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Review

Governance of coastal wetlands: Beyond the community conservation paradigm

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ABSTRACT

Governance plays an important role in coastal wetland protection and restoration. Through a review of the literature on the governance of coastal wetlands, we assessed the drivers influencing the governance of coastal wetlands. We found 66 cases addressing seven governance themes: politics, institutions, land tenure, economy, policies, resources, and behavior. The literature was dominated by studies focused on the protection of mangrove areas in lower-middle-income countries and at the local scale. We found 61 drivers that influence the governance of coastal wetlands. The literature highlighted the participation of local communities as a critical driver of protection and restoration practices and identified a range of challenges. Local communities' participation in governance depends on the implementation of multilevel, decentralized, and integrated practices that promote equitable distribution of power between actors. Solutions to enhance local community rights and land tenure, compensation for alternative livelihoods, and unequal power dynamics are significant knowledge gaps that need to be addressed in future research.

1. Introduction

Coastal wetlands, which include mangroves and saltmarshes, are among the most productive ecosystems in the world, providing services and resources important to human well-being, such as timber, fuelwood, fisheries, and other non-timber products, as well as services related to coastal protection, water quality improvement and culture such as maintenance of traditional knowledge and spiritual value (Costanza et al., 2014). Their abundant natural resources make wetlands a target for exploitation and, thus, a focus for multiple conflicting interests (Hagger et al., 2022; Hettiarachchi et al., 2017). The global cover of coastal wetlands has been greatly reduced compared to their original extent. Mangrove cover was reduced by approximately 35% by the end of the 1990s (Valiela et al., 2001), with a further 6.5% decline in cover between 1990 and 2020 (FAO, 2020). Saltmarsh cover has been similarly reduced for centuries (Gedan et al., 2009). Changes in the area and health of coastal wetlands have been caused by anthropogenic activities, such as deforestation, drainage, conversion to aquaculture and agriculture, coastal development and pollution, and by the impacts of climate change, which are predicted to increase in the next decades (Goldberg et al., 2020). Poor governance and management are also major underlying threats to coastal wetland ecosystems (Hettiarachchi et al., 2015; Orchard et al., 2015).

The governance of coastal wetlands can be defined as the set of institutions, policies, laws, and other norms, as well as their interactions and the processes by which society exerts power and assigns responsibilities to make decisions and implement policies affecting coastal wetlands and coastal wetland users (IUCN, 2013; Nemutamvuni et al., 2020). The many institutions and actors interact in accordance with formal and informal rules to govern human behavior and include elements such as discursive debates, negotiation, conflict resolution, power, responsibilities, justice, accountability, and participation (Lebel et al., 2006).

Coastal wetlands can extend across state and national boundaries, involving policies and institutions that range from those at local levels to those at international levels (Bell-James et al., 2020). Thus, the governance of coastal wetlands correspondingly occurs under complex legislative arrangements, often across different jurisdictions and involving different government agencies and non-government institutions. Social processes, such as governance, can produce positive and negative

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feedbacks responsible for shaping the environment (Cash et al., 2006). The location of coastal wetlands within the boundary of terrestrial, freshwater, and marine realms, involving both terrestrial and marine jurisdictions, adds additional complexity to the governance of these ecosystems (Rogers et al., 2016).

The complexity of governance configurations for coastal wetlands may result in institutions operating with little coordination (Fitzsimons et al., 2015) and low levels of management responsibility if there is no "lead" agency, resulting in the management of coastal wetlands being neglected or overlooked (Fitzsimons et al., 2015). In other cases, the state's management responsibilities for coastal wetlands can fall within one single sectoral agency, such as forestry, environment, or fisheries, leading to high levels of segmentation of governance. In this case, coastal wetland management can play a peripheral role within policies designed to service single needs or interests (Rotich et al., 2016).

Despite advances in understanding the characteristics of effective governance of the ecosystems (Cumming et al., 2020), governance systems are often inappropriately structured to support healthy and resilient coastal wetlands. The organization of institutions interacting across geographic scales, sectors, and administrative levels of governance generates problems of institutional fit, making the governance of coastal wetlands an institutional challenge (Cumming et al., 2020; Orchard et al., 2015; Tuda et al., 2019).

