university students to learn outside the university, and it is officially endorsed by the Ministry of Education, Culture, Research, and Technology. If collaborated with Merdeka Belajar, the opportunity to adopt the BwN concept into the university curriculum is very high. Even if the BwN concept is not formally adopted into a course, lecturers have started to include the concept through the courses they teach and convey the importance of the BwN concept. The partnership with international institutions as guest lecturers also gives good exposure to BwN courses at universities and to the university itself.

   Furthermore, there is a need to familiarize stakeholders with the concept and design approach of Building with Nature and its application in different settings, beyond the pilot on Demak where

Building with Nature was applied to halt coastal erosion and recover mangrove. In other words, there is a need for building capacity on the approach, not the measures, as a socially and environmentally inclusive engineering approach that works with nature rather than against it.

2. **The existence of BwN technical guidelines**. Technical guidelines for BwN approach have been released, notably learning from specific systems and landscapes such as muddy coastlines in Central Java. Stakeholders will benefit from this guidance to improve their capacities in the implementation process of the BwN approach.
3. **BwN in Demak as a pilot for replication in wider Indonesia.** The almost one-decade experience from the BwN project in Demak can serve as a knowledge-sharing platform to upgrade the capacity building in stakeholders. Replication in other locations across Java with lower land subsidence rates shows better recolonisation of the mangrove, and sediment traps, such as happened in Gresik.
4. **Capacity building in broader contexts to support the sustainability approach**. Not only about the maintenance of hybrid hydraulic infrastructure, but workshops related to improving livelihood will also enhance the co-ownerships from local communities, such as how to manage sustainable green tourism and make crafts from mangroves.

5.4 Technology and System Knowledge

Building with Nature requires knowledge about specific concepts and technology to design its Nature-based Solutions. In addition, learning about the ecosystem, social system, and physical system is essential to make BwN work. During focus groups, stakeholders identified several barriers in technology and system knowledge to wider implement BwN, such as:

1. **Lack of solid data as a basis for BwN.** The government needs evidence that a solutions works to be able to integrate a concept into a program, because if it fails and gets audited, it can be a problem. They also experienced limited information exchange, for example of spatial data which is crucial in formulating a roadmap or an action plan.
2. **Limited amount of software to model green infrastructure**. The number of software with the ability to make green infrastructure simulation and modeling is still limited compared to grey infrastructure. Having little software coupled with a lack of solid data, might impede the planning and designing processes of the BwN approach before being implemented.
3. **Lack of underlying knowledge of how BwN works.** Using natural ecological processes as its core, BwN is highly dependent on several dynamic supporting factors which affect the approach's effectiveness. For instance, mangrove greenbelt could not address land subsidence if the rate of land subsidence is faster than that of mangrove growth, but neither can grey infrastructure.

Three enablers could be identified in reducing incomplete knowledge and helps better understand unpredictable dynamics of the technical, ecological and socio-economic systems:

1. **The existence of 'BwN' technical guidelines**. Technical guidelines for the BwN approach were released, notably learning from specific systems and landscapes such as in muddy coastlines like Central Java. Indonesia would benefit from further implementation guidance for the design and implementation process applicable to different settings and conditions to support mainstreaming. This is critical as BwN is intimately entangled to its surroundings: fitting or using its dynamics,

focusing on multi-functionality, providing innovative solutions, and most importantly, context-specific in its approach. These guidelines are freely accessible on Ecoshape website for practitioners who are interested in applying BwN approach.

2. **A wide range of BwN options to address various problems**. There are at least 28 BwN concepts to be implemented in coastal areas with a wide range of functions (see Appendix 4). Several concepts or examples are restoring estuarine ecosystems, optimising flow patterns, restoring tidal dynamics, applying mega nourishments, and developing inland buffer zones.
3. **BwN in Demak as a knowledge-sharing platform.** Since 2015, Wetlands International, EcoShape, KKP, PUPR, and other partners have implemented the BwN approach in Demak, Central Java. This project is the start of a knowledge platform to help better understand the dynamics of technical, ecological, and socio-economic systems within BwN and learn how BwN works in adapting to climate change and reducing the risk of coastline abrasion.
4. **Developing preliminary studies.** To enable authorities to integrate concepts into a Programme, preliminary studies were suggested to evaluate if rehabilitation will be successful or not and to determine which locations are more suitable than others.

5.5 Management, Monitoring & Maintenance

Building with Nature relies on a system of management that is able to adapt to the dynamic environment that it seeks to harness, including under changing climatic conditions (adaptive management). To achieve this, stakeholders need to undertake detailed and regular monitoring and evaluation.

