

The Blue–Green Nexus: Political Economy, Governance Institutions, and the Future of Sustainable Ocean Development

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Abstract

The Blue–Green Nexus is a holistic approach to understanding the potential of ocean-based economic development to facilitate environmental sustainability, social equity and good governance. This research focused on the political-economic dimension, governance mechanisms and sustainability trajectories of sustainable ocean development. Systematic analysis of secondary evidence was used to adopt a qualitative research design. A purposive sampling of academic and institutional documents (60) was selected, focusing on publications in the specified time period (2020-2026) that addressed the blue economy, green economy, ocean governance, marine spatial planning, sustainability, and coastal development. Thematic analysis was conducted to uncover patterns concerning the political economy, institutional coordination, stakeholder engagement, resource allocation, environmental protection, and policy integration. The findings indicated that 80.0% of the analysed documents reported that governance and institutional coordination were key issues, and 76.7% highlighted the protection of ecosystems and biodiversity. Political-economic analysis revealed a predominance of three themes: unequal distribution of marine economic benefits (70.0%), competition over marine resources and space (66.7%), and the interests of the private sector and investments (63.3%). Governance analysis showed that regulatory and enforcement capacity was mentioned in 75.0% of documents, and stakeholder participation was mentioned in 65.0% of documents. The findings on sustainability revealed that climate resilience and mitigation were mentioned in 68.3%, and social inclusion and livelihood protection in 63.3%. The study concluded that sustainable ocean development needs to be guided by integrated governance, fair distribution of resources, conservation of ecological integrity, inclusive decision-making processes, and collective investment.

Keywords: Blue Economy, Blue–Green Nexus, Coastal Governance, Marine Sustainability, Ocean Development, Political Economy.

1. Introduction

The ocean's role as a source of production, food security, livelihoods, jobs, climate change, and biodiversity key to the sustainable development agenda, the blue focus has grown and is increasingly emerging as a priority on the global agenda. The task is related to the growing

importance of the Blue Economy, which aims to exploit marine resources for economic activity while preserving ecological functions, on which they rely. Recent scholarship points to the need not just to view the Blue Economy as a way to increase an economic base around the ocean, but also to consider sustainability, justice, institutional capacity, and benefit or cost distribution across various social groups (Penca et al. 2025). The concept is interlinked with the Green Economy in the field of Renewable Marine Energy, Sustainable Fisheries, Environmental Restoration, Blue carbon, low-carbon shipping, and Climate-Resilient Coastal development. The last few years have seen a series of misguided visions on the definition of the Blue Economy and distribution of economic growth, conservation and social development. The concept of the Blue Economy is also not a correct solution, as it is still under debate among different governments and institutions with respect to different priorities, diverging economic growth, conservation, and social development (Yuan & Failler, 2025).

The new Blue–Green Nexus can provide a more extensive perspective to the understanding of this interconnections, as it connects the potential economic benefits available from the seas to policies, climate objectives, developmental goals and biodiversity on land. Therefore, ocean governance is especially relevant in the context of interlinked systems of ocean governance, where decision-making occurs across several jurisdictions and involves multiple activities like shipping, increasing coastal urbanisation, fisheries, offshore energy, aquaculture, seabed activities and much more. Recently, there is a growing realization that a sustainable ocean governance is a difficult, collective-action challenge that requires bringing in state, international actors, markets, communities, science, and civil society (2024). Concurrently, the political economy of ocean development affects who holds control of marine resources, that which benefits and ends up with economic gain, and the social and environmental effects end up on whom. Tensions between blue-growth and small-scale fishing communities, largely driven by trade-offs between economic gain and environmental sustainability and social justice, are shown by Sowman & Sunde (2024).

1.1 Background of the study

This modern discussion on sustainable development in the ocean is not just one of the exploitation of the oceans resources but one that includes interactive elements of development which consider ecological boundaries, social justice etc. This trend is bearing on a surge of interest by growing governments to offshore renewable energy technologies, sustainable aquaculture, marine tourism and other innovative ocean businesses to drive growth. But increased use of these activities brings other competing demands for the use of marine space and potential conflicts between conservation, commercial and community interests. While many aspects of marine governance research have been undertaken in recent years, impacts of governance change have been considered from various facets and concepts such as justice and blue equity have been gaining increased traction in studies on marine governance, especially in recent years (Chen et al., 2024).

A fragmented governance landscape is one of the biggest challenges to realize the Blue–Green Nexus. Marine policies are often shared at different levels among ministries, regulatory bodies, coastal agencies, the private sector, different international organisations and local communities, resulting in overlaps in responsibilities and diverging policy goals. Fragmentation may lead to decreased enforcement ability, as well as hinder coordination of forest ecosystem protection with economic development. It may herald a "blue governance" revision that puts multi-connected aspects of blue security, blue economy and blue protection landmarks and suggests the need for a collective "body" to achieve a Sustainable Ocean in an institutional and national cross borders perspective (2024). Illegal fishery (IFF), maritime criminalities, environmental pollution and environmental crimes are emerging issues that are significant indicators of poor governance that can negatively affect the ocean-related economic activities and marine space (Ahmad et al., 2025).

Another major aspect of debate is the allocation of ocean resources in the future based on political and economic interests. Offshore renewable energy growth, marine biotechnology, aquaculture and coastal infrastructure development and other new commercial activity sectors may offer sustainable development and growth opportunities, but will also bring an added competition for the use of marine space/resources. However, there has been a recent call for an ocean development that involves enhanced social-science contributions to the research to understand the sustainability or not of ocean development (Penca et al., 2025). Similarly, a recently performed assessment of international instruments of the ‘blue economy’ emphasises the governance paradigm and the ability to sustain resource as the criteria to measure the effectiveness and sustainability of the blue economy policy (St. Pier et al., 2026).

