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COVER STORY

The cover image shows one of the most crucial marine response activities aimed at protecting marine ecosystem. It portrays trained staff deploying boomers and skimmers, which are key tools utilized in holding and retrieving oil spills and thus avert the spread of pollutants over sensitive oceanic areas. With the rise in maritime operations, risks of oil spills and marine pollution necessitate swift, coordinated and well-equipped response. This edition of the Maritime Watch underscores the role of vigilance, environmental protection and effective maritime governance. It depicts Pakistan's commitment to protect its seas by utilizing the modern response mechanisms, institutional coordination and sustainable maritime practices to make certain the long-term ecological resilience.



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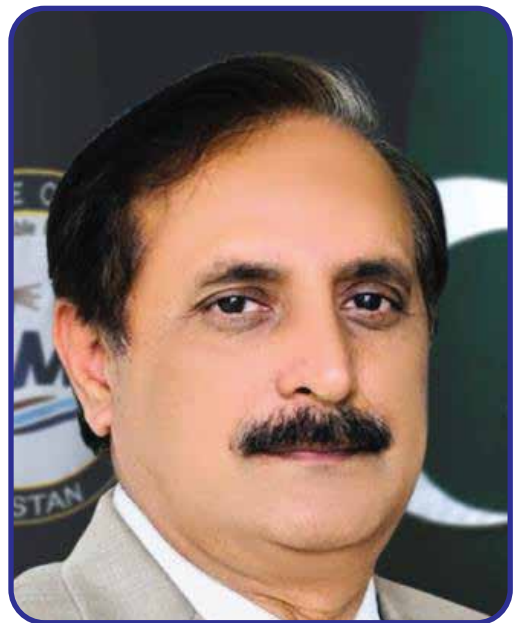
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Marine pollution has become one of the most pressing challenges of our time with direct implications for maritime security, economic resilience and ecological stability. From heavily trafficked sea lanes to sensitive coastal environments, the consequences of insufficient preparedness are increasingly visible.

Marine pollution takes many forms, including plastic waste, sewage discharge, nutrient runoff, heavy metals, underwater noise and thermal pollution. Among these, oil and chemical spills are the most serious threats, as they introduce toxic substances, spread rapidly and cause immediate and long-term damage to marine ecosystems, fisheries and coastal livelihoods. Oil spills and environmental emergencies transcend political boundaries, particularly in congested and strategically significant waters such as the Arabian Sea.



For maritime states such as Pakistan, whose trade, energy security and economic connectivity are intrinsically linked to the sea, marine environmental protection must be understood not as an environmental aspiration but as a strategic national priority.

As pressures on global oceans intensify, particularly from oil pollution, countries with growing maritime dependence must move beyond policy commitments toward practical preparedness. Although accidental tanker spills globally release on average less than 20,000 tons of oil annually into the marine environment, even a single major spill can cause severe ecological and economic damage.

Effective responses to marine pollution demand more than awareness; they require coordination, institutional readiness and sustained regional cooperation. Pakistan can significantly reduce marine pollution and support sustainable Blue Economy for future generations.

Cdre M Masud Akram SI (M), S BT (Retd)
Chief Editor

BARRACUDA XIII INTERNATIONAL SEMINAR FROM POLICY TO PRACTICE: ENSURING CLEAN OCEANS

The International Seminar on Oil Spill Response and Preparedness was convened on 9 December 2025 in Karachi as an integral component of the multinational maritime exercise BARRACUDA-XIII. The seminar was organized by NIMA in collaboration with the Pakistan Maritime Security Agency (PMSA) and brought together senior policymakers, maritime enforcement agencies, port authorities, academia, international organizations and regional experts.

The seminar provided a high-level strategic forum to deliberate on emerging challenges in oil and chemical spill preparedness, technological advancements in detection and response, international legal and governance frameworks and mechanisms for regional and multinational cooperation.

HISTORY AND BACKGROUND

Marine pollution has emerged as one of the most critical environmental challenges of the modern era, posing serious threats to oceanic biodiversity and coastal livelihoods worldwide. Oil and chemical spills are common sources of marine pollution and cause irreparable damage to marine ecosystem around the globe.

The grounding of MT "Tasman Spirit" in 2003, at Karachi Port, resulted in oil spill of more than 30,000 tons of crude oil into sea. The oil spill affected an offshore area of more than 2000 sq km and about 16 km long coastline.

Post event analysis highlighted the need of a dedicated national setup and well deliberated response strategy to deal with such and other calamities in maritime zones of Pakistan. Further, Pakistan being a signatory to international conventions & protocols such as Marine Pollution (MARPOL), Oil Pollution Preparedness, Response and Cooperation (OPRC) also necessitates to enhance capability to protect and preserve marine environment as a global common. Thus, marine pollution has become a perpetual threat in Maritime Zones of Pakistan. In this backdrop, National Marine Disaster Contingency Plan (NMDCP) was prepared and adopted in 2007.

In 2007, Ex BARRACUDA was introduced with the aim to Exercise Marine Oil Spill Response and Search and Rescue procedures as per NMDCP 2007 in order to refine procedures to improve inter agency coordination and enhance collaboration with international partners.

Based on stakeholders input and exercises conducted, NMDCP was revised and promulgated in 2019. It is pertinent to highlight that 12 x editions of Ex BARRACUDA have been conducted and scenarios are updated regularly.



CONCEPT NOTE

Oceans are under increasing pressure from pollution posing serious threats to marine ecosystems, coastal communities and economic activities. In 2024 alone, tanker oil spills accounted for a release of approximately 10,000 tons of oil into the oceans. While regulatory measures and improved vessel designs have reduced tanker spills by over 90% since 1970, risk of environmental and economic damage still remains considerable. This pollution threatens not only marine life but also fisheries, tourism and coastal livelihoods.

The Blue Economy, valued at US \$3-6 trillion and supporting more than 150 million jobs worldwide, is increasingly under threat. Protecting these resources is not just an environmental necessity, it is an economic imperative. Healthy seas mean thriving fisheries, sustainable tourism, resilient ports and prosperous coastal communities.

To tackle these escalating challenges, Pakistan Maritime Security Agency in collaboration with National Institute of Maritime Affairs is hosting International Seminar on Oil Spill Pollution & Response. This seminar is held as part of Exercise Barracuda XIII and aligned with International Convention on Oil Pollution Preparedness.

Response and Cooperation aims to bring together national and international stakeholders to share knowledge, enhance readiness and improve coordination to ensure cleaner oceans for sustainable exploitation of marine resources.