Therefore, understanding the drivers and the dynamics shaping the governance of coastal wetlands is essential knowledge for building adaptive capacity[1] and social and environmental resilience[2] in the face of abrupt changes brought about by natural forces and human actions (Cinner et al., 2018). Yet, most studies of coastal wetlands typically focus on ecological aspects of wetland management, such as the biophysical conditions influencing restoration and rehabilitation of wetlands and the physical effects of coastal erosion (Sánchez-Núñez et al., 2019; Spalding et al., 2014). Here, we review the emerging understanding of the governance of coastal wetlands, focusing on the protection and restoration of mangroves and saltmarshes. Protection is defined as any activity to prevent unwanted changes and maintain coastal wetlands' extent and/or quality (Hamilton et al., 2019); and restoration is defined as any activity to initiate, recreate, or assist in the recovery of coastal wetlands from degradation (SER, 2004). Here, we presented a descriptive literature review on the drivers of governance influencing coastal wetlands protection and restoration. The identified drivers were qualitatively grouped into critical themes to provide insights and recommendations that can be useful in improving the governance of coastal wetlands. We also assessed trends in the diversity of authorship, including the geographic locations of authors and their organizational affiliations, evaluating evidence for parachute science (Stefanoudis et al., 2021), which can add additional complexity to governance systems (Stefanoudis et al., 2021).

2. Methods

A systematic literature review on the governance of coastal wetlands protection and restoration was conducted using Pickering and Byrne (2013). The systematic method is used to search and categorize the literature, providing a reliable assessment of the status of a research field. The following steps are executed: definition of the topic, formulation of the research question, identification of keywords or search terms, identification of databases, creation of categories to structure the data, review of papers and revision of categories, and analysis of information (Pickering and Byrne, 2013).

Research papers published in English language journals were obtained by searching electronic databases, including Science Direct and Google Scholar, from 2000 to 2022. The Boolean search was carried out in the fields of title and abstract with the following keywords: ("coastal wetlands" OR "mangrove" OR "salt marshes" OR "saltmarshes") AND ("governance" OR "management" OR "policy" OR "land use" OR "land tenure" OR "institutions" OR "institutional capacity"). The search was conducted from January 2021 to January 2022. This review did not include studies from the "grey" literature. Initially, 81 articles were identified, and the selection was refined depending on whether the paper investigated, explored, or discussed the governance of coastal wetlands. Seventeen papers were excluded, as the research was not focused on coastal wetlands or the study did not specifically explore the governance of coastal wetlands. To evaluate whether the study of coastal wetland governance as a proportion of the total literature on coastal wetlands increased over time, we did a second search of the literature that included all articles on coastal wetlands (27,171 papers).

Once the selection of papers was completed, a qualitative analysis was applied to each text using *Nvivo* 12 (Bandara et al., 2015). Our 64 papers encompassed 67 cases, as some papers performed studies on more than one country. The following attributes were recorded in a database: authorship; author's institution; year of publication; journal; country where study was performed; economy by income-classified as low-, lower-middle, upper-middle, and high-income (UN, 2022); the scale of study; ecosystem in which the study was performed; whether the paper was focussed on protection or restoration; and the governance theme (see below).

We assessed the governance drivers that have been shown to influence coastal wetland protection and restoration. We analyzed the frequency (presence or absence) of drivers in the Results and Discussion sessions of each paper (Geist and Lambin, 2002). The relevant segments of papers that mentioned and/or described governance drivers influencing the protection and restoration of coastal wetlands were inductively coded (Chandra et al., 2019). Once the coding was completed, similar drivers (i.e., those with similar codes) were classified into thematic categories (Bandara et al., 2015). These categories describe different governance themes that were conceptualized according to the definition of governance used in this study. After reviewing the papers, seven key thematic categories of governance drivers were identified: Politics, Institutions, Policies, Economy, Land tenure, Resources, and Behavior (Table 1).

We assessed the geographic patterns of science practice, emphasizing equity in science. "Parachute research" or "helicopter research" refers to a practice where scientists, usually from higher-income countries, conduct field research in lower-income countries and then return to their home countries without maintaining engagement and communication with local researchers, communities or institutions in the host nation (Stefanoudis et al., 2021). This practice can neglect local research needs, hinder local research efforts, and may result in the dependency of lower-income countries on external expertise and financial resources. Following Stefanoudis et al. (2021), we assessed whether author lists contained authors from the "host nation" (the nation where the study was conducted) as leading and/or senior authors or if they were included as middle authors in the publication. We also assessed if the studies provided a research permit number to conduct fieldwork (interviews, questionnaires, and workshops) in the study area.

