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The Economic Power and Fragility of Blue Assets

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***Abstract* – Blue assets, encompassing oceans, seas, coastal ecosystems, and marine resources, represent a critical yet undervalued component of the global economy. This chapter examines the dual nature of blue assets as both powerful economic drivers and vulnerable natural systems facing unprecedented threats. The chapter explores the multifaceted economic contributions of blue assets, including fisheries, maritime transport, tourism, energy production, and ecosystem services valued at trillions of dollars annually. Simultaneously, it analyzes the fragility of these assets due to climate change, pollution, overexploitation, and habitat degradation. Through a comprehensive review of current literature and case studies, this chapter highlights the urgent need for sustainable blue economy frameworks that balance economic development with environmental conservation. The findings underscore that the future prosperity of coastal nations and global food security depends critically on protecting and managing blue assets effectively. The chapter concludes with recommendations for policy interventions, innovative financing mechanisms, and integrated coastal zone management strategies essential for ensuring the long-term viability of blue assets.**

***Keywords* - Blue assets, blue economy, marine ecosystem services, sustainable fisheries, coastal resilience, ocean conservation, maritime resources.**

I. INTRODUCTION

The world's oceans, covering approximately 71 percent of the Earth's surface, represent one of humanity's most valuable yet least protected assets. Blue assets, a term encompassing marine and coastal resources, ecosystems, and the economic activities they support, have emerged as a focal point in contemporary discussions about sustainable development and economic growth. These assets include not only the tangible resources such as fish stocks and mineral deposits but also the intangible benefits provided by marine ecosystems, including climate regulation, carbon sequestration, and biodiversity conservation.

The economic significance of blue assets cannot be overstated. The Organisation for Economic Co-operation and Development estimates that the ocean economy contributes approximately 2.5 trillion USD to global GDP annually, with projections suggesting this could double by 2030. Maritime industries provide livelihoods for over three billion people worldwide, with fishing alone supporting the nutritional needs of billions. Coastal tourism generates hundreds of billions of dollars each year, while emerging sectors such as offshore renewable energy and marine biotechnology promise substantial economic opportunities.

However, this economic power exists in precarious balance with increasing environmental fragility. Decades of unsustainable exploitation, combined with the accelerating impacts of climate change, have pushed many marine ecosystems to the brink of collapse. Overfishing has depleted fish stocks worldwide, with approximately 35 percent of global fisheries overexploited. Ocean acidification, rising sea temperatures, and plastic pollution threaten the fundamental biological processes that sustain marine life. Coastal habitats, including mangroves, coral reefs, and seagrass beds, are disappearing at alarming rates, undermining the natural protection they provide against storms and erosion.

This chapter addresses the critical gap in understanding how to harness the economic potential of blue assets while simultaneously addressing their vulnerability. The purpose is to provide a comprehensive analysis of both the economic dimensions and environmental challenges associated with blue assets, offering insights into pathways toward a sustainable blue economy. The chapter is particularly relevant in the context of the United Nations Decade of Ocean Science for Sustainable Development and the growing global recognition that ocean health is inseparable from human prosperity.

The chapter is organized into several sections that progressively build understanding of blue assets. Following this introduction, a literature review synthesizes current knowledge on blue assets and the blue economy concept. Subsequent sections examine the economic contributions of various blue asset categories, analyze the threats and vulnerabilities facing marine systems, explore case studies of successful and failed management approaches, and discuss policy frameworks and innovations for sustainable blue asset management. The chapter concludes with recommendations for stakeholders ranging from policymakers to private sector actors.

II. LITERATURE REVIEW

1. Conceptualizing Blue Assets and the Blue Economy

The concept of blue assets has evolved significantly over the past two decades, paralleling the development of the blue economy framework. Early scholarship focused primarily on fisheries and maritime transport, treating oceans mainly as resource extraction zones. However, contemporary understanding recognizes blue assets as

complex socio-ecological systems that provide multiple, interconnected benefits. The World Bank defines the blue economy as the sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystems. This definition emphasizes the integration of economic development with environmental stewardship.

Research has categorized blue assets into several key domains. Living resources include fisheries, aquaculture, and marine genetic resources used in biotechnology and pharmaceuticals. Non-living resources encompass offshore oil and gas, mineral resources, and renewable energy sources such as offshore wind, tidal, and wave energy. Ecosystem services, increasingly recognized as critical blue assets, include coastal protection, carbon sequestration, water purification, and habitat provision. Cultural and recreational services, particularly coastal tourism and marine heritage sites, constitute another important category.

