7. Conclusion of the National TDA Report

7.1 Meeting the TDA Objectives

The Transboundary Diagnostic Analysis (TDA) is a key component of the Strategic and Action Plan (SAP) for the marine and coastal environment of the South China Sea and Gulf of Thailand Large Marine Ecosystem, serving as the scientific assessment and technical foundation for identifying and understanding the root causes of environmental issues that transcend national borders. This current Transboundary Diagnostic Analysis (TDA 2.0) builds on the foundation of the first TDA for the South China Sea developed in 2000, which provided a baseline understanding of priority transboundary environmental concerns with the corresponding policy recommendations. While the earlier effort focused on identifying and prioritizing key threats such as overexploitation of fisheries, habitat degradation, and land- and sea-based pollution, the present TDA 2.0 updates the status of these issues and further identifies recent and urgent challenges toward shaping forward-looking solutions.

To ensure scientific accuracy and policy relevance, the TDA 2.0 underwent a national multi-stakeholder validation workshop on November 12-14, 2025, engaging technical experts and decision-makers from national agencies, local government units, academe and research institutions, and civil society groups. Through plenary discussion and facilitated review for each TDA component, stakeholders validated data inputs and supplemented additional information evidence with local monitoring and management experience. The workshop confirmed that the priority concerns identified in the TDA remain persistent and interconnected across Philippine coastal provinces bordering the SCS LME. Participants further affirmed that several of these pressures transcend jurisdictional boundaries, highlighting the need for harmonized monitoring systems and stronger boundary cooperation under the SAP 2.0.

The primary objective of the TDA 2.0 is to generate an updated, evidence-based assessment that will directly inform the formulation of a new Strategic Action Programme (SAP 2.0) for the South China Sea and the Gulf of Thailand LME. It harnesses accumulated scientific knowledge, monitoring results, and governance experience to produce an updated, indicator-based assessment of how climate change, coastal development, and pollution are affecting the resilience of marine and coastal ecosystems.

The updated TDA has effectively met its stated objectives by systematically identifying and characterizing the major environmental concerns and risks affecting Philippine waters within the South China Sea Large Marine Ecosystem (SCS-LME). Across its five components - socio-economic and climate, pollution, ecosystems, fish and fisheries, and governance - the assessment frames these issues within the context of the triple planetary crisis: climate change, nutrient and plastic pollution, and biodiversity loss. To exemplify, the socioeconomics and climate component underscores the high exposure of localities bordering the Philippine waters in the SCS-LME to multiple hazards and disasters. These risks are not only a consequence of the Philippines' geographic location but are also exacerbated by human-induced pressures, including continuous land conversion, unsustainable aquaculture, agricultural, and fishing practices, mining and quarrying, weak waste management, urban congestion, and pollution. These drivers collectively accelerate environmental degradation and erode natural buffers against hazards. As a result, ecosystem services, populations and economic assets are becoming increasingly exposed and at risk across different localities.

This comprehensive analysis has enabled the identification of the root causes, immediate impacts, and key driving forces behind ecosystem degradation, thereby providing a scientifically robust foundation for the SAP 2.0. While some data are sparse and inaccessible, others remain limited, particularly in relation to long-term time series and harmonized methodologies. Nonetheless, TDA 2.0 provided a reliable evidence base that can guide national and regional interventions in line with the updating of the SAP.

Through this approach, the TDA 2.0 positions itself not only as a retrospective assessment but also as a forward-looking decision-support tool. It provides governments and regional bodies with a shared, science-based foundation for policy coherence, investment prioritization, and international collaboration. By aligning national analyses with regional and global frameworks such as the Sustainable Development Goals, the Convention on Biological Diversity's Kunming-Montreal Global Biodiversity Framework, and current transboundary cooperation in East and Southeast Asia, the TDA 2.0 ensures that the forthcoming SAP will be responsive to current challenges while preparing countries to address emerging risks and opportunities in the future.

To further strengthen consensus and stakeholder ownership, the national validation workshop confirmed that the major environmental concerns assessed in the TDA remain reflective of on-ground realities across the Philippine coastal provinces bordering the SCS-LME. Stakeholders validated that the pressures affecting ecosystems and fisheries are strongly linked to pollution, land-use change, fragmented governance and insufficient institutional capacity, and socio-economic vulnerability from climate and environment-related threats. Moreover, multiple concerns were reaffirmed to be transboundary in nature such as nutrient and wastewater pollution, marine plastic, IUU fishing, biodiversity loss in shared migratory habitats, and degradation of wetland and coastal ecosystems that serve as regional migration corridors.