1. **Needs of a dedicated team on-site for monitoring and evaluation**. A dedicated team on-site is always needed to guide and guard the programme and facilitate ongoing learning and capacity-building to support maintenance. The team can exist of government departments, NGOs, and private institutions. During programme implementation, monitoring and evaluation meetings are needed to determine whether the programme yields the desired outcomes and what are the next actions. In Demak, both biophysical and socioeconomic indicators were monitored, ranging from rates of sedimentation and mangrove re-establishment to increases in pond harvest rates and incomes. Monitoring and evaluation work was shared by local communities, the project team and independent scientists. Assessment is always necessary to push the programme implementers in doing more.
2. **The short lifespan of BwN natural structures**. Due to various unexpected factors, such as shipworm, the lifespan service of BwN natural structures, such as bamboo or woods, could deteriorate within six months to one year.

The enabler is the BwN approach itself, which is inherently dynamic with solutions evolving over time. Though these dynamics bring greater perceived uncertainty regarding the performance and implementation of Building with Nature compared to traditional alternatives, this is also a strength since the development of natural elements in time often facilitate more robust and flexible alternatives to changing future conditions compared to traditional grey alternatives.

For instance in Demak, continuous monitoring has allowed the BwN Consortium to respond to the natural dynamics of coastal systems with changes in materials used for the structures, innovations in design and changes to budget allocations to make the necessary adjustments.

Community ownership has similarly been essential for adaptive management, because permeable structures need continuous maintenance in the face of storms and other wear and tear. This will continue until the mangroves behind the structures are sufficiently developed to take over their function.

6. The Way Forward

To encourage mainstreaming the BwN approach in Indonesia, this policy review recommends:

1. Broad-scale dissemination of BwN design and technical guidelines will enhance the familiarity of BwN among decision-makers within governments at the national and regional levels. The dissemination could also raise awareness and build technical capacity on BwN as one of the promising approaches for integrating water infrastructure development with CCA and DRR.
2. To institutionalise a new approach such as BwN, creating either a formal (BwN secretariat, working group) or informal institution (forum, community) and embed those under a relevant ministry will help BwN get more recognition and familiarity within public and private sector, and finance institutes, as a way to scale up BwN in and across Indonesia. Such a working group or forum can also work on institutional embedding with all the opportunities that are outlined in this report, and jointly work on overcoming outlined barriers, including trying innovative procurement and contracting process, and identify opportunities and raise funding for more pilots to build the evidence and experience. This working group should then be represented by at least Bappenas, Kemenkeu and relevant sectoral ministries, at national and subnational levels.
3. Setting policy goals on natural capital inclusion for infrastructure projects in especially in rich ecosystem environment (while NbS although works well in less-rich ecosystem environments) might urge the traditional development into a more ecosystem-friendly approach. RAN API defines green infrastructures as facilities and infrastructure built in harmony with the landscape or using environmentally-friendly and inexpensive technology for maintenance. This is in line with NbS concept and BwN approach that promotes working with nature instead of against it. Therefore, green infrastructure must be fully integrated with existing national development plans as well as sectoral and local plans. For example, compensation requirements of projects affecting the aquatic or terrestrial environment could create strong incentives for investments in the natural capital BwN approach.
4. Based on the recent Decree Bappenas on the Establishment of Strategic Coordination Team for Wetland Management for Achieving the Goals of Sustainable Development and Low Carbon Development (Kepmen PPN No. 89/2020 tentang Pembentukan Tim Koordinasi Strategis Pengelolaan Lahan Basah untuk Pencapaian Pelaksanaan Tujuan Pembangunan Berkelanjutandan Pembangunan Rendah Karbon), the Head of Office of Wetlands International (Yayasan Lahan Basah) was appointed as a member of the Working Group for Synchronizing Multi-Stakeholder Policies, Supporting Data and Information. This will be a concrete step forward for YLBA to take a bigger role on CCA and DRR in Indonesia, especially on the new low carbon development initiative through mangrove restoration.
5. BwN has the potential to answer several issues at the same location, touching a number of ministry's interest (infrastructure, disaster management, biodiversity conservation, recreation, etc.), but coupling public budgets are not a common practice, yet, in Indonesia. BwN can benefit from working with IFIs to create more pilot projects and at the same time, influence the government into supporting and enabling more BwN approach.
6. Due to limited fiscal capacity, promoting international private investment funding can support CCA programmes in Indonesia, such as Global Environment Facility, Green Climate Fund, and Adaptation Fund. Through the Government Regulation on Economic Instrument for Environment (PP No. 46/2017 tentang Instrumen Ekonomi Lingkungan Hidup) and the Presidential Regulation

on Environmental Fund Management (Perpres No. 77/2018 tentang Pengelolaan Dana Lingkungan Hidup), BPDLH was established to manage funding opportunities for relevant climate mitigation and adaptation, as well as disaster measures. Referring to BPDLH's climate financing mechanism, BwN can utilise its existing collaboration with relevant ministries, e.g. KKP and PUPR, to access funding managed by BPDLH through submitting project proposals for BwN pilots.