2. Economic Valuation of Marine Ecosystems

Significant scholarly attention has been devoted to valuing marine ecosystem services, though consensus on methodologies remains elusive. Studies employing various approaches, including market pricing, replacement cost methods, and contingent valuation, have demonstrated that marine ecosystems provide services worth trillions of dollars annually. Coral reefs alone provide ecosystem services valued at approximately 375 billion USD per year globally, supporting fisheries, tourism, and coastal protection. Mangrove forests, covering less than one percent of tropical forest area, provide ecosystem services worth an estimated 1.6 billion USD annually, including carbon storage, nursery habitat for commercial fish species, and storm protection.

However, traditional economic accounting systems have largely failed to incorporate these values, leading to what economists term market failure. The undervaluation of marine ecosystem services in national accounts and development planning has contributed to their degradation. Recent scholarship has called for natural capital accounting frameworks that integrate marine ecosystem values into GDP calculations and policy decisions.

3. Threats to Marine Systems

The scientific literature documents multiple, synergistic threats to blue assets. Climate change impacts, including ocean warming, acidification, and sea-level rise, represent perhaps the most pervasive threat. Research indicates that ocean temperatures have increased by approximately 0.13 degrees Celsius per decade over the past century, with accelerating warming in recent years. This warming disrupts marine food webs, causes coral bleaching events, and alters species distributions. Ocean acidification, resulting from increased atmospheric carbon dioxide absorption, threatens calcifying organisms including corals, shellfish, and plankton that form the base of marine food chains.

Overfishing and destructive fishing practices have received extensive research attention. Studies demonstrate that industrial fishing has reduced biomass of large predatory fish by approximately 90 percent since pre-industrial times. Illegal, unreported, and unregulated fishing costs the global economy an estimated 23 billion USD annually while undermining sustainable fisheries management efforts. Bottom trawling, a particularly destructive practice, damages seafloor habitats and releases carbon stored in marine sediments.

Pollution, particularly plastic contamination, has emerged as a critical concern. Research indicates that approximately eight million metric tons of plastic enter oceans annually, with projections suggesting this could triple by 2040 without intervention. Microplastics have been detected throughout the marine food chain, from plankton to apex predators, with potential but poorly understood consequences for marine life and human health. Chemical pollutants, including heavy metals, persistent organic pollutants, and agricultural runoff causing eutrophication, further degrade marine environments.

4. Sustainable Blue Economy Frameworks

Scholarship on sustainable blue economy approaches has proliferated in recent years. Researchers emphasize the need for integrated coastal zone management that coordinates activities across sectors and governance levels. Marine spatial planning has emerged as a key tool for balancing competing ocean uses while protecting critical habitats. Rights-based fisheries management, including individual transferable quotas and territorial user rights, shows promise for aligning economic incentives with sustainability objectives.

The literature also explores innovative financing mechanisms for blue asset conservation. Blue bonds, debt-for-nature swaps, and payments for ecosystem services represent emerging approaches to mobilize capital for marine conservation while supporting coastal communities. However, scholars note that these mechanisms require careful design to ensure genuine additionality and avoid dispossessing local communities of traditional access rights.

III. ECONOMIC CONTRIBUTIONS OF BLUE ASSETS

1. Fisheries and Aquaculture

Marine capture fisheries and aquaculture represent foundational elements of the blue economy, providing essential protein for billions of people and employment for millions of coastal communities. Global fish production reached approximately 214 million tonnes in recent years, with aquaculture now accounting for over 50 percent of fish consumed by humans. The first-sale value of marine

capture fisheries exceeds 140 billion USD annually, while aquaculture generates additional economic value through processing, distribution, and retail sectors.

Beyond direct economic contributions, fisheries provide critical food security benefits. Fish supplies approximately 17 percent of global animal protein consumption, with this proportion exceeding 50 percent in some developing coastal nations. Small-scale fisheries, though often overlooked in official statistics, support the livelihoods of approximately 90 percent of capture fishers and fish workers, many of whom are women engaged in processing and marketing activities.

2. Maritime Transport and Port Activities

Maritime transport forms the backbone of international trade, carrying approximately 90 percent of global trade by volume. The shipping industry generates hundreds of billions of dollars in revenue annually, while port activities contribute substantially to coastal economies through employment, infrastructure development, and associated services. Container shipping alone handles over 800 million twenty-foot equivalent units annually, facilitating global supply chains and economic integration.