1.2 Research Objectives

1. To examine the political-economic aspects of sustainable development of the oceans in the Blue–Green Nexus.
2. To evaluate the effect of governance institutions, regulatory frameworks and stakeholder engagement on sustainable and equitable ocean resource management.
3. To highlight key challenges and policy options for the integration of blue economy development and green sustainable goals.

1.3 Research Questions

Q1. What are the political-economic drivers for sustainable ocean development in the Blue–Green Nexus?

Q2. How do governance institutions, regulatory frameworks and stakeholder participation play a role in sustainable and equitable ocean resource management?

Q3. What are some of the greatest challenges and policy opportunities for integration of blue economy development and green sustainability goals?

1.4 Significance of the Study

This study is important as it has brought an integrated view to the relationship between ocean-based economic development, environmental sustainability and governance institutions. The study takes a political-economy perspective on the Blue–Green Nexus, emphasizing the importance of institutional capacity, resource allocation, regulatory efficiency, stakeholder involvement, and conflicting economic interests in achieving sustainable ocean development. The results can inform policy-makers, marine governance bodies, environmental groups, coastal communities and international development agencies to create policies that reconcile economic gains with marine ecosystem conservation and social equity. The study also builds on academic literature by intertwining the blue economy research with green development, governance, and political-economy approach as a basis for further studies on inclusive and environmentally sustainable governance of the ocean.

2. Literature Review

2.1 Blue–Green Nexus and Sustainable Ocean Development

Sustainable ocean development is now becoming more of a holistic process as suggested in the recent literature, in which the sustainable exploitation of marine resources needs to be compatible to ecological resilience and the welfare of the long-term benefit for the society. The Blue Economy

not only involves the production of goods based on the oceans and their resources, but also sustainable fisheries and aquaculture, marine tourism, the development and use of offshore renewable energy resources, maritime transportation, and marine biotechnology. Meanwhile, the Green Economy refers to concepts of resource efficiency, decarbonisation, conservation of ecosystems and inclusive development. A feature of the Blue–Green Nexus is that it allows for an analysis of the interactions between these agendas, but does not dissociate development of the ocean from environmental sustainability. As the ocean industries are growing rapidly, new forms of competition will relate to the ocean space and resources, and integrated solutions for ocean sustainability become more crucial, arguing Jouffray et al. (2024). Cisneros-Montemayor et al. (2024) argue that policies to support sustainable ocean development need to be able to link economic goals to ecological constraints and people's welfare.

There is also significant potential for ocean-based activities to support climate mitigation and sustainable development, previously identified in the literature. Offshore Renewable Energy, sustainable aquaculture, fishery restoration, blue carbon and low impact aquaculture can all provide economic returns and environmental goals. Recent studies by Claudet et al. (2024) also highlighted the need to connect better marine protection efforts with the broader concepts and solutions of sustainability planning. As mentioned by Voyer et al. (2024) blue economy policies can have distributional effects as they can lead to an uneven distribution of gains to large investors and commercial interests and to environmental costs to coastal communities. According to this literature, moving beyond a sectorial blue growth towards a coherent Blue–Green Nexus is essential in securing sustainable ocean development, as the expectations of a transition are set against the capabilities of an ecosystem, the parameters of climate action and the tenets of social inclusion.

2.2 Political Economy of the Blue Economy

Understanding sustainable ocean development within the political economy framework gives important insights into how power dynamics, investment decisions, ownership and conflicting interests also drive the direction and form of sustainable ocean development. Marine resources can be economic valuable, which offers incentives for governments, international corporations, investors and communities to manage and utilize these resources. Bennett et al. (2024) maintain that questions of power and distribution have to do with ocean sustainability, given that the choices people make about what can be done in the oceans are accompanied by consequences for either opportunities or costs for different groups.

The authors of this article, and specifically Österblom et al. (2024), show that transformative ocean governance needs to involve changes in both the institutional and economic frameworks which influence the use of marine resources. Their analysis shows that sustainability transitions can be futile of being more of an inequitable process when the decision-making systems favor more influential business interests over local knowledge and community rights. Strand et al. (2024) point out that inclusive governance is a key component of ensuring that a blue economy initiative benefits all socio-economic groups and does not widen inequalities.

Another political-economic conflict is also likely to be created by the escalating competition over marine space. Conflicts are likely to arise between competing uses of the same geographical area, such as offshore wind, conservation areas, fisheries, aquaculture, shipping, tourism and seabed activities, and their environmental and socio-economic interests. Bennett et al. (2024) call out unequal power dynamics and restricted representation to be key hazards in ocean transitions when transitions are driven by the needs of the state or the private sector. Marine spatial planning may have the potential to prevent some of these conflicts through harmonisation and clear principles on the allocation of marine resources amongst different activities.

2.3 Active Integration of Policies In the Blue Sphere

Governance institutions are a key part of the Blue – Green Nexus as there is a need for coordination between various national and international governments, organisations, regulatory institutions, industry, science and the coastal communities and stakeholders involved in marine sustainability. Because of multiple jurisdictions and overlapping policy regimes, the coordination of institutions is also a key element of ocean governance. Mahon et al. (2024) has recently shown how important it is to have good governance of the oceans, which requires the capacity of institutions to link scales and sectors in decision-making. One consequence of fragmented governance is conflicting policies and regulatory resistances, while coordinated governance can provide Policy coherence and increase the effectiveness of implementation of sustainability goals.