CHIEF OF THE NAVAL STAFF
ADMIRAL NAVEED ASHRAF NI, NI(M), T Bt

Oceans play a fundamental and irreplaceable role in sustaining life on Earth by regulating climate, supporting global trade and nurturing rich biodiversity. As a responsible maritime nation, Pakistan remains committed to promoting safe, secure and sustainable use of its maritime domain in consonance with international norms.

Pakistan Navy, as the key stakeholder with the responsibility of national maritime defence, extends unwavering support to all initiatives aimed at safeguarding marine ecosystems, ensuring maritime domain awareness and deepening regional cooperation for environmental protection.

Given the mix of maritime challenges, the looming threat of oil and chemical spills cast a grave risk to marine biodiversity, coastal communities and the wider maritime

environment. This underscores the necessity for a swift, coherent and collaborative response among national and international stakeholders. Guided by this obligation, Pakistan Navy (PN) and Pakistan Maritime Security Agency (PMSA) have been conducting a series of Multinational Exercise BARRACUDA under the National Marine Disaster Contingency Plan (NMDCP). Over the years, this Exercise has served as a dedicated platform to prepare for and tackle maritime environmental hazards by refining responses, assessing operational readiness and strengthening collective capability to meet any such contingency.

The 13th Edition of Exercise BARRACUDA is being held at Karachi and North Arabian Sea from 9-11 Dec 25. It is significant, since the number of countries and international organizations attending this Exercise reflects the growing confidence of international maritime community on Pakistan's constructive role in this endeavour.

The current Edition will also feature a Maritime Seminar and presentation of technical papers that will afford an invaluable forum to deliberate upon technological advancements, global best practices and contemporary methodologies to incorporate suitable marine pollution control measures and Search & Rescue (SAR) procedures.

In today's world, strengthening partnerships and enhancement of interoperability remain indispensable pillars of global and regional stability. Exercise BARRACUDA-XIII will enable us to synergize efforts towards our shared objectives of maritime environmental protection and safety of life at sea. I am confident that this Exercise will reinforce Pakistan's commitment to marine



conservation and contribute towards strengthening international maritime cooperation.

I extend my best wishes for the successful conduct of Exercise BARRACU-DA-XIII and commend PN, PMSA, national stakeholders and our esteemed partner nations for their active participation. Your continued support and vibrant spirit of collaboration is reassuring in ursuit of keeping our seas free from oil contamination, sterile and sustainable.



DIRECTOR GENERAL PMSA REAR ADMIRAL SHAHZAD IQBAL HI(M)

The increasing dependence of mankind on the oceans for resources, trade and environmental stability continue to shape the global maritime landscape. With over 90% of global commerce traversing sea routes, the threats posed by marine pollution, operational mishaps and environmental disasters remain an enduring challenge for the international community.

As the sole Maritime Law enforcement agency of Pakistan and Maritime Regional Coordination Center (MRCC) for Search and Rescue (SAR) under the aegis of IMO, Pakistan Maritime Security Agency (PMSA) remain unwavering in its resolve to safeguard the maritime environment, preserve national resources and uphold safety of life at sea, the very ethos upon which seafaring nations thrive.



In this backdrop, PMSA is conducting the 13th edition of Exercise BARRACUDA., scheduled from 9-11 December 2025 in Karachi. Since its inception in 2007 under the National Marine Disaster Contingency Plan (NMDCP), the exercise has grown into a flagship multinational forum for coordinated marine pollution response, maritime safety cooperation and joint preparedness against oil and chemical spill contingencies. This year's edition stands as a landmark event; with a number of countries and international maritime organization and agencies invited, it marks the heightened foreign participation, which is a testament to the increasing global recognition of Pakistan's efforts as a proactive maritime nation.

The exercise will encompass a comprehensive suite of activities including tabletop discussions, practical demonstrations, a maritime seminar encompassing presentation of technical papers. These engagements will focus on marine environmental protection, contemporary response mechanism and emerging technologies in maritime safety. The multi-layered construct of BARRACUDA-XIII exercise seeks to enhance operational synergy among national stakeholders and foster interoperability with international partners, thereby ensuring a unified, agile and well-coordinated response to maritime environmental mental emergencies.

As we embark upon this significant edition, I extend my sincere gratitude to all national stakeholders and our distinguished international partners for their valued participation and steadfast support. The collaborative spirit embedded in Exercise BARRACUDA-XIII provides an invaluable opportunity to exchange professional insight, strengthen operational linkages and reaffirm our shared commitment to the protection of the marine environment.

I remain confident that Exercise BARRACUDA-XIII will prove to be a rewarding and mutually enriching endeavor, contributing meaningfully to enhance regional cooperation, maritime resilience and environmental stewardship.



INTERNATIONAL SEMINAR FROM POLICY TO PRACTICE: ENSURING CLEAN OCEANS

SESSION I: IMPACTS OF OIL SPILL: NATIONAL RESPONSE FRAMEWORK

The Session featured speakers' presentations by National and International specialists, examining oil spill risks from regional, technological, legal and operational perspectives.

Dr. Ahmed Ali Khan, Senior Programme Officer, South Asian Seas Programme (SASP), Sri Lanka, under the theme “Oil Spill: A Trans-Border Challenge Requiring Collaborative Efforts,” highlighted oil spills as a shared regional threat in South Asia. Referring to major incidents in Pakistan Sri Lanka and India, he emphasized cross-border ecological and livelihood impacts and underscored the importance of regional mechanisms including the South Asian Seas Marine and Coastal Biodiversity Strategy and the Regional Oil and Chemical Pollution Contingency Plan 2025 for collective preparedness.

Dr. Sc. Muhammad Adnan Siddiqui, Director, Remote Sensing and AI Lab, ITU Lahore, under the theme “Oil Spill Detection in Pakistan’s EEZ with Space-borne Remote Sensing and Deep Learning,” highlighted the growing risk of oil pollution from maritime activities. He demonstrated the effectiveness of Sentinel-1 SAR imagery and deep learning models which detected 92 oil spill events covering approximately 1,162 km² in the Arabian Sea reinforcing the value of space-based monitoring for timely response.

Dr. Zeng Xian Gian, Director, Institute of South Asian Studies, Sichuan University, China, speaking online under the theme “China’s Role and Efforts to Mitigate Marine Oil Spills,” shared China’s experience in institutional strengthening multi-tiered response systems and regular large-scale exercises. He emphasized inter-ministerial coordination advanced response infrastructure and international cooperation as key pillars of effective oil spill governance.

Commodore Misbah (Retd), BN, Director General, BIMRAD, Bangladesh, under the theme “Bangladesh’s Perspective on Oil Spill,” noted that despite a global decline in tanker spill incidents residual risks persist due to aging vessels and shadow shipping. He stressed continued threats to marine ecosystems fisheries and coastal livelihoods and called for operational readiness resilient ports and enhanced regional cooperation under the IMO OPRC framework.

