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Understanding the Blue Economy across science, policy, higher education and communities



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Authors (by alphanetical order): Ana Teresa Santos, Ash Pachauri, Cátia Miriam Costa, Eliane El Haber, Fernando Vergara Benítez, Komal Mittal, Philo Magdalene A, and Ricardo Andrés Delgado Lander.

Reviewers (by alphanetical order): Cátia Miriam Costa, Eliane El Haber, Jacob Blasius, Jonghwi Park, Marina Ader, Mathias Bouckaert, Noah Sobe, and Tiago Nogueira.

Copyediting: Mary de Sousa

Graphic design and layout: César Vercher

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For more information contact: info-IESALC@unesco.org www.iesalc.unesco.org Tel +58 212 2861020

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- POP (Protect Our Planet) Movement
- Universidad Andrés Bello (UNAB)
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Abbreviations and acronyms

- **AECO** — Association for the Study and Conservation of the Oceans
- **CEAZA** — Center for Advanced Studies in Arid Zones
- **CEO** — Chief Executive Officer
- **FLUP** — University of Porto Faculdade de Letras
- **I.P.** — Instituto Público (Public Institute) - (Camões – Institute for Cooperation and Language, I.P.)
- **IESALC** — International Institute for Higher Education in Latin America and the Caribbean
- **ISCTE** — ISCTE – University Institute of Lisbon
- **JET** — Jamaica Environment Trust
- **NGO/NGOs** — Non-Governmental Organization(s)
- **POP** — Protect Our Planet
- **SDGs** — Sustainable Development Goals
- **SIDS** — Small Island Developing States
- **TEK** — Traditional Ecological Knowledge
- **UN** — United Nations
- **UNESCO** — United Nations Educational, Scientific and Cultural Organization
- **UNINBE** — University of Namibe
- **UNOSSC** — United Nations Office for South-South Cooperation

Executive summary

The Blue Economy is increasingly prominent in international discussions on marine governance, coastal sustainability, climate adaptation and ocean-based development. Developed within the *Blue Economy Pilot Project: Knowledge, Capacity Building and Resilience for the Preservation of Natural and Cultural Heritage,* this publication comparatively examines how these dynamics are evolving across Angola, Chile, Jamaica and Portugal. The analysis contributes to broader discussions on sustainable ocean governance, higher education transformation, community resilience and inclusive development.

Using a comparative mixed-methods approach, the publication integrates bibliometric analysis, policy and governance research and community-based perspectives to explore how Blue Economy frameworks are understood, implemented and experienced across different coastal contexts. The analysis is structured around the relationship between scientific knowledge, governance systems, higher education institutions and coastal communities, while youth and gender are treated as cross-cutting dimensions throughout the publication.

Within this framework, higher education is approached through its research and community engagement functions. The publication highlights the role of higher education institutions in supporting knowledge production, capacity-building, environmental monitoring and collaboration among governments, communities and civil society actors.

The findings demonstrate substantial growth in scientific production and policy attention related to the Blue Economy and coastal governance over recent decades. Climate adaptation, marine conservation, ecosystem management, fisheries governance and sustainable ocean-based development now occupy central positions within scientific and policy discourse. Across the four countries, the analysis identifies several interconnected findings: the rapid expansion of Blue Economy research and policy attention; the emergence of distinct national governance pathways; the important role of higher education institutions in supporting knowledge exchange and capacity-building; the active role of coastal communities in shaping Blue Economy transitions; and the continuing challenge of ensuring meaningful social inclusion within governance systems.

While all four countries are pursuing Blue Economy transitions, they do so through different governance and development trajectories. Portugal demonstrates strong integration within European policy frameworks and long-term maritime planning systems, supported by the most diversified governance profile among the four countries. Chile combines strong scientific production with increasingly structured governance approaches focused on marine management, environmental monitoring and climate adaptation. Jamaica's trajectory is closely aligned with the priorities of Small Island Developing States (SIDS), particularly through its emphasis on community-based coastal governance and climate resilience. Angola, while experiencing growing policy and research engagement, reflects a more emerging governance landscape in which institutional strengthening, capacity-building

and international cooperation remain central priorities.

The analysis further highlights the important contribution of higher education institutions to Blue Economy transitions. Universities and research centres contribute not only through scientific research and technical expertise, but also through environmental monitoring, ocean literacy, skills development, community engagement and capacity-building initiatives connected to coastal sustainability. Across the four countries, the findings point to the growing importance of interdisciplinarity, multistakeholder cooperation and knowledge co-production among universities, governments, civil society organizations and coastal communities.

Community perspectives presented throughout the publication demonstrate that coastal populations are not passive beneficiaries of Blue Economy initiatives, but active participants shaping environmental stewardship, local economies, adaptation strategies and governance practices. Women and youth emerge as organizers, innovators, environmental advocates, cooperative leaders and knowledge holders whose contributions often remain insufficiently recognized within formal governance systems. The research also identifies persistent challenges between top-down governance frameworks and bottom-up community realities, particularly regarding participation, access to resources, recognition of local and Indigenous knowledge, cultural and natural heritage and uneven institutional support across coastal territories.

The comparative analysis also reveals a broader pattern across the four countries. Environmental sustainability, climate adaptation, marine conservation and ocean governance increasingly occupy central positions within scientific and policy agendas. In contrast, social inclusion, community participation, cultural heritage, Indigenous knowledge systems and participatory governance remain comparatively less visible within institutional and policy discussions. Although governance participation in Blue Economy development has become increasingly multi-actor and institutionally diversified, significant differences remain in the extent to which local communities, civil society organizations, women, youth and Indigenous actors are represented within decision-making processes.

Overall, the publication argues that the future of the Blue Economy depends not only on economic growth and marine resource management, but also on the capacity to strengthen more inclusive, participatory and resilient forms of ocean governance. More equitable and sustainable Blue Economy pathways will require long-term investment in human capital, environmental literacy, research capacity, locally grounded institutional collaboration and meaningful participation by coastal communities. The comparative experiences of Angola, Chile, Jamaica and Portugal demonstrate that sustainable Blue Economy transitions are most effective when scientific knowledge, governance systems, higher education institutions and community practices are connected through collaborative approaches to coastal development.

1. Introduction

International discussions on climate change, marine governance, coastal sustainability and ocean-based development have increasingly positioned the Blue Economy as an important framework for rethinking the relationship between oceans, society and sustainable development, a trend reflected in recent global processes such as the 2025 United Nations Ocean Conference (UNOC3) in Nice, France. While often presented as an extension of coastal and marine research, the Blue Economy has expanded the way ocean issues are framed by incorporating questions of governance, resilience, higher education, community participation and economic development. At the same time, coastal science continues to emphasize vulnerability, ecological change, territorial pressures and long-term governance challenges. This publication examines how these perspectives interact across scientific research, policy frameworks, higher education and community practices in Angola, Chile, Jamaica and Portugal.

Selected within the framework of the Blue Economy Pilot Project: Knowledge, Capacity Building and Resilience for the Preservation of Natural and Cultural Heritage, Angola, Chile, Jamaica and Portugal provide a particularly valuable comparative perspective because they represent diverse coastal realities across the Atlantic and Pacific Oceans, different levels of economic development, scientific and institutional capacity and distinct governance traditions. Together, they include one Small Island Developing State (Jamaica) and three continental states with significant coastal and island territories, spanning Africa, Latin America, the Caribbean and Europe. This diversity makes it possible to examine how global agendas related to ocean governance, climate resilience and the Blue Economy are interpreted, adapted and implemented across different environmental, institutional and socio-economic contexts. While geographical distance and differing development trajectories may produce fragmented experiences, they also reveal broader global trends that are often overlooked in analyses focused primarily on leading maritime economies. The comparative approach therefore offers insights into how international Blue Economy frameworks are translated into national policies and local practices, how universities and other knowledge institutions contribute to these transitions and how coastal communities participate in, influence or remain excluded from these processes.

This publication contributes to broader international discussions on sustainable ocean governance, inclusive development, higher education transformation and climate resilience. The analysis aligns with international agendas and frameworks, including the United Nations Decade of Ocean Science for Sustainable Development (Ocean Decade), the Pact for the Future and UNESCO's Transforming higher education: global collaboration on visioning and action, among others. Across these frameworks, increasing attention is given to interdisciplinarity, multistakeholder cooperation, youth engagement, sustainability, skills development and stronger connections between science, policy, education and society.

The publication is structured around the relationship between scientific knowledge, governance systems, higher education and coastal communities, while integrating youth and gender as cross-cutting dimensions throughout the analysis. Coastal communities

are not approached solely as beneficiaries of Blue Economy initiatives, but also as knowledge holders, environmental stewards, innovators and active participants in coastal governance processes. Attention is given to the relationship between scientific knowledge and traditional ecological knowledge, illustrating how knowledge and resilience practices increasingly emerge through interactions between academic institutions, local communities, environmental organizations, governments and civil society actors.

Across the four countries, significant differences emerge in governance structures, institutional capacities, policy trajectories and community experiences. At the same time, several common dynamics can be identified, including the growing importance of climate adaptation and mitigation, ocean governance, environmental monitoring, capacity-building, community resilience and participatory approaches to coastal sustainability. The findings also reveal persistent tensions between top-down governance frameworks and bottom-up community practices, particularly regarding access to resources, participation in decision-making, recognition of cultural and natural heritage and the uneven inclusion of women and youth within formal governance systems.

Despite these differences, the comparative approach adopted in this publication enables the identification of common patterns, challenges and opportunities that extend beyond individual national contexts.

The publication argues that the future of the Blue Economy depends not only on economic growth and marine resource management, but also on the capacity to strengthen more inclusive, participatory and socially grounded forms of ocean governance. In this context, higher education institutions occupy an important position as actors capable of connecting scientific knowledge, governance processes and coastal communities. Through research and community engagement, they support knowledge co-production, environmental literacy, skills development and long-term collaboration across the different actors involved in sustainable coastal development. Through the comparative experiences of Angola, Chile, Jamaica and Portugal, the publication contributes to ongoing discussions on how more sustainable, equitable and resilient Blue Economy pathways can be developed across diverse coastal contexts.

2. Methodological approach

This publication draws on the research outputs developed under the *Blue Economy Pilot Project: Knowledge, Capacity Building and Resilience for the Preservation of Natural and Cultural Heritage*, coordinated by UNESCO IESALC and the United Nations Office for South-South Cooperation (UNOSSC), with the support of Camões, I.P. The publication does not seek to evaluate the project itself; rather, it synthesizes and comparatively analyses the knowledge, case studies, policy reviews and community-based research generated through the project across Angola, Chile, Jamaica and Portugal.

The analytical framework of the publication is grounded in a comparative, mixed-method and multi-scalar approach combining academic research, policy and governance analysis and community-centred practice-based research. These three interconnected research streams were developed through a harmonized comparative structure across the four pilot countries, allowing the publication to identify convergences, contextual differences, governance challenges and emerging practices related to the Blue Economy, resilience and the preservation of natural and cultural heritage.

The publication further adopts a socio-ecological and interdisciplinary perspective, recognizing the Blue Economy not solely as an economic framework but as a field shaped by governance systems, environmental sustainability, cultural heritage, local knowledge and community resilience. Across all analytical components, particular attention was given to the relationship between higher education, public policy and coastal communities as interconnected actors in sustainable coastal governance.

2.1. Academic research component

The academic research component focused on the evolution of Blue Economy research and scientific discourse between 1998 and 2025, using bibliometric and comparative analytical methods to examine global and country-level academic production and available in the Scopus database related to oceans, sustainability, governance, climate change, cultural heritage and coastal resilience.

The analysis drew primarily on academic databases and affiliated scientific resources with particular attention given to publication trends, thematic evolution, SDG alignment and emerging research priorities. The methodology combined quantitative and qualitative analytical approaches, including bibliometric mapping, keyword and co-occurrence analysis, thematic clustering, lexical analysis and comparative interpretation of scientific discourse across the four pilot countries. Comparative benchmarking was also conducted to situate the participating countries within broader global discussions on Blue Economy development and coastal governance.

This component contributed to the publication by providing a scientific and conceptual foundation for understanding how Blue Economy narratives, priorities and research agendas have evolved internationally and within the participating national contexts.

2.2. Policy and governance research component

The policy and governance research component examined the institutional, legal and governance frameworks shaping Blue Economy implementation across Angola, Chile, Jamaica and Portugal.

A harmonized comparative methodology was used to develop country baseline reports and governance mappings, enabling cross-country analysis despite differing political, institutional and territorial contexts. The research combined documentary review, stakeholder ecosystem mapping, institutional analysis and comparative governance interpretation based on the Overton database. Several national laws, marine and coastal strategies, climate frameworks, fisheries regulations, maritime spatial planning instruments, cultural heritage policies and international governance commitments were reviewed and comparatively analysed.

In addition to reviewing policy frameworks, this component assessed the practical relevance of governance systems for community resilience, sustainability, heritage preservation and local implementation. Multi-level governance structures, including international organizations, national ministries, regional authorities, civil society organizations, academic institutions and local actors were mapped to better understand how Blue Economy governance is operationalized across different territorial scales.

The policy research component also informed the comparative interpretation of governance models emerging across the publication, including state-led, community-centred, hybrid and multilevel governance approaches to coastal sustainability and marine resource management.

2.3. Community engagement and practice-based research component

The community engagement component adopted a practice-based and community-centred research approach focused on how coastal communities experience, negotiate and implement Blue Economy practices within their everyday social, cultural and environmental realities.

The research drew on community-based materials including workshops, training resources, audiovisual documentation, local initiatives and implementation experiences. In parallel, country case studies were developed through semi-structured interviews conducted with community leaders, cooperatives, civil society representatives, higher education institutions, environmental advocates and local practitioners across the four pilot countries.

The interviews were conducted to support the Community Engagement and Practice-Based Research Component and provided the primary empirical basis for the analysis presented in Section 5, *Voices of Stakeholders: Community Perspectives*.

The interviews were transcribed and thematically analysed to identify recurring themes related to:

- climate and environmental change,
- local governance,
- livelihoods and economic transitions,
- cultural heritage,
- traditional and local knowledge,
- women and youth participation,
- sustainability practices,
- and community resilience.

The resulting case studies allowed the publication to move beyond institutional and policy analysis by foregrounding lived experiences, territorial practices and locally grounded adaptation strategies. Emphasis was placed on the relationship between scientific knowledge and traditional ecological knowledge, illustrating how communities,

universities, NGOs and local actors co-produce knowledge and resilience practices within coastal territories.

2.4. Cross-cutting integration of youth and gender

Youth empowerment and gender equality were treated throughout the publication as transversal analytical dimensions rather than standalone themes. Through regular review and comparative analysis processes, particular attention was given to the integration of meaningful youth engagement and gender-responsive perspectives across the different research streams and country analyses.

As a result, the publication systematically examines the roles of women and young people not only as beneficiaries of Blue Economy initiatives, but also as knowledge holders, organizers, environmental advocates, entrepreneurs, community leaders and agents of territorial resilience. This cross-cutting approach enabled comparative analysis of how gender and generational dynamics shape coastal governance, marine livelihoods, community participation and sustainability practices across the four national contexts.

2.5. Comparative synthesis, validation and peer review

The publication was developed through an iterative comparative synthesis process bringing together findings from the academic, policy and community engagement components. By triangulating these different forms of knowledge production, the publication identifies common patterns, governance challenges, innovative practices and locally grounded responses to coastal sustainability challenges across Angola, Chile, Jamaica and Portugal.

To ensure methodological coherence and contextual accuracy, source materials produced under the project underwent review processes involving country focal points, technical contributors and relevant stakeholders from the participating countries. In addition, the publication itself will undergo peer review prior to finalization, strengthening its analytical rigor, interdisciplinary consistency and scholarly credibility.

The resulting methodology reflects an effort to bridge scientific research, governance analysis and community knowledge within a comparative framework capable of capturing both the structural and lived dimensions of the Blue Economy in coastal territories. The comparative framework also reflects growing expectations regarding the role of higher education institutions in supporting sustainable coastal development, community resilience, interdisciplinary knowledge production and locally grounded capacity-building processes.

Together, these methodological components provide a comparative lens through which the publication examines how scientific knowledge, governance systems, higher education institutions and community experiences interact within different Blue Economy contexts.

Scientific research has played a key role in shaping contemporary understandings of the Blue Economy, coastal sustainability and ocean governance. The following section examines how these themes have evolved within the scientific literature, highlighting publication trends, thematic developments and country-specific research priorities across the four participating countries.

3. The science of the Blue Economy

Comparing research on coastal zones with Blue Economy in scientific discourse, it was concluded that such research is characterized by continuity, cumulative development and a globally dispersed scholarly network anchored in environmental diagnosis, ecological risk and long-term governance concerns. By contrast, Blue Economy scholarship appears abruptly after 2010, remains concentrated in a limited number of research-intensive countries and is organized around growth-oriented, developmental and development-oriented narratives.

The lexical and bigram analyses further reveal that coastal zone research consolidates an ecological and risk-oriented vocabulary over decades, whereas the Blue Economy rapidly mobilizes economic, policy and policy-oriented terminology. This semantic shift is mirrored in discursive emphasis: while both fields recognize shared environmental threats, coastal-zones scholarship foregrounds risk, vulnerability and loss as central analytical objects, whereas Blue Economy discourse reframes these same conditions as challenges to be managed within an overarching narrative of opportunity and progress. The near absence of gender-related bigrams in both corpora also highlights a persistent marginalization of social equity concerns, particularly within the growth-centred Blue Economy framework. The absence of representation for certain trends in the figures below reflects the fact that no relevant results were identified for those trends in the countries concerned within the scope of the data collected and analysed for this publication.