This has led to growing consideration of marine spatial planning as a governance tool to coordinate overlapping uses of the ocean, and there is a growing number of elements within the planning tool. A number of elements have emerged in the planning tool and marine spatial planning has therefore become more visible as a governance tool to coordinate competing uses of the ocean. New research shows that good MSP can help conserve ecosystems and also create room for renewables, fisheries, shipping & traffic and other economic sectors. Effectiveness of spatial planning is necessarily tied to a range of factors other than technical planning tools, particularly the participation of stakeholders and institutional capacity of planning, as Jones et al. (2024) stress. Inclusion can help enhance legitimacy by fully engaging local knowledge, and recognizing any potential social impacts early on. Consequently, robust institutional arrangements are key to realizing "stakeholder participation" as equitable and enforceable marine governance results.

Policy integration, adaptive governance and improved cooperation among countries are more critical to sustainable ocean development in the future. The challenges brought by Climate change, biodiversity loss, marine pollution, rising demand of resources and technological development are interdependent issues which cannot be tackled by a sectoral approach to policy. In their review, Visbeck et al. (2024) explain that a more robust science–policy interface is needed to advance the state of sustainability within the ocean, and governance institutions that can adapt to highly dynamic ocean and socio-economic environments. Institutional learning, accountability, cross-sectoral coordination and long term planning have all been identified as important requirements for successful ocean governance as it transitions (Bennett et al., 2024).

3. Research Methodology

3.1 Research Design

This study utilized a qualitative research approach in the form of a "systematic research design" to gain insight into the political economy, governance institutions, and sustainability aspects of the Blue–Green Nexus. The qualitative method was used in the study because it emphasized the understanding of the institutional structures, policy frames, political interests, the nature of stakeholder relationships, and the governance issues – things that primary data cannot measure. It rigorously reviewed peer-reviewed journal articles, international policy documents, institutional reports, and authoritative publications that focus on the blue economy, green economy, ocean governance and administration, marine spatial planning, ocean conservation, coastal development, and sustainable ocean economy performance.

3.2 Study Population and Sample

The population of the study comprised published academic and institutional documents on ocean development and the Blue–Green Nexus that support the concept of sustainable development and

the Nexus livelihoods model. Sources were identified through purposive sampling, including those that directly focused on one of the main dimensions of the study: the political economy, governance institutions, marine sustainability, blue economy development, green transition, ocean policy, and social equity. There were 60 documents in the final sample, mostly peer-reviewed research articles (37%), scholarly books or book chapters (27%), reports from international organizations (15%), and relevant policy (21%) in the period 2020–2026.

3.3 Data Sources and Search Strategy

The secondary data were gathered from the available academic and institutional sources. Google Scholar, ScienceDirect, SpringerLink, Web of Science-indexed publications, Taylor and Francis, Wiley Online Library, and International organisation official repositories were primarily the search bases for the literature. All cross-washed terms such as Blue Economy, Green Economy, Blue–Green Nexus, sustainable ocean development, ocean governance, marine governance, political economy of oceans, marine spatial planning, blue justice, coastal sustainability, marine policy, and ocean sustainability were used as search terms. The selection process evaluated relevance to the published paper, methodological quality, newness, institutional credibility, and full bibliographic data.

3.4 Inclusion criteria

To ensure consistency across the sources used in the study, predefined inclusion and exclusion criteria were added. Publications were included when addressing specific economic sectors related to the ocean, ocean governance, environmental sustainability, political-economic dynamics, institutional frameworks, marine spatial planning, stakeholder engagement, and social and ecological aspects of ocean economy development. Fewer studies were published before 2020, and priority was given to those published between 2020 and 2026, adding relevance to their policy and governance developments.

3.5 Data Collection Procedure

The data collection was done in a systematic way through the document review. First, the retrieved publications were screened on the basis of their title and abstract to decide whether there is relevance with the research objectives or not. These studies were then reviewed in full and data collected relating to authorship, year of publication, research orientation, institutional set-up, political-economic factors, sustainability outcomes, stakeholder's participation, challenges faced by institutions and the policy suggestions provided. Material dimensions of the collected information were classified as thematic categories, based on the three research objectives. Specific focus was placed on evidence around sustainability, marine spatial planning, social equity, environmental protection, economic interests, and stakeholder participation, alongside institutional fragmentation and regulatory capacity, and resource allocation. This allowed the researcher to draw comparisons of findings from various geographical and institutional settings.

3.6 Data Analysis

Thematic analysis was used to analyze the collected secondary data. The analysis was organized in four steps: literature familiarization in the chosen texts, identification of common topics, structuring of evidence into thematic groups, interpretation of relationship of themes. The first analytical category examined the political economy of ocean development, which deals with issues of investments, resource ownership, power relations, interests and distributional effects. The

second category focused on governance institutions such as governance arrangements and frameworks, institutional arrangements and coordination, marine spatial planning, involvement of stakeholders and governance enforcement. The third category focused on sustainability outcomes such as conserving biodiversity, mitigating climate change, and building resilience of ecosystems, livelihoods in the coastal communities, and achieving social equity.