7. Framing BwN project proposal with international law enabling developments (see Appendix 2) could lead to concrete support and investments from international funding agencies and intergovernmental organisations, notably if BwN is framed as more innovative and future-proof than hard infrastructure options.
8. Developing a risk-sharing mechanism between the private sector and the Government, e.g., incentives, could help addressing several financial issues in BwN projects: lack of bankable projects and revenue stream.
9. Bundling multiple co-benefits, e.g., ecotourism and silvo-fishery, and natural capital, e.g., ecosystem services and biodiversity credits, into the project structure offers proponents for BwN investment case under a single and secure investment vehicle. For example, combining the co-benefits into hybrid infrastructure clusters can be absorbed by formal public investment planning processes and translated into several financially viable or even bankable deals using a blended finance approach.
10. BwN should also invest in demonstrating the feasibility and viability of the approach through more pilot projects, then sharing the experience to relevant stakeholders and potential partners on the pilot's performance and cost-benefits. Funding intense monitoring and information sharing networks can also be a powerful tool to expand and formalise the evidence base and encourage a shift in a more integrated and holistic project evaluation. Thus, it can promote BwN with evidence of its: (1) cost-effectiveness analysis across cases; (2) quantification of uncertainty and risk and development of management perspectives; (3) revenue generation concepts in light of increasing the bankability of BwN projects; and (4) technical feasibility.
11. The many efforts of BwN in Demak should be registered into SRN and AKSARA (when the platform is ready to involved non-state stakeholders such as NGOs) as the platform so that the impacts could be shared, studied, and further implemented. KLHK, who manages One Map Mangrove, has started the initiative to map the existing mangrove into the system, which should have also accommodated the mangrove restoration efforts in Demak to be integrated as part of One Map Mangrove. Two-way dialogue needs to start in making sure the mangrove in Demak is included.
12. Asia is predicted to contribute up to 60% of global growth (World Economic Forum 2019) and is now the fastest-growing economic region. To support this, development and construction in every sector are taking place. BwN can serve as an adaptive approach with the potentials to explore, aimed to build climate resilience for the people by enhancing natural ecological processes, anywhere in the world, especially in Asia and the Pacific where 60% of the population live (UNFPA Asia and the Pacific 2021). Working together across Asia, mapping the opportunities and challenges each country has, and supporting each other through multilateral collaboration are ways to make Asia habitable in the following decades.

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Acronyms and Abbreviations

ADB	Asian Development Bank
AF	Adaptation Fund
AIFDR	Australia-Indonesia Facility for Disaster Reduction
AKSARA	Aplikasi Perencanaan-Pemantauan Pembangunan Rendah Karbon Indonesia / Indonesia's Low Carbon Development Planning-Monitoring Application
APBD	Anggaran Pendapatan dan Belanja Daerah / Regional Budget
APBN	Anggaran Pendapatan dan Belanja Negara / State budget
APIK	Association of Climate Change and Forestry Experts
ASEAN	Association of Southeast Asian Nations
ATR/BPN	Kementerian Agraria dan Tata Ruang/Badan Pertanahan Nasional / Ministry of Agrarian Affairs and Spatial Planning
Bappeda	Badan Perencanaan Pembangunan Daerah / Regional Development Planning Agency
Bappenas	Badan Perencanaan Pembangunan Nasional / National Development Planning Agency
BIG	Badan Informasi Geospasial / Geospatial Information Agency
BKPM	Badan Koordinasi Penanaman Modal / Investment Coordinating Board
BMKG	Badan Meteorologi, Klimatologi, dan Geofisika / Meteorological, Climatological, and Geophysical Agency
BMUB-IKI	Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit-Internationale Klimaschutzinitiative / German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety-International Climate Initiative
BNPB	Badan Nasional Penanggulangan Bencana / National Board for Disaster Management
BPBD	Badan Penanggulangan Bencana Daerah / Regional Disaster Management Agency
BPDLH	Badan Pengelola Dana Lingkungan Hidup / Environmental Fund Management Agency
BPPT	Badan Pengkajian dan Penerapan Teknologi / Agency for the Assessment and Application of Technology
BPS	Badan Pusat Statistik / Central Bureau of Statistics
BRIN	Badan Riset dan Inovasi Nasional / The National Research and Innovation Agency
BUMN	Badan Usaha Milik Negara / State-owned Enterprises
BwN	Building with Nature
CBD	Convention on Biological Diversity
CBT	Climate Budget Tagging / Penandaan Anggaran Iklim
CCA / API	Climate Change Adaptation / Adaptasi Perubahan Iklim
CDKN	Climate Development and Knowledge Network
CSR	Corporate Social Responsibility