Captain Nish Wijayakulathilaka, IMO Goodwill Ambassador, under the theme “Bridging Policy and Practice in Marine Pollution Governance: Legal Compliance,” highlighted gaps between international legal obligations and implementation. He reviewed key instruments including UNCLOS MARPOL the Ballast Water Management Convention and IMO Biofouling Guidelines emphasizing

that weak enforcement undermines marine environmental protection.

Commodore Ehsan Ahmed SI(M), Deputy President, Maritime Centre of Excellence, PN War College, under the theme “Innovation and Regional Cooperation: Key to Tackling Oil Spills in North Arabian Sea,” emphasized risks posed by oil spills in high-traffic sea lanes. He highlighted Pakistan’s National Oil Spill Contingency Plan satellite surveillance spill modeling tools and exercises such as BARRACUDA-XIII as critical to strengthening preparedness.

SESSION II: PANEL DISCUSSION ON EMERGING CHALLENGES AND MULTI-AGENCY COLLABORATION FOR MITIGATING MEASURES

It was conducted as a panel discussion moderated by Commodore Syed Muhammad Obaidullah SI(M) (Retd). The panel comprised Rear Admiral Muhammad Khalid HI(M), Director General Ops Port Qasim Authority; Ms. Aliya Shahid, Director General Ports and Shipping, Ministry of Maritime Affairs; Dr. Asif Inam, Principal, BSMAS; Dr. Nuzhat Khan, CEO and Founder, BlueNet; Dr. Kanwar M. Javed Iqbal, Senior Policy Specialist, FAO; and Ms. Songul Jamal, CEO, Marine Conservation Pakistan.

The discussion focused on gaps in national preparedness, challenges in inter-agency coordination, the role of ports and the shipping sector, regulatory compliance and the integration of technology and innovation in oil spill response. Panelists underscored the need for effective port state control, green and resilient ports, trained human resources, and clearly defined command and control structures. Emphasis was also placed on regional cooperation and joint exercises to improve information sharing, build trust and enable coordinated responses to trans- boundary spill incidents.

The Chief Guest, Dr. Musadik Masood Malik, Federal Minister of Climate Change & Environmental Coordination, delivered a comprehensive address highlighting marine environmental protection as a national priority directly linked to economic stability, energy security and sustainable development. He described Pakistan’s maritime domain as a critical economic driver and cautioned that oil spills and marine pollution pose long-term ecological and economic risks. The Minister called for strengthened regional and international cooperation and urged all stakeholders, including government agencies, ports, shipping operators and civil society, to move from policy commitments to coordinated and actionable measures. He emphasized resilient maritime infrastructure, trained personnel, effective regulatory enforcement and the use of technology and innovation in oil spill response. He concluded by reaffirming that protecting Pakistan’s marine ecosystems is essential for sustainable development, food security and a resilient blue economy for future generations.

Oceans of Opportunity: Pakistan's Path to a Strong Blue Economy

BY MS. IQRA MANZOOR

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Pakistan's Blue Economy (BE) defined as the sustainable use of marine and coastal resources for economic growth remains one of the country's most underutilized economic frontiers. With over 1,000 kilometers of coastline, a 240,000 square kilometer Exclusive Economic Zone (EEZ), and an additional 50,000 square kilometer continental shelf extension granted by the United Nations in 2015, Pakistan possesses a maritime resource base larger than Punjab and Khyber Pakhtunkhwa combined. Yet, the ocean-based economy contributes only about 0.4% to national GDP.



This underperformance is striking, especially when experts estimate that with targeted investment and effective governance, the blue economy could contribute 10–15% of

GDP by 2035, with an annual potential exceeding USD 40 billion. The recent trends demonstrate that this potential is achievable. During Financial Year 2024–25, Pakistan's seafood exports reached USD 489.2 million, reflecting a 20.5% yearly growth. China and Thailand alone imported seafood worth over USD 291 million, indicating rising international demand. Moreover, the United States has extended authorization for Pakistani seafood exports for another four years under the Marine Mammal Protection Act (MMPA), granting Pakistan access to premium markets. These developments signal that Pakistan's fisheries sector is transitioning from a peripheral role toward global competitiveness.

A major policy shift occurred in July 2025 with the launch of the National Fisheries and Aquaculture Policy (2025–2035) by the Ministry of Maritime Affairs. Recognizing that fisheries currently contribute less than 0.5% to GDP despite having the potential to add USD 10 billion, the policy emphasizes environmental sustainability, modern aquaculture technologies, institutional reform, climate resilience, and gender inclusion. Developed through provincial consultation and aligned with international standards, the policy provides a credible framework for sectoral transformation.

The central challenge now lies in implementation. One of the most promising opportunities is shifting from raw seafood exports to value-added processing. Investment in cold-chain infrastructure, traceability systems, and processing clusters in Karachi, Gwadar, and Pasni could raise export value by more than 50% within five years, generate thousands of jobs, and protect fish stocks. With these

structural improvements, seafood exports could realistically reach USD 2.5-3 billion annually.

Pakistan's ecological assets further strengthen its blue economy prospects. The Indus Delta hosts one of the world's largest mangrove ecosystems, which supports fisheries, protects coastlines, and stores blue carbon. Pakistan is among the few countries where mangrove coverage has increased in recent decades, creating opportunities for blue-carbon credit projects that enhance climate resilience and generate income. Additionally, the designation of Astola Island (2017), Churna Island (2024), and Miani Hor (2025) as Marine Protected Areas (MPAs) reflects growing commitment to biodiversity conservation and eco-tourism. With effective management, these MPAs can support local livelihoods while restoring marine ecosystems. Industrial revitalization is also possible through ship recycling.

The entry into force of the Hong Kong Convention (HKC) in June 2025 provides Pakistan an opportunity to modernize Gadani shipbreaking yards to international safety and environmental standards. Compliance could reposition Pakistan as a trusted global ship recycling hub, improving labor conditions and environmental performance while earning foreign exchange.

Port development forms another critical pillar. Although Karachi Port, Port Qasim, and Gwadar remain underutilized due to congestion and outdated infrastructure, however the momentum is building. AD Ports' 25-year concession at Karachi Gateway Terminal (February 2024), Hutchison Ports' announcement of up to USD 1 billion in investment (March 2025), and the inauguration of Gwadar International Airport in January 2025 collectively lay the groundwork for modern logistics, transshipment, and tourism-driven growth. Renewable energy adds a forward-looking dimension.