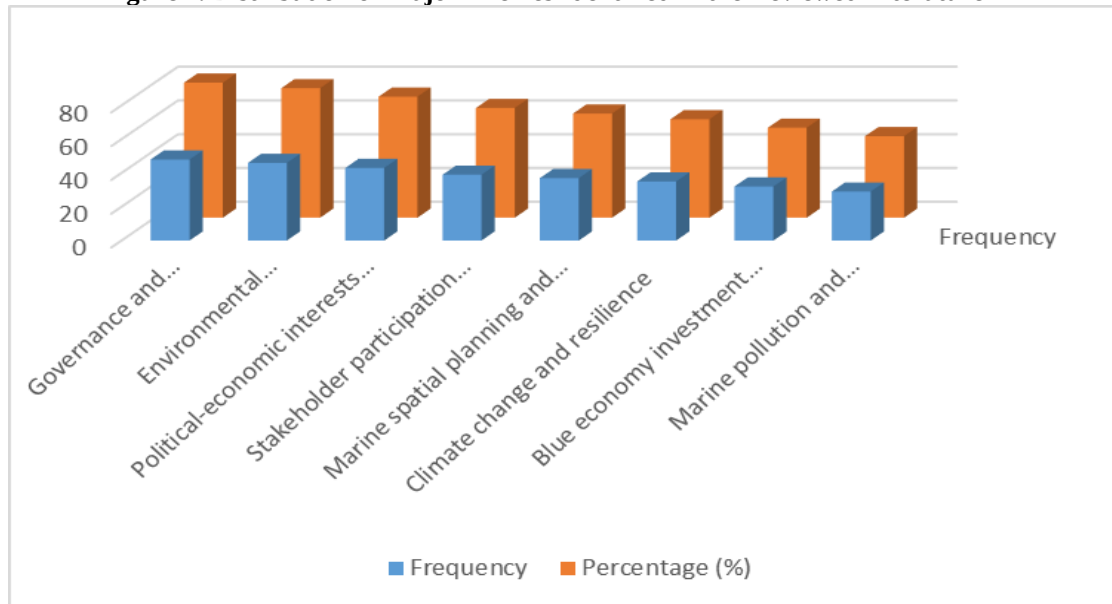
4. Results and Analysis

The results in Table 1 revealed that governance and institutional coordination was the most frequently mentioned theme, occurring 48 out of 60 documents, outlining a 80.0 per cent of the documents. This finding suggested that institutional capacity was a key feature to sustainable ocean development. The reviewed studies regularly mentioned the coordination between the government departments, marine authorities, environmental agencies, coastal administration, private sector actors and local communities. Those answers indicated that an environmental focus on sustainability and protection of ecosystems was present in 46 documents (76.7%), indicating a strong relation between protecting the ecosystem and the future growth of ocean use. Political-economic interests and resource allocation was the third most salient dimension, and was mentioned in 43 documents (71.7%). This conclusion showed that investment and access to marine resources, ownership, commercial interests, economic benefits and questions related to these were all important factors to the development of the oceans. The results showed that the indicators of economic growth were not sufficient to evaluate the work of the blue economy, as the degree of influence of different actors on marine resources was not equal. A total of 39 documents referred to stakeholder participation or highlighted social equity and focused on the role of coastal communities, small-scale fishers, vulnerable groups and how a more inclusive approach to decision-making would benefit everyone. The 4 other themes continued to showcase the interconnections of the Blue – Green Nexus. Coordinating fisheries, conservation, shipping, tourism, offshore renewable energy and other marine activities were reflected in 37 documents (61.7%) primarily through the use of marine spatial planning and policy integration. The number of documents containing the terms 'climate change' and 'resilience' were 35 (58.3%) and 32 (53.3%) respectively, while 32 (53.3%) contained the terms 'blue economy' and 'investment'. The terms 'climate change' and 'resilience' occurred in 35 documents (58.3%) and 32 documents (53.3%) respectively, the terms 'blue economy' and 'investment' had 32(53.3%) and 32(53.3%) occurrences, respectively. Twenty-nine documents (48.3%) mentioned marine pollution and pressures on ecosystems.

Table 1. Distribution of Major Themes Identified in the Reviewed Literature

Major Theme	Frequency	Percentage (%)
Governance and institutional coordination	48	80.0
Environmental sustainability and ecosystem protection	46	76.7
Political-economic interests and resource allocation	43	71.7
Stakeholder participation and social equity	39	65.0
Marine spatial planning and policy integration	37	61.7
Climate change and resilience	35	58.3
Blue economy investment and innovation	32	53.3
Marine pollution and ecosystem pressures	29	48.3

Figure 1. Distribution of Major Themes Identified in the Reviewed Literature



4.2 Political Economy of Sustainable Ocean Development

The political-economic analysis examined how economic interests, investment structures, resource allocation, power relations, and competing sectoral priorities influenced sustainable ocean development.

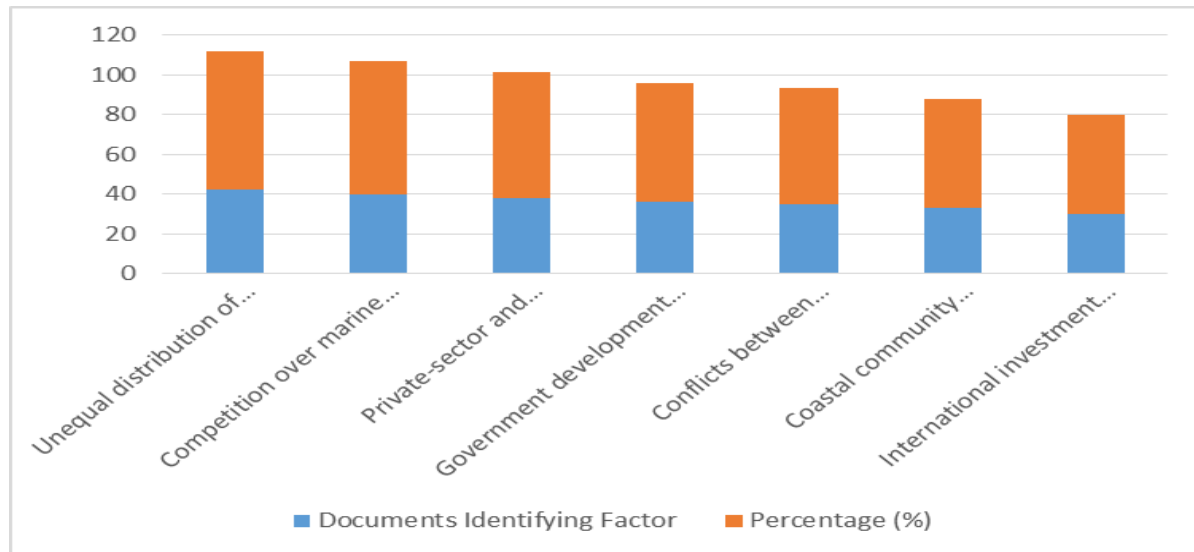
Table 2. Political-Economic Factors Influencing the Blue–Green Nexus