DA	Development Agenda / Agenda Pembangunan
DAK	Dana Alokasi Khusus / Special allocation fund
DAS	Daerah Aliran Sungai / Watershed
DAU	Dana Alokasi Umum / General allocation fund
DBH	Dana Bagi Hasil / Revenue-sharing fund
DD	Dana Dekosentrasi / Deconcentration fund
DDR	Perlucutan, Demobilisasi, dan Reintegrasi / Disarmament, Demobilization, and Reintegration
DESTANA	Desa Tangguh Bencana / Disaster resilient village
Ditjen PPI	Direktorat Jenderal Pengendalian Perubahan Iklim / Directorate General of Climate Change Control
DKP	Dinas Kelautan dan Perikanan / Maritime Affairs and Fisheries Agency
DLH	Dinas Lingkungan Hidup / Environmental Agency
DPR	Dewan Perwakilan Rakyat / (National) House of Representatives
DPRD	Dewan Perwakilan Rakyat Daerah / Regional House of Representatives
DRR / PRB	Disaster Risk Reduction / Pengurangan Resiko Bencana
DTP	Dana Tugas Perbantuan / Co-administration fund
FDH	Forum Demak Hijau / Green Demak Forum
FGD	Focus Group Discussion
FPLKD	Forum Pemerhati Lingkungan dan Kebudayaan Demak / Demak Culture and Environment Observer Forum
GCF	Green Climate Fund
GDP / PDB	Gross Domestic Product / Produk Domestik Bruto
GEF	Global Environment Facility
GFDRR	Global Fund for Disaster Risk Reduction
GIZ	Deutsche Gesellschaft für Internationale Zussamenarbeit / German Agency for International Cooperation
HD	Hibah Daerah / Regional grant
ICCTF	Indonesia Climate Change Trust Fund
ICRI	International Coral Reef Initiative
IDRIP	Indonesia Disaster Resilience Initiatives Project
IFI	International Financial Institutions
IFHV	Insitute for International Law of Peace and Armed Conflict
IKK	Indikator Kinerja Kegiatan / Activity performance indicators
IKLH	Indeks Kualitas Lingkungan Hidup / Environmental Quality Index
IMDFF-DR	Indonesia Multi Donor Fund Facility on Disaster Recovery
IOP	International Organisation Partners
ITB	Institut Teknologi Bandung / Bandung Institute of Technology
IUCCE	Initiative for Urban Climate Change and Environment
JICA	Japan International Cooperation Agency
KATANA	Keluarga Tangguh Bencana / Disaster Resilient Family
Kemen ESDM	Kementerian Energi dan Sumber Daya Mineral / Ministry of Energy and Mineral Resources
Kemen PPPA	Kementerian Pemberdayaan Perempuan dan Perlindungan Anak / Ministry of Women Empowerment and Child Protection

