

Global Coastal Planning Framework's Influence on Mombasa's Blue Planning Uptake

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Abstract

Mombasa's coastal planning remains fragmented despite exposure to climate change, pollution and biodiversity loss. This study examined how global planning frameworks influence Blue Planning Uptake in Mombasa, addressing limited quantitative evidence on framework availability, institutional capacity and land-sea integration. A descriptive explanatory cross-sectional design used Likert-scale questionnaires from 288 coastal-governance stakeholders, with descriptive statistics, exploratory factor analysis and multiple regression. The regression model explained 52.5% of variation in uptake. Land-sea planning integration capacity was the strongest predictor ($\beta = 0.563$, $p < 0.001$), followed by environmental management capacity ($\beta = 0.319$, $p < 0.001$) and ICZM adaptive capacity ($\beta = 0.146$, $p = 0.005$). Framework availability and functional effectiveness were not significant predictors. The study contributes empirical evidence that Blue Planning depends less on framework existence than institutional capacity, coordination and operational integration, supporting stronger coastal governance, implementation and adaptive planning in Kenya within rapidly changing coastal governance systems nationally.

Keywords: Blue planning, integrated coastal zone management, coastal governance, land-sea interface, Mombasa

INTRODUCTION

Coastal areas where land, sea and the atmosphere intersect (Yuan & Chang, 2021) connect ocean systems and land systems forming the land-sea interface comprising coastal land, territorial sea (12nm), contiguous zone (24nm) and the exclusive economic zone (200nm) (United Nations, 1982). Coastal Mombasa links terrestrial and marine habitats (Talley et al., 2003) including coral reefs, mangroves, wetlands, seagrass beds, terrestrial forests, estuaries, sandy beaches and historical-cultural monuments that are valuable natural assets (Harris et al., 2019).

Sadly, 17% of the total land area in Mombasa could get submerged by a mere 0.3m sea level rise (Awuor et al., 2008) while 43.3% is classified as flood risk potentially affecting property and livelihoods including the above valuable natural assets and causing displacement and destruction of critical infrastructure like hotels. With only 25.9% of Mombasa classified as safe from flood-

related risks, exposure to health threats and loss of lives and livelihood remains high given the intense pressure from anthropogenic drivers and climate change (Hoegh-Guldberg et al., 2019).

The above exposure to vulnerabilities calls for holistic, multi-stakeholder and integrated approaches to land-sea planning and management. While policy documents including Mombasa's County Integrated Development Plan (2023-2027) requires addressing the above challenges through planning across the physiographic coastal plains, hilly areas and the Indian ocean shoreline and integration of blue economy resources into the county plans (County Government of Mombasa, 2023), gaps arise where the CIDP and other county frameworks fail to support Blue Planning uptake.

Away from the CIDP, scholars acknowledge that Blue Planning is key for effective coastal planning and management and for mitigating cumulative

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pressure and environmental conflicts on the land-sea interface, (Portman, 2011; Hoegh-Guldberg et al., 2019) but scholarly gaps on uptake dimensions of Blue Planning still exist.

Research shows planning fragmentation in Mombasa but does not empirically examine framework-related factors — such as institutional capacity, framework availability, or land-sea integration — that predict Blue Planning Uptake. Similarly, broader Blue Planning literature in East African coastal cities is conceptual and less quantitative. This study addresses that gap by applying a quantitative approach that tests these relationships directly in Mombasa, contributing empirical evidence to existing literature formed by case description and policy analysis.

Aim and Objectives of the Research

The overall aim was to examine the influence of global planning frameworks on Blue Planning Uptake in Mombasa.

The objectives were to:

- i. Assess the planning frameworks perceived as most relevant to Blue Planning in Mombasa.
- ii. Determine the extent to which land-sea planning integration capacity influences Blue Planning Uptake.
- iii. Examine the institutional and governance factors that significantly predict Blue Planning Uptake in Mombasa.

The study was guided by corresponding research questions on framework relevance, land-sea integration capacity, and institutional and governance determinants of Blue Planning Uptake.

THEORY

The Theory examines Blue Planning uptake, global planning frameworks, Marine Spatial Planning (MSP), Integrated Coastal Zone Management (ICZM), and national and county spatial planning instruments. It then synthesises the literature gaps and presents the theoretical and conceptual frameworks guiding the study.

Planning frameworks promote sectoral planning where terrestrial and marine systems are separated, and decision-making is fragmented causing environmental conflicts (Douvere, 2008). Holistic governance solutions are required in areas like

Mombasa where anthropogenic drivers directly impact on marine ecosystems. Blue Planning - the preparation of ecosystem-based integrated spatial planning frameworks for development and management of coastal and marine resources within the land-sea interface mitigates these coastal vulnerabilities and climate-induced risks, pollution and biodiversity loss.

Blue Planning Uptake

Blue Planning uptake refers to coastal and marine governance frameworks' capacity to institutionalize (Douvere, 2008; Ehler & Douvere, 2009) planning within the land-sea interface. In Mombasa, the "...inability [of the land-sea interface] to cope with increasing amounts of municipal waste causes direct discharge of sewage into the ocean" (Shanti, 1991, p. 16), despite an existing City Gate Master Plan, evidence that "...application of the master plan within the land-sea interface doesn't consider land-sea linkages..." (Olale et al., p.190). Inability to "...involve planners, resource managers, scientists and technologists..." (Crist et al., 2009, p. 1) in management of coastal resources in Mombasa can hinder Blue Planning uptake.

Global Planning Frameworks

Deterioration of coastal and marine habitats is negatively affecting human well-being (United Nations Department for Economic and Social Affairs [UNDESA], 2017) indicating that development of marine economic functions is inseparable from the land (Wenze et al., 2023). Consequently "...integrating ecosystem-based approaches at the immediate coastal interface through improved MSP and ICZM practices..." (UNESCO, 2020, p. 82) can mitigate against coastal challenges providing a rationale and a theoretical and practical basis for Blue Planning Uptake.

MSP and ICZM

Evidence shows that MSP is a widely accepted global framework for coastal and marine governance given its strong ecological, social, and economic linkages with marine protected areas (Cicin-Sain & Belfiore, 2005). As an ecosystem-based management approach, MSP improves environmental protection and enables sustainable territorial development (Douvere, 2008) thereby facilitating adoption of Blue Planning. In Mombasa, MSP's importance in sustainable

ocean governance has been identified (UNESCO, 2022) yet its influence in Blue Planning Uptake is limited, especially in the absence of an operational framework.

Unlike Australia's 30-year-old MSP framework, Kenya's lack of an MSP negatively influences Blue Planning Uptake in Mombasa. Australia's MSP framework protects delicate ecosystems boosting conservation efforts in the Great Barrier Reef Marine Park, the world's largest coral reef ecosystem (Ehler & Douvère, 2009) which attracts millions of visitors annually contributing to Australia's GDP. Coral bleaching caused by climate change that injures the Parks economic potential prompted the Great Barrier Reef Marine Park Authority to apply a comprehensive MSP zoning system regulating activities that cause degradation.