Political-Economic Factor	Documents Identifying Factor	Percentage (%)
Unequal distribution of marine economic benefits	42	70.0
Competition over marine resources and space	40	66.7
Private-sector and investment interests	38	63.3
Government development priorities	36	60.0
Conflicts between commercial and conservation objectives	35	58.3
Coastal community resource dependence	33	55.0
International investment and market pressures	30	50.0

Table 2 showed unequal distribution of the economic benefits of the sea was the most common political-economic determinants mentioned in 42 documents (70.0%). The result revealed that allocation of benefits of blue economy activities did not always occur equally for stakeholders. Advantages for commercial enterprises and investors were more significant, while opportunities for coastal societies and smaller scale resource utilizers due to environmental change and reduced access to resources were greater. The concepts of competition for marine resources and space were mentioned in 40 documents (66.7%) and private-sector interests and investment appeared in 38 documents (63.3%). The results showed that more industries went into the ocean, leading to greater pressure on the limited ocean space. Fisheries and offshore renewable energy projects, tourism, shipping, conservation areas, aquaculture and coastal infrastructure all bid for access to

the same marine areas. Additionally, 36 of the documents included government development priorities, reinforcing the role of government policies in deciding which sectors are subject to other policies and received financial and regulatory support (60.0%). A further result is that 35 documents (58.3%) contained conflict between commercial and conservation purposes. The importance of marine resources in community livelihood continued to be reflected in the eighteenth coastal community resource dependence (55.0%) documents presented. International investment and market pressures also played a role in 30 documents (50.0%), indicating that international forces were also forcing national ocean-development strategies.

Figure 2. Political-Economic Factors Influencing the Blue–Green Nexus



4.3 Governance Institutions and Policy Integration

The analysis of governance institutions focused on regulatory capacity, institutional coordination, policy coherence, stakeholder participation, enforcement, and marine spatial planning.

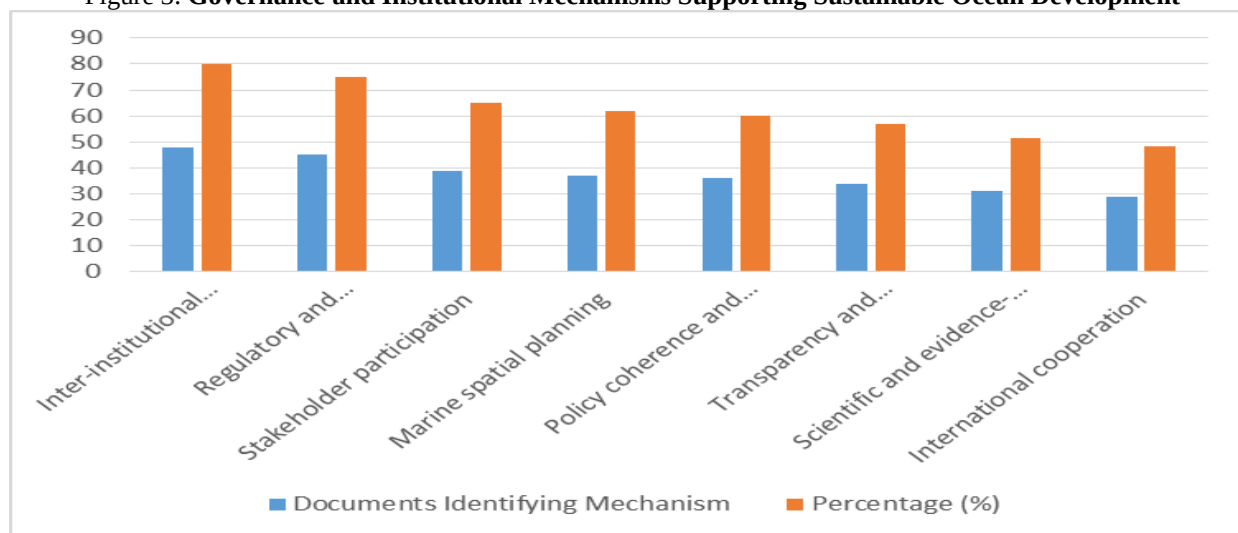
Table 3. Governance and Institutional Mechanisms Supporting Sustainable Ocean Development

Governance Mechanism	Documents Identifying Mechanism	Percentage (%)
Inter-institutional coordination	48	80.0
Regulatory and enforcement capacity	45	75.0
Stakeholder participation	39	65.0
Marine spatial planning	37	61.7
Policy coherence and integration	36	60.0
Transparency and accountability	34	56.7
Scientific and evidence-based policymaking	31	51.7
International cooperation	29	48.3