Kemendag	Kementerian Perdagangan / Ministry of Trade
Kemendagri	Kementerian Dalam Negeri / Ministry of Home Affairs
Kemendes PDTT	Kementerian Desa, Pembangunan Daerah Tertinggal, dan Transmigrasi Pedesaan / Ministry of Village, Development of Disadvantaged Regions and Transmigration
Kemenhub	Kementerian Perhubungan / Ministry of Transportation
Kemenkes	Kementerian Kesehatan / Ministry of Health
Kemenkeu	Kementerian Keuangan / Ministry of Finance
Kemenko Perekonomian	Kementerian Koordinator Bidang Perekonomian / Coordinating Ministry of Economic Affairs
Kemenkomarves	Kementerian Koordinator Bidang Kemaritiman dan Investasi Republik Indonesia / Coordinating Ministry of Maritime Affairs and Investment
Kemenkumham	Kementerian Hukum dan HAM / Ministry of Law and Human Rights
Kemenparekraf	Ministry of Tourism and Creative Economy
Kemenperin	Kementerian Perindustrian / Ministry of Industry
Kemenristek	Kementerian Riset dan Teknologi / Ministry of Research and Technology
Kemensos	Kementerian Sosial / Ministry of Social Affairs
Kementan	Kementerian Pertanian / Ministry of Agriculture
Kepmen	Keputusan Menteri / Ministerial Decree
KKP	Kementerian Kelautan dan Perikanan / Ministry of Maritime Affairs and Fisheries
KLHK	Kementerian Lingkungan Hidup dan Kehutanan / Ministry of Environment and Forestry
KLHS	Kajian Lingkungan Hidup Strategis / Strategic Environmental Assessment
KRB	Kajian Risiko Bencana/ Disaster Risk Study
LAPAN	Lembaga Penerbangan dan Antariksa Nasional / National Institute of Aeronautics and Space
LIPI	Lembaga Ilmu Pengetahuan Indonesia / Indonesian Institute of Sciences
MAPI	Mitigasi dan Adaptasi Perubahan Iklim / Climate Change Mitigation and Adaptation
Musrenbang	Musyawarah Rencana Pembangunan / Development Consultative Forum
NAP	National Action Plan / Rencana Aksi Nasional
NbS	Nature-based Solutions
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organization
NSPK	Norma, Standar, Prosedur, and Kriteria / Norms, Standards, Procedures, and Criteria
OISCA	Organization for Industry, Spiritual, Culture, and Advancement
OJK	Otoritas Jasa Keuangan / Financial Services Authority
Pemda	Pemerintah Daerah / Regional Government
Permen	Peraturan Menteri / Ministerial Regulation
Perpres	Peraturan Presiden / Presidential Regulation
PES	Payment for Ecosystem Services
PfR	Partners for Resilience

Planas PRB	Platform Nasional Pengurangan Resiko Bencana / National Platform for Disaster Risk Reduction
Pokja API-PRB	Kelompok Kerja Adaptasi Perubahan Iklim – Pengurangan Resiko Bencana / CCA-DRR Working Group
PP	Peraturan Pemerintah / Government Regulation
PPP	Public Private PartnershipF
PROKLIM	Program Kampung Iklim/ Climate Village Programme
PUPR	Kementerian Pekerjaan Umum dan Perumahan Rakyat / Ministry of Public Works and Public Housing
PUSDATARU	Pekerjaan Umum Sumber Daya Air dan Penataan Ruang / Public Works of Water Resources and Spatial Planning
RAN-API	Rencana Aksi Nasional Adaptasi Perubahan Iklim / National Action Plan for Climate Change Adaptation, or National Adaptation Plan
RCCC	Red Cross Climate Centre
RDTR	Rencana Detail Tata Ruang / Detailed Spatial Plan
Renja	Rencana Kerja / Work Plan
RENSTRA	Rencana Strategis / Strategic Plan
RHL	Rehabilitasi Kawasan Konservasi atau Lindung / Land and Forest Rehabilitation
RIPN	Rencana Induk Pelabuhan Nasional / Nasional Port Master Plan
RKA	Rencana Kerja dan Anggaran / Work and Budget Plan
RKP	Rencana Kerja Pemerintah / Government Annual Work Plan
RKPD	RKP Daerah / Regional Government Annual Work Plan
RPI2JM	Rencana Terpadu dan Program Investasi Infrastruktur Jangka Menengah / Middle-Term Integrated Planning and Investment Program for Infrastructures
RPJM	Rencana Pembangunan Jangka Menengah / Medium-Term Development Plan
RPJMD	RPJM Daerah / Regional Medium-Term Development Plan
RPJMN	RPJM Nasional / National Medium-Term Development Plan
RPJP	Rencana Pembangunan Jangka Panjang / Long-Term Development Plan
RPJPD	RPJP Daerah / Regional Long-Term Development Plan
RPJPN	RPJP Nasional / National Long-Term Development Plan
RPP	Rancangan Peraturan Pemerintah / Government Regulation Draft
RTRW	Rencana Tata Ruang Wilayah / Spatial Plan
SDGs	Sustainable Development Goals
SFDRR	Sendai Framework for Disaster Risk Reduction
SIDIK	Sistem Informasi Data Indeks Kerentanan / Information System for Vulnerability Index Data
SKPD	Satuan Kerja Perangkat Daerah / Regional Work Unit
SPPN	Sistem Perencanaan Pembangunan Nasional / National Development Planning System
SRN	Sistem Registri Nasional / National Registration System
SS	Sasaran Strategis / Strategic goal
TWA	The Water Agency

UKCCU	United Kingdom Climate Change Unit
UN	United Nations
UNDIP	Universitas Diponegoro / Diponegoro University
UNDRR	United Nations Office for Disaster Risk Reduction
UNFCCC	United Nations Framework Convention on Climate Change
UNISDR	United Nations International Strategy for Disaster Reduction
UNNES	Universitas Negeri Semarang / State University of Semarang
UNOPS	United Nations Office for Project Services
USAID	United States Agency for International Development
UU	Undang-undang / Law
WWF	World Wildlife Fund
YLBA	Yayasan Lahan Basah / Wetlands International Indonesia