Globally, ICZM has supported coastal jurisdictions to address pressures arising from rapid development and environmental degradation, rooted in the understanding that the coastal and marine environment is a limited spatial area in which a range of environmental and socio-economic interests interconnect. In Malaysia, where urbanisation and oil and gas exploitation have intensified pressure on coastal ecosystems (Abdullah, 1999; Ong, 2000) causing erosion, sedimentation at river mouths, uncontrolled mining and degradation of coastal forests (Abdullah, 1999; Hezri & Hasan, 2006), the application of ICZM in coastal settlements like Melaka transformed them into major commercial centres with strategic coastal positioning (Hinrichsen, 1998; Ong, 2000). Mombasa's Blue Planning Uptake can be influenced by the Malaysian model thereby improving land-sea planning and addressing failures of sectoral-based approach.

National and County Spatial Plans

The National Spatial Plan (NSP 2015–2045) urges preparation of “integrated spatial planning frameworks” (Ministry of Lands and Physical Planning, 2015, p. 251) transcending land, terrestrial boundaries and the territorial sea and encourages regulation of marine resources through preparation of coastal management plans. The Mombasa Gate City Master Plan (County Government of Mombasa, 2022) urges development of well-balanced system of settlements including land and water but has a

terrestrial bias peculiarity ignoring the territorial sea hence hindering Blue Planning Uptake in Mombasa.

Synthesis of Literature Gaps

Literature gaps motivating the study's theoretical approach have been reviewed including MSP and ICZM that are both endorsed globally, but whose application in Mombasa remains largely aspirational. The MSP lacks an operational framework in Mombasa while ICZM's implementation is stuck. Comparative analyses from Australia and Malaysia demonstrates that framework effectiveness depends less on mere policy existence but more on sustained institutional capacity and cross-sectoral coordination, a dynamic that remains under-examined in Mombasa's context. Kenya's national and county spatial planning instruments reveal a structural weakness: a terrestrial bias peculiarity that excludes the territorial sea and exclusive economic zone, yielding jurisdictional and conceptual gaps between land-use planning and marine governance which are acknowledged in the literature but remains unresolved. These gaps — limited operationalization, weak institutional capacity, and fragmented land-sea jurisdiction — indicate that Blue Planning Uptake requires coordination of stakeholders in addition to mere existence of policy, explained theoretically below.

Theoretical Framework

Three complementary theories — Rational Planning Theory, Collaborative Planning Theory, and Environmental Justice Theory apply — each addressing a distinct gap identified in the above literature and collectively offering a more complete account of Blue Planning Uptake than any single theory.

Rational Planning Theory provides the technical and procedural foundation for understanding Blue Planning as a structured, evidence-based process through which planners identify problems, set objectives, and select interventions based on data (Faludi, 1973; Friedmann, 1987). It is relevant to Mombasa's context, where the gap between the existence of frameworks (e.g., the CSP, NSP) and their operational effectiveness suggests that rational planning processes have been formally initiated but not fully carried through to implementation. Rational Planning Theory explains why frameworks exist on paper

but remain under-operationalized.

Collaborative Planning Theory (Healey, 1997) addresses coordination and institutional capacity gaps manifesting in Mombasa's fragmented, sectoral approach to land-sea coordination. Unlike Rational Planning Theory's top-down, technical orientation, Collaborative Planning Theory emphasizes negotiated, consensus-based decision-making among diverse stakeholders (Innes, 1995) government agencies, planners, blue economy actors, and communities — as essential to overcoming the cross-jurisdictional conflicts documented in the literature. It is relevant given the study's own findings that land-sea integration capacity is central to Blue Planning Uptake, since integration is fundamentally a collaborative, multi-stakeholder achievement.

Environmental Justice Theory (Bullard, 1990; Schlosberg, 2007) addresses the third gap, grounding distributional and procedural equity dimensions of coastal governance that neither Rational nor Collaborative Planning Theory fully captures. With climate-induced flooding and sea-level rise threatening vulnerable coastal communities' livelihoods, infrastructure, and health, this theory (Agyeman et al., 2003) ensures that Blue Planning Uptake is evaluated by

institutional success and that planning outcomes equitably protect and benefit vulnerable coastal communities.

Together, these three theories are complementary rather than competing: Rational Planning Theory explains the technical design and intended function of Blue Planning frameworks (Faludi, 1973); Collaborative Planning Theory explains the institutional and stakeholder coordination required for those frameworks to be effectively implemented (Healey, 1997); and Environmental Justice Theory ensures that the equity implications of planning outcomes are not overlooked (Schlosberg, 2007). These three theories guided the interpretation of the study's findings, providing a multi-dimensional lens through which the technical, institutional, and equity-related determinants of Blue Planning Uptake in Mombasa were understood and analyzed.

Conceptual Framework

The conceptual framework presented in **Figure 1** links the planning frameworks reviewed in the literature with the institutional and planning capacities tested in the study and the resulting level of Blue Planning Uptake. Global and national planning instruments, including MSP, ICZM and spatial plans, provide the policy context, while

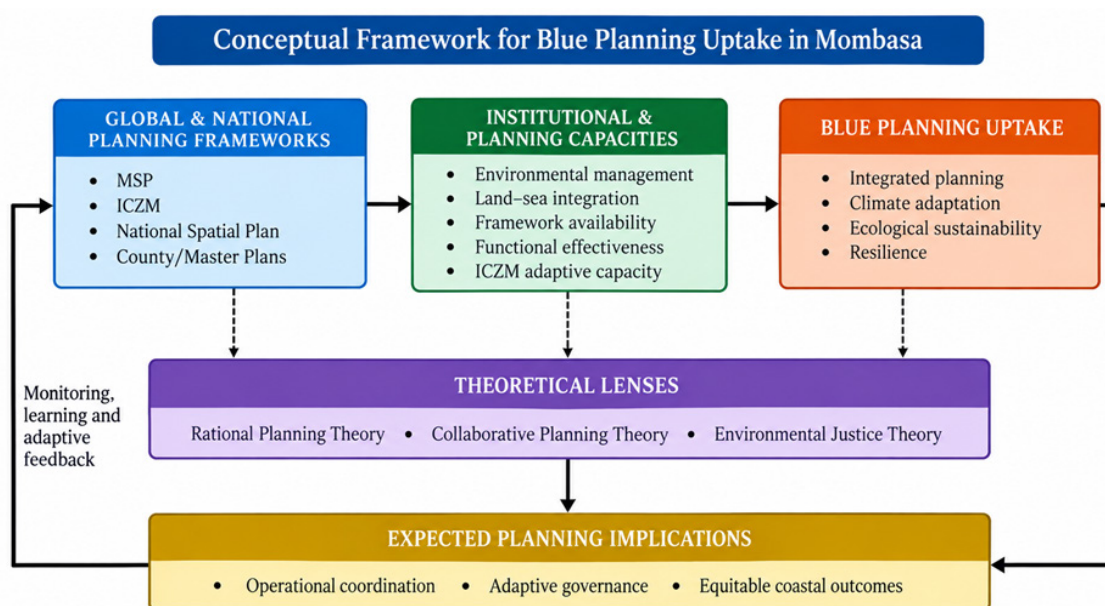


FIGURE 1

Conceptual framework for Blue Planning Uptake in Mombasa

Source: Authors' conceptualisation (2026), informed by Faludi (1973), Healey (1997), Schlosberg (2007), Douvere (2008) and the reviewed planning frameworks

environmental management capacity, land–sea planning integration, framework availability, functional effectiveness and ICZM adaptive capacity represent the principal explanatory constructs.