With solar power already accounting for over 25% of electricity generation in 2025, Pakistan is well-positioned to pilot offshore wind and tidal energy projects along the Sindh-Balochistan coast. Even a modest 200-300 MW offshore project could integrate Pakistan into emerging green hydrogen and sustainable maritime fuel markets. To unlock these opportunities, three strategic actions are essential: establishing a transparent blue economy investment pipeline of bankable projects; linking incentives to international quality and sustainability standards; and expanding MPAs through community-based management.

"Climate Justice and Future of Coastal Communities - A Perspective on World Maritime Day"

MR. MUHAMMAD UMAR

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Pakistan has been topping the charts of the most climate-vulnerable countries for the past few years, despite minimal greenhouse gas emissions. According to a report by PIDE, casualties up to 10,000 and losses up to \$4 billion have been directly linked to climate change.

Alarming levels of global warming are not only depleting glacial sources but also wreaking havoc in the form of fluvial flooding and rising sea level, which is synergized with a drastic lack of infrastructure, proving to be a catastrophe in the form of 2010, 2022 and 2025 riverine and flash floods. Sea level rise, causing saltwater intrusion inland, coupled with the loss of mangrove reserves on the Indus basin, is devastating for aquaculture and agriculture. With an estimated 17 million people of Karachi at risk, and the history of damage of about 10\$ billion in floods of 2010 alone, the human cost of these changes can be drastic, with issues like acute water shortage and food insecurity disproportionately impacting poor coastal and urban communities.



Human interventions like urban pollution and effluents from industrial activities directly lodged into estuaries and creeks pose an existential threat to marine life and the 1.8 million people who directly depend on fishing for livelihood.

Despite Constitutional articles 9, 14, 23, and 19A enshrining environmental rights, for an estimated 14 million people displaced due to the floods in 2010 alone, the legal avenues for climate justice remain limited. Important pieces of legislation in this regard include, Environmental Protection Act 1997, the Fisheries Act, 1897 and the Climate Change Act

¹ Nazim, Moiz. "Impact of Climate Change on Water in Pakistan." PIDE Knowledge Brief, October 2022.

<https://file.pide.org.pk/uploads/kb-085-impact-of-climate-change-on-water-in-pakistan.pdf>. Accessed 14 Sep. 2025.

² Asian Development Bank. (2022). Indus Basin Floods: Mechanisms, Impacts, and Management. Asian Development Bank.

<https://www.adb.org/publications/ndus-basin-floods-mechnisms-impacts-and-management>. Accessed 14 Sep. 2025.

of 2017; however, legislative gaps and lack of institutional capacity remain evident. Pakistan's National Climate Change Policy (NCCP) provides the overarching framework for climate adaptation and mitigation but lacks compensation for displaced communities and a mechanism for sustainable management of resources.

Proposed legislation like the Climate Refugees Rights and Protection Act and The Climate Accountability Bill, 2024 by the federal government seems pioneering; however, it all hinges on institutional capacity. At the Federal level, the NCCP is headed by the Ministry of Climate Change (MoCC), in collaboration with the Pakistan Meteorological Department (PMD) and the National Institute of Oceanography (NIO). Pakistan Navy Hydrographic Department contributes to tide gauge observations. The governments of Sindh and Balochistan house Provincial Environment Departments, whereas, Sindh Climate Change Department also ensures the Sindh Climate Change Policy, revised in 2022.

Unfortunately, despite the presence of National Disaster Management Authority (NDMA) and Provincial Disaster Management Authorities (PDMAs), catastrophic events like the 2023 Cyclone Biparjoy, which caused an evacuation of nearly 85,000 people, damaged over 2,500 houses, and destroyed more than a thousand acres of crops in Sindh and Balochistan, highlight the urgent need for robust early warning and disaster preparedness systems integrated with real-time scientific data. There is a demand for a National Framework for Climate Services (NFCS) integrating coastal climate data, heavy investments in tide gauge networks, improved high-resolution inundation modelling, leveraging satellite LiDAR and drone technologies for precise elevation data collection.

The NCCP has not been revised since 2021, as Pakistan is lagging behind in the implementation of UNFCCC (United Nations Framework Convention on Climate Change) and Paris Agreement obligations and human rights treaties like the ICESCR (International Covenant on Economic, Social and Cultural Rights). Pakistan needs to immediately address pollution stringently with both legislative and regulatory measures.

However, for restoration and mitigation, before any legislative effort, institutional capacity is to be revitalized. Owing to the strategic importance of Gwadar, Balochistan should be provided with immediate Federal assistance. Incentivizing climate-smart maritime industries and promoting nature-based solutions can make the Blue Economy sustainable in the long run.

Climate justice is the key to safeguarding the future of Pakistan's coastal communities and Blue Economy of the nation against the threat of climate change. Legislative and policy reforms, institutional capacity building, and international collaboration are need of the hour to materialize rights and policies.

³. Khidri FF, Riaz H, Khuwaja AH (2023) Cyclone Biparjoy: A Test of Pakistan's Disaster Preparedness. *Disaster Med Public Health Prep* 17:e454. <https://doi.org/10.1017/dmp.2023.135>

"Nuclear Technology and Water Security in Pakistan: A Strategic Approach through the Blue Economy"

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Water security holds a paramount place in Pakistan's national security, where some regions face catastrophic flood-water, while others face acute shortage. This piece builds a case for peaceful nuclear applications, including nuclear-enabled flood forecasting, desalination, and isotope hydrology, into the Blue Economy Strategy of Pakistan. Only through the smart integration of the nuclear tools can a sustainable maritime development be ensured.



Changing Weather Patterns and the Scarcity-Excess Paradox in Pakistan

Unlike before, monsoon rainfall has become more intense, unpredictable, and frequently overwhelming disaster management systems. According to the latest studies by the World Weather Attribution Consortium, this year alone, Paki-

stan witnessed 10-15 times more rainfall than average, resulting in unprecedented destruction. This was followed by the erratic glacial melt in the Himalayas and Karakoram, which further exacerbated the stir in the Indus River.

In contrast, Pakistan's maritime resilience is challenged by the 'scarcity' dimension of the scarcity-excess paradox, manifested in main water tributaries. During spring 2025, the Mangla and Tarbela hit 'dead-levels' affecting hydropower and irrigation. Geopolitics added precarity to this scenario, as the abeyance of the Indus Water Treaty (IWT) by New Delhi has increased the chances of the upper riparian, India, manipulating the river inflows to Pakistan.

Such unilateral water weaponization can manipulate 80% of Pakistan's water access, which was earlier guaranteed under the IWT. It will also limit information about the water information of 80% of Pakistan's waters. Future prospects appear increasingly bleak with the unchecked aquifer extraction and weak recharge in the major cities such as Karachi, Rawalpindi, Quetta, and Lahore, where the groundwater has reportedly declined up to 3-4 feet.

How Peaceful Nuclear Applications Provide a Sustainable Solution?