3.1. Research dynamics in coastal and Blue Economy studies

Publication trend analyses were conducted to examine the temporal evolution of scientific output across the selected countries

Figure 1a) Annual publication trends for Angola, Chile, Jamaica and Portugal (1920–2025)

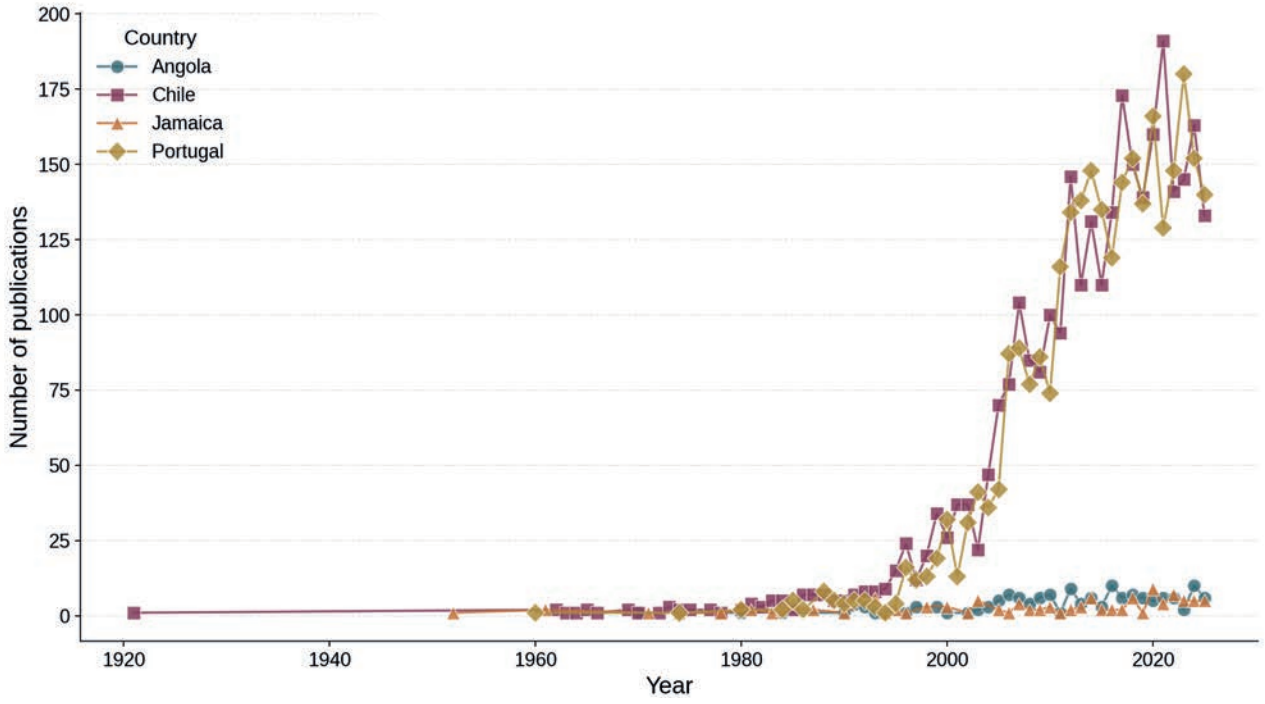
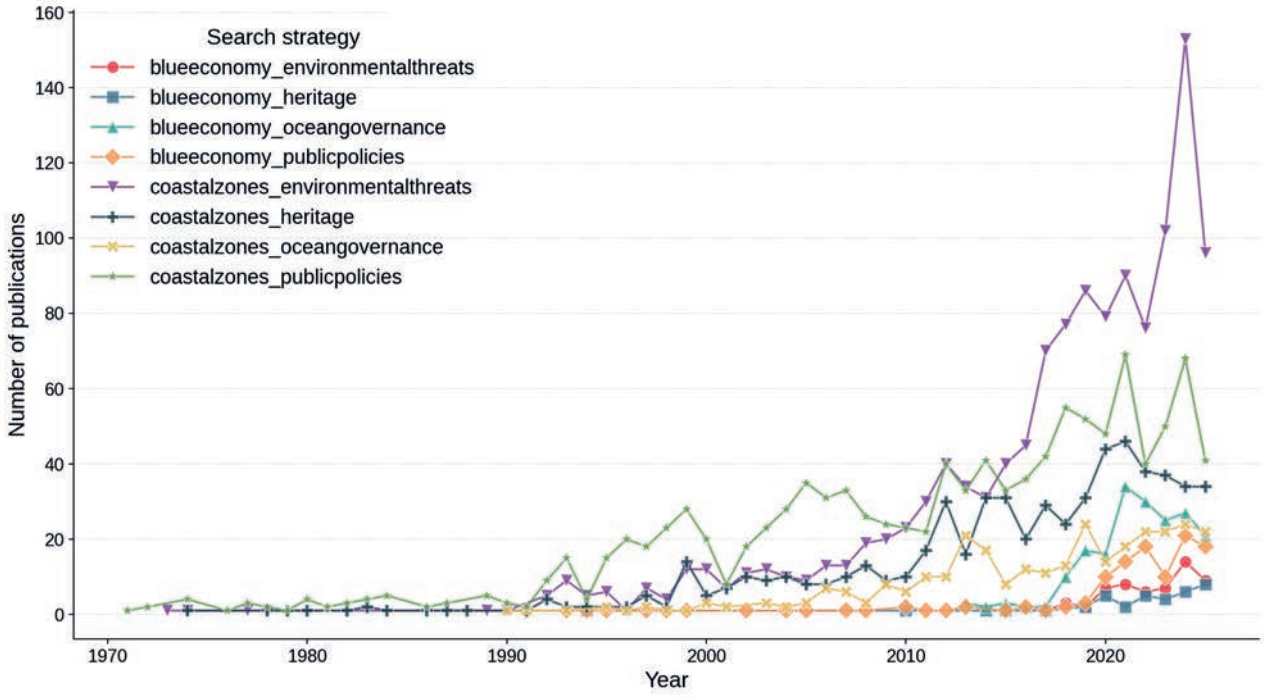


Figure 1b) Annual scientific publications on the Blue Economy and coastal zones



and research domains. As shown in Figure 1a, all countries experienced increases in publication activity over time, although with marked differences in magnitude. Chile and Portugal exhibited the strongest growth, particularly after 2000, reaching higher annual publication outputs than Angola and Jamaica. Figure 1b further demonstrates the rapid expansion of publications associated with Blue Economy and coastal research themes with a pronounced acceleration after 2010.

Publication trends provide insight into the growth of scientific activity over time. However, understanding the evolution of the field also requires examining the themes and concepts that have emerged within the literature. The following analysis therefore explores the dominant expressions associated with Blue Economy and coastal zone research.

3.2. Theme dynamics on Blue Economy and coastal zones

A bigram frequency analysis was conducted to compare thematic patterns between the Blue Economy and coastal zone research domains over time. As shown in Figure 2, both fields show robust growth after 2000, particularly after 2010. Coastal zone research is associated with terms such as 'marine', 'water', 'species' and 'zone management' reflecting a focus on environmental governance and marine ecosystems. In contrast, blue-economy research is more strongly linked to expressions including 'blue growth', 'economic growth' and 'sustainable development' emphasizing economic development and resource utilization. Terms related to 'climate change' and 'sea level' appear prominently in both domains, indicating shared concerns about environmental change and coastal sustainability. The terms 'gender', 'gender equality', 'gender inequality' and 'youth' were intentionally included, despite their low frequencies, to assess the representation of social and equity-related dimensions within the literature. It is also noteworthy that, when countries are examined individually, the dominant research themes reflect national and regional issues.

Figure 2. Occurrence of most frequent unigrams and bigrams

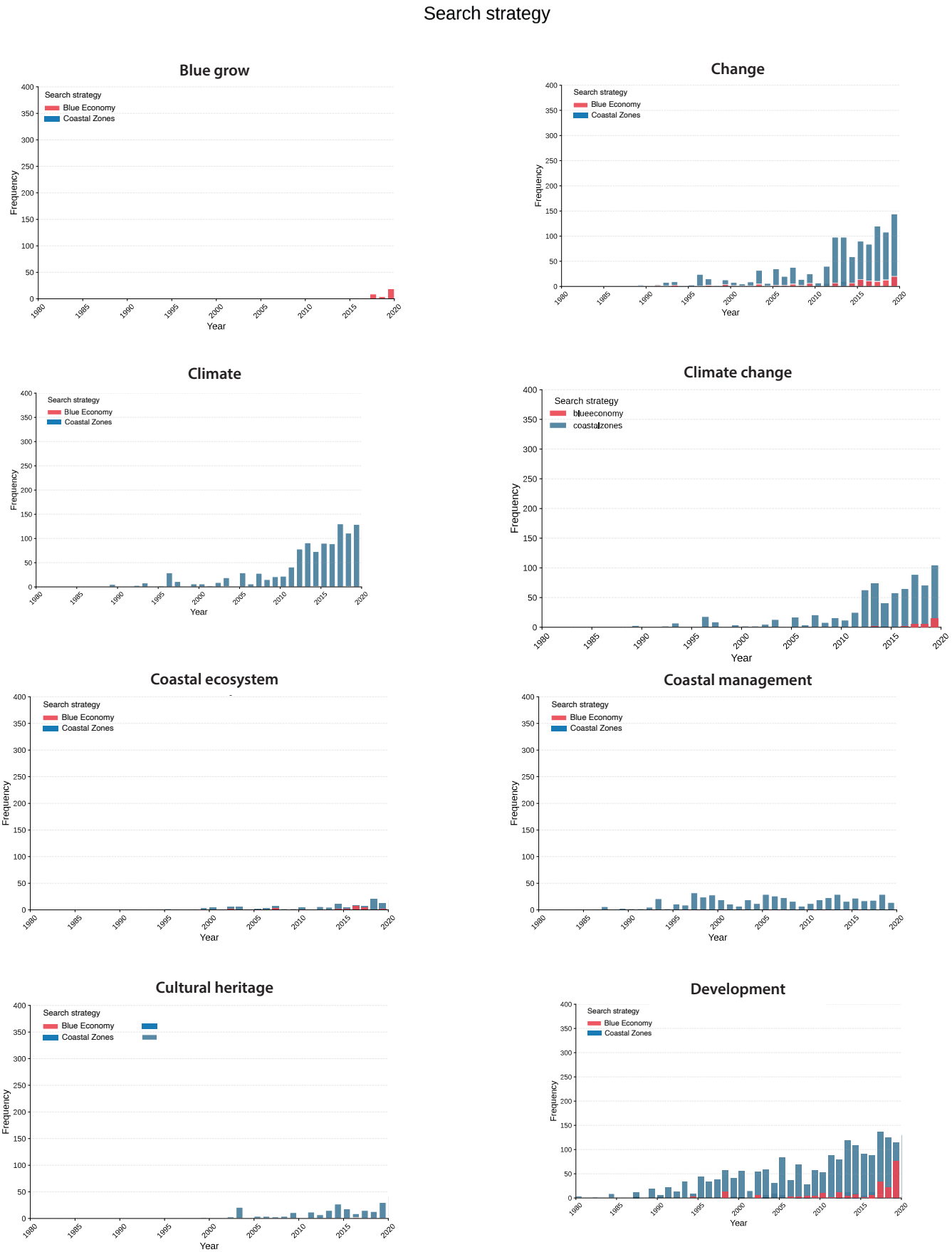


Figure 2. Occurrence of most frequent unigrams and bigrams

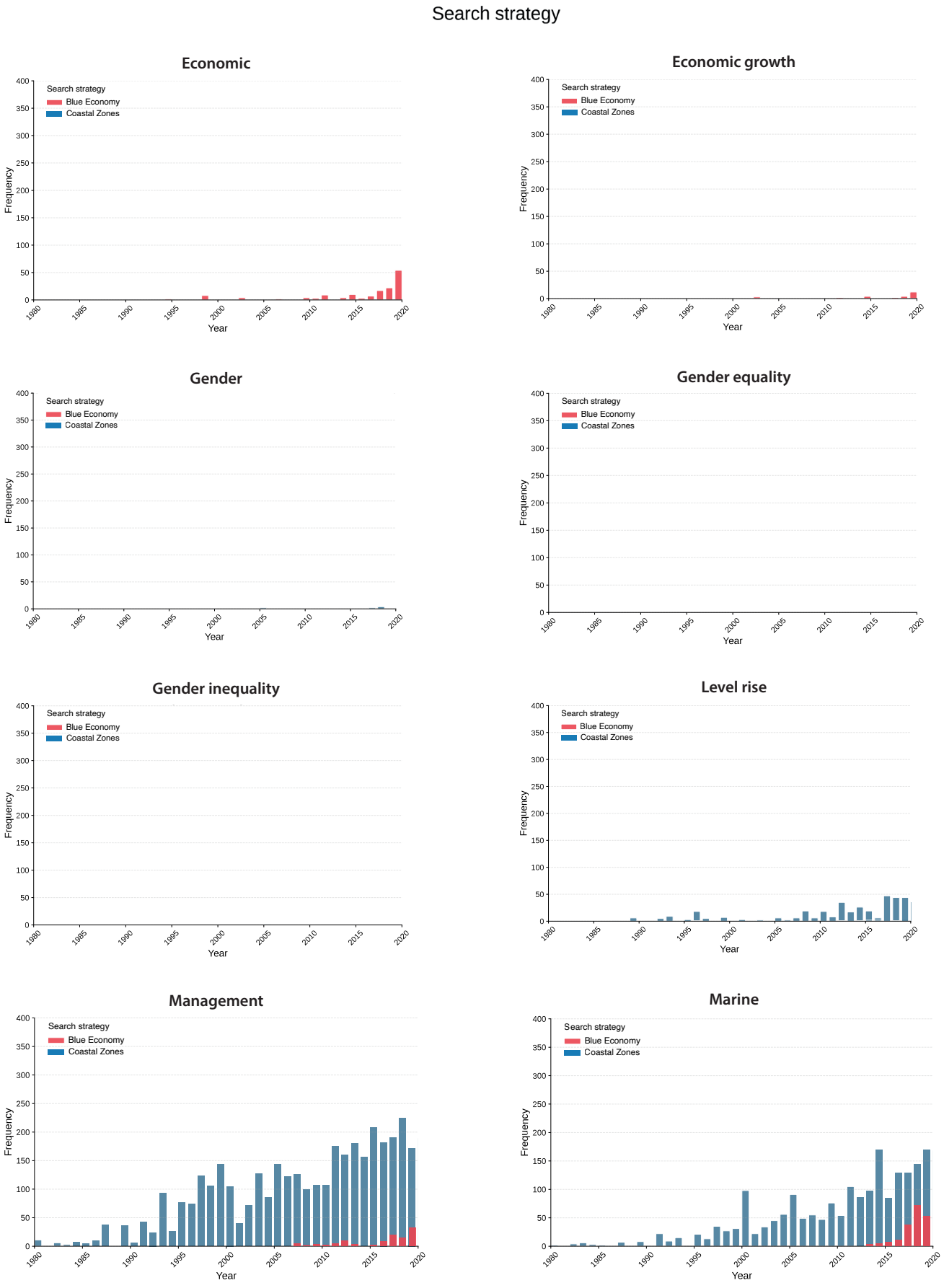


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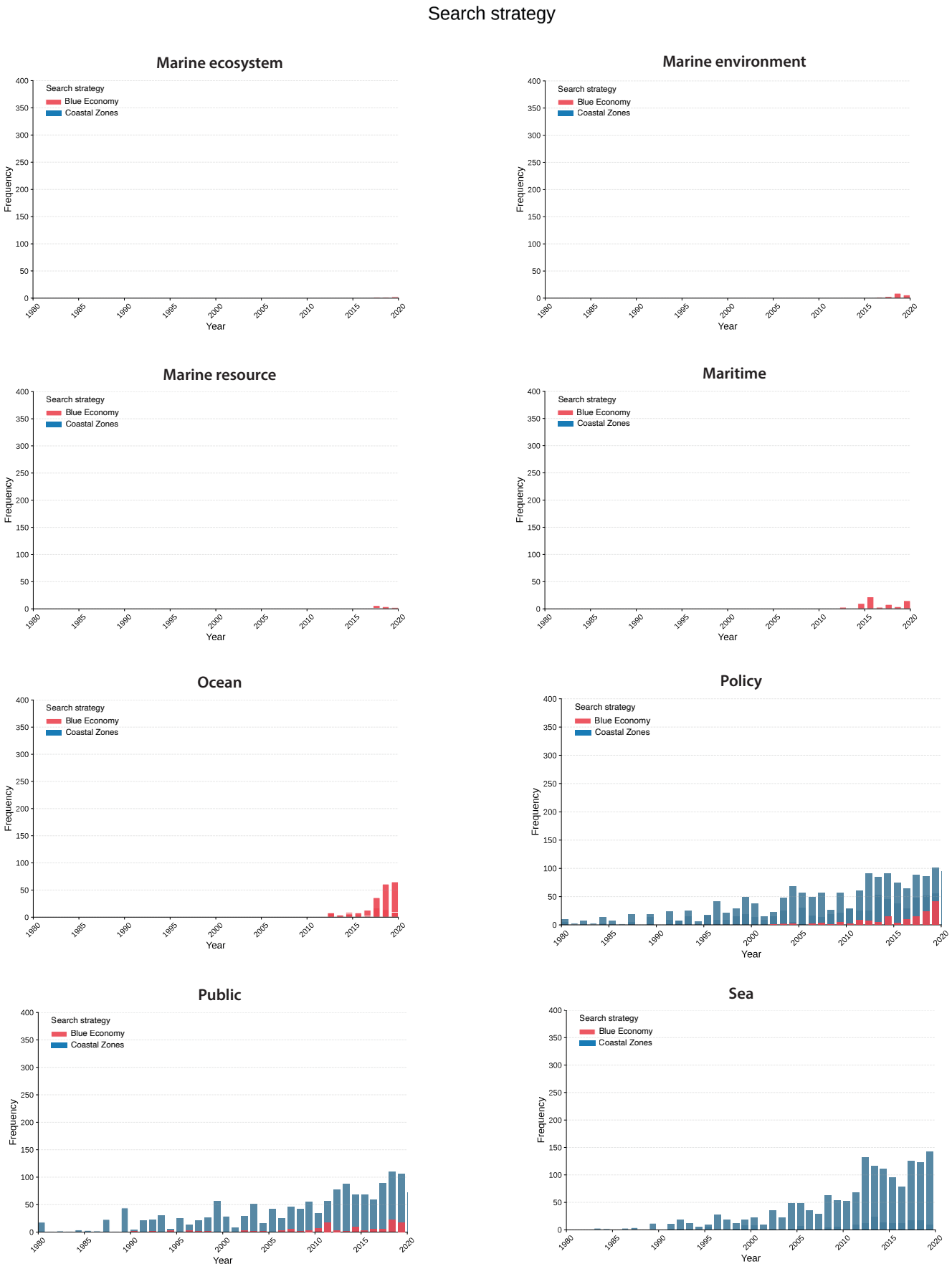