Appendix 1. Stakeholder Consultations

In total, we interviewed 25 stakeholders from the Government, academia, private sector for *Building with Nature Entry Points Recommendations in Indonesia* study:

1. Muhammad Yusuf and Fegi Nurhabni from Ministry of Maritime Affairs and Fisheries (Kementerian Kelautan dan Perikanan / KKP).
2. Saparis Soedarjanto from Ministry of Environment and Forestry (Kementerian Lingkungan Hidup dan Kehutanan / KLHK).
3. Kus Prisetiahadi from Coordinating Ministry for Maritime and Investment Affairs (Kementerian Koordinator Bidang Kemaritiman dan Investasi / Kemenkomarves).
4. Mirwansyah Prawiranegara from Ministry of Agrarian Affairs and Spatial Planning (Kementerian Agraria dan Tata Ruang/ Badan Pertanahan Nasional / ATR/BPN).
5. Abdul Muhari from Indonesian National Board for Disaster Management (Badan Nasional Penanggulangan Bencana / BNPB).
6. Apri Susanto and Eko Budi Priyanto from Yayasan Lahan Basah (YLBA) / Wetlands International Indonesia.
7. Joost Noordermeer from Witteveen+Bos Indonesia.
8. Eko Yunianto from Water Resources and Spatial Planning Agency of Central Java Province (Dinas Pekerjaan Umum Sumber Daya Air dan Penataan Ruang / PUSDATARU Pemprov Jateng).
9. Lilik Harnadi and Vita from Marine Affairs and Fisheries Agency of Central Java Province (Dinas Kelautan dan Perikanan Provinsi Jawa Tengah / DKP Jawa Tengah).
10. Singgih Setyono from Demak Regency Government (Pemerintah Kabupaten Demak), together with Suhasbukit and Azis from Regional Development Planning Agency of Demak Regency (Badan Perencanaan Pembangunan Daerah Demak / BAPPEDA Demak), M. Fatkhurrahman from Maritime Affairs and Fisheries Agency of Demak Regency (Dinas Kelautan dan Perikanan Kabupaten Demak / DKP Demak), Agus Musyafak from Demak Environmental Agency of Demak Regency (Dinas Lingkungan Hidup Kabupaten Demak / DLH Demak).
11. Sulkhan from Maritime Affairs and Fisheries Agency of Demak Regency (Dinas Kelautan dan Perikanan Kabupaten Demak / DKP Demak).
12. Azizul Miftah from Demak Regional Development Planning Agency (Badan Perencanaan Pembangunan Daerah Demak / BAPPEDA Demak).
13. Rezki Sulistyanto from Regional Disaster Management Agency of Demak Regency (Badan Penanggulangan Bencana Daerah Kabupaten Demak / BPBD Demak).
14. Sri Rejeki from Diponegoro University (Universitas Diponegoro / UNDIP).
15. Rudhi Pribadi from Diponegoro University (Universitas Diponegoro / UNDIP).
16. Widya Ningtias from Bandung Institute of Technology (Institut Teknologi Bandung / ITB).
17. Nana Kariada Tri Martuti from State University of Semarang (Universitas Negeri Semarang / UNNES).
18. Raja Siregar from Red Cross Climate Centre (RCCC) and Partners for Resilience (PfR).
19. Putra Dwitama as an expert on Climate Change Adaptation and Disaster Risk Reduction.
20. Annisa Srikandini as an expert on Climate Change Adaptation and Disaster Risk Reduction.
21. Muhammad Ridho Hakim, Pietra Widiadi and Syafrudin Syafii from World Wildlife Fund (WWF) Indonesia.

22. Wiwandari Handayani from Initiative for Urban Climate Change and Environment (IUCCE) Semarang.
23. Ali Mahmud from Organization for Industry, Spiritual, Culture, and Advancement (OISCA) Demak.
24. Nadhif Alawi from Demak Culture and Environment Observer Forum (Forum Pemerhati Lingkungan dan Kebudayaan Demak / FPLKD)
25. Sri Widayatuti from Green Demak Forum (Forum Demak Hijau / FDH).