Nuclear desalination technologies can mitigate the acute water crisis, demonstrating a proven solution to bring a meaningful impact. The largest city of Pakistan, Karachi, faces a water shortfall of about 600 million gallons. A similar situation is prevailing in Gwadar as well, which is projected to

become the maritime hub of the historic China-Pakistan Economic Corridor (CPEC). Although Karachi has a nuclear desalination plant built at a 137 MW CANDU reactor at Karachi Nuclear Power Plant (KANUPP), which uses the Multi-effect Desalination (MED) process.

However, the modest capacity of the plant (1,600 cubic meters) is insufficient to meet the city's demand, highlighting the need to scale up nuclear desalination capacity for meaningful impact. Globally, nuclear-powered desalination plants are also considered an integral component of the water strategies, i.e., Russian floating nuclear desalination units in the Arctic. Moreover, Kazakhstan and the UAE have recognized nuclear power as a significant element of their water strategies.

Through a precise groundwater map generated using isotope hydrology, authorities can enforce effective urban water strategies. This nuclear technique can trace the water molecules and differentiate between renewable and fossil groundwater. Water levels are depleting in the twin cities of Rawalpindi and Islamabad due to unplanned and extravagant water extraction, risking irreversible aquifer damage.

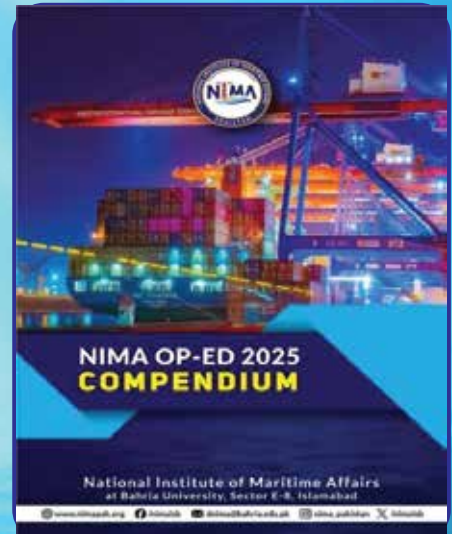
Pakistan Atomic Energy Commission (PAEC) collaborates with the International Atomic Energy Agency (IAEA) and runs a water management excellence center. PEAC, Pakistan Space and Upper Atmosphere Research Commission (SUPARCO), and provincial authorities can implement this nuclear-powered strategy and effectively manage the urban water crisis.

Integrating peaceful nuclear applications into Pakistan's Blue Economy strategy offers a strategic pathway to address both water scarcity and excess through desalination, isotope hydrology, and nuclear-enabled hydrological monitoring. These tools can strengthen data-driven policymaking, enhance disaster preparedness, and secure coastal and urban water supplies. With coordinated institutional action and sustained investment, nuclear technology can become a critical pillar of Pakistan's long-term water security and maritime resilience

NIMA PUBLICATIONS

Title: NIMA OP-ED 2025 COMPENDIUM

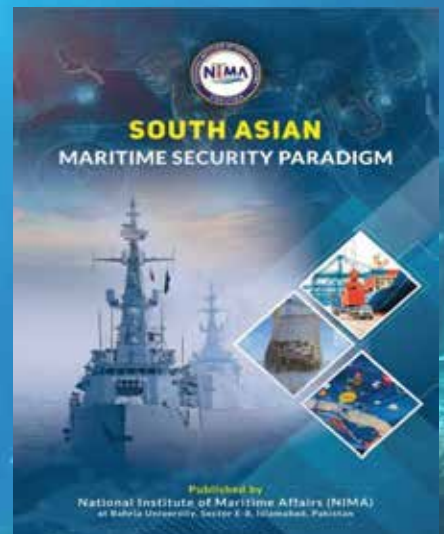
The National Institute of Maritime Affairs (NIMA) continues to contribute to maritime research and policy through informed analysis and constructive dialogue. Our researchers regularly publish opinion articles on key maritime issues, guided by strong ethical standards. This compendium brings together last year's published work to make our insights more accessible. It reflects NIMA's ongoing commitment to raising maritime awareness, supporting informed decision making and promoting the Blue Economy.



Title: South Asian Maritime Security Paradigm

Authors: Editor-in-Chief: Vice Admiral Ahmed Saeed HI(M) (Retd)

This book explores the dynamic security landscape of the Indian Ocean Region (IOR), analyzing the impact of traditional and non-traditional threats, technological advancements, environmental concerns, and great power rivalries on maritime policy, strategy, and practices. a



4th November 2025: International Maritime Conference 2025 opens with strong focus on Blue Economy and Sustainable Development



MARITIME CON

5th November 2025: IMC-25 concludes in Karachi, reaffirming Pakistan's Commitment to Maritime Security and Blue Growth



11th November 2025: SAN delegation led by Rear Admiral Musawenkosi Nkomonde visits NIMA to strengthen Maritime cooperation and Blue Economy collaboration.



12th November 2025: NIMA and Karachi Chamber of Commerce Strengthen Cooperation for Maritime Economic Development



12th November 2025: Former Pakistani Ambassador H.E. Mr. Muhammad Arshad Jan Pathan engages NIMA on Maritime Strategy and Regional Connectivity for Strengthening Academic Collaboration



12th November 2025: Additional Foreign Secretary (Africa) Mr. Hamid Asghar Khan Visits NIMA to enhance Maritime diplomacy and Strategic engagement



15th November 2025: NIMA pays tribute to outgoing Rector Bahria University Vice Admiral Asif Khaliq HI(M) (Retd)



21st November 2025: NIMA and KoFHA Observe World Fisheries Day to promote Sustainable Fishing practices



25th November 2025: NIMA contributes to approval of Balochistan Fisheries & Aquaculture Rules 2025 in TWG meeting held at FAO Office Quetta



26th November 2025: President NIMA Meets Chairman Karachi Port Trust Rear Admiral Shahid Ahmad SI (M) to enhance Port efficiency and Maritime growth



26th November 2025: President NIMA Meets Chairman Karachi Port Trust Rear Admiral Shahid Ahmad SI (M) to enhance Port efficiency and Maritime growth



26th November 2025: Bangladesh Navy delegation led by Rear Admiral Muhammad Moinul Hassan engages NIMA on Strategic Maritime studies and Blue Economy Research



28th November 2025: NIMA and TELEC group sign MoU establishing TELEC Chair for Maritime Research and Training



1st December 2025: Student delegation from Bahria College visits NIMA to learn about Pakistan's Maritime potential



1st December 2025: NIMA Launches Landmark Publication on South Asia's evolving Maritime Security landscape



2nd December 2025: Italian Navy delegation visits NIMA to expand cooperation in Maritime research and strategy