Blue Planning Uptake is reflected through integrated planning, climate-change adaptation, ecological sustainability and resilience. Rational Planning Theory explains the technical role of formal frameworks, Collaborative Planning Theory explains the coordination required for implementation, and Environmental Justice Theory highlights the distributional implications of planning outcomes.

RESEARCH METHODS

The research methods describe the study design, sampling approach, questionnaire development, operationalisation of variables, statistical analysis, reliability, validity and ethical procedures.

A descriptive explanatory cross-sectional design was used, enabling timely data collection, description of the status of planning and assessment of relationships among variables. The study targeted 399 coastal and marine governance stakeholders at national and county levels, comprising government staff, urban and regional planners, and blue-economy sector stakeholders. The target was derived using Yaman's (1967) formula at a 95% confidence level. A total of 288 usable questionnaires were returned, giving a 72%

response rate, which was considered adequate for the descriptive, exploratory factor and regression analyses applied (Mugenda & Mugenda, 2003).

Knowledgeable respondents were selected purposively because participation required direct experience of coastal planning, marine governance or blue-economy activities. Purposive sampling was appropriate for identifying information-rich respondents, although it may overrepresent institutionally connected stakeholders (Etikan et al., 2016; Palinkas et al., 2015). To broaden coverage, respondents were drawn from government staff, urban and regional planners and blue-economy stakeholders.

The findings are therefore interpreted as stakeholder perceptions rather than population estimates. Primary data were collected using a structured questionnaire with Likert-scale items (1 = Strongly Disagree to 5 = Strongly Agree) organised into four sections: planning frameworks, barriers to Blue Planning Uptake, extent of planning integration in Mombasa, and measures of Blue Planning Uptake. Expert review was used to assess content validity before administration; no separate pilot-test results were available in the study record, so no pilot-test statistics are claimed. The study constructs and their operational indicators are summarised in **Table 1**.

Blue Planning Uptake was the dependent construct, indicated by integrated planning, climate-change adaptation, ecological sustainability and

TABLE 1

Operationalisation of study constructs and indicators

Construct	Role	Operational indicators
Blue Planning Uptake	Dependent	Integrated planning; climate-change adaptation; ecological sustainability; resilience
Environmental management capacity	Independent	Capacity to address climate impacts, pollution and biodiversity conservation
Land–sea planning integration capacity	Independent	Integration of marine and terrestrial planning; holistic coastal management
Availability of Blue Planning frameworks	Independent	Presence and accessibility of MSP, ICZM, ecosystem-based and spatial planning frameworks
Functional effectiveness of frameworks	Independent	Perceived effectiveness of frameworks in guiding integrated coastal and marine governance
Adaptive capacity of ICZM	Independent	Ability of ICZM to support adaptation, inclusive planning and changing environmental conditions

Source: Authors' operationalisation from the study instrument, 2026

resilience. The independent constructs were environmental management capacity, land-sea planning integration capacity, availability of Blue Planning frameworks, functional effectiveness of frameworks and adaptive capacity of ICZM. Data analysis involved descriptive statistics and exploratory factor analysis (EFA) with promax rotation to identify latent constructs and reduce dimensionality. Composite scores for retained factors were then entered into multiple linear regression to evaluate their influence on Blue Planning Uptake. Statistical significance was assessed at the 5% level. Instrument validity was assessed through expert review and factor analysis, while reliability was evaluated using Cronbach's alpha, with 0.70 used as the retention threshold. Ethical responsibilities were addressed through informed consent, confidentiality and restriction of data use to academic purposes. The questionnaire, sampling frame and coding scheme were retained in the study appendices to support replication.

RESULTS

The results are presented in four stages: respondent characteristics, descriptive statistics, exploratory factor analysis and multiple regression. This section reports the empirical evidence, while broader comparison with theory and literature is reserved for the Discussion of Findings.

Respondent Characteristics

Regarding age, 43.75% ($n = 126$) of respondents were aged 25–40 years, 18.75% ($n = 54$) were aged 41–50 years and 37.50% ($n = 108$) were above 50 years. The distribution shows that responses were obtained from both mid-career and more experienced stakeholders involved in the technical and policy dimensions of Blue Planning. **Figure 2** presents the age distribution of respondents.

Regarding gender, male respondents constituted 84.38% ($n = 243$) and female respondents 15.63% ($n = 45$). The imbalance indicates that the findings predominantly reflect male stakeholder perspectives and should be interpreted cautiously when considering gender-differentiated experiences of coastal governance.

Figure 3 illustrates the gender distribution of respondents.

Regarding education, 50.0% ($n = 144$) held master's degrees, 31.25% ($n = 90$) held bachelor's degrees and 18.75% ($n = 54$) held doctorates. The high educational profile is consistent with the specialised planning, governance and technical roles represented in the sample.

Figure 4 shows the education levels of respondents.

Descriptive Statistics

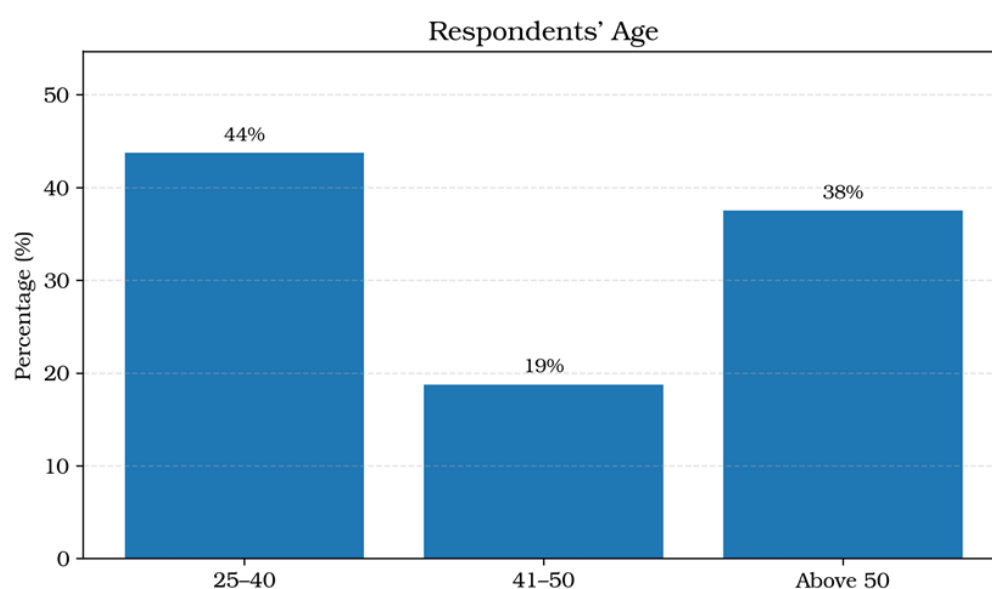


FIGURE 2

Respondents' age

Source: Authors' survey (2026)