Coordination between different levels of government (inter-institutional) was the most visible governance mode, as evidenced in 48 out of 55 documents (80.0%); This finding confirmed the

previous one, where governance has been identified as a key part of the Blue–Green Nexus. Development of the oceans in a sustainable manner is dependent on the environmental, fisheries, energy, transport and maritime security and coastal-development institutions. The second most salient governance mechanism was regulatory and enforcement capacity, which mentioned in 45 documents (75.0%). It showed that environmental and marine laws were obviously not sufficient to assure sustainable results. Monitoring, compliance mechanisms, institutional resources, technical expertise and enforcement powers were needed for effective implementation. The involvement of stakeholders was mentioned in 39 documents (65.0%), and marine spatial planning in 37 documents (61.7%). Additionally, the results revealed that policy coherence and integration was mentioned in 36 documents (60.0%) whereas the transparency and accountability appeared in a number of 34 documents (56.7%). The key concepts of scientific and evidence-based policymaking were found in 31 documents (51.7%) and international cooperation was found in 29 documents (48.3%). These findings showed that the ability of sustainable and good governance within the ocean was beyond the reach of national regulation. Marine activities transcended boundaries and fisheries, shipping, pollution, climate change and biodiversity, benefitting from ecosystem conservation, were transboundary in impact. Biodiversity conservation, fisheries, shipping, pollution, climate change were transboundary in impact, and so were marine ecosystems.

Figure 3. Governance and Institutional Mechanisms Supporting Sustainable Ocean Development



4.4 Sustainability Outcomes and the Future of the Blue–Green Nexus

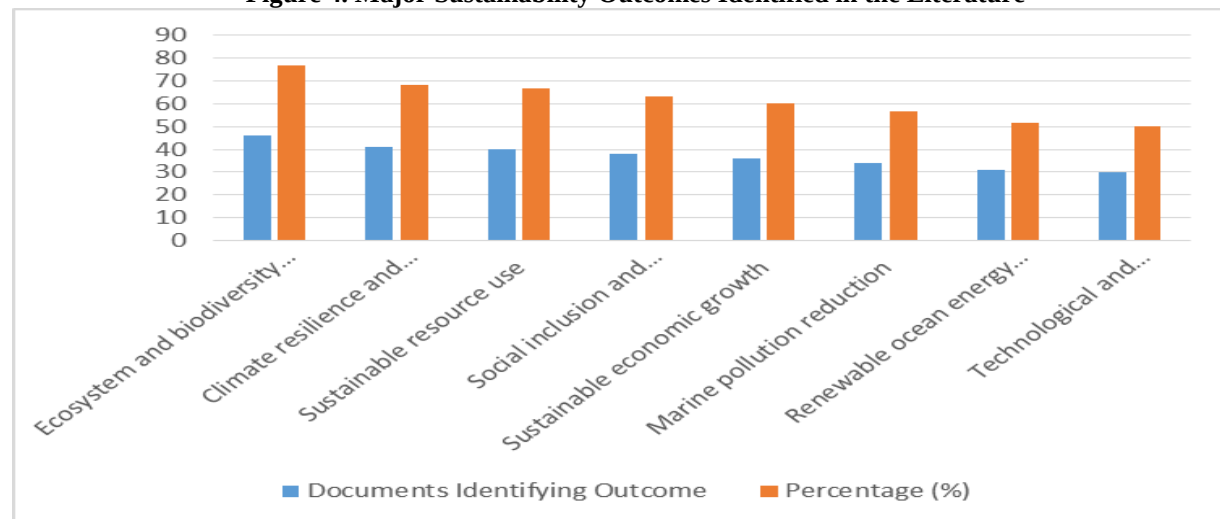
Sustainability outcome identified in the highest number of documents was ecosystem and biodiversity protection, with 46 documents (76.7%). (Table 4). The result had shown that the integrity of the ecosystem is continuous and inextricable part of sustainable ocean development. There were 61.3% documents that included the concept of climate resilience or mitigation and 66.7% documents on sustainable resource use. The results suggested a growing association of the Blue–Green Nexus with climate policy and climate resiliency. Social inclusion and livelihood protection were mentioned in 38 documents (63.3%) and a second outcome of social sustainability was detected. Fisheries, tourism, aquaculture, and other marine-related activities were often important livelihoods for offshore communities, which are critical for their food and financial security. Policies that limit resources and do not provide for their replacement could thus have negative social side-effects. Sustainable economic growth was found in 36 documents (60.0%)

and literature did not dismiss the economic development but rather highlighted its need to be done in light of ecological and social protection. Reducing marine pollution was included in 34 documents (56.7%) indicating the need to tackle both economic and environmental pressures. Other results included technological and institutional innovation (30 documents, 50.0%) and renewable ocean energy development (31 documents, 51.7%). The results indicated that the future Blue – Green strategies might employ technological innovation in economic growth that is low carbon and optimizes resource usage.

Table 4. Major Sustainability Outcomes Identified in the Literature

Sustainability Outcome	Documents Identifying Outcome	Percentage (%)
Ecosystem and biodiversity protection	46	76.7
Climate resilience and mitigation	41	68.3
Sustainable resource use	40	66.7
Social inclusion and livelihood protection	38	63.3
Sustainable economic growth	36	60.0
Marine pollution reduction	34	56.7
Renewable ocean energy development	31	51.7
Technological and institutional innovation	30	50.0

Figure 4. Major Sustainability Outcomes Identified in the Literature



5. Discussion

The governance and institutional coordination element was the most dominant theme that appeared across the board, in 80.0% of the documents analysed. The finding indicated that a major foundation to the Blue–Green Nexus was the capacity of coordinating fisheries, conservation, shipping, tourism and coastal development in the institutions. This coincided with the most recent research emphasising the need for policy coherence in the transition to a sustainable blue economy (SBE) where two or more CIs and sectors share the same marine space (de Ycaza et al., 2024).