3. Results and Discussion

3.1. State of understanding

We found that the number of governance studies has increased over time, following the same trajectory as the increase in coastal wetlands articles across all disciplines (Appendix A, Fig. 1A). Of the sixty-four journal articles on the governance of coastal wetlands published between 1999 and 2022, the majority were published between 2011 and 2022 (Fig. 1A). Articles on governance were only a small proportion (~0.3%) of all the peer-reviewed published articles on coastal wetlands.

[1] The ability of a system to adapt to changes (Cinner et al., 2018).

[2] Ability of a system to absorb disruption and reorganize while going through changes (Nelson et al., 2007).

Table 1
Description of the seven themes identified in the literature review on coastal wetland governance. Themes are based on the definition of governance used in this study (IUCN, 2013; Nemutamvuni et al., 2020).

Theme	Description of the theme
Politics	Activities and processes associated with the governance of a society or a country, including decision-making, distribution of authority and control, political stability, enforcement of the law, and level of corruption (UN, 2006).
Institutions	Socially constructed structures (governmental or non-governmental) that establish norms and formal (laws and constitutions) and informal rules (codes of conduct, conventions, and norms of behavior), as well as provide guidelines and frameworks for organizing collective action (North, 1991).
Land Tenure	The legal terms on which coastal wetlands are held and used. It involves the rights and obligations of the holders and includes issues such as ownership, access to resources, and rights to manage, transfer, or exploit the land. (Bruce, 1986).
Economy	Economic system by which a country's goods and services are produced, distributed, and consumed within a political entity. It encompasses economic activities and is influenced by natural resources, infrastructure, policies, and technology (Buckley et al., 2018).
Resources	The financial, technical, and human resources necessary to achieve the protection and restoration of coastal wetlands.
Policies	Sets of rules, principles, and guidelines established by a government to guide decision-making processes, setting the objectives, actions, and regulations that actors must follow to protect natural resources (Roberts, 2010).
Behavior	Social components such as cultural and social values, power dynamics, participation, information sharing, and conflicts influence the dynamics within institutions, affecting decision-making processes (North, 1991).

This study considered only peer-reviewed articles in English language, which limited the number of documents assessed. Further research could include reports in the grey literature and articles in languages other than English, given that much of the world's coastal wetlands occur in Southeast Asia and tropical regions of Africa and South America (Murray et al., 2022).

The literature revealed that governance research was predominantly performed on mangrove areas (78%). Only two studies (3%) were performed on saltmarshes and 12% on coastal wetlands in general. Around 52% of the studies were conducted in South and Southeast Asia, and only 12% in Western and Central Africa, despite the large area of mangroves on the African continent (~20% of world mangrove area) (FAO, 2020). Only 6% of studies were undertaken in North America, South America, and Oceania (Fig. 1B). The articles appeared in 33 separate journals, with most of the articles being published in applied journals such as Ocean and Coastal Management (20%), Journal of Environmental Management (7%), and *Estuarine, Coastal and Shelf Science* (7%) (Appendix A).

The countries whose coastal wetlands have received the highest numbers of studies were Thailand, Indonesia, and Vietnam. Twenty-one percent of studies were performed in countries with high income, 19% in countries with upper middle income, and 49% and 1% in countries with lower middle and low income, respectively (Fig. 1C). Nine percent of the articles were conducted on a global scale and were classified as not applicable. Most studies were conducted locally (i.e., local sites and communities) (54%). The articles were also classified according to their focus on protection or/and restoration. Around 50% of papers were focused on protection, 39% on both protection and restoration and only 14% on restoration alone.