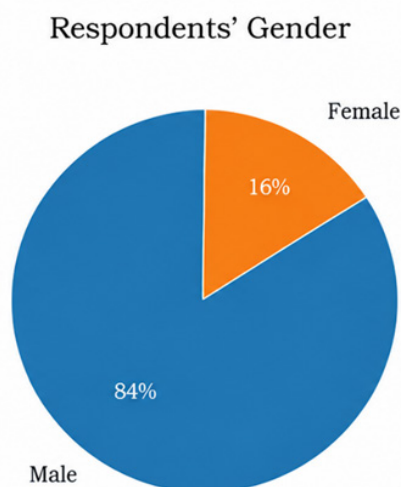


FIGURE 3
Respondents' gender
Source: Authors' survey (2026)

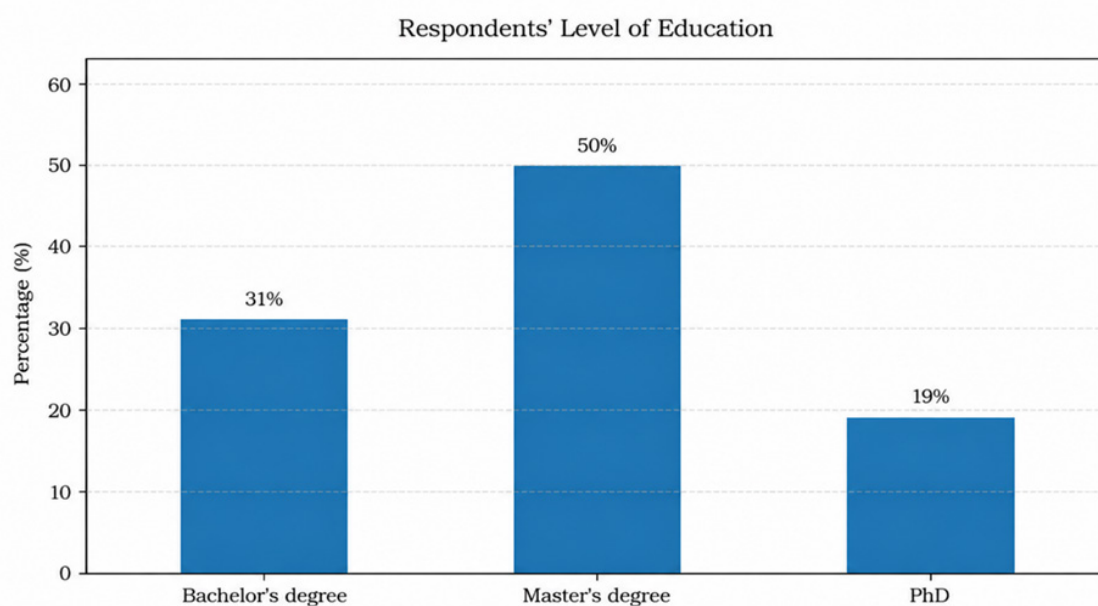


FIGURE 4
Respondents' level of education
Source: Authors' survey (2026)

Frameworks for Blue Planning

Table 2 presents respondents' assessments of the planning frameworks relevant to Blue Planning. The strongest agreement concerned integrating marine spatial planning with terrestrial land-

use planning ($M = 4.62$; $SD = 0.86$; $CV = 0.19$), reducing ocean pollution through Blue Planning ($M = 4.64$; $SD = 0.88$; $CV = 0.19$), mitigating biodiversity loss ($M = 4.53$; $SD = 0.85$; $CV = 0.19$), and applying holistic ICZM approaches ($M = 4.53$;

TABLE 2

Descriptive Statistics for Blue Planning Framework

	Mean	Std. Deviation	Coefficient of variation	Rank
MSP should be integrated with terrestrial land-use planning to promote sustainable coastal development	4.622	0.863	0.187	1
Biodiversity loss can be mitigated through Blue Planning	4.531	0.847	0.187	2
Ocean pollution from land-based sources can be reduced through Blue Planning	4.639	0.88	0.19	3
Holistic management approaches in ICZM lead to more comprehensive and long-term solutions to coastal management challenges	4.531	0.863	0.19	4
Blue Planning can mitigate climate change impacts on marine ecosystems	4.542	0.962	0.212	5
The effectiveness of ICZM is improved by incorporating ecological, social, and economic dimensions into a holistic management approach	4.292	0.914	0.213	6
ICZM has been applied to facilitate better adaptation to climate change impacts on coastal zones	3.726	0.842	0.226	7
Ecosystems Based Management is an existing framework applied in Blue Planning	3.726	1.001	0.269	8
ICZM is an existing framework applied in Blue Planning	3.667	1.016	0.277	9
Frameworks for Blue Planning are integrating county spatial plans & marine spatial plans	3.493	1.049	0.3	10
MSP is an existing framework applied in Blue Planning	3.531	1.201	0.34	11
Existing frameworks are effectively guiding Blue Planning	3.128	1.123	0.359	12
ICZM has worked in Kenya coastal areas	2.729	1.112	0.407	13

Source: Authors' survey analysis (2026)

SD = 0.86; CV = 0.19).

By contrast, respondents expressed weaker confidence in the effectiveness of existing frameworks. ICZM effectiveness in Kenya's coastal zone recorded the lowest mean ($M = 2.73$; $SD = 1.11$; $CV = 0.41$), while existing frameworks providing effective guidance to Blue Planning also attracted moderate ratings ($M = 3.13$; $SD = 1.12$; $CV = 0.36$). The higher coefficients of variation indicate greater disagreement on framework performance than on the need for integrated planning.

Blue Planning Uptake Measures

Table 3 summarises respondents' assessments of Blue Planning Uptake measures. The highest-rated measures emphasised ecosystem-based management, investment in data and technical training, stakeholder engagement, institutional

collaboration and public participation, indicating strong support for integrated ecological and institutional approaches.

Monitoring and enforcement mechanisms ($M = 4.44$; $SD = 1.04$; $CV = 0.23$) and integrated policies linking environmental conservation with economic development ($M = 4.44$; $SD = 0.92$; $CV = 0.21$) were also rated highly, although responses showed slightly greater variation. Overall, the descriptive results point to ecosystem-based management, governance, stakeholder involvement and technical capacity as central dimensions of Blue Planning Uptake.