Figure 2. Occurrence of most frequent unigrams and bigrams

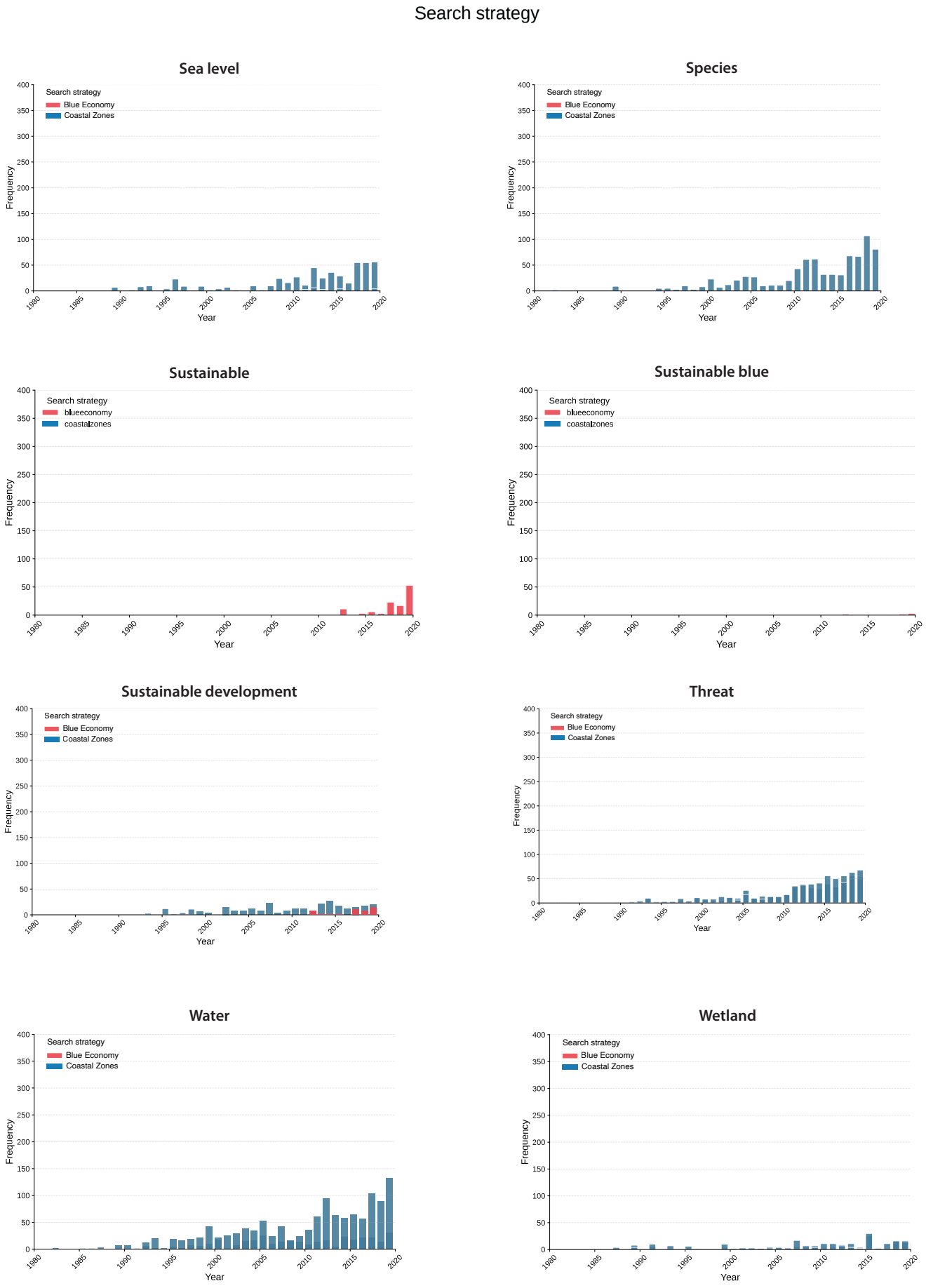
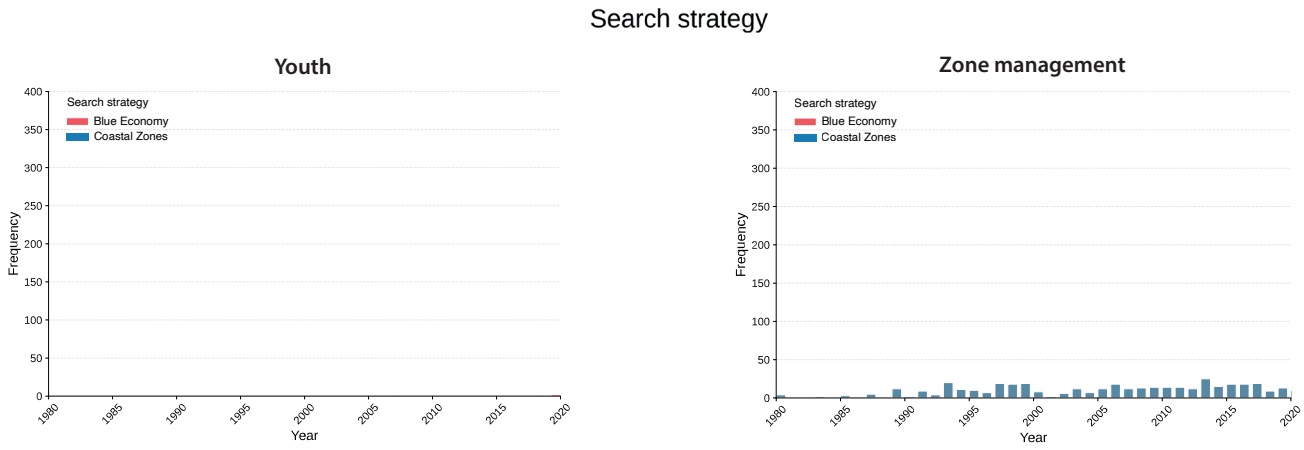


Figure 2. Occurrence of most frequent unigrams and bigrams



Additional insights emerge when these thematic patterns are examined at the national level. Differences in environmental conditions, governance priorities and development trajectories contribute to distinct research profiles across the four participating countries.

3.3. Evolving research themes in each country

3.3.1. Temporal dynamics of research themes in Angola-related publications

A unigram and bigram analysis was performed to examine the dominant thematic patterns in Angola-related scientific publications over time. The results, presented in Figure 3, indicate a strong concentration of research on marine and oceanographic topics, with terms such as 'upwelling,' 'Atlantic,' 'South' and 'surface' occurring most frequently. The increased frequency of terms associated with the Benguela upwelling system after the 2000s suggests growing research interest in fisheries, ocean productivity and climate-related marine dynamics in the South Atlantic region.

Figure 3. Temporal evolution of dominant unigrams and bigrams in Angola-related scientific publications

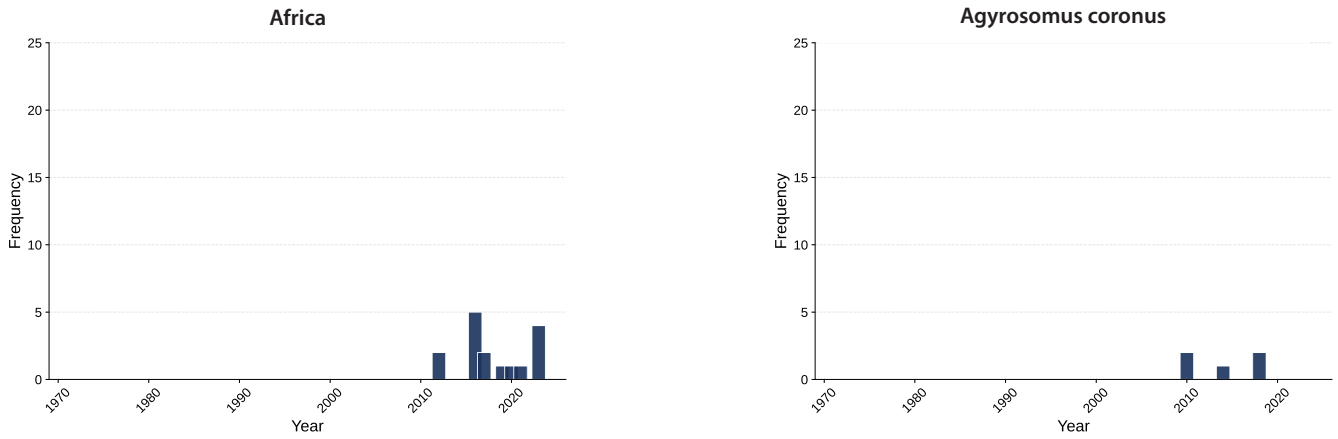


Figure 3. Temporal evolution of dominant unigrams and bigrams in Angola-related scientific publications

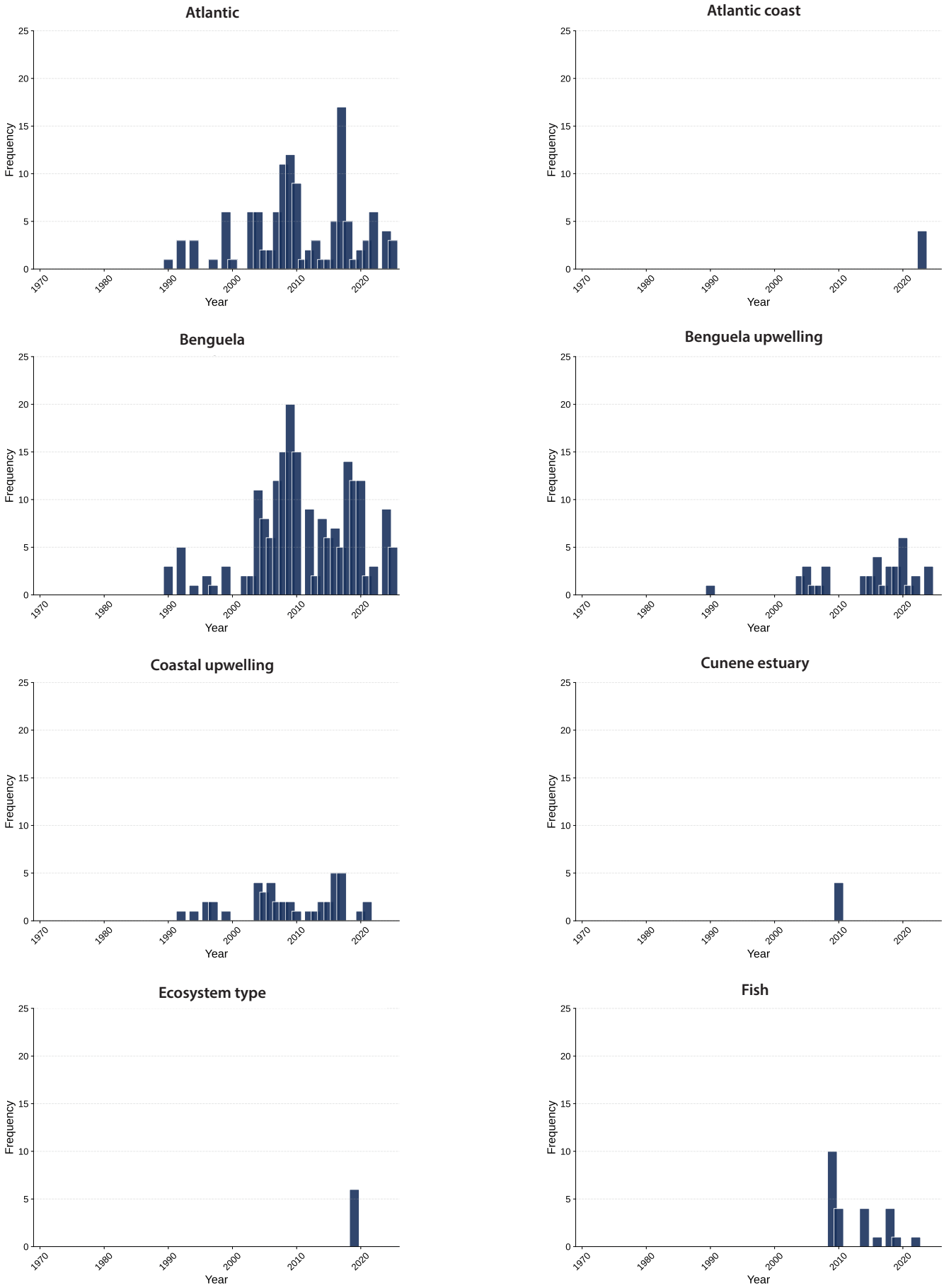


Figure 3. Temporal evolution of dominant unigrams and bigrams in Angola-related scientific publications

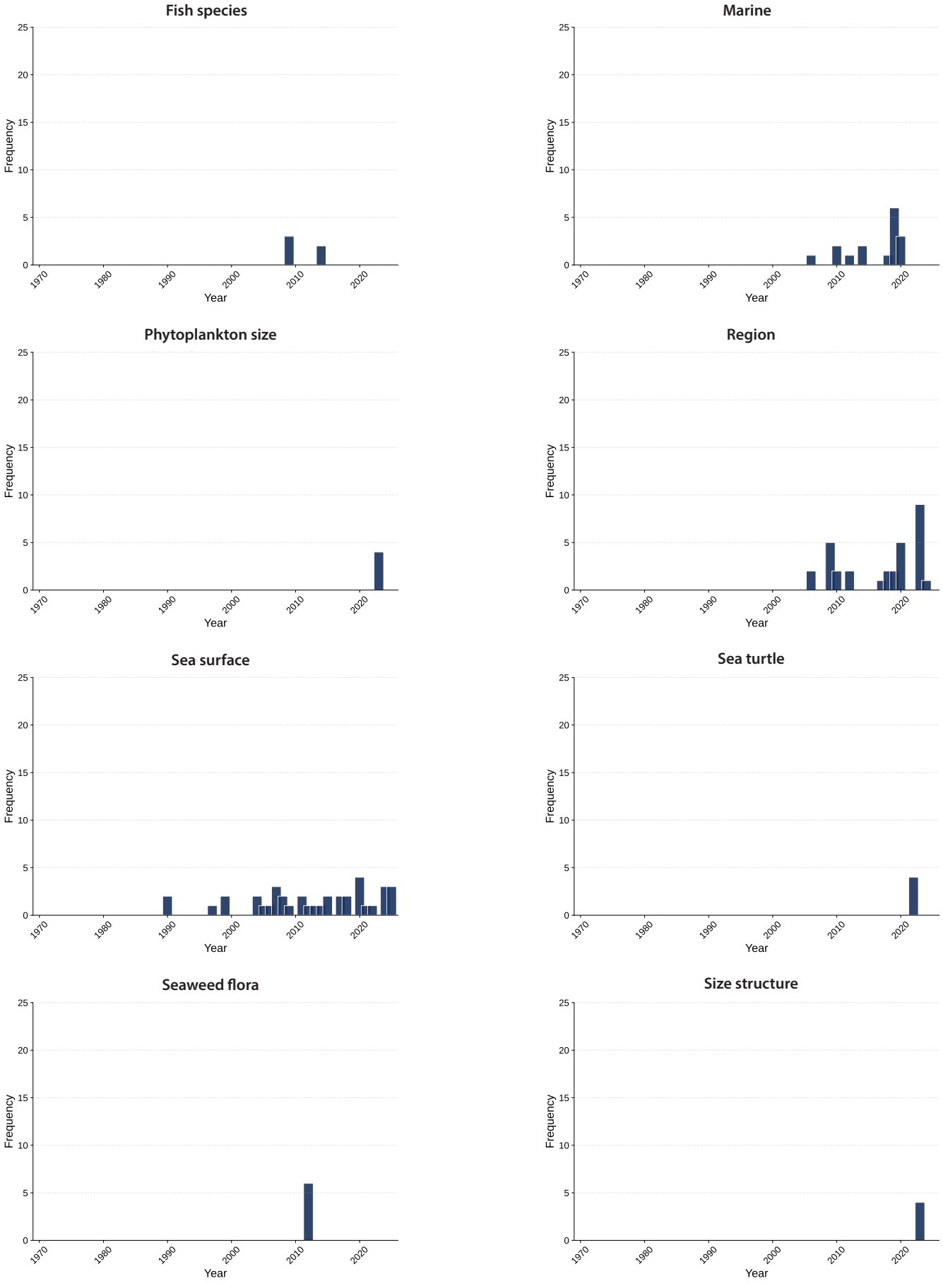


Figure 3. Temporal evolution of dominant unigrams and bigrams in Angola-related scientific publications

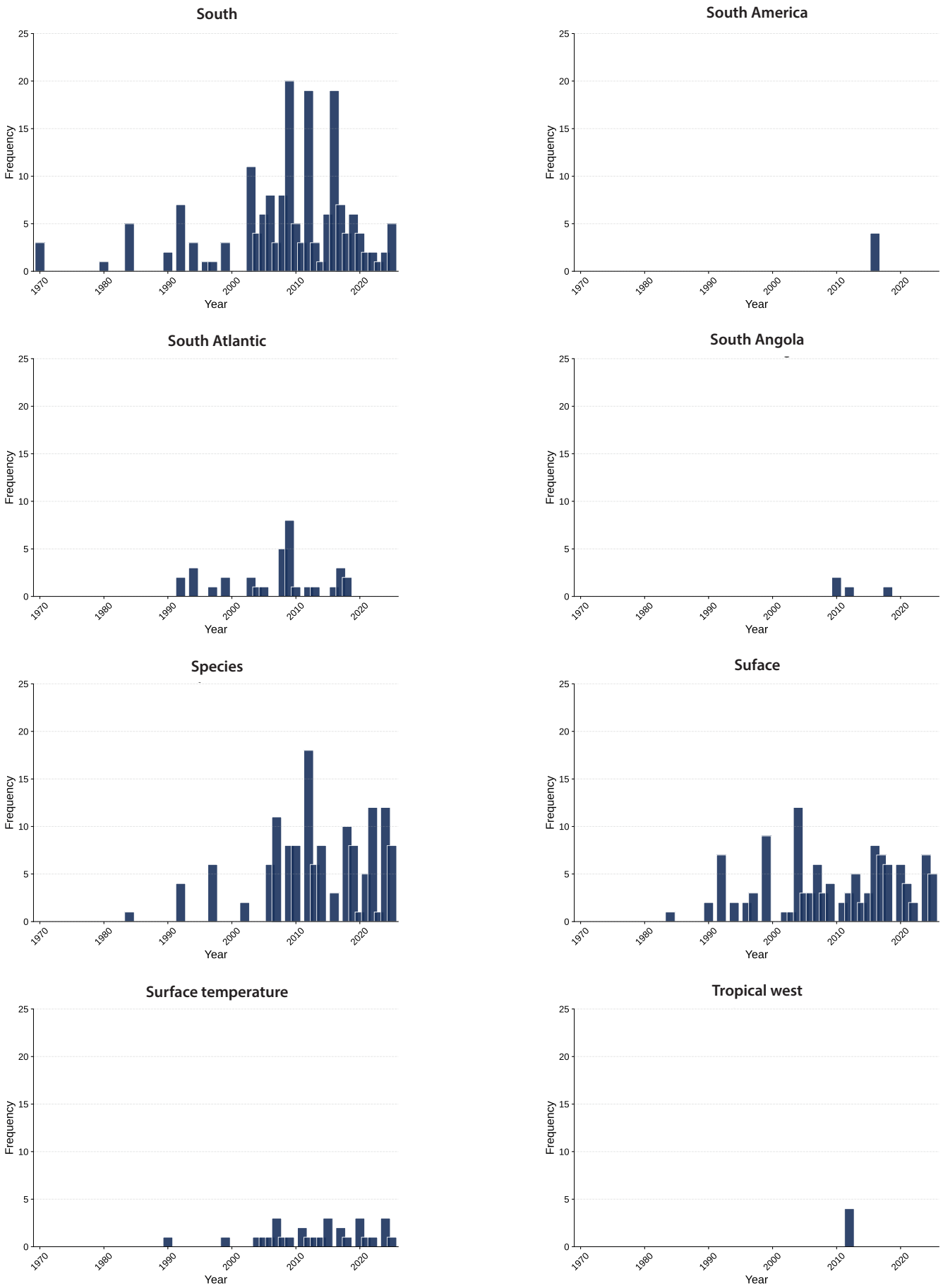
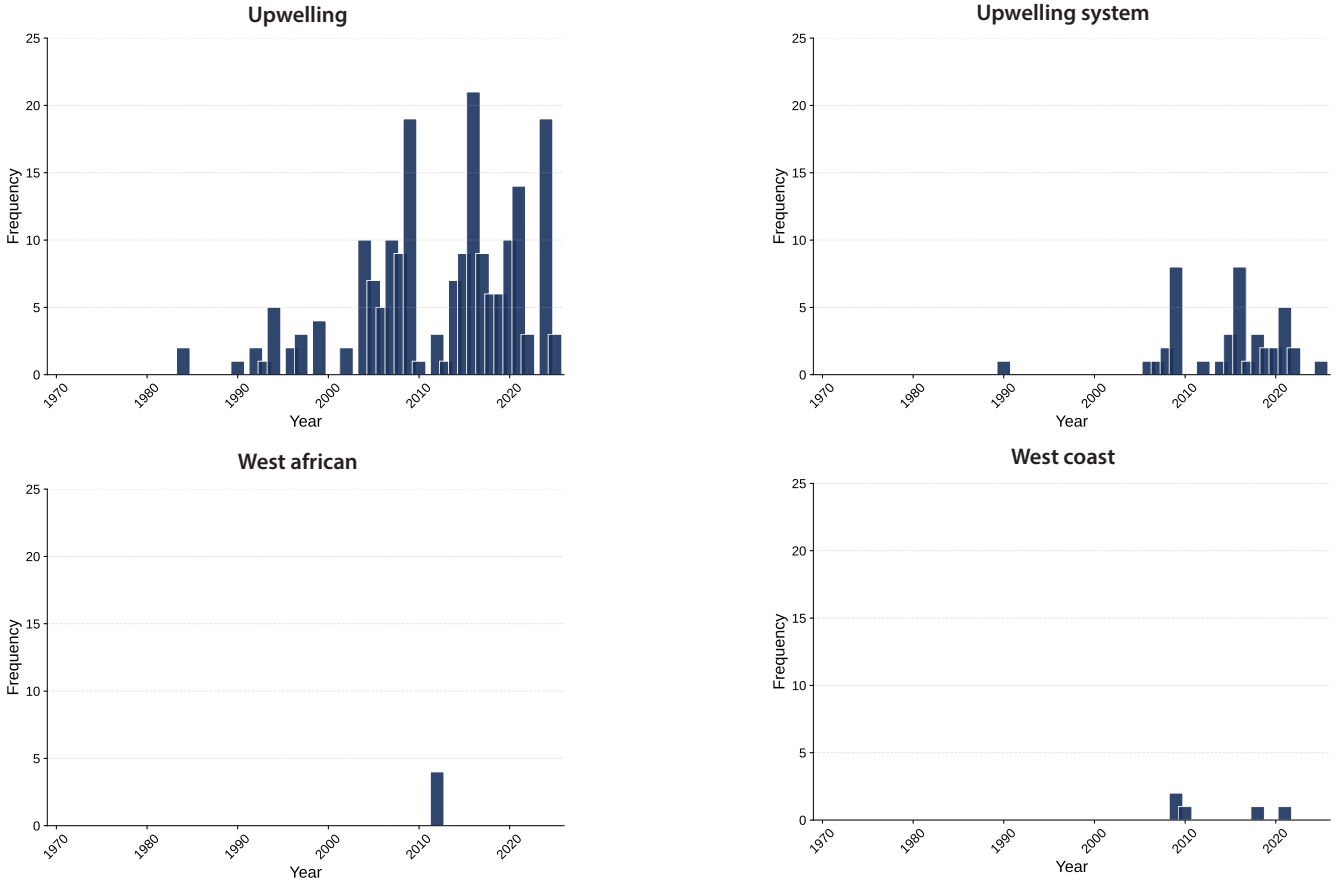