7.2 Key Conclusions and Crosscutting Interactions

The TDA 2.0 underscores that the environmental challenges in the Philippine portion of the South China Sea Large Marine Ecosystem (SCS-LME) are deeply interconnected, cutting across ecosystems, sectors, and governance scales. Key conclusions point to the convergence of ecological, socio-economic, and institutional pressures that reinforce one another, magnifying risks and complicating solutions. These dynamics are further framed within the triple planetary crisis which not only accelerate ecosystem degradation but also heighten risks to human well-being, economic resilience, and institutional effectives.

The conclusions presented below are strengthened by the outcomes of the national multistakeholder validation workshop, which confirmed that the priority environmental concerns identified in the TDA 2.0 are both persistent and increasingly interconnected across Philippines coastal provinces bordering the SCS-LME. Stakeholders reaffirmed that many of these concerns including pollution flows, illegal unreported and unregulated (IUU) fishing, and biodiversity loss in ecologically linked habitats, extend beyond national jurisdiction, underscoring the necessity of harmonized monitoring, regional management measures, and shared investments under the forthcoming SAP 2.0.

1. Ecosystems remain under continued pressure from multiple drivers. Mangroves, seagrasses, coral reefs, and wetlands continue to experience habitat loss and degradation due to coastal development, pollution, destructive fishing, and weak enforcement. These pressures erode the ecological resilience of coastal systems, diminishing their capacity to act as natural buffers against climate change and to sustain fisheries and livelihoods. The cumulative degradation of these ecosystems exacerbates the exposure of coastal populations to hazards and reduces the potential for blue economy opportunities that rely on healthy coastal and marine systems
2. Information on coastal wetlands in the Philippine waters within SCS-LME, particularly mudflats and tidal flats, remains limited. These ecosystems are still poorly studied, with few biodiversity assessments and gaps in understanding their ecological and physical functions. Advancing research and assessments in these areas will strengthen evidence-based decision-making, improve site prioritization, and enhance the integration of tidal flats into conservation, management, and climate adaptation strategies.
3. Pollution, particularly nutrient loading, sediment mobilization, plastics, and untreated wastewater, remains a systemic stressor with impacts that cascade across local and regional scales. While the Clean Water Act (2004) provides a comprehensive framework, its enforcement and compliance remain fragmented. Gaps in wastewater treatment infrastructure, insufficient monitoring systems, and the seemingly inaccessible national

effluent database weaken the country's ability to manage pollution sources effectively. These deficiencies contribute to declining water quality, ecosystem degradation, and transboundary spillover effects that affect the wider SCS-LME.

4. The findings also reveal that while human development indicators are improving, socio-economic progress remains uneven, with growth concentrated in urban centers, while rural and island provinces remain underutilized. At the same time, inefficient land-use planning, unsustainable resource management, and rapid urban expansion are amplifying the exposure of populations and economic assets to natural and climate-related hazards. These patterns highlight the interdependence of human well-being, economic growth, and environmental resilience. Moving forward, fostering integrated approaches that balance inclusive development with climate adaptation and sustainable resource management is highly called for. By strengthening these linkages, the Philippines can further reduce risk, enhance resilience, and more efficiently harness the blue economy as a driver of sustainable development and regional cooperation.
5. Fisheries resources in the SCS-LME are experiencing unsustainable fishing leading to depletion of fish stocks and declining fish catch, as well as biodiversity loss. Illegal unreported and unregulated (IUU) fishing (i.e., encroachments of commercial boats in municipal waters and potential impacts of fishing activities in transboundary waters in fishing grounds and areas within Philippine territory) and lack of compliance to fisheries regulations also contribute to unsustainable fisheries situation. Resource use conflicts in coastal waters have resulted in environmental degradation from water pollution and habitat destruction (coral reefs, seagrass beds, mangroves including climate-related shocks (e.g., typhoons) contributes to the challenges to maintaining productive fisheries habitats and healthy fish stocks.
6. Fragmented and weak institutional coordination remains a critical barrier. Despite progress since the first TDA (2000) with the enactment of the Clean Water Act (Republic Act No. 9275), Fisheries Code (Republic Act No. 8550 as amended by Republic Act No. 10654), Wildlife Act (Republic Act No. 9147), Expanded National Integrated Protected Areas System Act (Republic Act No. 11038), and adoption of Integrated Coastal Management through Executive Order No. 533 series of 2006, key governance challenges include weak enforcement, competing commitments for coastal and marine conservation, reliance on external funding for sustainability, and socio-economic pressures driving destructive practices. This makes imperative the urgent need for strengthened and consistent implementation, enhanced inter-agency coordination, community empowerment, and sustainable financing that could be integrated into a coherent strategic action programme anchored on regional cooperation taking into account current international biodiversity and climate targets and the SDGs.
7. These crosscutting challenges directly affect national strategies such as the Philippine Biodiversity Strategy and Action Plan (PBSAP), which emphasize coherent, ecosystem-based, and multilevel governance to fulfill the country's commitment under the Convention on Biological Diversity. Weak coordination between national and local levels, as well as across different agencies, together with limited program continuity and inadequate resources, undermines the alignment of PBSAP targets with global frameworks, including the SDGs and the Kunming-Montreal Global Biodiversity Framework. Strengthening institutional coordination across sectors at the national level and among national, provincial, and local governments is critical to ensure that PBSAP objectives are aligned with regional and global biodiversity commitments.