Appendix 2. How International Regulations Work for BwN Development

Table A.1 How international regulations work for Building with Nature development

Convention/ policy	**Commitments relevant to Building with Nature**	**National-level instruments for implementing the Agreement and scope for promoting Eco-DRR/CCA through these instruments**
Paris Agreement, UNFCCC	The Paris Agreement recognises protecting the integrity of ecosystems and biodiversity for both climate change mitigation and adaptation actions. It specifically lays out principles of adaptation that take ecosystems into consideration. It also calls for integrating adaptation into relevant environmental policies and actions, as well as for building the resilience of ecosystems through sustainable management of natural resources. It further recognises the role of sustainable development in reducing the risk of loss and damage associated with climate change impacts, including extreme events and slow onset events.	Parties should ensure that their National Adaptation Plan and the adaptation components in their Nationally Determined Contributions (NDC) incorporate the key adaptation principles set out in the Paris Agreement, which include building ecosystem resilience in adaptation and protecting the integrity of ecosystems. Eco-DRR/CCA projects and technical assistance can be supported through the Green Climate Fund and the Climate Technology Centre and Network (CTCN).
Sustainable Development Goals	The SDGs on water (6), climate action (13), life below water (14), life on land (15), sustainable cities and settlements (11), ending hunger (2), and extreme poverty (1)– are all linked to Building with Nature. They address the challenges in deltas, where people's livelihoods often depend on their immediate natural environment, and explicitly make reference to sustainable ecosystem management and strengthening resilience.	Countries will develop their respective National Sustainable Development Strategies or National SDG Frameworks, and countries are tasked to develop corresponding indicators for each of the targets listed under the SDGs.
Convention on Biological Diversity	Decision XII/20 on Biodiversity and Climate Change and DRR recognises the significant role of conservation and sustainable use of biodiversity and restoration of ecosystems in climate change mitigation and adaptation, combating desertification and disaster risk reduction. It calls on governments and other relevant organisations to promote Eco-DRR/CCA approaches and integrate these into their respective policies and programmes. Decision XII/20 supports implementing the Aichi Targets, specifically Target 15 on conservation and restoration of degraded ecosystems.	Signatory countries are obligated to develop, implement and regularly review their National Biodiversity Strategic Action Plans (NBSAPs), which should take into account Decision XII/20 and integrate DRR and climate change actions in their respective NBSAPs. CBD signatory Member States can leverage Decision XII/20 to advocate for a stronger role for biodiversity conservation and ecosystem-based approaches in local and national DRR strategies as well as in National Adaptation Plan.

Convention/ policy	Commitments relevant to Building with Nature	National-level instruments for implementing the Agreement and scope for promoting Eco-DRR/CCA through these instruments
Ramsar Convention on Wetlands	Resolution 13 on wetlands and disaster risk reduction strongly encourages countries to mainstream disaster risk reduction measures in wetland management plans, especially Ramsar Sites, which integrate the principles of ecosystem-based management and adaptation against natural hazards and accelerated sea-level rise. It further calls for the integration of DRR in all relevant policies, action plans, and programmes. It further calls on countries to integrate ecosystem management-related considerations, particularly wetland and water management, in their national disaster risk reduction and climate change adaptation strategies.	Ramsar Contracting Parties can leverage Resolution 13 to promote Eco-DRR/CCA in wetland management policies and plans (in both Ramsar and non-Ramsar wetland sites), as well as in national and local DRR and CCA strategies, plans, and programmes.

Source: PEDRR 2016.

Appendix 3. Benefits from BwN

Table A.2 BwN projects in comparison to their conventional alternative

EcoShape Project	Description BwN solution (NbS)	Conventional alternative	Benefits from BwN
Mud motor	Use dredged sediment to enhance salt marsh development	Dredging and 'dump' dredged material in water bodies impacting water quality, or remove it as waste product	Beneficial use of dredged sediment to create nature
Houtrib Dike	Sandy foreshore in front of a dike	Stone dike reinforcement	Improves natural value, cheaper and more effective (under certain circumstances)
Marconi	Saltmarsh development with dredged sediment	Dredging and 'dump' material or remove it as waste product	Beneficial use of dredged sediment to create nature, knowledge development and improve the coast of Delfzijl
Clay Ripening project	Use dredged sediment from the Eems-Dollard to make clay which can be used for local dike reinforcement	Dredge the Eems-Dollard and 'dump' dredged material or remove it as waste product, and buy clay for the dike reinforcement	Improve water quality, stimulating regional economy, beneficial use of dredged sediment for clay production
Soft Sand Engine	Sandy shore protection, in the form of a sand engine	Stone dike reinforcement	Sustainable coastal protection that is adaptable to water level changes, improved spatial quality, and knowledge generation for larger-scale application in the strategy for the Frisian Ijsselmeer coast
Marker Wadden	Create island with local mud and sand to improve water quality and natural values	Do nothing	Improve natural value, improve water quality, provide recreation opportunities
BwN Indonesia	Use semi-permeable dams to promote mangrove restoration for coastal protection	Do nothing/stone protection structures (dams, groynes)	More effective in trapping sediment, reduce coastal erosion, and improve natural value
Hondsbossche Dunes	Building of a new dune coast with marine sand for coastal protection	Stone dike reinforcement	Coastal flood protection improve natural value and create opportunities for recreation
Delfland Sand Engine	Use mega sand nourishment for coastal protection	Use stone coastal protection constructions (dams, groynes)	Use natural processes for long-term coastal protection, create recreation opportunities and reduce negative ecological impact of sand nourishment

Source: EcoShape 2021.