Figure 3. Temporal evolution of dominant unigrams and bigrams in Angola-related scientific publications



3.3.2. Temporal dynamics of research themes in Chile-related publications

A unigram and bigram analysis shown in Figure 4 indicates a strong emphasis on coastal and marine systems with terms such as 'species,' 'coast,' 'marine,' 'water,' 'upwelling' and 'central Chile' occurring most frequently. The increasing frequency after the 1990s, particularly during the 2000s, reflects growing scientific attention to marine biodiversity, oceanographic processes and coastal ecosystem dynamics. Terms including 'climate change,' 'El Niño,' 'coastal upwelling' and 'water column' further highlight the importance of environmental variability within the literature. The terms 'gender' and 'gender equality' were intentionally included, despite their low frequencies, to evaluate the representation of social and equity-related dimensions in the research output (see Figure 4).

Figure 4. Temporal evolution of dominant unigrams and bigrams in Chile-related scientific publications

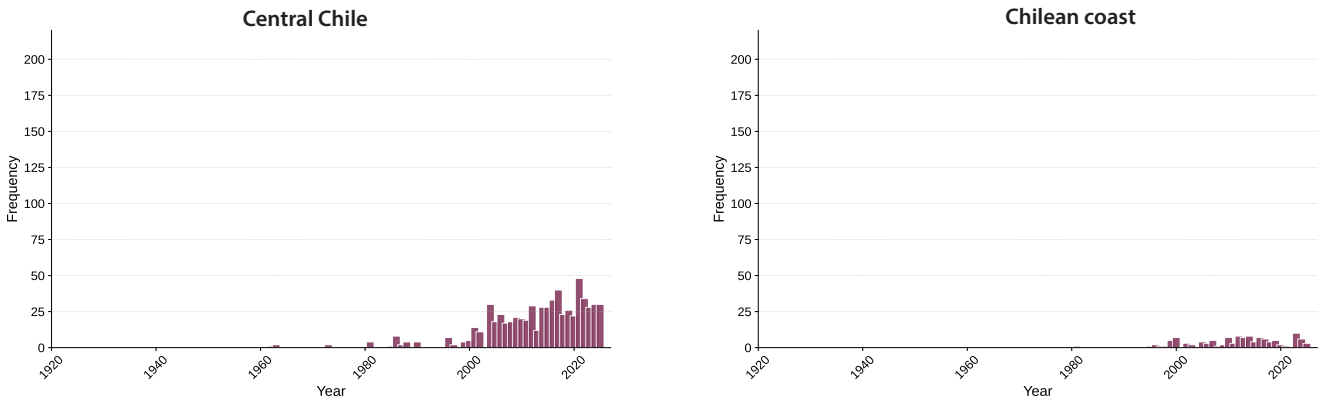


Figure 4. Temporal evolution of dominant unigrams and bigrams in Chile-related scientific publications

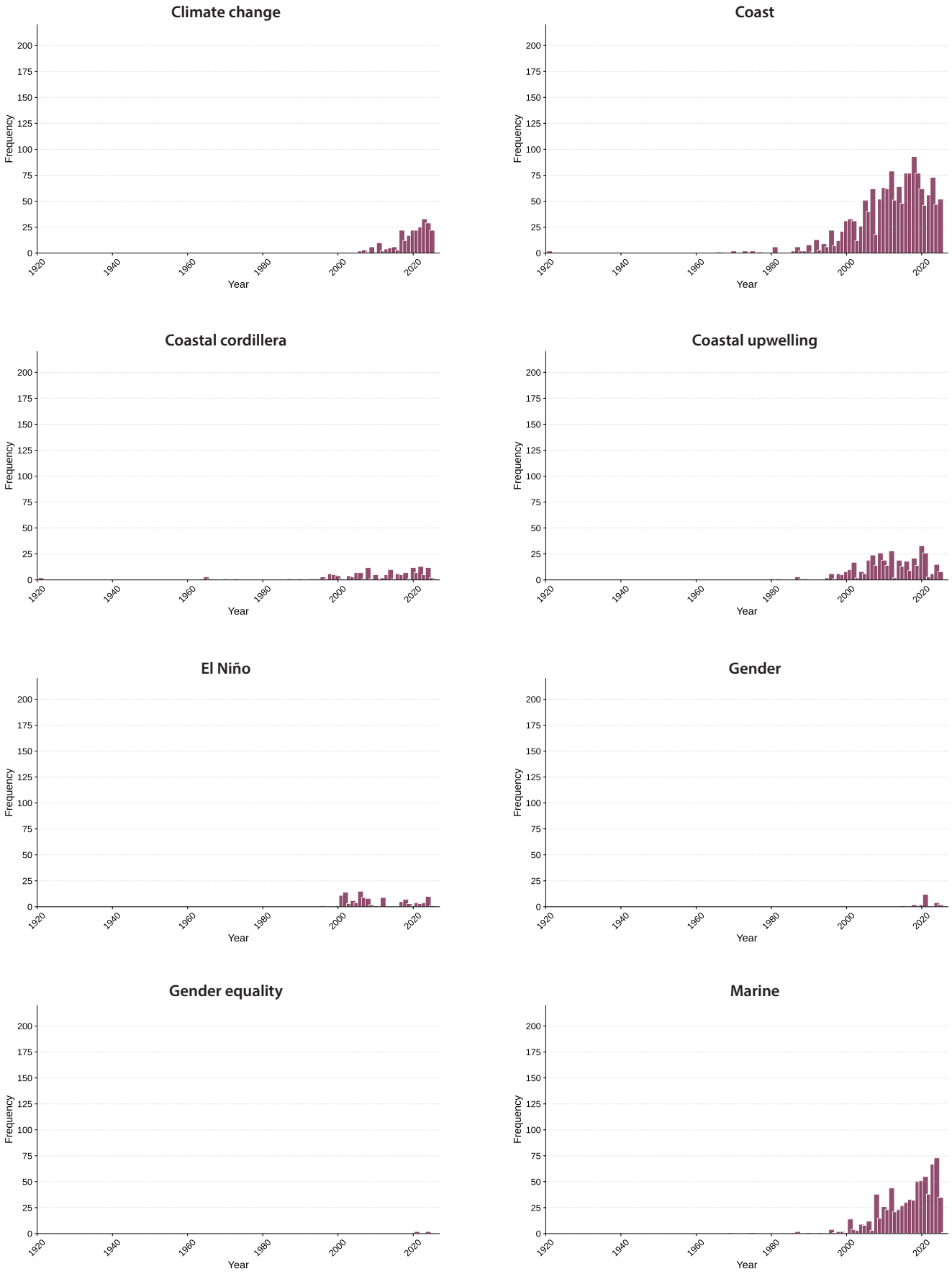
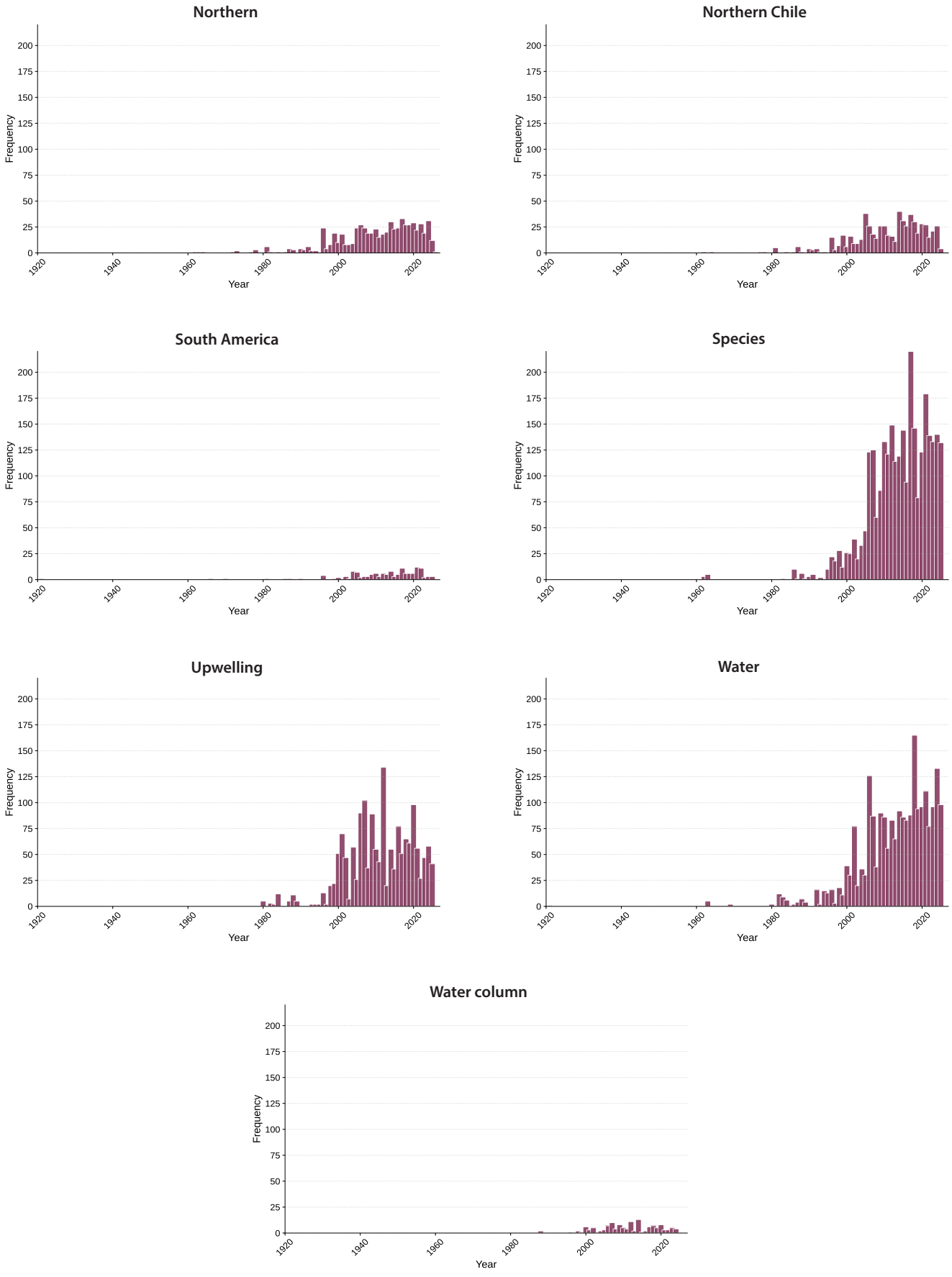


Figure 4. Temporal evolution of dominant unigrams and bigrams in Chile-related scientific publications



3.3.3. Temporal dynamics of research themes in Jamaica-related publications

A unigram and bigram analysis was conducted to identify dominant thematic patterns in Jamaica-related scientific publications over time. As illustrated in Figure 5, the literature is strongly associated with coastal and marine environments, with frequent terms including 'Caribbean,' 'bay,' 'marine,' 'sea' and 'species.'

The increasing occurrence of terms such as 'climate change,' 'sea level' and 'sustainable development' after the 1990s indicates growing attention to environmental change, coastal vulnerability and sustainability issues. Additional terms, including 'coral reef,' 'salt marsh' and 'solid waste' further reflect the ecological and environmental management focus of the research output (see Figure 5).

Figure 5. Temporal evolution of dominant unigrams and bigrams in Jamaica-related scientific publications

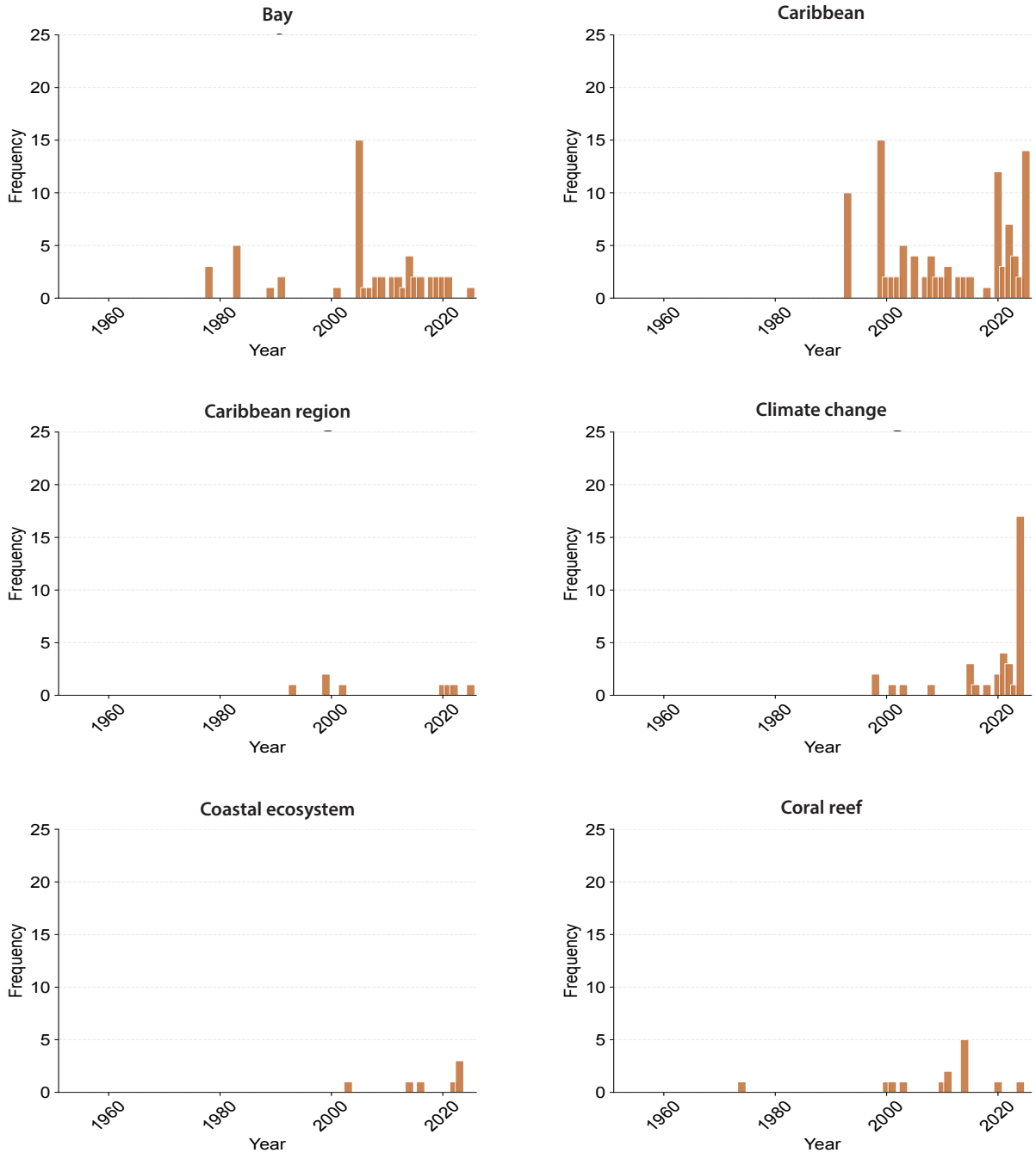


Figure 5. Temporal evolution of dominant unigrams and bigrams in Jamaica-related scientific publications