Minimizing regulatory fragmentation and reconciling economic development with environmental goals was an important means of effective coordination.

In the political-economic results, it was found that unequal distribution of marine economic benefits and the competition over marine resources was the main challenges mentioned in 70.0 % and 66.7 % of documents, respectively. This pattern allowed for distribution conflicts to arise if the investment decision making process and resource access were particularly advantageous to more powerful commercial aspects than the coastal communities. An increasing awareness of inequities, injustices and inequalities regarding the distribution of benefits and costs along social groups also becomes a relevant topic in the recent research on ocean sustainability (Claudet et al., 2024). The results, in turn, confirmed a political and economic standpoint that acknowledges the sustainable ocean development—the challenge to extend beyond economic growth to access, power, participation and fairness.

Results also showed that protection of the ecosystem and biodiversity was the outcome of sustainability that occurred the most in the reviewed documents, which is 76.7%. Climate resilience was next with 68.3% while sustainable use of resources was 66.7%. This revealed that the well-being of the Blue-Green Nexus depends on the balancing and intertwining of economic growth and development, as well as the ecological integrity of ocean-based industries. The importance of incorporating environmental concerns into the marine spatial planning process and for any development plans that may fail to include sufficient environmental protection was also noted by Rezaei et al. (2024).

Other key concepts identified were stakeholder engagement (65.0% of evidence reviewed), and social inclusion (63.3% of evidence reviewed). This reflected that the coastal population not only was key stakeholders in the sustainable governance process, but also not just focus of policy making, but rather also stakeholders. The involvement can help not only to increase policy legality but also add local information and help decrease conflict over marine development. More recently, evidence has emerged also demonstrating the significance of social equity in the governance of the blue economy; effectively engaging and considering social equity is vital to securing a transition of the ocean without perpetuating existing inequities (Clark & Cisneros-Montemayor, 2024). It identified these processes as areas which merited greater involvement in marine planning. Finally, the results indicated that the potential of ocean-based renewable energy, technological readiness and climate adaptability and sustainable economic development provide profitable avenues for advancing the Blue–Green Nexus progress. It was necessary, however, that the opportunities would have to rely on good institutions, protection of persons in vulnerable groups, and participation in the governance system. From the outcomes it was evident that technology or financial investment alone was not sufficient for sustainable ocean development. The need for policy coherence, accountability, science-driven decision-making and international cooperation to result in long-term sustainability outcomes from blue economic opportunities remained. This reading aligns with recent studies which suggest that a more integrative view of ocean development as a tool to support the concepts of climate, conservation and social goals. (Penca et al., 2025).

6. Conclusion

The study was based on the premise that political economy, institutional governance, environmental sustainability, and social equity are valuable lenses for studying how sustainable oceans will develop in the future, and that the Blue–Green Nexus was a helpful framework for accomplishing these objectives. Most strongly, 80.0% of the documents of evidence related to governance and institutional coordination, out of 60 documents that were available and reviewed. Political-economic issues – unequal benefit distribution, marine resource conflicts, values in investments, and political-economic conflicts between conservation and commercial objectives –

also played a significant role in determining sustainability outcomes. The results suggested that economic development of the oceans can support climate resilience, ecosystem protection and care, renewable energy, and sustainable livelihoods sectors, as long as adequate institutional and regulatory safeguards are in place to facilitate these sectors. Sustainable ocean development is therefore a complex process that demands a multi-sectoral approach, including the consideration of economic opportunities, ecological protection, institutional accountability, and social inclusion.

6.1 Recommendations

Establish linked policy mechanisms between fisheries and environment; fisheries and marine transport; renewables; tourism; maritime development and conservation; and fisheries and government and marine governance institutions; enhance co-ordination at the inter-institutional level; and strengthen fishing. Improve governance mechanism linkages and co-ordinate at inter-institutional level between fisheries and environment, fisheries and marine transport, renewables, tourism, maritime development and conservation, and fisheries and government and marine governance institutions. Marine spatial planning should be given higher priority for policy attention to address competition for marine space and mitigate conflicts between the various economic and environmental interests. The capacity of regulatory bodies also needs to be strengthened to enable them to be more effective in monitoring, enforcement, transparency, and accountability checks, and to ensure compliance with sustainability requirements. Equity aspects must be taken into account in policies by giving more voice to stakeholders affected by conservation measures, whether regarding the blue economy or its development, including small resource users, as well as coastal communities' participation in the marine decision-making process. For investments in the offshore renewable (ORE) energy industry, climate resilience and social safeguards also need to be taken into account, along with environmental impact assessment (EIA); this applies to the entire scope of the blue economy, including sustainable aquaculture, marine biotechnology and more. But stronger cooperation between different countries is needed to solve problems that cross geographical boundaries, such as marine pollution, illegal fishing, biodiversity loss, climate change.

6.2 Future Directions

It needs to be broadened with empirical and comparative research on a range of coastal communities, policies, private organisations and marine governance institutions from around the world and regions – and now into the future. A quantitative study may explore the link between governance quality, investments in the blue economy, environment performance and socio-economic results based on both cross-country and panel data. Specific sectors, like offshore wind, fisheries and aquaculture, marine tourism, Blue Carbon and Marine Biotechnology, could also be explored in further studies to reflect the most promising Blue–Green synergies. Gender, livelihood security, indigenous communities and access to ocean resources should be studied separately for special consideration to the distributional impacts associated with the development of the ocean. An in-depth study of how the Blue–Green Nexus changes over time could also be investigated taking into account the involvement of climate change, the development of technology, new ocean business sectors and new into functionalized international regulations.