Taken together, the descriptive results show strong support for integrated, ecosystem-based and collaborative approaches, alongside weaker confidence in the effectiveness of existing coastal planning frameworks. The analysis therefore

TABLE 3
Descriptive Statistics for Blue Planning Uptake Measures

	Mean	Std. Deviation	Coefficient of variation	Rank
Ecosystem-based management approaches can improve the balance between ecological health and human activities.	4.594	0.717	0.156	1
Planning should incorporate ecosystem-based management to address cumulative impacts on marine environments.	4.59	0.83	0.181	2
Investment in data collection and technical training is necessary to address data gaps and technical barriers in blue planning	4.583	0.831	0.181	3
Stakeholder engagement in Blue Planning processes is critical for successful implementation	4.566	0.861	0.189	4
Community involvement in the management of MPAs within Blue Planning leads to more successful conservation outcomes.	4.483	0.851	0.19	5
Strengthening institutional collaboration and governance structures is essential for the success of blue planning	4.542	0.867	0.191	6
Training and capacity-building in Blue Planning can better improve community understanding of sustainable blue economy	4.465	0.859	0.192	7
Public participation plays a significant role in the implementation and success of Blue Planning	4.497	0.864	0.192	8
Ecosystem-based management can enhance the adaptive capacity of Mombasa settlements	4.385	0.864	0.197	9
Integrated policies that promote synergies between environmental conservation and economic development are key to a successful Blue Economy.	4.438	0.924	0.208	10
Monitoring and enforcement mechanisms are essential for the effectiveness of MPAs in blue planning	4.441	1.041	0.234	11

Source: Authors' survey analysis (2026)

proceeded to exploratory factor analysis to identify the underlying constructs shaping these responses.

Exploratory factor analysis

Exploratory Factor Analysis (EFA) performed on the data to understand composition of the variables involved in Blue Planning Uptake included: Kaiser-Meyer-Olkin (KMO) to measure sample size adequacy for EFA; and Bartlett's Test of Sphericity to determine sufficient correlation of variable to justify EFA. KMO overall values (0.671) indicated adequacy with each individual measure of sampling adequacy (MSA) ranging from 0.558 to 0.781 - higher than the 0.5 minimum threshold - indicating fit inclusion in the analysis and Bartlett's

Test of Sphericity was statistically significant ($\chi^2 = 2106.461$, $df = 78$, $p < 0.001$) indicating that the correlation matrix is not an identity matrix hence appropriate for EFA.

Table 4 reports the Kaiser-Meyer-Olkin measures used to assess sampling adequacy for the exploratory factor analysis.

Table 5 presents Bartlett's Test of Sphericity, which assesses whether the correlation matrix is suitable for factor analysis.

Table 6 shows the chi-squared model test used to assess the statistical significance of the fitted factor solution.

TABLE 4

Kaiser-Meyer-Olkin Test

Item	MSA
Overall MSA	0.671
MSP is an existing framework applied in Blue Planning	0.718
Ecosystems Based Management is an existing framework applied in Blue Planning	0.678
ICZM is an existing framework applied in Blue Planning	0.571
Existing frameworks are effectively guiding Blue Planning	0.668
ICZM has worked in Kenya coastal areas	0.699
Frameworks for Blue Planning are integrating county spatial plans & marine spatial plans	0.721
Marine spatial planning should be integrated with terrestrial land-use planning to promote sustainable coastal development	0.662
Ocean pollution from land-based sources can be reduced through Blue Planning	0.741
Blue Planning can mitigate climate change impacts on marine ecosystems	0.620
Biodiversity loss can be mitigated through Blue Planning	0.670
Holistic management approaches in ICZM lead to more comprehensive and long-term solutions to coastal management challenges	0.781
ICZM has been applied to facilitate better adaptation to climate change impacts on coastal zones	0.558
The effectiveness of ICZM is improved by incorporating ecological, social, and economic dimensions into a holistic management approach	0.617

Source: Authors' survey analysis (2026)**TABLE 5**

Bartlett's Test

χ^2	df	p
2106.461	78.000	< .001

Source: Authors' survey analysis (2026)**TABLE 6**

Chi-squared Test

Model	Value	df	p
Model	179.016	23	< .001

Source: Authors' survey analysis (2026)**Factors Extracted**

From the data, eigenvalues greater than 1 and Promax rotation helped to identify a total of five factors (Table 7).

Factor 1: Environmental Management Capacity for Blue Planning

The factor captured items related to social impacts expected to arise from implementing

Blue Planning: Social equity; economic growth; and providing quality jobs. The factor analysis demonstrated that all the items had high loadings (ranging from .726 to .957) and low uniqueness indicating that the factor explains a large amount of variance in these building blocks.

Factor 2: Land-sea Planning Integration Capacity

TABLE 7

Factor characteristics

Factor	Eigenvalue	Unrotated solution (SumSq. / Proportion / Cumulative)	Rotated solution (SumSq. / Proportion / Cumulative)
Factor 1	4.575	4.321 / 0.332 / 0.332	2.391 / 0.184 / 0.184
Factor 2	2.127	1.756 / 0.135 / 0.467	1.883 / 0.145 / 0.329
Factor 3	1.326	0.984 / 0.076 / 0.543	1.757 / 0.135 / 0.464
Factor 4	1.181	0.913 / 0.070 / 0.613	1.574 / 0.121 / 0.585
Factor 5	1.149	0.806 / 0.062 / 0.675	1.176 / 0.090 / 0.675

Source: Authors' survey analysis (2026)

The factor was representative of the use of integrated marine and terrestrial planning systems and holistic coastal management strategies. Accordingly, the items that loaded strongly included (i) integration of marine spatial planning into terrestrial land use planning; and (ii) use of a holistic ICZM approach (**0.650 to 1.004**). The high loading value (>1.0) indicates that multicollinearity is probably present in some of the items, but it does not disqualify the factor as a whole.

Factor 3: Availability of Blue Planning Frameworks

This factor measures the existence and availability of Blue Planning frameworks that can be used in integrated coastal and marine governance. It includes items associated with Ecosystem-Based Management (EBM), ICZM, and MSP. The factor loadings ranged from 0.664 - 0.837 indicating moderate to high relationships between these items and the underlying constructs.

Factor 4: Functional Effectiveness of Blue Planning Frameworks

This factor indicates how effective Blue Planning frameworks are in aiding integrated coastal and marine governance. It takes into consideration the opinions of the participants regarding the efficiency of ICZM in Kenya, whether the existing frameworks are suitable for Blue Planning and if the frameworks integrate county and marine planning. The factor loadings corresponded to a range of 0.538 - 0.799 indicating moderate-to-strong relations of the observed variables to the concept.

Factor 5: Adaptive Capacity of ICZM

ICZM's capacity to assist with climate adaptation and inclusive multi-dimensional planning was

reflected by this factor; as demonstrated by the strong agreement of loadings of 0.668 and 0.811, respectively.

Table 8 illustrates the rotated factor loadings and uniqueness values for the questionnaire items retained in the analysis.

Table 9 summarises the five factors extracted from the exploratory factor analysis and the variables represented by each factor.

The factor analysis reduced the observed questionnaire items into five interpretable constructs. These factor scores were subsequently entered into multiple regression to determine which constructs most strongly predicted Blue Planning Uptake.