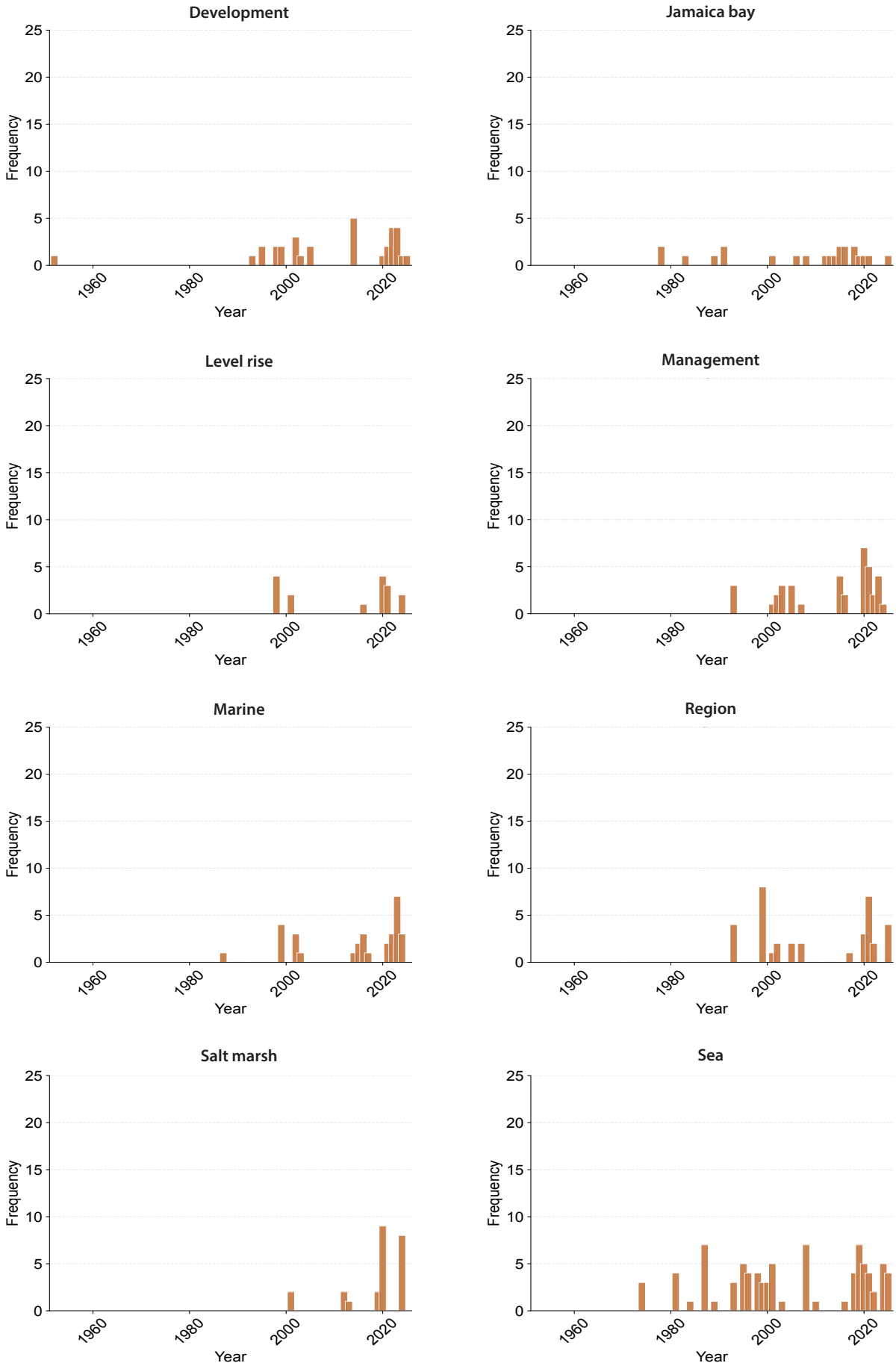
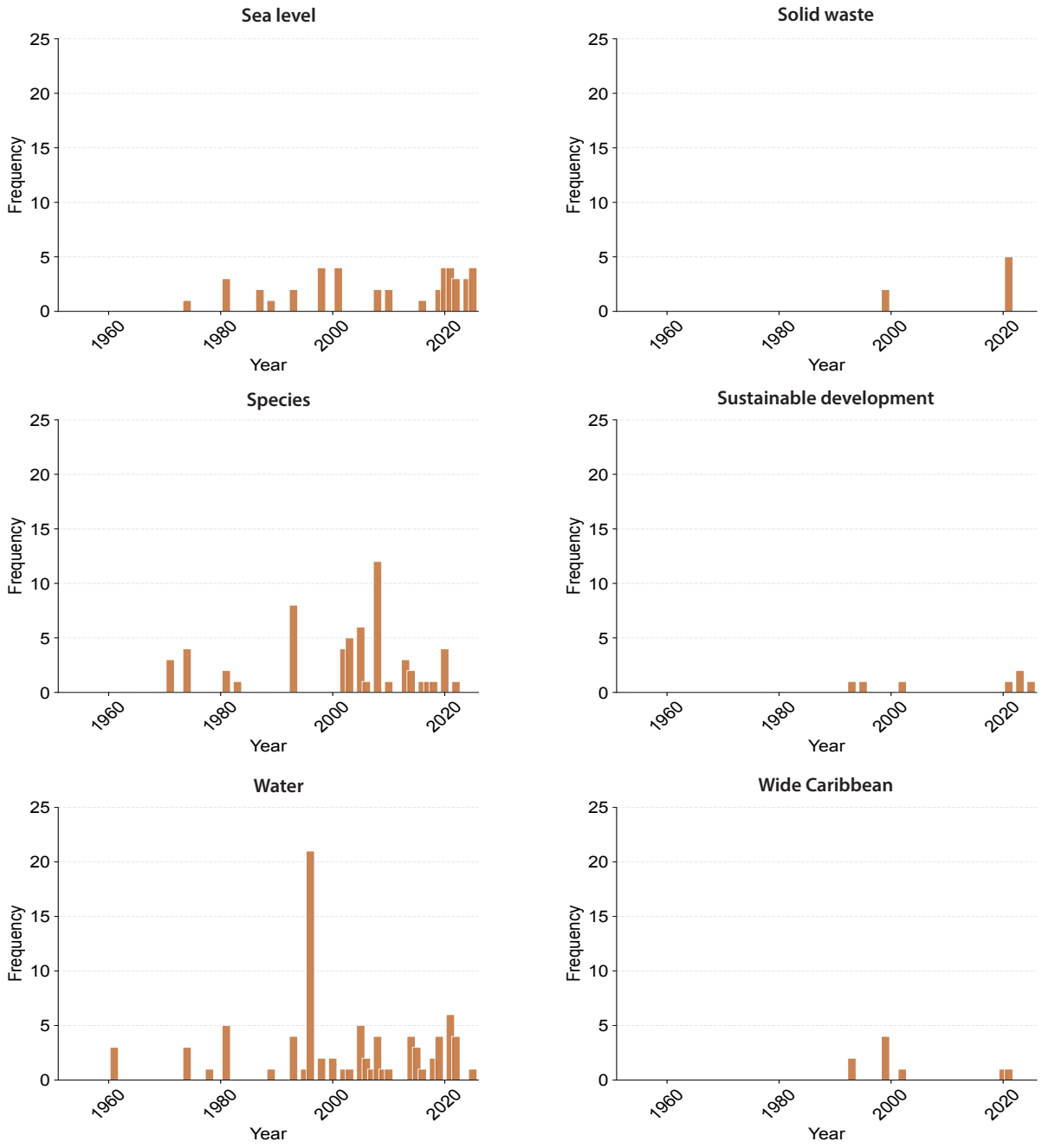


Figure 5. Temporal evolution of dominant unigrams and bigrams in Jamaica-related scientific publications



3.3.4. Temporal dynamics of research themes in Portugal-related publications

A unigram frequency analysis was conducted to examine thematic patterns in Portugal-related scientific publications over time. As illustrated in Figure 6, the literature is strongly focused on coastal and marine research, with frequent terms including 'coast', 'marine', 'species', 'water' and 'management'. The increased occurrence of terms such as 'climate change', 'coastal erosion', 'ecosystem services' and 'sea level' after 2000 reflects growing attention to environmental change and coastal management. References to 'Ria Formosa' and the 'Portuguese coast' highlight the importance of regional coastal systems,

while the terms 'gender', 'gender inequality' and 'youth' were intentionally included, despite their low frequencies, to evaluate the representation of social dimensions within the literature (see Figure 6).

Figure 6. Temporal evolution of dominant unigrams and bigrams in Portugal-related scientific publications

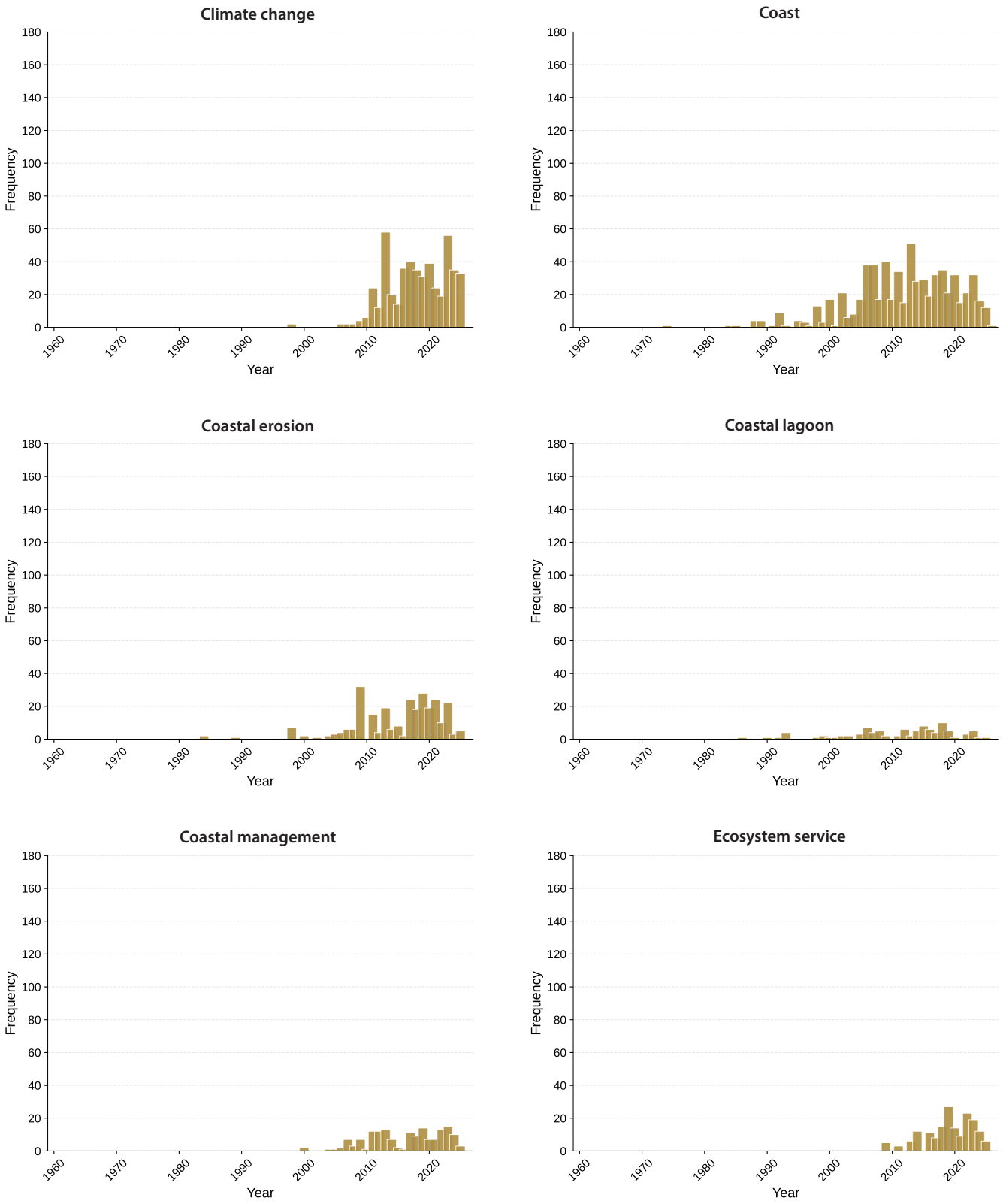


Figure 6. Temporal evolution of dominant unigrams and bigrams in Portugal-related scientific publications

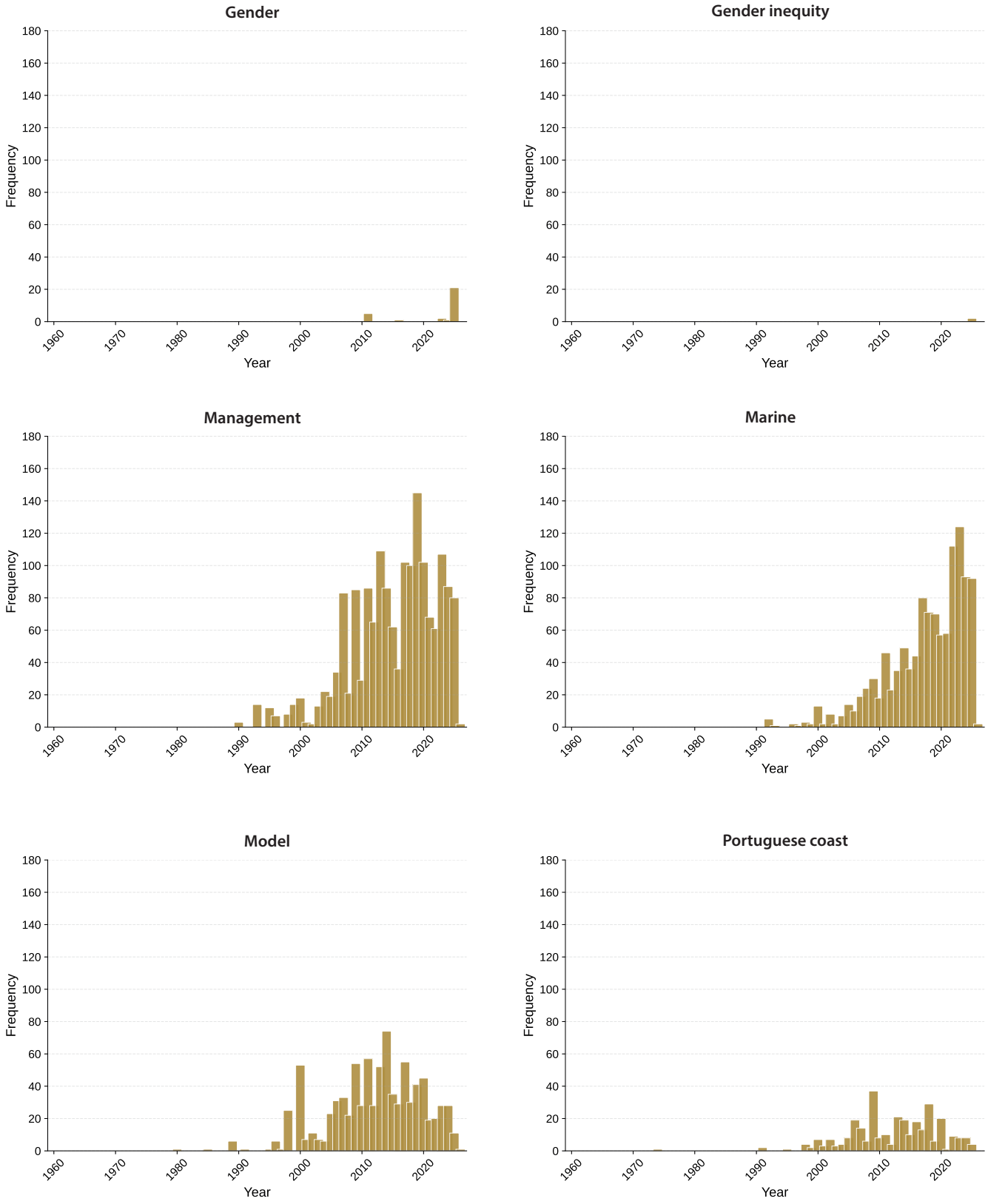
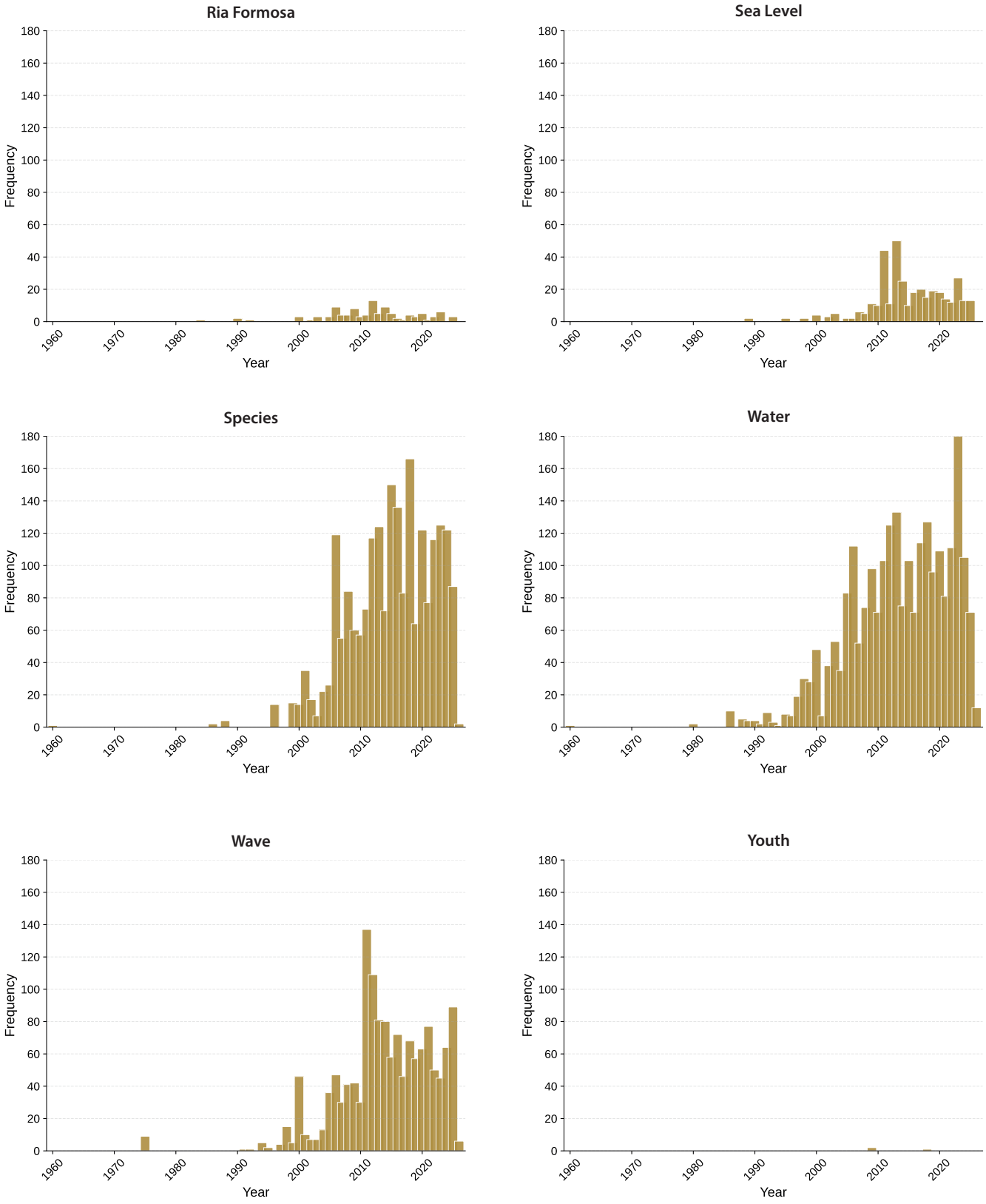


Figure 6. Temporal evolution of dominant unigrams and bigrams in Portugal-related scientific publications



These differences suggest that the Blue Economy operates simultaneously as a scientific field, a policy framework and a development narrative shaped by distinct national priorities, governance models and socio-environmental realities. The comparative patterns identified across the scientific literature therefore provide an important foundation for understanding how Blue Economy governance, institutional participation and policy priorities evolve across different coastal contexts.