Port cities benefit from multiplier effects that extend far beyond direct port operations. Maritime clusters typically include ship repair and maintenance, maritime insurance and legal services, logistics and warehousing, and related manufacturing activities. These clusters create skilled employment opportunities and foster technological innovation, particularly in areas such as autonomous shipping, port automation, and green maritime technologies.

3. Coastal and Marine Tourism

Coastal and marine tourism represents one of the fastest-growing components of the blue economy. Beach tourism, cruise tourism, diving, and marine wildlife watching generate an estimated 390 billion USD annually in direct expenditure, supporting millions of jobs in hospitality, transportation, and recreational services. Small island developing states derive a particularly high proportion of GDP from marine tourism, with some nations deriving over 30 percent of economic output from this sector.

The economic significance of marine tourism extends beyond direct expenditure to include infrastructure development, cultural preservation, and international investment flows. However, tourism also presents sustainability challenges, including habitat degradation from coastal development, pollution from cruise ships, and disturbance to marine wildlife. Balancing tourism growth with environmental protection represents a critical challenge for many coastal destinations.

4. Offshore Energy and Mineral Resources

Offshore oil and gas production contributes significantly to global energy supplies and national revenues for many coastal states. Approximately 30 percent of global oil production and 27 percent of natural gas production originates from offshore sources. Beyond fossil fuels, offshore renewable energy, particularly wind power, has experienced dramatic growth, with global offshore wind capacity expanding rapidly. Emerging technologies including tidal, wave, and ocean thermal energy conversion promise additional contributions to the renewable energy transition.

Deep-sea mining for minerals including polymetallic nodules, seafloor massive sulfides, and cobalt-rich ferromanganese crusts represents a potential future source of critical materials for batteries and electronic devices. However, deep-sea mining remains controversial due to concerns about irreversible ecosystem damage and the precautionary principle given limited scientific understanding of deep-sea environments.

5. Marine Biotechnology and Bioprospecting

Marine organisms, adapted to extreme conditions and displaying unique biochemical properties, provide valuable genetic resources for pharmaceutical, industrial, and agricultural applications. Marine-derived compounds have contributed to treatments for cancer, pain management, and viral infections. Marine enzymes find applications in industrial processes, while compounds from marine organisms inspire biomimetic innovations in materials science and engineering.

The economic potential of marine biotechnology remains largely unrealized but shows significant promise. However, bioprospecting raises important questions about equitable benefit sharing, particularly concerning resources in areas beyond national jurisdiction. The Nagoya Protocol on Access and Benefit Sharing provides a framework for ensuring that benefits derived from genetic resources are shared fairly with source countries and indigenous communities.

IV. FRAGILITY AND THREATS TO BLUE ASSETS

1. Climate Change Impacts

Climate change represents the most pervasive and potentially irreversible threat to blue assets. Ocean warming affects marine life directly through thermal stress and indirectly by altering ocean circulation patterns, nutrient availability, and oxygen concentrations. Coral reefs, among the most biodiverse and economically valuable marine ecosystems, face existential threats from thermal bleaching events. Mass bleaching events have increased in frequency and severity, with some reefs experiencing bleaching mortality exceeding 50 percent. Projections suggest that coral reefs could largely disappear by mid-century under current emission trajectories.

Ocean acidification, sometimes called climate change's evil twin, poses distinct challenges. As oceans absorb carbon dioxide, carbonic acid forms, reducing pH and

carbonate ion concentrations essential for calcifying organisms. Shellfish aquaculture, particularly oyster and mussel farming, already experiences economic losses from acidification-induced larval mortality. Acidification also threatens pteropods, tiny marine snails that form a crucial food source for commercially important fish species including salmon and mackerel.

Sea-level rise, accelerating due to thermal expansion and ice sheet melting, threatens coastal communities, infrastructure, and ecosystems. Low-lying coastal areas face inundation risks, while saltwater intrusion degrades freshwater resources and agricultural lands. Small island developing states confront existential threats, with some nations potentially becoming uninhabitable within decades. Economic costs of sea-level rise, including infrastructure relocation, increased flood damage, and lost productivity, could reach trillions of dollars globally by century's end.

2. Overexploitation of Living Resources

Despite advances in fisheries science and management, overexploitation remains widespread. Approximately 35 percent of assessed fish stocks are fished at biologically unsustainable levels, while only seven percent are underfished. Overfishing not only depletes target species but also disrupts marine food webs and ecosystem functioning. The loss of large predators cascades through ecosystems, sometimes leading to unexpected consequences including proliferation of less desirable species.