Regression Analysis

The five extracted variables were subjected to multiple linear regression to investigate their effect on Blue Planning Uptake. **Table 10** summarises the model fit, with $R^2 = 0.525$, indicating that the five predictors jointly explain 52.5% of the variation in Blue Planning Uptake.

The overall regression model for Blue Planning Uptake is significantly predictive based on the ANOVA results ($F = 55.352$, $p < 0.001$). In this context, the independent variables provide a valid means of predicting uptake of Blue Planning.

Table 11 presents the ANOVA results for the multiple regression model predicting Blue Planning Uptake.

Regression coefficients and interpretation

The coefficients indicate significant positive effects for environmental management capacity

TABLE 8

Factor loading

Item	Factor	Loading	Uniqueness
Blue Planning can mitigate climate change impacts on marine ecosystems	Factor 1	0.957	0.081
Biodiversity loss can be mitigated through Blue Planning	Factor 1	0.924	0.154
Ocean pollution from land-based sources can be reduced through Blue Planning	Factor 1	0.626	0.196
MSP should be integrated with terrestrial land-use planning to promote sustainable coastal development	Factor 2	1.004	0.105
Holistic management approaches in ICZM lead to more comprehensive and long-term solutions to coastal management challenges	Factor 2	0.650	0.340
Ecosystems Based Management is an existing framework applied in Blue Planning	Factor 3	0.837	0.250
ICZM is an existing framework applied in Blue Planning	Factor 3	0.670	0.345
MSP is an existing framework applied in Blue Planning	Factor 3	0.664	0.481
ICZM has worked in Kenya coastal areas	Factor 4	0.799	0.413
Existing frameworks are effectively guiding Blue Planning	Factor 4	0.684	0.396
Frameworks for Blue Planning are integrating county spatial plans & marine spatial plans	Factor 4	0.538	0.465
ICZM has been applied to facilitate better adaptation to climate change impacts on coastal zones	Factor 5	0.811	0.326
The effectiveness of ICZM is improved by incorporating ecological, social, and economic dimensions into a holistic management approach			0.668

Note: Applied rotation method is promax.**Source:** Authors' survey analysis (2026)**TABLE 9**

Factors extracted

Factor	Variable Name	Items
Factor 1	Environmental Management Capacity of Blue Planning	Climate change, biodiversity, pollution
Factor 2	Land–Sea Planning Integration Capacity	Integration of MSP & terrestrial planning, holistic ICZM
Factor 3	Availability of Blue Planning Frameworks	MSP, ICZM, EBM existence
Factor 4	Functional Effectiveness of Frameworks	ICZM works, frameworks guide planning
Factor 5	Adaptive Capacity of ICZM	Climate adaptation, multi-dimensional ICZM

Source: Authors' survey analysis (2026)**TABLE 10**

Factors extracted

Model	R	R ²	Adjusted R ²	RMSE
M ₁	0.725	0.525	0.516	0.531

Source: Authors' survey analysis (2026)

TABLE 11
ANOVA

Model	Component	Sum of Squares	df	Mean Square	F	p
M ₁	Regression	78.021	5	15.604	55.352	< .001
	Residual	70.477	250	0.282		
	Total	148.497	255			

Source: Authors' survey analysis (2026)

($\beta = 0.319$, $p < 0.001$) and land-sea planning integration capacity ($\beta = 0.563$, $p < 0.001$), with land-sea integration emerging as the strongest predictor of Blue Planning Uptake.

Framework availability ($\beta = 0.007$, $p = 0.904$) and functional effectiveness ($\beta = -0.040$, $p = 0.435$) were not statistically significant predictors, indicating that the mere presence or perceived effectiveness of frameworks does not independently explain uptake.

ICZM adaptive capacity also had a positive and statistically significant effect ($\beta = 0.146$, $p = 0.005$), reinforcing the importance of planning systems that can adjust to changing environmental and institutional conditions.

Table 12 shows the regression coefficients for the five predictors of Blue Planning Uptake.

Overall, the regression model explained 52.5% of the variation in Blue Planning Uptake. Land-sea planning integration capacity was the strongest predictor ($\beta = 0.563$, $p < 0.001$), followed by environmental management capacity ($\beta = 0.319$, $p < 0.001$) and ICZM adaptive capacity ($\beta = 0.146$, $p = 0.005$), while framework availability

and functional effectiveness were not statistically significant predictors.

DISCUSSION

This section interprets the principal statistical findings in relation to the study objectives, the three guiding planning theories and the literature reviewed earlier. It also considers the practical implications of significant and non-significant predictors for coastal governance in Mombasa.

This research focused on understanding Blue Planning enablers and inhibitors, emphasizing determinants of Blue Planning Uptake assessed through five (5) variables: i) environmental management capacity; ii) land-sea planning integration; iii) availability of frameworks; iv) functional effectiveness; and v) adaptive capacity of ICZM. The results offer valuable information regarding the ability of planning systems to effectively translate into the implementation of Blue Planning within coastal cities.

Read together and interpreted through the study's three guiding theories (Rational Planning, Collaborative Planning, and Environmental Justice), the findings reveal a governance system

TABLE 12
Coefficients

Model	Predictor	B	Std. Error	β	t	p
M ₁	(Intercept)	4.461	0.034		130.543	< .001
	Environmental Management Capacity of Blue Planning	0.248	0.043	0.319	5.756	< .001
	Land-Sea Planning Integration Capacity	0.470	0.049	0.563	9.508	< .001
	Availability of Blue Planning Frameworks	0.006	0.046	0.007	0.121	0.904
	Functional Effectiveness of Frameworks	-0.033	0.043	-0.040	-0.782	0.435
	Adaptive Capacity of ICZM	0.135	0.048	0.146	2.822	0.005

Source: Authors' survey analysis (2026)

that is technically well-designed but institutionally under-integrated.

Land-sea planning integration capacity emerged as the strongest determinant of Blue Planning Uptake, aligning with Collaborative Planning Theory (Healey, 1997). This result supports past studies that identify integration as essential to sustainable coastal governance and reinforces the bridging of land-sea planning gaps as critical in mitigating coastal environmental conflicts arising from anthropogenic pressures (Portman, 2011; Hoegh-Guldberg et al., 2019). However, not all literature is unanimous on this point: some studies caution that integration mandates, when imposed without corresponding legal authority or funding, can produce coordination in name only, with agencies formally collaborating while continuing to act within sectoral silos (Douvere, 2008). Mombasa's own case where the CSP retains a terrestrial bias despite integration being a stated policy goal illustrates this exact risk, suggesting that integration capacity as measured in this study reflects institutional willingness and practice more than merely the existence of collaborative mandates.