The analysis of the literature shows evidence of parachute science (Stefanoudis et al., 2021). Despite most of the studies being performed in

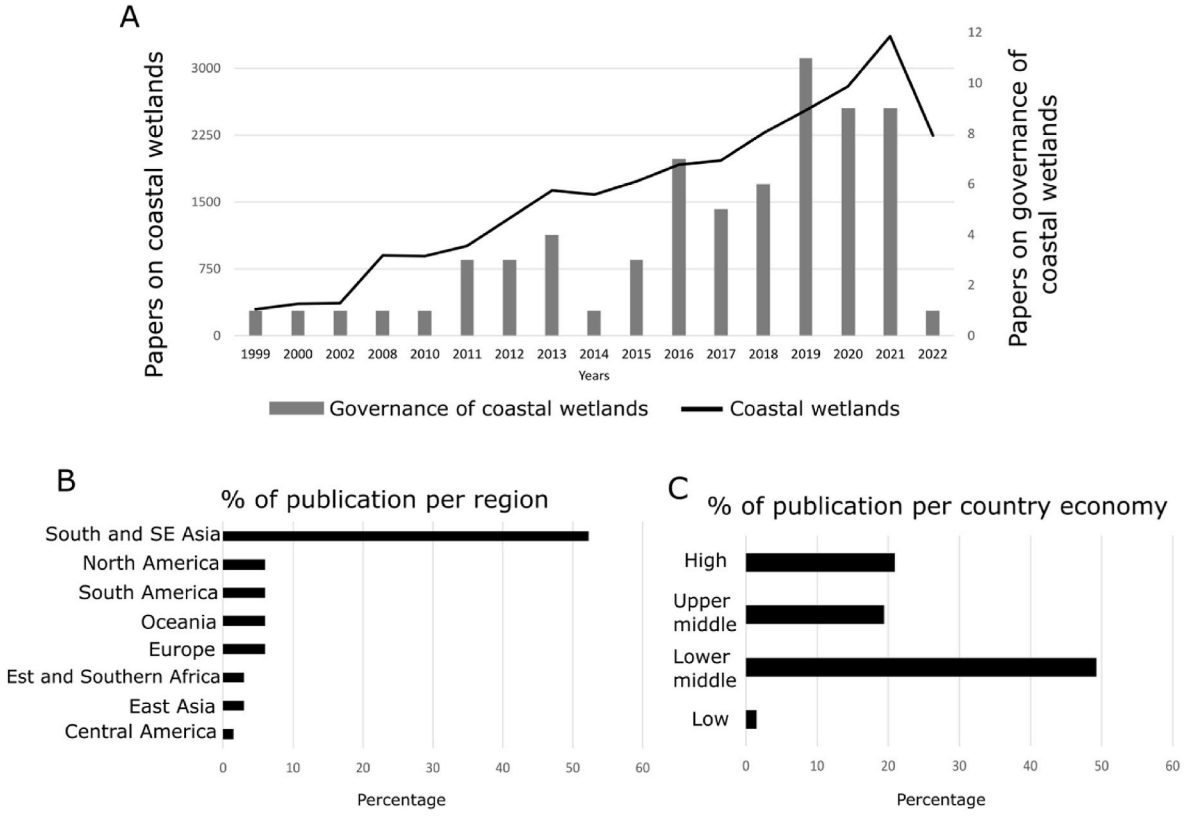

Fig. 1. Results from the bibliographic analysis of the governance of coastal wetlands that assessed publications between 1999 and 2022. (A) Number of articles published per year. Values on the left y-axis represent the number of articles published on the governance of coastal wetlands, and values on the right y-axis show all articles published on coastal wetlands. (B) The percentage of study cases per region (based on reported study area). (C) Percentage of study cases by country economic classification (country economic classification was obtained from UN, 2022).

South and Southeast Asia, most authors (and institutional affiliations) were located in the USA, Netherlands, Australia, Belgium, and the United Kingdom (Fig. 2A). In this review, 28% of cases published had no scientists from the host nation included in the research, while approximately 48% of studies had host-nation scientists leading the research. When focusing the analysis on publications conducted in South and Southeast Asia, regions with the largest mangrove cover and where most of the studies were conducted (Fig. 1B), 27% of publications had no scientist from the host nation included, and 42% of research articles were led by host-nation scientists (Fig. 2B). Most of the studies did not provide details of permit/ethics numbers that are prerequisites for conducting research involving interviews and questionnaires (mainly when conducting research with local communities). Ninety percent of the literature assessed and 83% of studies conducted in South and Southeast Asia (Fig. 2B) did not include the permit/ethics numbers on the publication. The absence of permit/ethics number details does not necessarily imply unethical conduct but might reflect on ethics and transparency in academic institutions and publishing (Stefanoudis et al., 2021).