Appendix 4. BwN Concepts and Examples

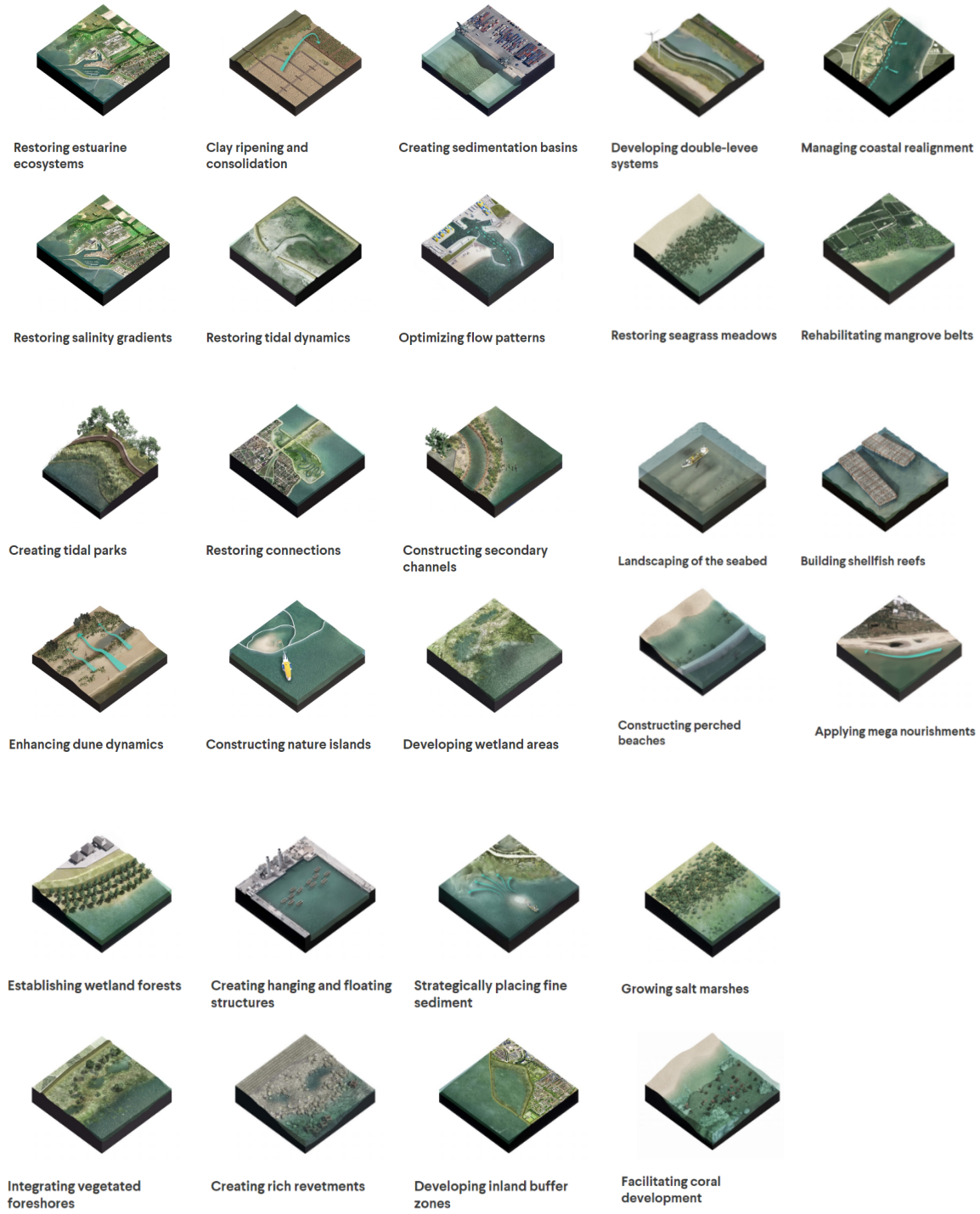

Figure A.1 Building with Nature concepts and examples

Source: EcoShape n.d.