Illegal, unreported, and unregulated fishing exacerbates overexploitation and undermines management efforts. This shadow fishery operates outside regulatory frameworks, often using destructive methods and targeting vulnerable stocks. Developing nations with limited enforcement capacity suffer particularly severe impacts, losing both fish resources and associated economic benefits. The economic costs of illegal fishing include not only lost catch but also diminished future productivity and market distortions.

3. Pollution and Habitat Degradation

Marine pollution from multiple sources degrades water quality, harms marine life, and reduces the economic value of blue assets. Plastic pollution has reached crisis proportions, with visible accumulations in ocean gyres representing only a fraction of total plastic contamination. Microplastics permeate marine food webs, with potential consequences for food safety and ecosystem health still being elucidated. The economic costs of marine plastic pollution, including impacts on tourism, fisheries, and maritime activities, are estimated at billions of dollars annually.

Nutrient pollution from agricultural runoff and sewage discharge causes eutrophication and creates oxygen-depleted dead zones where marine life cannot survive. The number and size of hypoxic zones have increased dramatically, with some areas experiencing seasonal anoxia affecting hundreds or thousands of square kilometers. Coastal dead zones devastate local fisheries and tourism, imposing substantial economic costs on affected communities.

Habitat destruction through coastal development, dredging, and destructive fishing practices eliminates critical nursery areas, feeding grounds, and breeding sites for marine species. Mangrove forests have declined by approximately 35 percent globally since the 1980s, while seagrass meadows and coastal wetlands have experienced similar losses. These habitat losses compromise the ecosystem services these environments provide, including coastal protection, carbon storage, and fisheries support.

4. Governance Challenges and Jurisdictional Complexity

The governance of blue assets presents unique challenges due to jurisdictional complexity and the common-pool nature of many marine resources. Oceans are divided among national exclusive economic zones, territorial seas, and areas beyond national jurisdiction, with overlapping claims and unclear boundaries in some regions. This jurisdictional patchwork complicates management of migratory species and transboundary resources.

Weak governance capacity in many coastal states hampers effective management of blue assets. Limited financial resources, technical capacity, and institutional frameworks constrain monitoring, enforcement, and stakeholder engagement. Corruption and political interference further undermine management effectiveness. Even where strong legal frameworks exist, implementation gaps and inadequate resources limit their effectiveness.

V. CASE STUDIES IN BLUE ASSET MANAGEMENT

1. Success Story: Namibia's Fisheries Recovery

Namibia provides a compelling example of successful fisheries recovery through rights-based management and strong governance. Following independence in 1990, Namibia inherited depleted fisheries and weak management institutions. The government implemented comprehensive reforms including establishment of exclusive economic zone rights, allocation of fishing quotas based on scientific advice, and rigorous monitoring and enforcement. These reforms incorporated stakeholder participation while maintaining firm catch limits.

Results have been dramatic. Fish stocks recovered, with some species rebounding to healthy levels within two decades. The economic value of Namibia's fisheries increased substantially, providing government revenues exceeding 200 million USD annually and supporting thousands of jobs. The Namibian case demonstrates that effective governance, scientific management, and stakeholder buy-in can reverse fisheries decline even in developing country contexts.

2. Challenge Case: The Aral Sea Catastrophe

The Aral Sea, once the world's fourth-largest lake, provides a sobering example of blue asset collapse due to unsustainable management. Soviet-era agricultural development diverted rivers feeding the Aral Sea for cotton irrigation, causing the lake to shrink by over 90 percent since 1960. The resulting environmental catastrophe eliminated the once-thriving fishing industry, created toxic dust storms from the exposed seabed, and devastated local communities.

Economic losses from the Aral Sea disaster extend far beyond lost fishing revenues to include public health impacts, agricultural productivity losses from altered microclimates, and remediation costs. The case illustrates the irreversible consequences of prioritizing short-term economic gains over sustainable resource management. Despite modest recovery efforts in the Northern Aral Sea, the Southern Aral Sea appears beyond restoration, representing a permanent loss of natural capital.

3. Innovation Example: Seychelles Blue Bonds

Seychelles pioneered the use of blue bonds to finance ocean conservation while addressing sovereign debt sustainability. In 2018, Seychelles issued the world's first sovereign blue bond, raising 15 million USD for marine conservation and sustainable fisheries. The transaction included debt restructuring through a debt-for-nature swap, reducing Seychelles' debt burden while freeing resources for conservation.