The scientific literature highlights how Blue Economy and coastal sustainability issues are understood within research communities. Policy development and governance systems provide a complementary perspective, revealing how these themes are translated into institutional priorities, regulatory frameworks and public decision-making processes. The following section examines these governance dimensions at both the global and national levels.

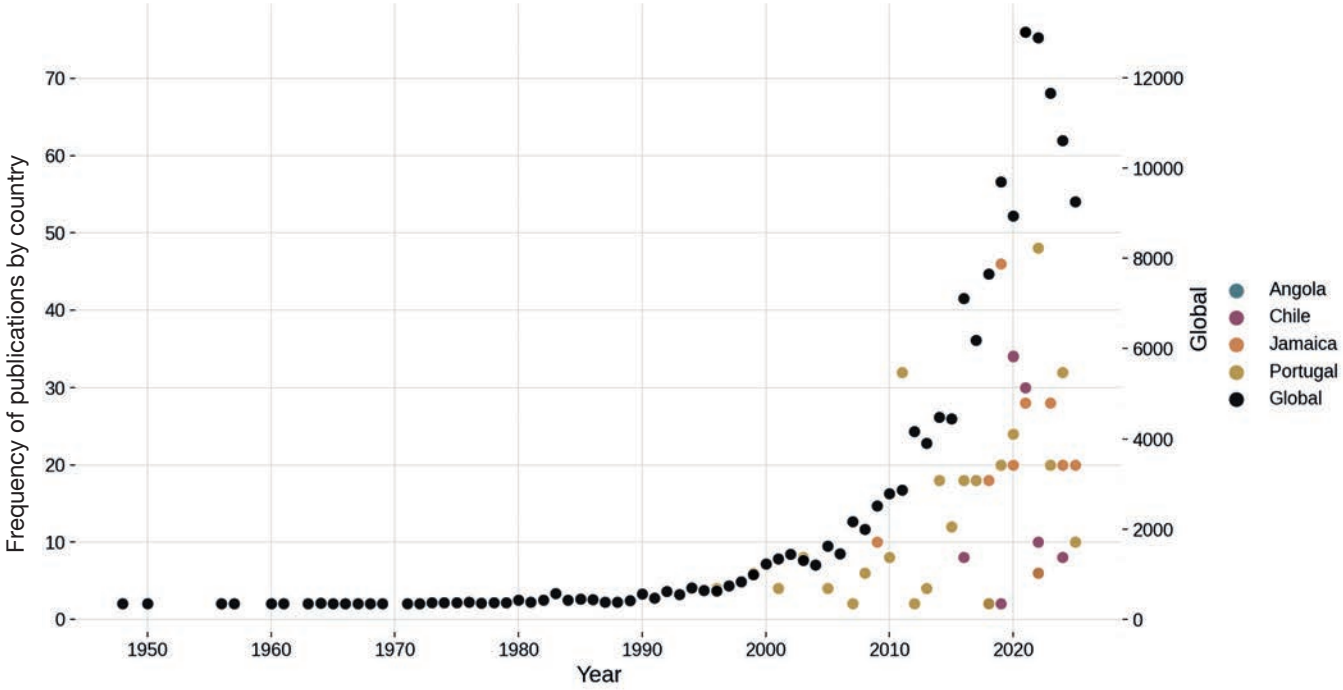
These scientific trends also provide important context for understanding how knowledge is translated into governance frameworks, educational initiatives and community practices explored in the following sections.

4. Policy and governance of the Blue Economy

4.1. Evolution of Overton publications related to the Blue Economy and coastal zones

Policy frameworks for the Blue Economy have expanded considerably across all selected countries reflecting the growing strategic importance of ocean-based development and increasing alignment with international sustainability agendas. The Blue Economy has increasingly emerged as a strategic governance framework through which countries seek to integrate environmental sustainability, climate adaptation, marine conservation and ocean-based economic development within coastal and marine policy systems. As shown in Figure 7, publication activity related to the Blue Economy and coastal zones remained limited prior to the 1990s followed by gradual growth during the late 1990s and early 2000s and a marked acceleration after 2010. Publication output reached its highest levels in the early 2020s exceeding 3,000 records annually indicating increasing scientific and policy attention to marine governance and coastal sustainability worldwide. Important differences nevertheless emerge across the four countries, reflecting distinct historical trajectories, institutional capacities and governance traditions. Portugal demonstrates strong integration within European policy frameworks and long-term maritime planning systems while Angola and Chile exhibit more recent but increasingly structured policy development processes associated with climate adaptation and marine governance. Jamaica, in contrast, shows close alignment with international agendas associated with SIDS, particularly in relation to community-based coastal management and climate resilience (see Figure 7).

Figure 7. Annual number of Overton Publications on the Blue Economy and coastal zones globally and in Angola, Chile, Jamaica and Portugal



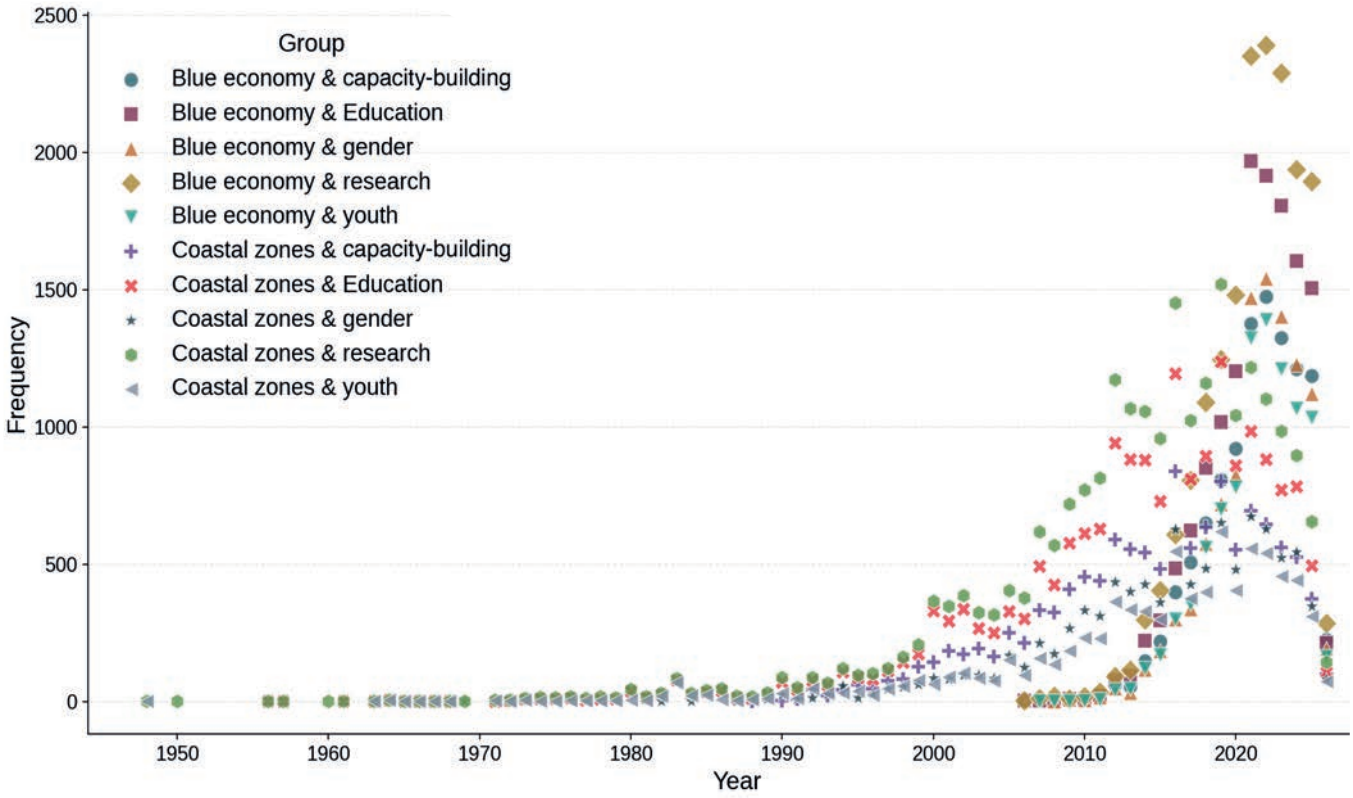
4.2. Knowledge, capacity-building and social inclusion in Blue Economy governance

Figure 8 illustrates the growing importance of research, education, capacity-building, gender and youth within Blue Economy and coastal governance discourse over recent decades. The sharp rise in scientific production reflects increasing global attention to marine governance, coastal sustainability, climate adaptation and ocean-based economic development while also demonstrating the expanding role attributed to scientific knowledge, environmental monitoring, higher education and technical training within contemporary ocean governance frameworks.

At the same time, Figure 8 demonstrates that social dimensions such as gender equality and youth participation remain comparatively less visible within formal governance and policy discourse. Although women and young people play important roles in coastal livelihoods, environmental stewardship and community resilience practices, their representation within scientific production, governance systems and institutional decision-making processes remains comparatively limited. This imbalance suggests that Blue Economy governance continues to prioritize environmental and economic objectives more strongly than questions of social inclusion and participatory equity (see Figure 8).

While Figure 8 captures broad patterns in the evolution of research, education, capacity-building, gender and youth within Blue Economy and coastal governance discourse, these aggregate trends mask important differences across national contexts. The comparative analysis undertaken in this publication indicates that the four countries are pursuing Blue Economy transitions through distinct institutional, governance and knowledge development trajectories. Variations in scientific production, governance structures, capacity-building efforts and stakeholder engagement reflect differences in national priorities, policy frameworks and implementation contexts.

Figure 8. Temporal evolution of Blue Economy and coastal zone publications related to research, education, gender and youth



Important differences nevertheless emerge across the four countries. Portugal and Chile exhibit substantially higher publication outputs and stronger integration into international scientific and policy networks reflecting more consolidated research infrastructures and long-term investments in marine and coastal governance. Angola, by contrast, remains in a process of institutional and technical capacity strengthening with increasing emphasis placed on international cooperation, environmental monitoring and professional training. These dynamics also reflect the importance of knowledge co-production between universities, communities, civil society organizations and governance institutions within contemporary coastal governance systems. Jamaica demonstrates growing integration between community-based governance approaches and local participation initiatives, particularly in relation to coastal resilience and fisheries management.

Higher education institutions are increasingly recognized within Blue Economy governance discussions for their contributions to knowledge production, environmental monitoring, technical training, capacity-building and engagement with governments, communities and civil society organizations. Across the four countries, the findings point to the growing importance of higher education actors in supporting knowledge exchange and collaboration among stakeholders involved in Blue Economy transitions.

4.3. Comparative institutional structures in Blue Economy governance

Governance systems for the Blue Economy and coastal zones involve multiple actors operating across different institutional levels, including governments, academic institutions, private-sector organizations and civil society actors. The comparative analysis

of publication trends presented in Figure 9 and Figure 10 highlights the evolution of governance participation over time at both global and national scales. Globally, publication output increased steadily from the 1970s onward with particularly strong growth after 2000 and a marked acceleration after 2010. This expansion reflects the increasing prominence of international organizations, NGOs, legislative bodies, judicial institutions and think tanks as contributors to Blue Economy and coastal governance discussions indicating a gradual diversification of governance participation over time.

The diversification of organizational participation reflected in Figure 9 suggests that Blue Economy governance increasingly involves a broader range of institutional actors operating across multiple governance levels. Governments remain central actors, but universities, NGOs, think tanks, international organizations and civil society institutions have become increasingly visible within policy and governance discussions over time.

At the national level, governance structures differ considerably across the selected countries. Portugal exhibits the most diversified governance profile, with strong participation from NGOs, legislative institutions, judicial bodies and think tanks. This reflects the country's strong integration within European maritime and environmental governance frameworks. Chile and Jamaica display comparatively more centralized governance patterns, with publication activity concentrated primarily within governmental institutions and universities, although Jamaica also demonstrates growing emphasis on community-based coastal governance initiatives. Angola, by contrast, shows lower overall institutional activity and more limited diversification of governance

Figure 9. Distribution of organizational types in Overton publications on the Blue Economy and coastal zones: global trends (1950–2025)

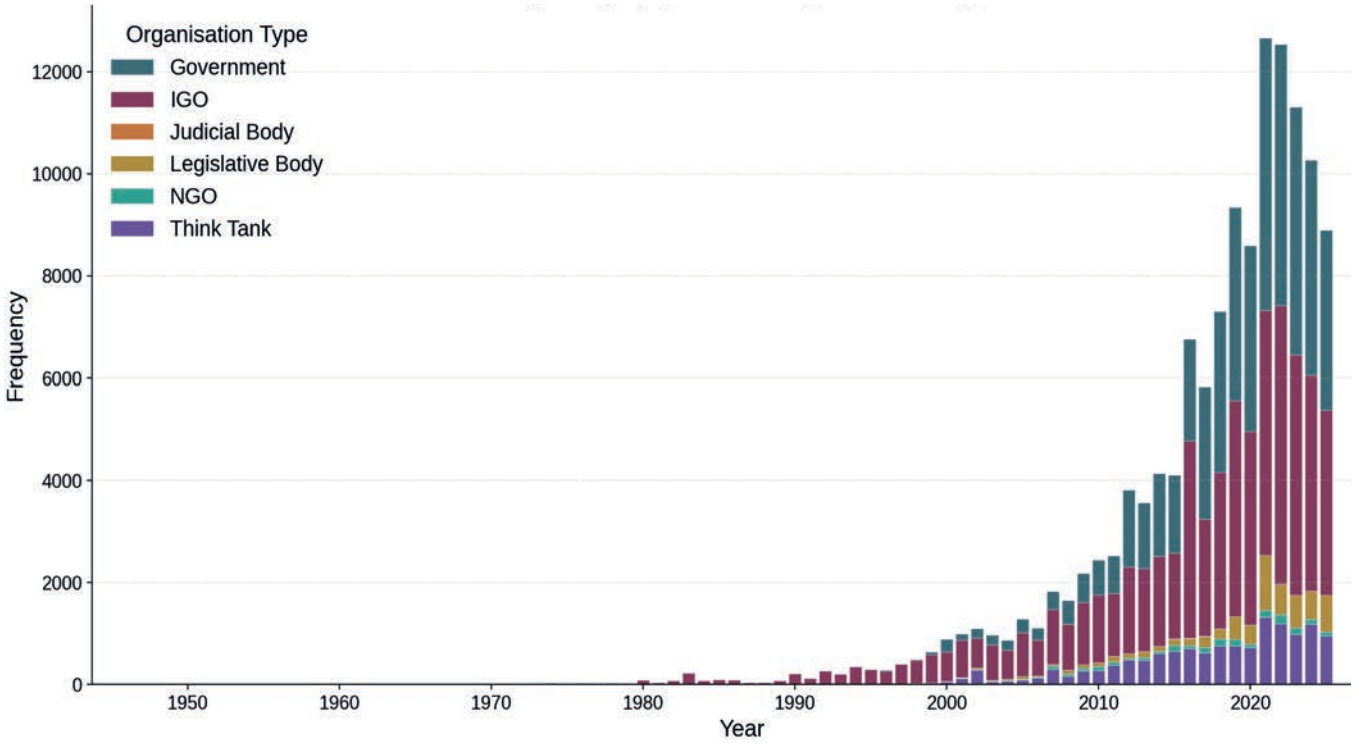
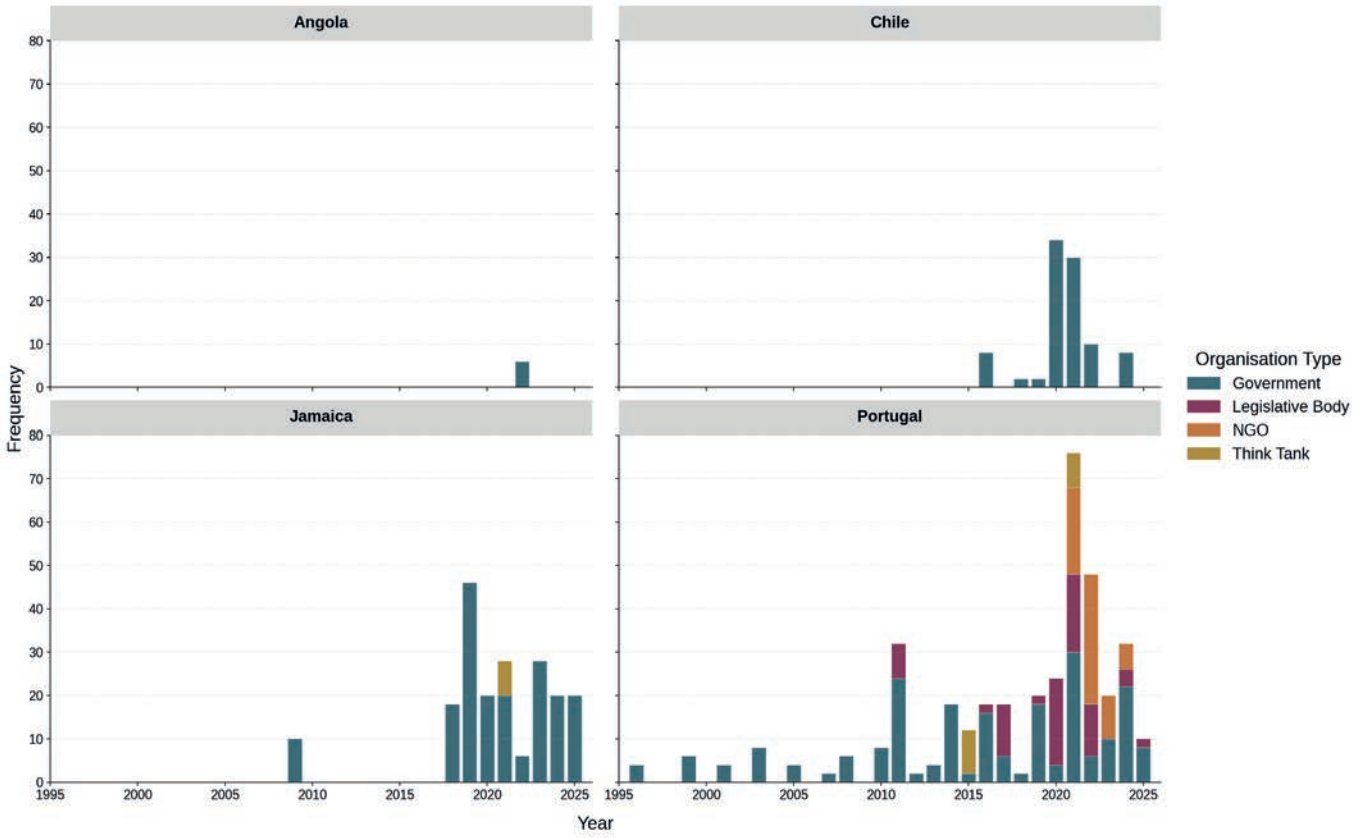


Figure 10. Distribution of organizational types in Overton publications on the Blue Economy and coastal zones for Angola, Chile, Jamaica and Portugal (1950–2025)



actors, reflecting a comparatively emerging governance landscape in which institutional strengthening and international cooperation remain important. Overall, the results demonstrate that governance participation in Blue Economy and coastal-zone research has become increasingly multi-actor and institutionally diversified although significant differences remain across national contexts (see Figure 9 and Figure 10).