1st December 2025: Leadership Transition at NIMA: Rear Admiral Javaid Iqbal HI (M) takes over as new President which marks continuity in maritime policy and research excellence



4th December 2025: Participants of 8th Maritime Security Workshop Visit NIMA for insights on Maritime economy



9th December 2025: NIMA and PMSA hold International Seminar on Oil Spill response and Marine environmental protection



19th December 2025: Maritime Centre of Excellence delegation visits NIMA to explore academic and research collaboration



16th December 2025: NIMA Research Fellow participates in 8th Maritime security workshop at PN War College



24th December 2025: Royal Saudi naval forces delegation visits NIMA to enhance Blue Economy and Research Cooperation



16th December 2025: Russian federation Navy delegation visits NIMA to strengthen maritime research cooperation



26th December 2025: NIMA commemorates Quaid-e-Azam Day, reaffirming commitment to National ideals and unity



Maritime Trade and Economy

04th November 2025: Finance Minister Muhammad Aurangzeb calls Pakistan's Blue Economy 'Game-changing sector' with huge potential
(Source: The News)



21st November 2025: Pakistan achieves milestone with first large-scale production of IMO-compliant very low Sulphur fuel oil at Karachi Port Trust Oil Pier
(Source: Profit Pakistan Today)



19th November 2025: Pakistan enters bunkering market with first facility at Karachi Port
(Source: Dawn)



31st December 2025: Pakistan's Seafood Exports to China Rise 24% to \$240 Million in 2025
(Source: Arab News)



Ports & Shipping

01st November 2025: Pakistan to build three new ports, modern maritime complex under five-point strategy
(Source: Aaj News)



24th December 2025: Pakistan PM orders port reforms to cut cargo delays, boost trade and growth
(Source: Arab News)



06th November 2025: PIMEC-25 concludes successfully, boosting Pakistan's Maritime vision and Blue Economy. Federal Minister for Maritime Affairs, Muhammad Junaid Anwar Chaudhry lauds Pakistan Navy efforts in organizing the event
(Source: Daily Independent)



31st December 2025: Government approves major expansion of National Shipping Fleet
(Source: Express Tribune)



Maritime Safety, Security and Technology

02nd Nov 2025: Exclusive: First batch of submarines under China-Pakistan cooperation project to enter service next year, says Pakistani Naval Chief
(Source: Global Times)



23rd November 2025: Pakistan-Türkiye naval partnership strengthens local industry, boosts regional security: Naval Chief
(Source: Pakistan Today)



19th November 2025: Pakistan Navy seizes over 2,000kg of crystal meth worth nearly \$130m in Arabian Sea drug bust
(Source: Dawn)



01st December 2025: Pakistan Navy hosts MARSEW-8 to promote National Maritime Security Awareness
(Source: Islamabad Post)



Maritime Environment, Policy and Law

06th November 2025: Pakistan announces multi-billion upgrade for Gaddani, new green shipyard at Port Qasim
(Source: Business Recorder)



18th Nov 2025: Fisherfolk Forum launches three-day festival, conference in Badin
(Source: Express Tribune)



12th November 2025: Pakistan Navy organizes free medical camp at Piskukan
(Source: The Nation)



27th Nov 2025: Spinner, Humpback Dolphins found dead along Balochistan Coast
(Source: Express Tribune)



Maritime Trade and Economy

5th November 2025: MSC shatters industry record, becomes first carrier to command 7 million TEU fleet capacity
(Source: gCaptain)



10th November 2025: Suez Canal, ocean lines discuss return of global shipping
(Source: Freight News)



6th December 2025: Oil climbs to 2 weeks high on fed rate-cut signals, supply concerns
(Source: Reuters)



16th December 2025: EU imposes sanctions on oil traders with links to Russia's shipping network
(Source: Reuters)



Ports And Shipping

17th November 2025: Turkish-flagged LPG ship hit during discharge at Ukraine's Izmail port
(Source: Daily Sabah)



17th December 2025: Hapag-Lloyd and NCL to power container ships with e-fuels from 2027
(Source: Reuters)



20th November 2025: Hong Kong Maritime Week: Setting sail for a greener future
(Source: TMX News File)



19th December 2025: Gulftainer launches its second bonded dry port in Sajaa
(Source: Trade Chronicle)



Maritime Safety, Security And Technology

15th November 2025: Iran confirms seizure of oil tanker in the Strait of Hormuz
(Source: The Associated Press)



26th November 2025: Poland picks Saab to supply three submarines
(Source: Marine Link)



22nd December 2025: U.S. boards Oil Tanker Centuries East of Barbados as Caribbean enforcement operations expand
(Source: MARINO PH)



2nd December 2025: White House defends US attack on boat from Venezuela as lawful
(Source: BBC News)



Maritime Environment and Law

28th November 2025: Russia fails to win back seat on UN shipping agency's council
(Source: Reuters)



14th November 2025: COP30: NGO's demand action on shipping emissions
(Source: Sea trade maritime News)



12th December 2025: IMO reaffirms commitments during EU Maritime Security Week
(Source: Safety4Sea)



24th December 2025: UN Reaches Shipping Emissions Agreement Amid US Opposition
(Source: Maritime Fairtrade)

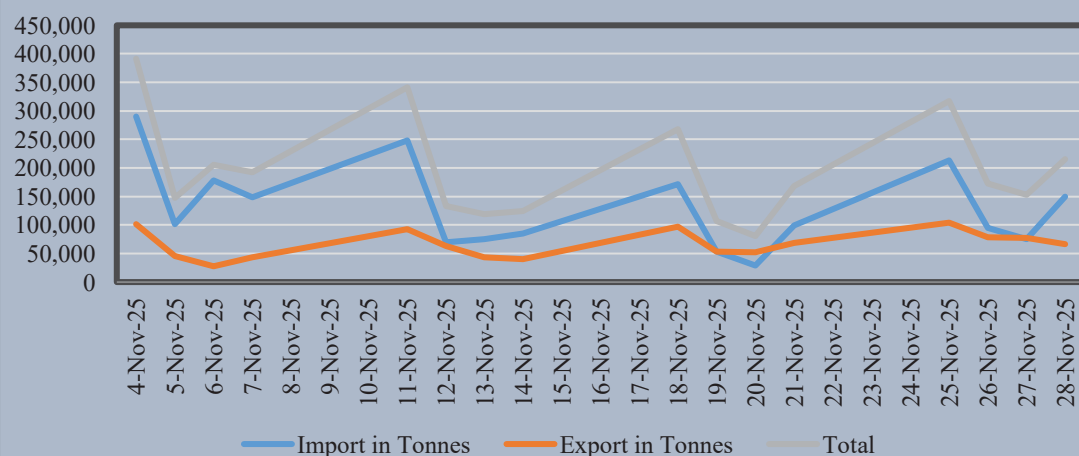


KARACHI PORT

ACTIVITIES AT KARACHI PORT (NOVEMBER 2025)