Overall, this updated TDA highlights that ecological degradation, pollution, socio-economic pressures, climate risks, and governance fragmentation are not isolated issues but reinforcing drivers that demand integrated solutions. Addressing them requires strong cross-sectoral coordination, long-term investment, and sustained regional cooperation to ensure that both national priorities and transboundary commitments are effectively met.

7.3. Patterns of Risk Among Spatial Units of Analyses and at Country Scale

The assessment revealed distinct patterns of risk across pollution, socio-economic and climate factors, fisheries and ecosystems. These risks vary among provinces but are interconnected, reflecting both localized pressures

and transboundary drivers within SCS-LME. This spatial analysis highlights four (4) key areas along the Philippine waters within SCS-LME namely, Manila Bay, Lingayen Gulf in Pangasinan, Batangas Bay, and west coast of Palawan.

A. Pollution

Urban and industrial centers have emerged as pollution hotspots. Nutrient loading, sediment mobilization, plastics and untreated wastewater continue to affect water quality and coastal and marine ecosystems. While the Clean Water Act provides a strong policy framework, gaps in treatment facilities, monitoring, and data accessibility continue to challenge effective management and enforcement.

- Manila Bay remains the most critical hotspot with excessive coliforms, nutrients and heavy metals concentrated by its semi-closed waters.
- Lingayen Gulf receives substantial riverine inputs from agriculture, upstream mining, and aquaculture.
- Batangas Bay, including Verde Island Passage, experiences localized oil residues, trace metals, and industrial waste that place pressure on globally important reefs.
- Palawan generally faces lower risks but is showing rising coliform levels near tourism areas such as El Nido and Coron.

B. Socio-economic and Climate

The National Capital Region (NCR), in which Manila Bay is situated, and nearby provinces face the highest exposure of people and assets to hazards, while remote provinces such as Batanes show the lowest.

C. Fisheries

Overfishing, habitat loss, and IUU fishing persist as major pressures, particularly in Fisheries Management Areas 5 (Palawan and Occidental Mindoro) and 6 (Ilocos Norte, Ilocos Sur, La Union, Pangasinan, Bataan, Bulacan, Pampanga, Zambales, Batangas, Cavite, Occidental Mindoro). These drivers reduce fish catch, undermine food security, and accelerate biodiversity decline in productive fishing grounds.

D. Ecosystems

Mangroves and wetlands (mudflats and tidal flats), coral reefs, and seagrass beds remain under stress from conversion, reclamation, destructive practices, and pollution. Palawan, Batangas, and Pangasinan were identified as high-priority areas, given their high conservation and socio-economic value alongside elevated risks. Medium and low priority provinces require adaptive measures and continuous monitoring to prevent escalation of threats. Across the assessment, Manila Bay, Lingayen Gulf, Batangas Bay and the Verde Island Passage, and Palawan, emerged as critical focal areas, reflecting both the intensity of pressures and their importance to national and regional sustainability.

Risks are varied yet interconnected across sites, with pollution in urban centers, declining fisheries, and vulnerable ecosystems. At the national scale, the convergence of risks in Manila Bay, Lingayen Gulf, Batangas Bay, and Palawan underscores the urgency of focusing interventions where ecological and socioeconomic stakes are highest. These shared challenges transcend boundaries, reinforcing the need for collaborative action across the SCS-LME.