4.4. SDG alignment in the Blue Economy and coastal governance

The comparative analysis of governance participation in Blue Economy and coastal zone research highlights the growing institutional diversification of governance actors over time. Figure 11a illustrates how publications indexed in Overton align with the Sustainable Development Goals (SDGs) revealing a strong emphasis on environmental sustainability and climate governance. SDG 13 (Climate Action) and SDG 14 (Life Below Water) are the most prominently represented goals, highlighting the importance of climate adaptation, marine conservation, sustainable resource management and coastal ecosystem protection within Blue Economy governance. The representation of SDG 15 (Life on Land) further demonstrates recognition of the interconnections between marine and terrestrial ecosystems while moderate representation of SDGs 8, 9 and 11 indicates growing attention to economic transformation, infrastructure development and coastal urban sustainability.

In contrast, goals associated with poverty reduction, education, gender equality, health, governance and international partnerships (SDGs 1–5, 16 and 17) appear less frequently, suggesting that policy discourse remains predominantly environmentally oriented

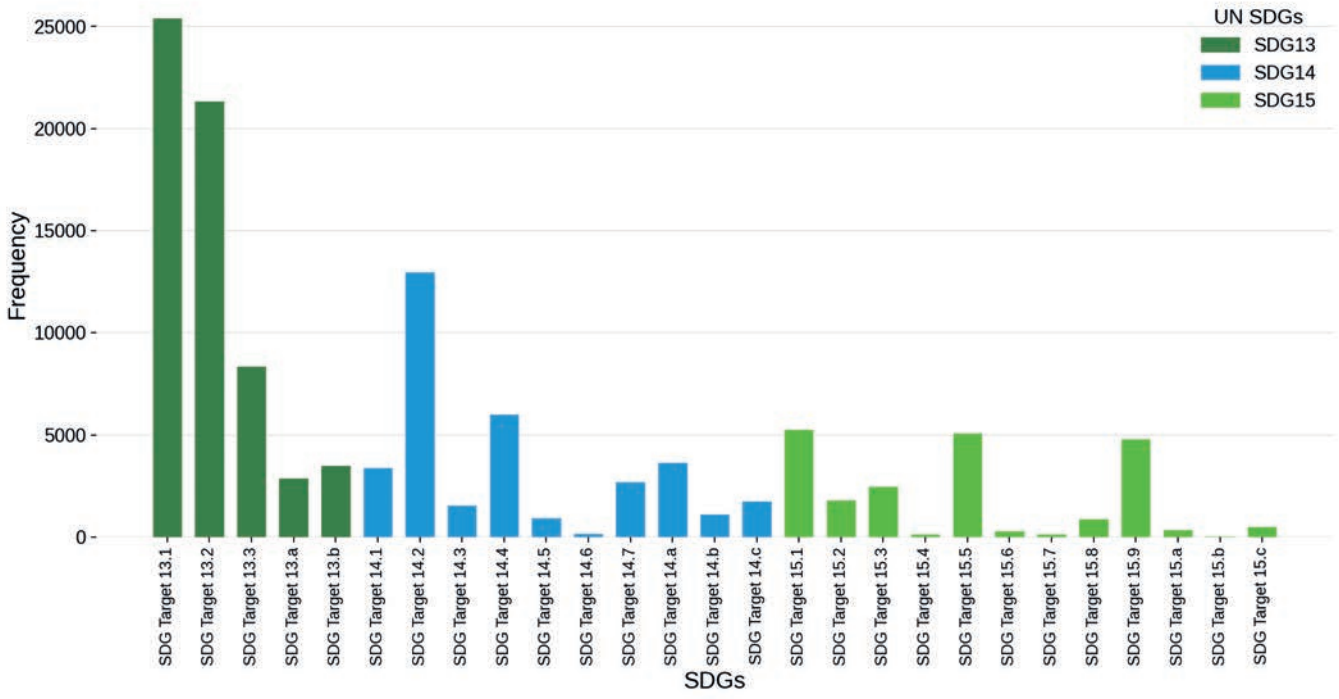
rather than comprehensively integrated across all dimensions of sustainable development. This reinforces broader findings across the four countries where environmental sustainability, climate adaptation and marine governance increasingly occupy central positions within public policy frameworks, while social inclusion, community participation, cultural heritage and participatory governance remain comparatively less visible within institutional and policy discussions.

Figure 11b further examines publications associated with targets under SDGs 13, 14 and 15, the most frequently addressed goals in the dataset. The results show that contemporary sea governance strategies are primarily structured around climate resilience, ecosystem-based marine management, biodiversity conservation and sustainable fisheries governance. Targets 13.1 and 13.2 emphasise climate adaptation and the integration of climate considerations into marine planning, while Targets 14.2 and 14.4 highlight sustainable marine ecosystem management and fisheries governance. Additional attention to Targets 14.1, 14.7, 14.a, 15.1, 15.5 and 15.9 reflects increasing concern with marine pollution reduction, sustainable ocean-based economic growth, biodiversity conservation and ecosystem restoration.

Figure 11a) Distribution of Overton publications on Blue Economy and coastal zones addressing the UN Sustainable Development Goals



Figure 11b) Sea governance strategies reflected in SDG targets within Blue Economy and coastal zone publications.



Overall, the SDG analysis suggests that Blue Economy governance is increasingly shaped by integrated environmental and climate-related priorities, although important challenges remain regarding the incorporation of social equity, local participation and broader cultural dimensions within sustainable coastal and marine governance frameworks.

4.5. Heritage, communities and resilience in Blue Economy governance

One of the most significant findings emerging from this comparative analysis is that, despite substantial advances in environmental management, climate adaptation and marine governance, heritage and community dimensions continue to occupy a comparatively marginal position within Blue Economy governance frameworks. Across the four countries, policy and governance discussions strongly emphasize environmental sustainability, marine conservation, fisheries management and climate resilience, while comparatively less attention is given to cultural and natural heritage, local knowledge systems, community memory and the social relationships that shape coastal territories.

Nevertheless, many of the resilience practices observed within coastal communities possess important heritage dimensions. Traditional ecological knowledge, collective forms of coastal organization, intergenerational transmission of maritime practices and cultural relationships with marine ecosystems continue to play a key role in how communities adapt to environmental and social change. From this perspective, heritage should not be understood solely as an object of conservation, but also as a social and territorial resource that contributes to environmental stewardship, social cohesion and community resilience.

The limited visibility of heritage within contemporary Blue Economy governance therefore represents an important gap within existing policy frameworks. Strengthening the connections between ocean governance, community participation and cultural heritage could contribute to more inclusive and socially grounded approaches to coastal sustainability, while improving the legitimacy and long-term effectiveness of governance interventions across marine and coastal territories.

Scientific research and governance frameworks provide important perspectives on the Blue Economy. Community experiences offer an equally important dimension, illustrating how policies, environmental changes and development initiatives are understood and experienced within coastal territories. The following section explores these perspectives through the voices and experiences of stakeholders across the four countries.

The perspectives of community actors themselves are therefore essential for understanding how these governance frameworks are experienced, interpreted and implemented within coastal territories.

5. Voices of stakeholders: Community perspectives

While the previous sections examined the scientific, institutional and governance dimensions of the Blue Economy, the following section foregrounds the experiences and perspectives of community actors directly engaged in coastal livelihoods, environmental stewardship and local governance practices. The analysis presented in this section draws primarily on five semi-structured interviews conducted across the four pilot countries as part of the Community Engagement and Practice-Based Research Component. All interviewees provided their informed consent for participation in the study and for the use of their contributions in this report.

These conversations brought together Prof. Manuel Vilengalenga of the Universidade do Namibe in Angola, Indigenous leader Kasike Kalaan Nibonrix Kaiman and Jamaica Environment Trust CEO Dr. Theresa Rodriguez-Moodie in Jamaica, João Melo of the Turning Blue project in Portugal (APROXIMAR) and Devora García, President of the Acuipesca Tongoy Mujeres cooperative in Chile. The interviews include perspectives from community leaders, Indigenous representatives, civil society actors, cooperative leaders and higher education practitioners from Angola, Chile, Jamaica and Portugal, providing diverse insights into both shared challenges and context-specific realities related to the Blue Economy, community resilience and coastal development.

A summary of the interviews conducted is provided in Annex 1 and the interview questionnaire is included in Annex 2.

5.1. Community livelihoods and Blue Economy practices

Across the four pilot countries, community-level blue economies centre on fisheries, aquaculture, coastal tourism, conservation and advocacy around rivers and beaches. In Tongoy, Chile, women's cooperatives cultivate oysters, scallops, *piure* and algae in a nutrient-rich bay moving beyond capture fisheries into community-driven aquaculture. In Angola's Namibe province, initiatives such as *Mulheres na Água* support women to shift from clam collection to mussel cultivation while the University of Namibe promotes aquaculture, eco-tourism and alternative livelihoods alongside artisanal fishing. Jamaican coastal communities combine small-scale fishing and tourism with local stewardship activities, even when these are not formally labelled as 'Blue Economy projects'. In Portugal, projects like Turning Blue connect young men in correctional facilities to potential jobs in ports, tourism, fisheries and marine-related services framing the sea as ***'full of opportunities'*** for social inclusion as well as growth. These experiences further demonstrate that the Blue Economy is not limited to marine resource extraction but increasingly involves diversified local economies connected to sustainability, social inclusion and community resilience.

These patterns resonate with a wider set of initiatives documented in the broader mapping and rarely exist in isolation; diversification is a recurring strategy. In Tongoy, Chile, fishers have consciously shifted from ***'hunters and extractors'*** to aquaculturists who ***'cultivate the sea, organizing it, cleaning it and conserving it'*** making cultivation rather than extraction the backbone of future livelihoods. Dévora García from Chile's first women-led oyster

cooperative illustrates this shift through oyster prices. Oysters in Tongoy sold for around 190 pesos each in 2019, but, as García explains, ***'If we, the producers, did not value the oyster, nobody else would. We decided not to sell below 350 pesos.'*** Despite initial skepticism, buyers accepted the new price and by 2025 oysters were worth around 600 pesos. For García, ***'that change helped raise the value of the product and showed the importance of women in giving proper value to the work.'***

In Namibe, Angola, families blend fishing with agriculture, mariculture and emerging tourism to reduce dependence on increasingly unstable catches, echoing national efforts to move beyond extractive fishing. Jamaican and Angolan experiences show that communities use advocacy and cultural practices – such as ceremonies, sports-based mangrove planting, or beach-access campaigns – to keep ecological and access issues in public view, thereby defending the conditions under which fisheries and tourism can remain viable. These grounded practices confirm that community blue economies combine traditional knowledge with newer approaches to sustainability and adaptation.

These examples illustrate the diversity of community-based Blue Economy practices across the four countries. While the specific activities differ across Angola, Chile, Jamaica and Portugal, the interviews consistently demonstrate efforts to diversify coastal livelihoods through combinations of conservation, skills development, community engagement, sustainable resource use and local economic innovation. Questions of participation and influence nevertheless remain central, particularly regarding the roles of women and young people within coastal economies and governance processes.

5.2. Women and youth participation in coastal governance and development

The five semi-structured interviews conducted across Angola, Chile, Jamaica and Portugal show that women and youth are already central to coastal livelihoods and community organization even when formal frameworks treat them as peripheral. In Tongoy, Chile, Dévora García (*Acuipesca Tongoy Mujeres*) traces a four-generation lineage of artisanal fishing in her family and highlights how women have moved from cleaning and selling fish onshore to diving, cultivating shellfish and leading cooperatives. As she puts it, ***'Women always wanted to speak, but they did not always have the space,'*** pointing to a long-standing desire for participation rather than a recent awakening. García's later reflection to male guild members that they had ***'missed 40 years of opportunities because they did not think about the women working beside them'*** frames exclusion as costly, not merely unjust. Drawing on her own experience leading the cooperative, García explains that the core group of five women now represents a broader umbrella of more than 100 women across diverse coastal activities, while women account for 92 out of 375 members (approximately 24.5%) in the Tongoy fishing guild overall leading cultivation planning, setting production floors and introducing conservation ethics – such as bringing all debris ashore rather than discarding it at sea – now adopted across the bay and gradually taken up by male fishers as well. Further north in Coliumo, the Union of Fisherwomen and Seaweed Gatherers, a women-led artisanal fishing union that is the first of its kind in Chile, has co-managed algae extraction areas for over two decades, turning former 'informal gatherers' into recognized resource managers who now influence national fisheries debates (Ocean Witness, 2021).

The increasing influence of women, and their participation in decision-making, also occurs in less formal ways. In Namibe, Angola, women dominate fish marketing and post-harvest processing; as Manuel Vilengalenga (University of Namibe) notes ***'It is the women who receive the fish… they are the ones who determine the sale price of the fish'*** giving them de facto authority over key economic decisions even when they are less represented in fisheries governance. In Portugal's Sado Estuary, fisherwomen involved with Ocean Alive have become 'Guardians of the Sea', acting as monitors, citizen scientists and eco-tourism guides and are thereby increasingly recognized as legitimate ocean experts in local governance. In Jamaica, Kasike Kalaan (Yamaye Guani Taíno peoples) describes Taíno communities as matriarchal, emphasizing that women ***'guide the next generation'*** and often lead children's activities by the sea, from surf camps to nature days that embed environmental ethics in everyday life. These examples indicate that women are progressively making choices that affect value chains, intergenerational learning and stewardship practices even though policy documents still treat them as ***'vulnerable groups'*** rather than co-governors.

Young people similarly play an active part in their communities beyond their role as future workers. In Chile, García actively invites young people into aquaculture by explaining the livelihood in concrete, mathematical terms: **'work in an orderly way, cultivate properly and understand your production'** which, in practice, means keeping around 500,000 oysters in the water at all times to maintain a structured harvest cycle and make cultivation economically viable (a figure García uses to convey the scale of planning required). In Angola, youth associations were the entry point for a four-month training programme led by the Universidade do Namibe, in which 30 young people took part in sessions covering alternatives to extractive fishing and subsequently helped relay information and build trust within their communities. Jamaican youth organizations co-lead advocacy around deep-sea mining and environmental rights. Many of the young activists involved with the Jamaica Environment Trust, such as representatives of the Jamaica Climate Change Youth Council and EcoSeas **'happen to be women'** underscoring how generational and gendered inclusion intersect. On Jamaica's south coast, the 'Play for the Mangroves' programme turns youth sports culture into a vehicle for mangrove planting and shoreline clean-ups, making stewardship participation feel locally meaningful (Seacology, 2025).

In Portugal, the Association for the Study and Conservation of the Oceans (AECO)'s *Crescer pelo Mar* connects vulnerable youth – especially young women – to the sea through practical training and ocean-literacy activities, with the aim of positioning them as future custodians of marine resources rather than marginal spectators (RTV AECO, 2022). According to the interview with João Melo (APROXIMAR), the Turning Blue pilot in Leiria, Portugal, involving 16 incarcerated young men, achieved 100% retention, with every invited participant choosing to continue. This level of engagement highlights that marginalized youth can be active drivers of opportunity and change. As Kasike (Jamaica) summarizes, **'The most important lesson is to focus on youth and women. They carry the message and can shift the mindset of a generation.'**

Across the four countries, the interviews suggest that women and youth are already

active contributors to coastal livelihoods, environmental stewardship and community resilience. Yet the degree to which these contributions are formally recognized varies considerably. In Chile, the Coliumo union holds legal co-management rights and the Tongoy cooperative is in the process of formal incorporation therefore concrete steps toward institutional recognition are being taken. In Angola, women's price-setting authority and participation in aquaculture training remain informal with literacy barriers still limiting access to governance structures. In Jamaica, the absence of legal recognition for Indigenous peoples means Taíno stewardship practices carry no formal standing, despite their depth and continuity. In Portugal, the 'Guardians of the Sea' model has earned institutional visibility but women's roles in fisheries governance remain the exception rather than the norm. In each case, the gap between what communities are already doing and what policy frameworks acknowledge points to a structural lag that limits the effectiveness of the Blue Economy itself.

5.3. Barriers to participation and equitable benefit-sharing

The interviews also suggest that inclusion remains uneven and the benefits from Blue Economy initiatives are often fragile or unequally shared. In Namibe, many women often face limited educational opportunities resulting in low literacy levels or minimal formal schooling. For example, when the University of Namibe first approached women about mussel cultivation ***'many ran away… we believe there had been promises in the past that were not fulfilled'*** revealing how education gaps and histories of broken trust can undermine participation even in carefully designed projects. On Angola's North Coast, where women often face limited access to finance and formal economic opportunities, the Nkola Project benefited 7,000 women by revitalizing fishing cooperatives and savings groups that strengthened savings, access to credit and income-generating activities (VerAngola, 2025). But infrastructural gaps still compound challenges: Angola's artisanal fisheries, where women make up 80% of the workforce, suffer from the absence of cold storage and reliable road infrastructure. In the port of Benguela on Angola's Atlantic Coast, fishers and fish traders report declining catches that they attribute to illegal trawler incursions, yet they have little capacity to influence or challenge the practices of industrial fishing companies (Marcos & Santos, 2024).

Other barriers are embedded in the design of programmes and advocacy itself. Kasike (Jamaica) points out that external organizations often schedule events ***'in the middle of the day, which excludes children at school, men at work, and women who are preparing to pick up children or return home***' showing how seemingly neutral logistics can systematically exclude those with care responsibilities or precarious jobs. According to Jamaica Environment Trust CEO Dr Theresa Rodriguez-Moodie, some young people who support campaigns against deep-sea mining avoid visible participation because they fear losing their jobs, especially if they work in government, highlighting how employment precarity constrains voice even among educated youth. For incarcerated youth in Portugal, prison regimes and staff shortages delay or cancel Turning Blue sessions, while social stigma makes it harder for employers to see these young men as legitimate candidates for Blue Economy jobs.

The interviews also show that official Blue Economy strategies can neglect or marginalize the very actors whose practices sustain coastal environments. In Jamaica, for instance, the Indigenous peoples continue to face legal and cultural barriers to recognition of their status, rights and stewardship roles, even as Taíno communities and NGOs contest deep-sea mining and restricted beach access. In Angola and Chile, media reports point to weak enforcement of regulations against illegal fishing while interviews highlight limited infrastructure and market access which together undermine small-scale fishers' ability to benefit from policy reforms or new market opportunities. García's (Chile) account of the 2024 mass oyster mortality in Tongoy – where oxygen depletion killed over 80,000 oysters representing a loss of roughly 15 million Chilean pesos – illustrates that cooperatives remain structurally exposed to climate and environmental shocks. Blue Economy infrastructure could play a stronger role in reducing this exposure: early warning systems and environmental monitoring buoys would allow communities to detect oxygen drops or temperature anomalies before losses become catastrophic; improved cold storage and processing facilities would reduce dependence on immediate sale under crisis conditions; and better transport access would open markets beyond the local bay, spreading economic risk across a wider buyer base. As García's cooperative has already begun partnering with universities and scientific agencies to install sensors and track environmental parameters, the model exists – what is missing is the institutional commitment to scale and fund it.