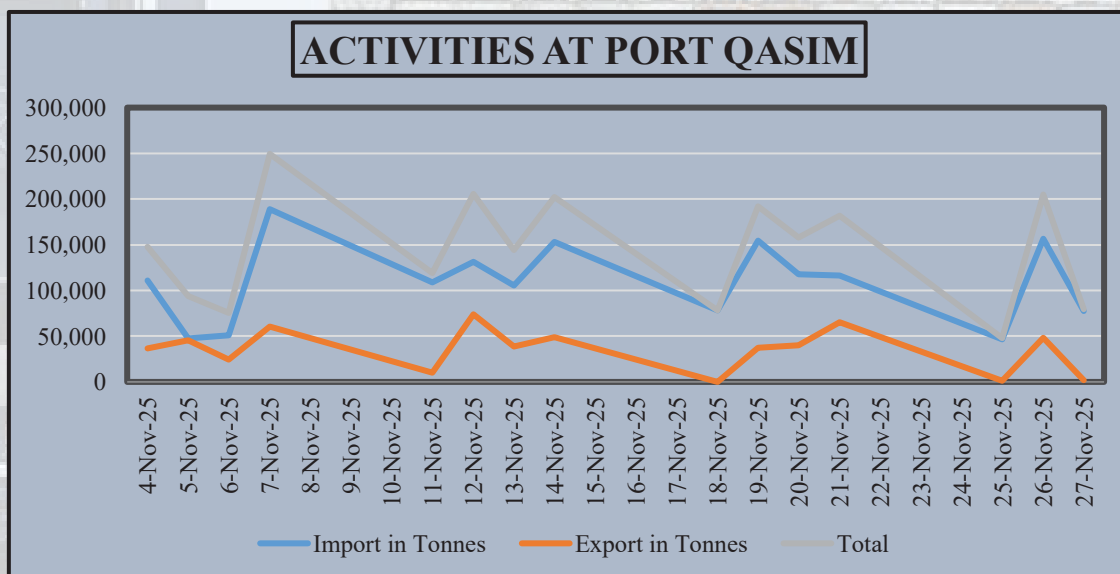
Date	Import in Tonnes	Export in Tonnes	Total
4-Nov-25	290,061	101,399	391,460
5-Nov-25	101,562	45,831	147,393
6-Nov-25	177,627	27,649	205,276
7-Nov-25	148,860	43,977	192,837
11-Nov-25	247,712	93,129	340,841
12-Nov-25	69,471	63,506	132,977
13-Nov-25	75,455	43,749	119,204
14-Nov-25	84,617	39,637	124,254
18-Nov-25	171,284	97,120	268,404
19-Nov-25	53,178	53,672	106,850
20-Nov-25	28,976	51,686	80,662
21-Nov-25	99,217	68,609	167,826
25-Nov-25	213,616	104,121	317,737
26-Nov-25	94,450	78,279	172,729
27-Nov-25	75,642	77,540	153,182
28-Nov-25	150,003	65,917	215,920
Total	2,081,731	1,055,821	3,137,552

ACTIVITIES AT KARACHI PORT



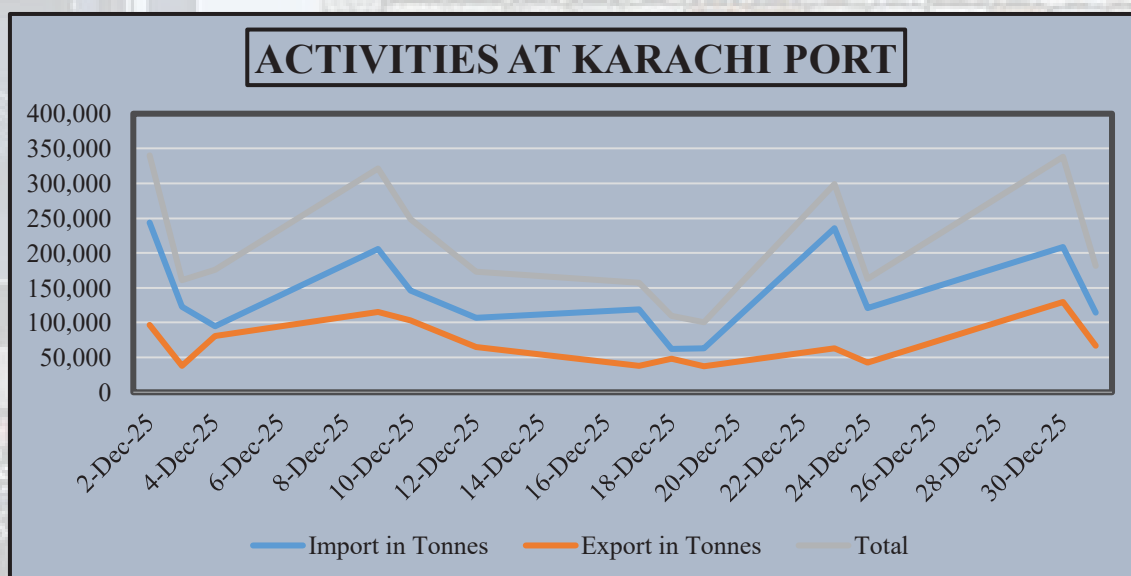
PORT QASIM

ACTIVITIES AT PORT QASIM (NOVEMBER 2025)			
Date	Import in Tonnes	Export in Tonnes	Total
4-Nov-25	110,940	36,439	147,379
5-Nov-25	47,848	45,849	93,697
6-Nov-25	50,712	24,514	75,226
7-Nov-25	188,924	60,422	249,346
11-Nov-25	108,884	10,221	119,105
12-Nov-25	131,626	73,910	205,536
13-Nov-25	105,617	38,794	144,411
14-Nov-25	153,418	48,651	202,069
18-Nov-25	78,367	0	78,367
19-Nov-25	154,677	37,448	192,125
20-Nov-25	117,944	40,225	158,169
21-Nov-25	116,682	65,269	181,951
25-Nov-25	46,557	1,330	47,887
26-Nov-25	156,576	48,198	204,774
27-Nov-25	77,314	2,250	79,564
Total	1,646,086	533,520	2,179,606