Proceeds support expansion of marine protected areas, improved fisheries management, and development of the blue economy. The initiative demonstrates innovative financing approaches that align economic and environmental objectives. While the amounts raised remain modest relative to global conservation needs, the model has attracted interest from other small island states and could scale with appropriate institutional support and risk mitigation mechanisms.

VI. PATHWAYS TO SUSTAINABLE BLUE ASSET MANAGEMENT

1. Integrated Ocean Governance

Achieving sustainable blue asset management requires integrated governance approaches that transcend sectoral silos and coordinate activities across scales. Marine spatial planning represents a key tool for spatially allocating ocean uses while protecting critical habitats and ecosystem functions. Effective marine spatial planning involves stakeholder participation, scientific input, and adaptive management that responds to changing conditions and new information.

Ecosystem-based management provides a conceptual framework for integrated ocean governance. Rather than managing single species or sectors in isolation, ecosystem-based management considers cumulative impacts and interdependencies among ecosystem components. Implementation requires coordination among government agencies, meaningful stakeholder engagement, and integration of traditional ecological knowledge with scientific research.

2. Economic Instruments and Market-Based Mechanisms

Economic instruments can align private incentives with conservation objectives while generating revenues for management. Catch shares and individual transferable quotas in fisheries have demonstrated success in reducing overfishing and improving economic efficiency, though careful design is essential to prevent excessive consolidation and ensure equitable access. User fees for marine protected areas and coastal access can generate revenues while managing visitor pressure.

Payments for ecosystem services represent promising but underutilized mechanisms for blue asset conservation. Coastal wetlands that provide storm protection, water purification, or nursery habitat could generate revenue streams supporting their conservation. Carbon markets could incentivize blue carbon conservation in mangroves, seagrass beds, and salt marshes. However, challenges including measurement, verification, and ensuring additionality require careful attention.

3. Technology and Innovation

Technological innovations offer new opportunities for sustainable blue asset management. Satellite monitoring, electronic vessel tracking, and artificial intelligence enable improved fisheries enforcement and detection of illegal activities. Environmental DNA techniques allow rapid biodiversity assessment and monitoring of rare species. Autonomous underwater vehicles and remote sensing expand scientific understanding of marine ecosystems.

Blue technology innovations also include sustainable aquaculture systems, ocean renewable energy, and marine biotechnology applications. However, technological solutions must be coupled with appropriate governance frameworks and stakeholder acceptance. Technology alone cannot solve governance failures or overcome conflicting interests, but it can enhance management effectiveness when embedded within sound institutional frameworks.

4. Capacity Building and Knowledge Sharing

Many coastal developing countries lack the technical capacity, financial resources, and institutional frameworks for effective blue asset management. International cooperation and capacity building are essential to address these gaps. Knowledge sharing platforms, South-South cooperation, and technology transfer can accelerate adoption of best practices. Training programs for resource managers, scientists, and enforcement personnel strengthen national capacity.

Traditional ecological knowledge held by indigenous and local communities represents an often-overlooked resource for sustainable management. Integrating this knowledge with scientific research can improve understanding of long-term trends, identify sustainable practices, and ensure culturally appropriate management approaches. Meaningful participation of local communities in decision-making processes enhances management legitimacy and effectiveness.

5. Climate Adaptation and Resilience Building

Given the scale of climate impacts already locked in, adaptation strategies are essential for maintaining blue asset values. Nature-based solutions, including mangrove restoration, coral reef rehabilitation, and coastal wetland conservation, can enhance coastal resilience while providing co-benefits. Hard infrastructure solutions may be necessary in some contexts but should complement rather than replace natural defenses.

Adaptation planning requires integration with development planning and consideration of social equity dimensions. Vulnerable coastal communities often lack resources for autonomous adaptation and require targeted support. Planned relocation may become necessary in some locations, requiring careful attention to human rights, cultural preservation, and livelihood alternatives. Climate finance mechanisms should prioritize adaptation in small island developing states and least developed countries facing the most severe impacts.

VII. CONCLUSION

Blue assets represent a cornerstone of global economic prosperity and human well-being, yet their very existence is threatened by unsustainable exploitation and accelerating environmental change. This chapter has examined the dual nature of blue assets as both powerful economic engines and fragile ecosystems requiring urgent protection. The evidence presented demonstrates that blue assets contribute trillions of dollars to the global economy annually through diverse sectors including fisheries, maritime transport, tourism, energy, and biotechnology. However, these economic contributions rest on a precarious foundation increasingly undermined by climate change, pollution, overexploitation, and habitat destruction.