Funding modalities and institutional logics are also critical for the survival of initiatives. Kasike (Jamaica) observes that ***'Funding in the right hands can do great good; in the wrong hands, it can do damage'*** noting that some projects ***'focus on turning out numbers rather than creating sustainable impact beyond the project.'*** In Portugal, João Melo (APROXIMAR) similarly stresses that Turning Blue is time-bound and that its continuity after 2027 depends on new funding or national institutions taking over, underlining the precarity of pilot projects despite participants' enthusiasm. These testimonies suggest that even promising, community-validated models can remain isolated examples of good practices unless the structural reasons they fail to scale or endure are addressed.

Taken together, these experiences show structural conditions such as literacy, time, transport, rights, stigma and funding logic filter who can participate and what can turn participation into durable benefits.

Many of the barriers identified by interview participants are closely connected to issues of knowledge, information and access to evidence. Understanding how different forms of knowledge are generated, shared and recognized therefore represents an important dimension of community resilience and Blue Economy governance.

5.4. Knowledge systems, environmental monitoring and evidence

Another cross-cutting theme relates to the shaping of environmental information and the recognition of different knowledge systems. In all four contexts, communities bring rich traditional and place-based knowledge: Taíno fishers align with seasonal cycles and closed seasons; Chilean fisherwomen draw on decades of experience with currents and species; Angolan communities have long shifted between fishing, trade and agriculture to cope with bans or scarcity. This knowledge

shapes decisions about when to fish, how to harvest and which practices are seen as respectful or harmful.

At the same time, communities increasingly depend on scientific institutions to access environmental information previously invisible to them. In Tongoy, Chile, the Center for Advanced Studies in Arid Zones (CEAZA, in Spanish) measures oxygen, temperature and salinity revealing unprecedented ***'oxygen drop to zero'*** events, leading García and peers to conclude that ***'the system had changed and that we had to adapt.'*** García stresses that ***'technology becomes essential'*** and that fishers ***'need to measure temperature, oxygen, salinity and other conditions'*** calling for buoys and instruments in the bay so communities can ***'have more information ourselves'*** rather than relying solely on external alerts. In Jamaica, the Jamaica Environment Trust trains community members to test water quality and report pollution quickly, partially devolving monitoring capacity to those closest to rivers and coastal sites. In Angola, student research and university programmes formalise local observations of declining catches, changing species and the emergence of toxic fauna, even though long time-series data are still scarce.

These experiences illustrate the broader role of higher education institutions in supporting knowledge co-production within coastal territories. Universities contribute not only by generating scientific evidence, but also by helping communities collect and access environmental information, strengthening monitoring capacities, documenting local knowledge and translating research into locally relevant adaptation and sustainability strategies.

Experiences with co-managed areas reinforce what it means to institutionalize the sharing of knowledge and responsibility. At White River Fish Sanctuary, Jamaica, trained fishers serve as wardens who patrol the reef, enforce no-take rules and participate in coral-restoration efforts combining their own observation with scientific monitoring in a formal management structure. By 2023, this community-generated effort had produced a documented 55% increase in fish populations inside the sanctuary (Maddix et al., 2023) with spillover benefits to fishers working in adjacent areas – showing that the integration of experiential and scientific knowledge in a co-managed structure can yield quantifiable ecological gains. In Sado Estuary, Portugal, the 'Women Guardians of the Sea' integrate seagrass monitoring, educational tours and campaigns on sustainable shell fishing, translating fisherwomen's knowledge into recognized environmental expertise.

Another observed issue concerns how the Blue Economy itself is named and framed. Theresa Rodriguez-Moodie (Jamaica Environment Trust) recounts challenging a document that listed deep-sea mining as a ***'blue-economy activity'*** arguing that ***'deep-sea mining is an extractive industry and… should not be presented as a sustainable blue economy.'*** Rodriguez-Moodie's intervention shows that knowledge contests are not just about data but also about which activities are counted as legitimate components of the Blue Economy in the first place. Similarly, Jamaica's Indigenous leaders note that they are often excluded both as consultants in decision-making processes and as custodians in projects affecting traditional territories, despite holding deep historical knowledge of these spaces and

a long-standing responsibility for their stewardship. These dynamics matter because language and framing influence which activities are seen as legitimate, which voices are included and which solutions are more likely to attract resources and support.

These examples reflect the demands of communities to co-produce and access scientific knowledge. They seek tools, training and recognition that allow traditional, experiential and scientific knowledge to inform decisions on more equal terms.

Across the four countries, these experiences demonstrate that knowledge co-production increasingly depends on collaboration between communities, higher education institutions, research centres and civil society organizations. Whether through environmental monitoring, technical training, participatory research or community-based learning, these actors can help connect scientific knowledge with local realities and support more informed and resilient Blue Economy practices.

5.5. Community perspectives on resilience and inclusive Blue Economy futures

Finally, the interviews point to clear visions of what communities, women and youth expect from the Blue Economy and under what conditions it can be genuinely resilient and inclusive. García *(Acuipesca Tongoy Mujere*, Chile) emphasizes that their cooperative was recognized as a ***'Caleta modelo'*** (exemplary cove) for replication and insists that ***'aquaculture is the future: cultivating the sea is the most valuable thing we have'*** not only because it generates income but because it centres care, order and conservation. The cooperative's model has since been replicated in more than twelve coves across Chile. New initiatives such as the *Algas Atacama* programme build on this groundwork by supporting women seaweed producers to develop value-added products, signaling that Blue Economy innovation can be rooted in cooperative control rather than external firms (The Fish Site, 2025). In Namibe, Angola, Vilengalenga warns that ***'if we look only at extractive fishing, we have no future for more than 20 years'*** arguing for diversified livelihoods where aquaculture, agriculture and tourism sit alongside conservation activities. This warning carries institutional weight as the Universidade do Namibe was itself born partly from local policy recognition that the coastal province required academic and research infrastructure oriented towards the sea. Melo (*APROXIMAR*, Portugal) presents Turning Blue as an attempt to connect ***'all the opportunities that are available in the blue economy'*** with young men in prison who are ***'willing to get a new job'*** positioning the sector as a space for second chances and social reintegration.

These futures are not purely economic. For Kasike (Jamaica), the ***'most significant benefit'*** of engaging with the blue economy would be youth ***'having pride in what is theirs and investing in their future on the island'*** rather than feeling compelled to migrate. He frames communities not as passive victims but as ***'climate defenders, planet defenders and protectors'*** insisting that they must know their rights and be recognized accordingly.

Taken together, these voices suggest that a sustainable, inclusive and resilient Blue Economy in the pilot countries depends on at least five inter-related conditions:

1. **Women and young people should be recognized and supported as active agents of change**, innovators and contributors to decision-making processes throughout the design, implementation and evaluation of Blue Economy initiatives.
2. **Structural barriers to participation and opportunity**, including limitations related to education, time, social stigma, infrastructure and access to rights and services, should be systematically addressed to enable meaningful and equitable inclusion.
3. **Coastal communities should have strengthened access to the tools, institutions and capacities** required to generate, access and interpret environmental information, alongside formal recognition of local, traditional and Indigenous knowledge systems as valuable sources of evidence and expertise.
4. **Financing and governance arrangements should prioritize long-term, locally grounded partnerships**. Such partnerships should foster shared responsibility among universities, civil society organizations, governments and communities while supporting inclusive and decentralized approaches to resource governance and sustainable development.
5. **Indigenous peoples and traditional custodians should be formally recognized within governance frameworks as knowledge holders** and stewards of coastal and marine ecosystems with their knowledge systems and practices appropriately reflected in resource-management and decision-making processes.

The evidence from these communities demonstrates that the most consequential innovations documented in the pilot countries: women-led cooperatives that transformed oyster markets and replicated across multiple coves; community fish sanctuaries that sharply increased fish populations; traditional knowledges that have sustained marine ecosystems across generations; and youth-led advocacy that pushed moratoria onto national agendas have been generated precisely by the groups that national fisheries regulations, Blue Economy policy processes and marine governance institutions most often fail to meaningfully include. As the interviews illustrate, this exclusion takes concrete forms: women's unions spending years contesting gender bias before securing co-management rights in Chile; Indigenous stewardship carrying no legal standing in the Jamaican policy processes that govern traditional territories; youth advocates self-censoring out of fear of job loss; and women in Angola remaining structurally marginalized from governance structures despite their central role in fish marketing and food security. The evidence presented across the four countries suggests that more inclusive governance systems, long-term institutional support and meaningful participation mechanisms are essential for strengthening the ecological and social resilience of Blue Economy transitions.

6. Conclusion

The findings presented throughout this publication demonstrate the close interconnections between scientific research, governance systems, higher education institutions and community experiences. Examined comparatively across Angola, Chile, Jamaica and Portugal, these dimensions reveal both shared challenges and context-specific pathways toward more sustainable and inclusive Blue Economy transitions.

The comparative analysis demonstrates that Blue Economy transitions are not shaped solely through economic strategies or environmental policies but also through the ways knowledge, participation, institutional capacity and territorial realities intersect within different social and governance contexts. Several overarching findings emerge from the analysis. First, scientific production, policy attention and institutional engagement related to coastal and marine governance have expanded substantially over recent decades. Second, while all four countries are pursuing Blue Economy transitions, they do so through distinct governance pathways shaped by different institutional capacities, policy traditions and development priorities. Third, higher education institutions are playing an important role in supporting knowledge production, environmental monitoring, skills development and capacity-building processes connected to coastal sustainability. Fourth, coastal communities are not passive beneficiaries of Blue Economy initiatives, but active agents shaping environmental stewardship, local economies, adaptation strategies and governance practices. Finally, persistent challenges remain regarding social inclusion, participation and the recognition of local, traditional and Indigenous knowledge systems within formal governance frameworks.

Important differences nevertheless emerge across the four countries. Portugal demonstrates the most diversified governance profile and strongest integration within European maritime and environmental governance frameworks. Chile combines strong scientific capacity with increasingly structured approaches to marine governance and climate adaptation. Jamaica's trajectory reflects the priorities of SIDS, particularly through its emphasis on community-based coastal governance and resilience. Angola continues to strengthen institutional capacity and governance structures through growing investments in research, capacity-building and international cooperation. Despite these differences, all four countries demonstrate the growing importance of climate adaptation, marine conservation, environmental monitoring and ocean governance within both scientific and policy agendas.

At the same time, the analysis reveals that environmental sustainability and economic development objectives continue to receive greater institutional attention than social inclusion, cultural heritage, community participation and participatory governance. Heritage and community dimensions remain comparatively marginal within many Blue Economy frameworks, despite their demonstrated importance for resilience, stewardship and long-term sustainability. Structural inequalities, uneven access to resources and infrastructure, limited participation opportunities, weak enforcement mechanisms and insufficient recognition of local and Indigenous knowledge continue to influence who benefits from Blue Economy

transitions and who remains marginalized within governance processes.

The publication also highlights the important contribution of higher education institutions within Blue Economy transitions. Universities and research centres contribute not only through scientific production and technical expertise but also through environmental monitoring, skills development, community engagement, knowledge exchange and capacity-building processes connected to coastal sustainability. Across the four countries, higher education institutions increasingly operate at the intersection of science, policy and society, although their capacity to support coastal communities and local implementation processes remains uneven across contexts. The findings suggest the importance of more flexible, interdisciplinary and community-responsive approaches to learning and capacity-building that respond to the lived realities of coastal territories and evolving environmental challenges.

At the community level, the research demonstrates that women, youth, Indigenous peoples, local organizations and coastal communities are already contributing to environmental stewardship, innovation, adaptation and governance. Their experiences highlight the importance of traditional ecological knowledge, participatory governance and locally grounded resilience practices for the long-term sustainability of marine and coastal systems. More inclusive governance arrangements that recognize these contributions will be essential for achieving equitable and sustainable Blue Economy transitions.

Overall, the publication suggests that the future of the Blue Economy depends on stronger connections between scientific knowledge, public policy, higher education and community experience. More inclusive and participatory governance approaches, combined with long-term investment in human capital, environmental literacy, research capacity and local institutional strengthening, will be essential for achieving sustainable coastal development aligned with broader international agendas related to climate resilience, ocean sustainability, social development and intergenerational equity.

The patterns identified throughout this publication also point to important avenues for future research which could further investigate the drivers behind the trends identified in this publication, including the relationships between scientific knowledge production, policy agendas, funding priorities and international sustainability frameworks. Such analysis could also contribute to a better understanding of how initiatives related to ocean literacy and Education for Sustainable Development intersect with evolving Blue Economy priorities.

The experiences documented across Angola, Chile, Jamaica and Portugal demonstrate that some of the most innovative and adaptive Blue Economy practices are already emerging from communities, cooperatives, universities and local partnerships working directly within coastal territories. Their experiences demonstrate that sustainable Blue Economy transitions are most effective when scientific knowledge, public policy, higher education and community engagement are connected through inclusive and collaborative approaches to coastal development.

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Annex 1: Summary of interviews conducted

Five semi-structured interviews were conducted between August and September 2025 with 5 people (community practitioners, Indigenous leaders, civil society advocates and cooperative leaders) across Angola, Chile, Jamaica and Portugal. The interviews constitute the primary base for the 'community voices' section of this research and the argument that the uneven inclusion of women and youth structurally undermines Blue Economy effectiveness.

The interviews were conducted exclusively for the Community Engagement and Practice-Based Research Component of the study. They were not used in the bibliometric analysis or the policy and governance analysis presented in Sections 3 and 4 which draw on separate data sources and methodologies.

Purpose

The interviews aimed to obtain local perspectives on how community-led Blue Economy initiatives are implemented and experienced in coastal contexts with particular attention to the participation of women and youth, the role of local knowledge and cultural heritage, the effects of climate change on livelihoods and the challenges, lessons and support needs that can enable better global practices.

Methodology

The interviews were transcribed and thematically analyzed to generate insights on community and project background, implementation and engagement, climate and environmental challenges, knowledge and practices, inclusion of women and youth, challenges and success factors, impacts and outcomes and knowledge-sharing for future action. The sample consisted of individual semi-structured interviews with one key informant per country except in Jamaica where two separate interviews were conducted to capture both Indigenous custodianship and civil society advocacy perspectives within the same national context. The interviews followed an open questionnaire of 25 questions divided into 7 sections.

Table 1. Overview of interviews conducted

Period	Country	Interviewee & Affiliation	Stakeholder Profile	Format	Thematic Takeaways	Inclusion Dimensions
Aug 2025	Angola	**Manuel Vilengalenga** Universidade do Namibe	*Academic & community engagement leader*	Semi-structured interview	Livelihood diversification; aquaculture; women's market authority; youth training; TEK	Gender Youth
Aug 2025	Jamaica	**Kasike KalaanNibonrix Kaiman** Yamaye Guani Tainó Peoples	*Indigenous leader & cultural steward*	Semi-structured interview	Indigenous stewardship; access rights; intergenerational responsibility	Indigenous Gender Youth
Aug 2025	Jamaica	**Theresa Rodriguez-Moodie** Jamaica Environment Trust	*Civil society leader & environmental advocate*	Semi-structured interview	Governance reform; deep-sea mining opposition; media advocacy; youth mobilisation	Youth Gender
Sep 2025	Portugal	**João Melo** APROXIMAR (Turning Blue)	*Social enterprise coordinator*	Semi-structured interview	Incarcerated youth (16–21); maritime career pathways; social reintegration	Youth
Sep 2025	Chile	**Devora García** Acuipesca Tongoy Mujeres	*Community cooperative leader*	Semi-structured interview	Women-led aquaculture; intergenerational knowledge; climate adaptation; model replication	Gender Youth

Annex 2: Interview questionnaire: Community perspectives on the Blue Economy

Section I: Participant and project background

1. Introduce yourself briefly and describe your role in the community/project/initiative.
2. Can you describe your project/initiative/community activities, specifically focusing on how they relate to the Blue Economy?
3. When did your community/project/initiative first begin actively engaging with the Blue Economy?
4. Where is your community/project/initiative based and why is this location significant in terms of activities for the Blue Economy?
5. What were the main reasons or driving factors that led your community/project/initiative to begin engaging in Blue Economy-related activities?

Section II: Implementation and community engagement

6. What kinds of outreach, workshops or training activities has your community/project/initiative organized or taken part in to support the blue economy? ADDITIONAL: Could you share examples or highlights of these activities?
7. Who are the main participants or beneficiaries of your community/project/initiative's engagement with the blue economy? ADDITIONAL: Why do you think these specific groups participate actively?
8. How do you ensure meaningful participation and representation of women and youth in your community/project/initiative's activities, especially focused on the blue economy? ADDITIONAL: Have you faced challenges in engaging these groups?
9. What tools, methods or strategies have been most effective in promoting active involvement?

Section III: Interplay of climate, oceans and coastal communities

10. How is climate change affecting your local marine resources and coastal livelihood? ADDITIONAL: Can you share specific examples or impacts you have observed?
11. What measures or practices has your community/project/initiative implemented to build community resilience against climate-related challenges?
12. How has integrating local/traditional knowledge contributed to addressing climate and marine-related challenges?

Section IV: Cross-cutting themes (women, youth, cultural heritage, environmental sustainability)

13. How has your community/project/initiative specifically empowered women and youth? ADDITIONAL: Could you describe a notable example or success story?
14. Why is it important to involve women and youth in marine conservation efforts and sustainable economic activities?
15. In what ways have cultural heritage and traditional practices influenced the direction or methods used in your community/project/initiative?

16. How do your community/project/initiative's efforts contribute directly to environmental sustainability in your coastal area?

Section V: Challenges, success factors and lessons learned

17. What key obstacles has your community/initiative/project encountered? ADDITIONAL: Why do these challenges persist?
18. What factors or conditions have been key to your community/project/initiative's successes or achievements?
19. What are the main lessons learned from this experience?

Section VI: Impacts and outcomes

20. Can you describe the direct social, economic or environmental impacts your community/initiative/project has experienced as a result of engaging in sustainable blue economy-related practices?
21. How do you measure or evaluate the impact of your community/initiative/project's efforts, especially regarding women and youth?
22. From your viewpoint, what would be/is the most significant outcome or benefit resulting from engaging with the blue economy?

Section VII: Knowledge sharing, capacity-building and recommendations

23. What kinds of knowledge or resources has your community/initiative/project's members gained that you believe could be valuable to others?
24. How could your experiences, successes or challenges inform others aiming to take similar action?
25. What additional resources, training or support would your community/project/initiative benefit from to expand or sustain your current activities?

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Understanding the Blue Economy across science, policy, higher education and communities

This document is an output of the Blue Economy Pilot Project: Knowledge, Capacity Building and Resilience for the Preservation of Natural and Cultural Heritage, led by the UNESCO International Institute for Higher Education in Latin America and the Caribbean (UNESCO IESALC), the United Nations Office for South-South Cooperation (UNOSSC) and Camões – Institute for Cooperation and Language, I.P., under the UNOSSC Triangular Cooperation Window and with the support of the Government of Portugal. Drawing on a comparative, mixed-methods approach that combines bibliometric analysis, community-centred perspectives and policy research, it examines the evolution of national policy, scientific research and community participation in the Blue Economy across Angola, Chile, Jamaica and Portugal, with particular attention to the role of higher education institutions in advancing research and community engagement, and to youth and gender as cross-cutting dimensions. Rather than proposing a single model, it traces the distinct national pathways each country is following and highlights the enabling conditions needed to advance sustainable, inclusive ocean governance, offering valuable insights for higher education policy and practice.

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