The absence of a significant relationship between framework availability and Blue Planning Uptake is one of the study's most policy-relevant findings, and it warrants deeper interpretation than a simple restatement of the coefficient. This result is consistent with Rational Planning Theory's own internal limitation: while rational planning processes are effective at designing technically sound frameworks (such as MSP and the NSP's integrated planning provisions), the theory offers little account of what happens after a framework is formally adopted — a gap that becomes visible precisely where this study finds it, in the disconnect between framework availability and uptake. Practically, this suggests that Mombasa's governance challenge is not a design deficit but an implementation deficit: existing frameworks may be well-conceived on paper but remain unsupported by the budgetary allocation, legal enforcement mechanisms, and inter-agency mandates required to operationalize them (Olale et al., 2020). This corroborates findings from other developing coastal contexts where policy availability without implementation capacity yields limited practical impact (Olale et al., 2020), though it also departs from more optimistic

accounts in some Southeast Asian contexts (e.g., Malaysia's ICZM experience discussed earlier) where framework adoption did translate into visible coastal outcomes — a divergence that may reflect Mombasa's comparatively weaker enforcement infrastructure and more fragmented inter-agency coordination relative to those cases.

The statistically significant, positive influence of ICZM's adaptive capacity on Blue Planning Uptake supports prior literature associating adaptive capacity with resilience and sustainable coastal development (Intergovernmental Panel on Climate Change [IPCC], 2014). In Mombasa's case, this suggests that even where overall confidence in ICZM's effectiveness is low (as shown in the descriptive results), the adaptive dimension of ICZM—its capacity to adjust to changing environmental and institutional conditions still meaningfully contributes to uptake. This nuance matters practically: it implies that policy reform efforts need not wait for a fully operational, comprehensive ICZM system before yielding benefits: incremental investments in adaptive capacity (monitoring systems, flexible zoning mechanisms, iterative review processes) may generate uptake gains even ahead of full institutional maturity.

Viewed through Environmental Justice Theory, these findings raise a further consideration not fully captured by the regression model itself: the institutional and integration capacities identified as key drivers of uptake are concentrated within technical and government planning institutions, while the communities most exposed to coastal risk as documented in the Introduction's discussion of flooding and sea-level rise impacts have comparatively limited representation in the sample (only 15.63% female respondents, and no explicit measure of community-level participation beyond stakeholder engagement perceptions). This suggests that while the study identifies what drives institutional uptake, it says less about whether that uptake, once achieved, translates into equitable protection for the populations most at risk a distinction planners and policymakers should not conflate.

Overall, the findings address the study objectives by showing that the most relevant contribution of planning frameworks lies in how they are operationalised through institutional and land-

sea integration capacity rather than through their mere availability. The results also show that environmental management capacity and ICZM adaptive capacity strengthen uptake, while framework availability and functional effectiveness alone do not. The study therefore contributes quantitative evidence to Blue Planning scholarship by demonstrating that implementation capacity, coordination and adaptive governance are central to integrated coastal planning in Mombasa and have wider relevance for developing coastal cities.

CONCLUSION

This study examined the influence of global and national planning frameworks on Blue Planning Uptake in Mombasa, addressing the limited quantitative evidence on whether framework availability, institutional capacity and land–sea integration translate into planning uptake. Its original contribution is the empirical demonstration that land–sea planning integration capacity, rather than the mere existence of planning frameworks, is the strongest determinant of Blue Planning Uptake.

The capacity for land–sea integration and environmental management both influence Blue Planning Uptake. Conversely, existing frameworks like MSP and ICZM have minimal effect on Blue Planning Uptake on their own, despite their conceived functional capabilities, unless integrated into national and county frameworks. The adaptive capacity of ICZM has a positive, statistically significant effect on Blue Planning Uptake suggesting that as planning systems become more adaptive to changing environmental and institutional conditions, integrated planning approaches become more achievable, and that reducing fragmentation across planning systems is essential for enhanced Blue Planning Uptake.

For policy and practice, the findings indicate that national and county coastal planning should prioritise implementation capacity, coordinated land–sea governance and adaptive management. This has implications beyond Mombasa because national spatial planning and Blue Economy initiatives require institutional arrangements that connect terrestrial planning with marine governance rather than creating additional frameworks without implementation mechanisms.

Study Limitations

Purposive sampling approach, while appropriate for accessing knowledgeable stakeholders, limits the statistical generalizability of findings beyond the sampled population and may under-represent perspectives from less institutionally connected or community-level actors. The sample's gender composition (84.38% male) constrains the extent to which the findings reflect gendered perspectives on coastal governance and resource access. The cross-sectional design captures perceptions and institutional conditions at a single point in time and cannot account for how planning capacity or framework implementation may evolve as Kenya's coastal governance institutions mature. The study relied on stakeholder perceptions rather than direct measures of implementation outcomes (e.g., documented enforcement actions or budget allocations), meaning that reported relationships reflect perceived rather than objectively verified institutional performance. Consequently, several limitations should be considered when interpreting these findings.

Future Research

Future research should extend the present findings through:

- i. Comparative studies of Blue Planning Uptake determinants across other Kenyan coastal counties, including Kwale and Lamu, to assess whether land–sea integration capacity remains the strongest predictor beyond Mombasa.
- ii. Longitudinal research tracking how institutional capacity and framework implementation evolve as Kenya's Marine Spatial Planning framework becomes operational.
- iii. Qualitative research examining the institutional and legal barriers that prevent framework operationalisation and complementing the present quantitative findings with process-level evidence.
- iv. Research on equity dimensions of Blue Planning Uptake, including how integration and adaptive governance reforms affect vulnerable coastal communities' access to marine and coastal

RECOMMENDATIONS

Revise the Mombasa County Spatial Plan. The County Physical Planning Department and

National Land Commission should address terrestrial bias by incorporating coastal land, the territorial sea and the Exclusive Economic Zone within spatial planning and implementation processes.

Operationalise Marine Spatial Planning. The State Departments responsible for Blue Economy and Fisheries and for Lands and Physical Planning should jointly operationalise the Marine Spatial Planning framework and allocate adequate resources for implementation.

Strengthen ICZM enforcement and monitoring. The National Environment Management Authority (NEMA) and Kenya Marine and Fisheries Research Institute (KMFRI) should strengthen ICZM enforcement and monitoring mechanisms, building on the finding that ICZM adaptive capacity supports Blue Planning Uptake.

Establish an inter-agency land-sea planning coordination mechanism. Relevant county and national government agencies should establish a coordination mechanism with a clear legal mandate, defined responsibilities and budgetary allocation because framework availability alone does not translate into uptake without institutional coordination.

Expand inclusive participation in coastal governance. Civil society organisations and public agencies should strengthen community- and gender-inclusive participation in coastal governance to address underrepresentation of at-risk groups and the equity concerns identified in the discussion.