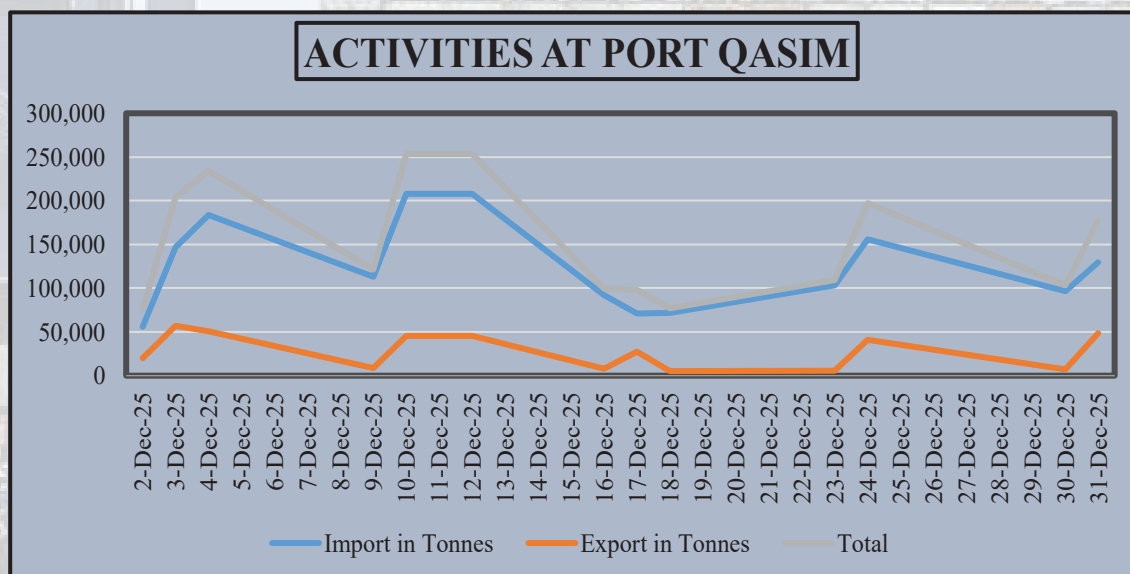
KARACHI PORT

ACTIVITIES AT KARACHI PORT (DECEMBER 2025)			
Date	Import in Tonnes	Export in Tonnes	Total
2-Dec-25	243,588	96,482	340,070
3-Dec-25	123,087	37,965	161,052
4-Dec-25	95,113	80,645	175,758
9-Dec-25	205,315	115,575	320,890
10-Dec-25	145,976	102,910	248,886
12-Dec-25	107,269	65,373	172,642
17-Dec-25	119,254	37,685	156,939
18-Dec-25	62,246	47,899	110,145
19-Dec-25	63,153	37,337	100,490
23-Dec-25	235,942	63,270	299,212
24-Dec-25	120,725	42,297	163,022
30-Dec-25	208,302	129,618	337,920
31-Dec-25	114,168	67,082	181,250
Total	1,844,138	924,138	2,768,276



PORT QASIM

ACTIVITIES AT PORT QASIM (DECEMBER 2025)			
Date	Import in Tonnes	Export in Tonnes	Total
2-Dec-25	55,849	19,752	75,601
3-Dec-25	146,842	57,030	203,872
4-Dec-25	183,473	50,628	234,101
9-Dec-25	112,833	8,591	121,424
10-Dec-25	207,863	45,596	253,459
12-Dec-25	207,863	45,596	253,459
16-Dec-25	92,088	7,756	99,844
17-Dec-25	71,143	27,137	98,280
18-Dec-25	71,731	5,219	76,950
23-Dec-25	103,426	5,542	108,968
24-Dec-25	156,111	40,803	196,914
30-Dec-25	96,714	6,845	103,559
31-Dec-25	129,465	48,410	177,875
Total	1,635,401	368,905	2,004,306



Stamatina Th. Rassia *Editor*

The Blue Book: Smart Sustainable Coastal Cities and Blue Growth Strategies for Marine and Maritime Environments

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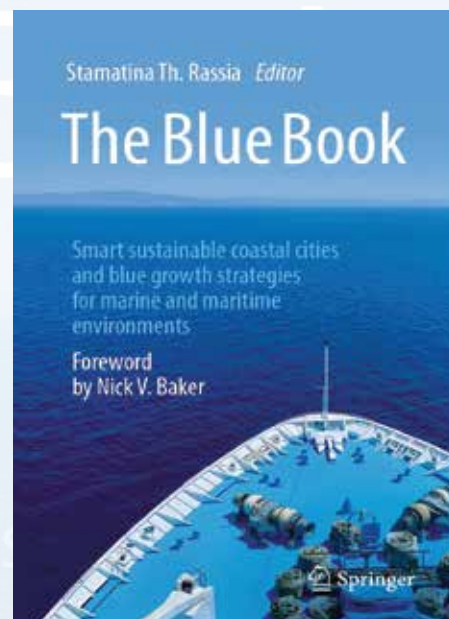
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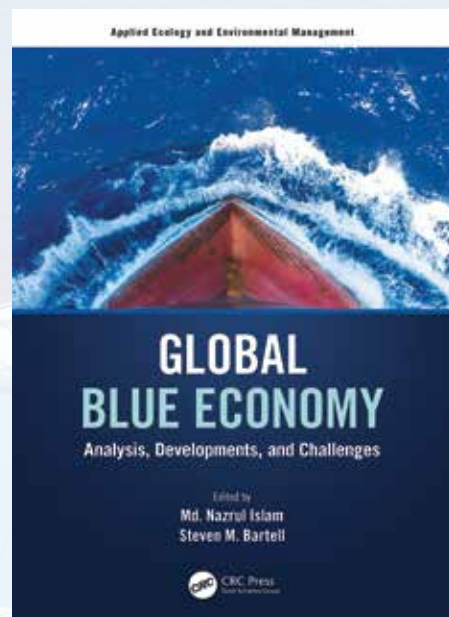
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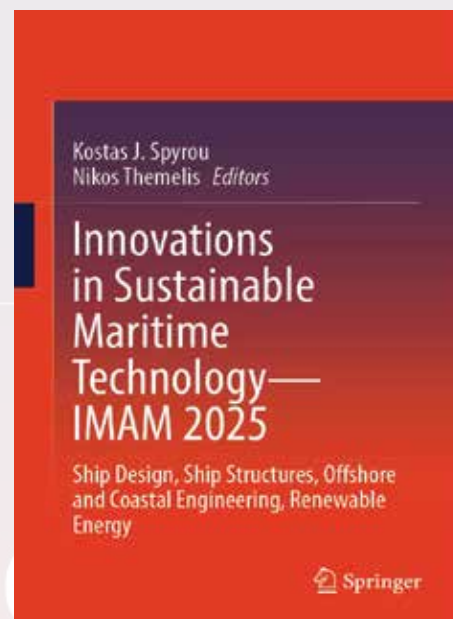
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