The validated list of environmental concerns categorized as national and transboundary is summarized as follows:

a. National Concerns:

- Land and sea-based pollution
- Habitat degradation of mangroves, seagrass beds, coral reefs, and wetlands
- Limited data and research on wetlands
- Unsustainable fisheries and resource use conflict
- Weak enforcement and fragmented governance
- Limited resources (i.e., manpower, technical knowledge and skills) to implement policies and programs
- Limited institutional capacity

b. Transboundary Concerns:

- Marine plastic debris
- Oil spills and ship-borne pollution
- Riverine pollution and nutrient loading
- Shared marine resources contamination
- IUU fishing (encroachment of commercial fishing vessels in municipal waters and operations of flagged fishing vessels within Philippine waters)
- Overfishing and depletion of fish stock in coastal waters
- Habitat destruction and environmental degradation
- Species loss and biodiversity threats
- Climate change impacts

7.4 Target Audience

TDA is designed to serve various audiences whose engagement is crucial to the success of the forthcoming SAP 2.0. These audiences span national, local, research, civil society, private sectors, and international cooperations and development partners, each with distinct but complementary roles in addressing the transboundary environmental challenges of the SCS-GOT.

- **National Government Agencies:** Policymakers and agencies directly responsible for coastal and marine resource management, including the Department of Environment and Natural Resources (DENR), Department of Agriculture (DA), Department of Economic, Planning and Development (DepDEV), DTI, DFA, DOTr, DOST, DILG, DHSUD, Department of Energy (DOE), Department of Tourism (DOT), Department of Public Works and Highways (DPWH), Climate Change Commission, and other relevant agencies. The TDA provides them with evidence-based analysis to guide remedial legislation, strategic planning and implementation, inter-sectoral coordination, and budget allocation.
- **Local Government Units (LGUs):** As frontliners in natural resource management and service delivery, LGUs play a critical role in translating national policies into concrete local actions. The TDA can support LGUs by contextualizing local initiatives within broader SAP 2.0 objectives and international commitments, enabling integrated and ecosystem-based management approaches at the community level that enhances their overall well-being.
- **Research institutions and the academe:** Universities, technical institutes, and think tanks are vital in addressing scientific data gaps, advancing monitoring systems, and producing new knowledge. The TDA highlights research priorities across its components and offers a roadmap for scientific inquiry that can inform adaptive management and innovation.
- **Non-governmental organizations (NGOs) and civil society organizations (CSOs):** These groups can leverage the findings of the TDA report to strengthen advocacy, promote accountability, advance community-based resource management, and innovative solutions.

- **Private sector:** Industries engaged in fisheries, aquaculture, shipping, and other Blue Economy sectors are both users and stewards of coastal and marine resources. The TDA provides them with a platform to identify potential business opportunities and align their practices with sustainability principles through corporate social responsibility initiatives, public-private partnership, compliance with environmental regulations, and investments in nature-based solutions.
- **Regional and International Bodies and Development Partners:** Multilateral institutions such as the Global Environment Facility (GEF), United Nations Environment Programme (UNEP), UNOPS, UNDP, Coordinating Body on the Seas of East Asia (COBSEA), PEMSEA, Southeast Asian Development Center (SEAFDEC), ASEAN sectoral bodies, and other development partners are central to providing financial, technical, and policy support. The TDA serves as a scientific reference and decision-support tool to align national priorities with regional and global frameworks, foster transboundary cooperation, and leverage resources for SAP 2.0 implementation.

7.5. Future Indicator-based Environmental Assessments

Future assessments should prioritize the following indicators:

A. Socio-economic and climate:

- Maritime disasters, including oil spillage
- Coastal infrastructure developments (reclamation projects, coastal highways/roads, boulevard,
- Encroachment of informal settlers
- Application of local ecological knowledge in disaster risk reduction and management

B. Pollution:

- Coastal and Marine Water Quality and Pollution Index
- Riverine Pollution Load Index
- Eutrophication Index
- Risk Quotient of Microplastics, Persistent Organic Micropollutants, and Emerging Contaminants
- National Industrial Waste and Effluent Central Database

C. Ecosystems:

- Coastal wetland (i.e. mudflats and tidal flats) biodiversity and integrity index
- Ecosystem health monitoring index
- Habitat condition and connectivity index
- Integrated ecosystem data and accessibility
- Ground-based ecological assessment
- Standardized marine habitat and wildlife monitoring protocols
- Ecosystems resilience and vulnerability indicator

D. Fish and Fisheries:

- Trends in fish catch by FMA/province, sub-sector, gear and species
- Trends in fishing effort by FMA/province, sub-sector
- Stock status by FMA/fishing ground
- Coastal habitat health/status
- Climate impacts to fish and fisheries

E. Governance:

- Policy implementation and accomplishment

- Coordination among national, provincial and local institutions
- Capacity and resources of LGUs for integrated coastal management
- Adequacy and sustainability of financing mechanisms
- Availability and quality of data collection and reporting
- Stakeholders' participation and engagement
- Best/Innovative practices for replication