CITED REFERENCES

- Abdullah, K. B. (1999).** Malaysian coastal environment: Planning, development and management of the environment in preparation for the next millennium. Department of Irrigation and Drainage Malaysia. Retrieved from <https://www.water.gov.my/jps/resources/auto%20download%20images/5844e30ccd939.pdf>
- Agyeman, J., Bullard, R. D., & Evans, B. (2003).** Just sustainabilities: Development in an unequal world. MIT Press.
- Awuor, C. B., Orindi, V. A., & Adwera, A. O. (2008).** Climate change and coastal cities: The case of Mombasa, Kenya. *Environment and Urbanization*, 20(1), 231–242.
- Bullard, R. D. (1990).** Dumping in Dixie: Race, class, and environmental quality. Westview Press.
- Cicin-Sain, B., & Belfiore, S. (2005).** Linking marine protected areas to integrated coastal and ocean management: A review of theory and practice. *Ocean & Coastal Management*, 48(11–12), 847–868. Retrieved from <https://doi.org/10.1016/j.ocecoaman.2006.01.001>
- County Government of Mombasa. (2022).** Mombasa Gate City Master Plan 2022: A premier gateway port city that upholds diversity and heritage. County Government of Mombasa. Retrieved from <https://repository.kippira.or.ke/handle/123456789/4858>
- County Government of Mombasa. (2023).** Third County Integrated Development Plan (CIDP) 2023–2027. County Government of Mombasa.
- Crist, P., Madden, K., Varley, I., Eslinger, D., Walker, D., Anderson, A., Morehead, S., & Dunton, K. (2009).** Integrated land-sea planning: Technical guide to the integrated land-sea planning toolkit. NatureServe/EBM Tools Network. Retrieved from https://www.natureserve.org/sites/default/files/publications/files/land_sea_tech_guide_final.pdf
- Douvere, F. (2008).** The importance of marine spatial planning in advancing ecosystem-based sea use management. *Marine Policy*, 32(5), 762–771. Retrieved from <https://doi.org/10.1016/j.marpol.2008.03.021>
- Ehler, C., & Douvere, F. (2009).** Marine spatial planning: A step-by-step approach toward ecosystem-based management. UNESCO Intergovernmental Oceanographic Commission. Retrieved from <https://unesdoc.unesco.org/ark:/48223/pf0000186559>
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016).** Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1–4.
- Faludi, A. (1973).** Planning theory. Pergamon

Press.

Friedmann, J. (1987). *Planning in the public domain: From knowledge to action*. Princeton University Press.

Harris, L. R., Bessinger, M., Dayaram, A., Holness, S., Kirkman, S., Livingstone, T.-C., Lombard, A. T., Lück-Vogel, M., Pfaff, M., Sink, K. J., Skowno, A. L., & Van Niekerk, L. (2019). Advancing land-sea integration for ecologically meaningful coastal conservation and management. *Biological Conservation*, 237, 81–89. Retrieved from <https://doi.org/10.1016/j.biocon.2019.06.020>

Healey, P. (1997). Collaborative planning: Shaping places in fragmented societies. Macmillan.

Hezri, A. A., & Hasan, M. N. (2006). Towards sustainable development? The evolution of environmental policy in Malaysia. *Natural Resources Forum*, 30(1), 37–50. Retrieved from <https://doi.org/10.1111/j.1477-8947.2006.00156.x>

Hinrichsen, D. (1998). Coastal waters of the world: Trends, threats, and strategies. Island Press.

Hoegh-Guldberg, O., Caldeira, K., Chopin, T., Gaines, S., Haugan, P., Hemer, M., Howard, J., Konar, M., Krause-Jensen, D., Lindstad, E., Lovelock, C. E., Michelin, M., Nielsen, F. G., Northrop, E., Parker, R., Roy, J., Smith, T., Some, S., & Tyedmers, P. (2019). The ocean as a solution to climate change: Five opportunities for action. *Frontiers in Marine Science*, 6, 17. Retrieved from <https://doi.org/10.3389/fmars.2019.00017>

Innes, J. E. (1995). Planning theory's emerging paradigm: Communicative action and interactive practice. *Journal of Planning Education and Research*, 14(3), 183–189.

Intergovernmental Panel on Climate Change. (2014). Climate change 2014: Impacts, adaptation, and vulnerability. Cambridge University Press. Retrieved from <https://www.ipcc.ch/report/ar5/wg2/>

Ministry of Lands and Physical Planning. (2015). National Spatial Plan 2015–2045: An integrated spatial plan for balanced and sustainable national development. Department

of Physical Planning. Retrieved from <https://vision2030.go.ke/publication/kenya-national-spatial-plan-2015-2045/>

Mugenda, O. M., & Mugenda, A. G. (2003). Research methods: Quantitative and qualitative approaches. ACTS Press.

Olale, P., Odote, C., & Kibugi, R. (2020). Integrating marine spatial planning in governing Kenya's land-sea interface. *Law, Environment and Development Journal*, 16(2), 178–194. Retrieved from <https://doi.org/10.25501/SOAS.00033484>

Ong, J. E. (2000). Coastal management in Malaysia: Issues and challenges. *Coastal Management*, 28(1), 55–68. Retrieved from <https://doi.org/10.1080/089207500263989>

Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health and Mental Health Services Research*, 42(5), 533–544. Retrieved from <https://doi.org/10.1007/s10488-013-0528-y>

Portman, M. E. (2011). Marine spatial planning: Achieving and evaluating integration. *ICES Journal of Marine Science*, 68(10), 2191–2200. Retrieved from <https://doi.org/10.1093/icesjms/fsr157>

Schlosberg, D. (2007). Defining environmental justice: Theories, movements, and nature. Oxford University Press.

Shanti, W. (1991). The law of the sea and the Indian Ocean. UNEP and the International Ocean Institute.

Talley, D. M., North, E. W., Juhl, A. R., Timothy, D. A., Conde, D., deBrouwer, J. F. C., Brown, C. A., Campbell, L. M., Garstecki, T., Hall, C. J., Meysman, F. J. R., Nemerson, D. M., Souza Filho, P. W., & Wood, R. J. (2003). Research challenges at the land-sea interface. *Estuarine, Coastal and Shelf Science*, 58(4), 699–702. Retrieved from <https://doi.org/10.1016/j.ecss.2003.08.010>

UNESCO. (2020). Global ocean science report 2020: Charting capacity for ocean sustainability.

UNESCO Publishing. Retrieved from <https://gosr.ioc-unesco.org/home>

UNESCO. (2022). Marine spatial planning and the blue economy in Kenya. UNESCO. Retrieved from <https://unesdoc.unesco.org/ark:/48223/pf0000384930>

United Nations Department of Economic and Social Affairs. (2017). The potential of the blue economy: Increasing long-term benefits of the sustainable use of marine resources for Small Island Developing States and coastal least developed countries. United Nations.

United Nations. (1982). United Nations Convention on the Law of the Sea. United Nations. Retrieved from https://treaties.un.org/doc/publication/CTC/Ch_XXI_6_english_p.pdf

Wenze, Y., Hou, B., Ye, G., & Wang, Z. (2023). China's land-sea coordination practice in territorial spatial planning. *Ocean & Coastal Management*, 237, 106545. Retrieved from <https://doi.org/10.1016/j.ocecoaman.2023.106545>

Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper & Row.

Yuan, W., & Chang, Y.-C. (2021). Land and sea coordination: Revisiting integrated coastal management in the context of community interests. *Sustainability*, 13(15), 8183. Retrieved from <https://doi.org/10.3390/su13158183>