REFERENCES

- Ayilu, R. K., Fabinyi, M., & Barclay, K. (2022). Small-scale fisheries in the blue economy: Review of scholarly papers and multilateral documents. *Ocean & Coastal Management*, 216, 105982. <https://doi.org/10.1016/j.ocecoaman.2021.105982>
- Bennett, N. J. (2022). Mainstreaming equity and justice in the ocean. *Frontiers in Marine Science*, 9, 873572. <https://doi.org/10.3389/fmars.2022.873572>
- Bennett, N. J., Alava, J. J., Ferguson, C. E., Blythe, J., Morgera, E., Boyd, D., & others. (2023). Environmental (in)justice in the Anthropocene ocean. *Marine Policy*, 147, 105383. <https://doi.org/10.1016/j.marpol.2022.105383>
- Bennett, N. J., Blythe, J., White, C. S., & Campero, C. (2021). Blue growth and blue justice: Ten risks and solutions for the ocean economy. *Marine Policy*, 125, 104387. <https://doi.org/10.1016/j.marpol.2020.104387>
- Brodie Rudolph, T., Ruckelshaus, M., Swilling, M., Allison, E. H., Österblom, H., Gelcich, S., & others. (2020). A transition to sustainable ocean governance. *Nature Communications*, 11, 3600. <https://doi.org/10.1038/s41467-020-18409-5>
- Chen, M., Wang, Y., & Xu, Z. (2024). A framework for assessing the blue equity of social-ocean systems in marine governance transformation. *Frontiers in Marine Science*, 11, 1403194. <https://doi.org/10.3389/fmars.2024.1403194>
- Clark, T. P., & Cisneros-Montemayor, A. M. (2024). Colonialism and the Blue Economy: Confronting historical legacies to enable equitable ocean development. *Ecology and Society*, 29(3), Article 4. <https://doi.org/10.5751/ES-15122-290304>
- Claudet, J., Blythe, J., Gill, D. A., Bennett, N. J., Gurney, G. G., Evans, L., Mahajan, S. L., Turner, R. A., Ahmadi, G. N., Ban, N. C., Epstein, G., Jupiter, S. D., & others. (2024). Advancing ocean equity at the nexus of development, climate and conservation policy. *Nature Ecology & Evolution*, 8, 1205–1208. <https://doi.org/10.1038/s41559-024-02417-5>
- Claudet, J., Blythe, J., Gill, D. A., Bennett, N. J., Gurney, G. G., Evans, L., Mahajan, S. L., Turner, R. A., Ahmadi, G. N., Ban, N. C., Epstein, G., Jupiter, S. D., Lau, J., Mangubhai, S., Zafra-Calvo, N., Lazzari, N., Baggio, J. A., Bernard, M. L., Brun, V., D’Agata, S., Di Franco, A., Horan, R., & Naggea, J. (2024). Advancing ocean equity at the nexus of development, climate and conservation policy. *Nature Ecology & Evolution*, 8(7), 1205–1208. <https://doi.org/10.1038/s41559-024-02417-5>
- Davis, R. A., Hanich, Q., Haas, B., Cisneros-Montemayor, A. M., Azmi, K., Seto, K. L., & others. (2022). Who gets the catch? How conventional catch attribution frameworks undermine equity in transboundary fisheries. *Frontiers in Marine Science*, 9, 831868. <https://doi.org/10.3389/fmars.2022.831868>
- de Ycaza, R. A., Spalding, A. K., & Cisneros-Montemayor, A. M. (2024). Assessing policy coherence for developing a blue economy: A case study in the Republic of Panama. *Frontiers in Marine Science*, 11, 1336030. <https://doi.org/10.3389/fmars.2024.1336030>
- Issifu, I., Dahmouni, I., Deffor, E. W., & Sumaila, U. R. (2023). Diversity, equity, and inclusion in the Blue Economy: Why they matter and how do we achieve them? *Frontiers in Political Science*, 4, 1067481. <https://doi.org/10.3389/fpos.2022.1067481>

- Jacquemont, J., Loiseau, C., Tornabene, L., & Claudet, J. (2024). 3D ocean assessments reveal that fisheries reach deep but marine protection remains shallow. *Nature Communications*, 15, 4027. <https://doi.org/10.1038/s41467-024-47975-1>
- Penca, J., Ertör, I., Ballesteros, M., Briguglio, M., Kowalewski, M., Pauksztat, B., Cepić, D., Piñeiro-Corbeira, C., Vaidianu, N., Villasante, S., & Pascual-Fernández, J. J. (2025). Rethinking the Blue Economy: Integrating social science for sustainability and justice. *npj Ocean Sustainability*, 4, 40. <https://doi.org/10.1038/s44183-025-00138-1>
- Rezaei, F., Contestabile, P., Vicinanza, D., Azzellino, A., Weiss, C. V. C., & Juanes, J. (2024). Soft vs. hard sustainability approach in marine spatial planning: Challenges and solutions. *Water*, 16(10), 1382. <https://doi.org/10.3390/w16101382>
- Shucksmith, R., & Withouck, I. (2024). Barriers and opportunities for improved governance of fisheries within the context of marine spatial planning. In C. Jones (Ed.), *Governing oceans: Policy development, implementation and evaluation* (pp. 18–34). Edward Elgar Publishing. <https://doi.org/10.4337/9781035315598.00009>
- Sowman, M., & Sunde, J. (2024). [Relevant research on blue economy, small-scale fisheries, governance, and social justice]. *Marine Policy*.
- Stakeholder perceptions of blue economy governance networks and their equity implications in Bangladesh. (2024). *Marine Policy*, 170, 106359. <https://doi.org/10.1016/j.marpol.2024.106359>
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