The pathway forward requires fundamental shifts in how societies value and manage blue assets. Economic accounting systems must incorporate the full value of ecosystem services, moving beyond narrow GDP metrics that incentivize resource extraction over conservation. Governance frameworks must integrate across sectors and scales, applying ecosystem-based management principles that recognize interconnections within marine systems. Rights-based management approaches, when carefully designed to ensure equity and sustainability, can align economic incentives with conservation objectives.

Innovation in financing mechanisms, including blue bonds, payments for ecosystem services, and impact investment, can mobilize capital for ocean conservation while supporting coastal communities. However, financial innovation must be coupled with strong governance, scientific management, and meaningful stakeholder participation to ensure genuine conservation outcomes. Technology offers powerful tools for monitoring, enforcement, and sustainable production, but technological solutions cannot substitute for political will and institutional reform.

International cooperation is essential given the transboundary nature of marine systems and climate impacts. Developed nations must support capacity building in developing countries while addressing their own consumption patterns that drive demand for unsustainably harvested marine resources. Climate mitigation efforts require dramatic acceleration to prevent catastrophic impacts on marine ecosystems, while adaptation strategies must receive adequate resources and prioritize vulnerable communities.

Future research should prioritize several areas. First, improved valuation methodologies for marine ecosystem services can strengthen the economic case for conservation. Second, longitudinal studies of successful and failed management interventions can identify transferable lessons. Third, understanding social dimensions of blue economy transitions, including distributional impacts and community resilience, requires greater attention. Fourth, climate impact projections at regional scales can inform adaptation planning. Fifth, evaluation of innovative governance and financing mechanisms can guide scaling of promising approaches.

The economic power and environmental fragility of blue assets present a defining challenge for this century. The choices made in the coming decade will largely determine whether blue assets continue supporting human prosperity or undergo irreversible degradation. A sustainable blue economy is not only possible but essential for coastal nations and global society. Achieving this vision requires commitment from governments, private sector actors, civil society, and individuals to value blue assets not merely as resources to be extracted but as living systems deserving protection and stewardship. The cost of action is substantial, but the cost of inaction would be catastrophic.

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REFERENCES

1. Beaumont, N. J., Aanesen, M., Austen, M. C., Börger, T., Clark, J. R., Cole, M., ... & Wyles, K. J. (2019). Global ecological, social and economic impacts of marine plastic. Marine Pollution Bulletin, 142, 189-195. https://doi.org/10.1016/j.marpolbul.2019.03.022
2. Bennett, N. J., Cisneros-Montemayor, A. M., Blythe, J., Silver, J. J., Singh, G., Andrews, N., ... & Sumaila, U. R. (2019). Towards a sustainable and equitable blue economy. Nature Sustainability, 2(11), 991-993. https://doi.org/10.1038/s41893-019-0404-1
3. Brander, L. M., van Beukering, P., & Cesar, H. S. (2007). The recreational value of coral reefs: A meta-analysis. Ecological Economics, 63(1), 209-218. https://doi.org/10.1016/j.ecolecon.2006.11.002
4. Cisneros-Montemayor, A. M., Moreno-Báez, M., Reygondeau, G., Cheung, W. W., Crosman, K. M., González-Espinosa, P. C., ... & Sumaila, U. R. (2021). Enabling conditions for an equitable and sustainable blue economy. Nature, 591(7850), 396-401. https://doi.org/10.1038/s41586-021-03327-3
5. Costanza, R., de Groot, R., Sutton, P., van der Ploeg, S., Anderson, S. J., Kubiszewski, I., ... & Turner, R. K. (2014). Changes in the global value of ecosystem services. Global Environmental Change, 26, 152-158. https://doi.org/10.1016/j.gloenvcha.2014.04.002
6. Diaz, R. J., & Rosenberg, R. (2008). Spreading dead zones and consequences for marine ecosystems. Science, 321(5891), 926-929. https://doi.org/10.1126/science.1156401
7. Duarte, C. M., Losada, I. J., Hendriks, I. E., Mazarrasa, I., & Marbà, N. (2013). The role of coastal plant communities for climate change mitigation and adaptation. Nature Climate Change, 3(11), 961-968. https://doi.org/10.1038/nclimate1970
8. Food and Agriculture Organization. (2022). The State of World Fisheries and Aquaculture 2022: Towards blue transformation. FAO. https://doi.org/10.4060/cc0461