3.2. Governance drivers influencing coastal wetlands

Through the literature review and using inductive coding, we identified 61 drivers that influence the governance of coastal wetlands. The 61 drivers were then categorized into seven interacting themes (Fig. 3). The drivers can influence each other and act cumulatively and simultaneously within the governance system (e.g., lack of financial resources can affect policy implementation). Due to these interactions, some themes were discussed together. Box 1 and Box 2 illustrate the interaction between drivers and themes. The seven themes are discussed in the following sections from the most to the least frequently discussed theme. Governance drivers mentioned most frequently were policies (discussed in 76% of articles), the presence of local communities (67%), participation (57%), financial and human resources (52%), conflicts (52%), and power imbalances (51%). The absolute frequency of drivers in each thematic category, as well as the frequency of drivers by country economic classification, are included in Appendix B (Table B).

3.2.1. Behavior

The governance of coastal wetlands is shaped by a wide range of social components (Datta et al., 2012). In our review, drivers such as participation (discussed in 57% of articles), conflict resolution

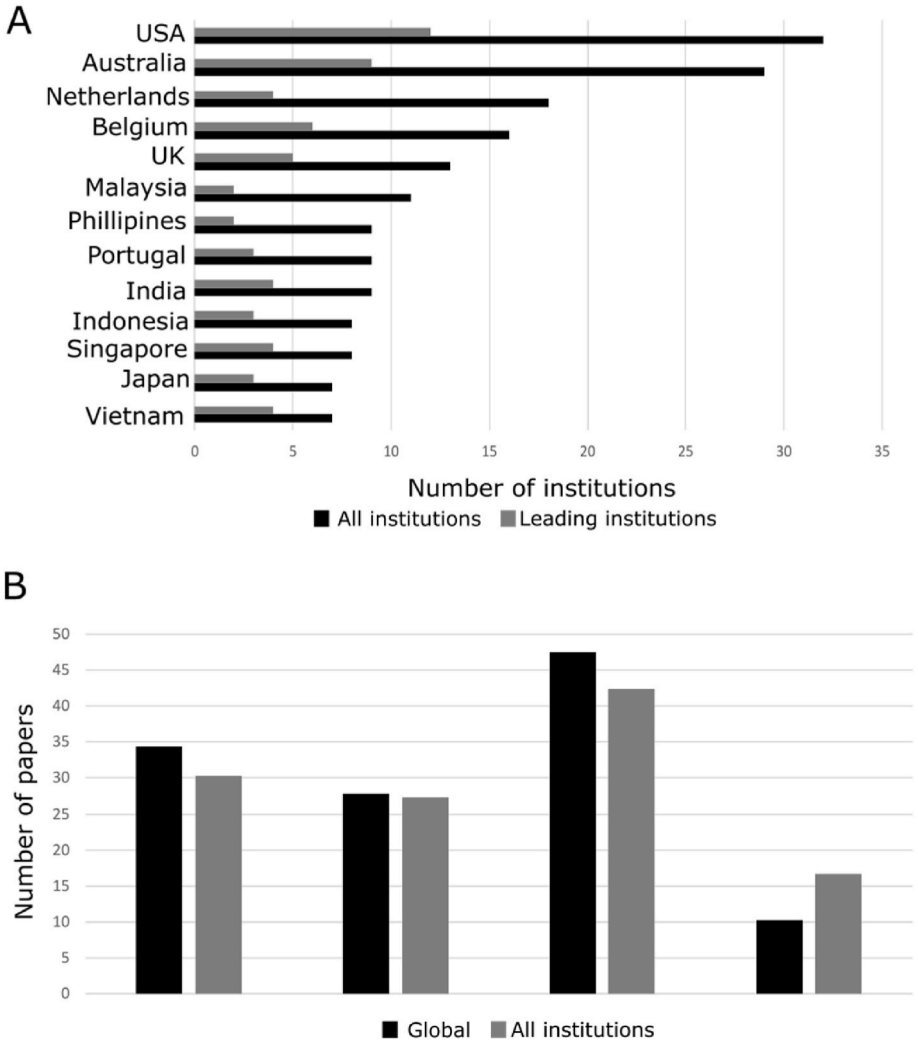

Fig. 2. Research equity and ethics in studies of the governance of coastal wetlands. (A) The top countries (based on authors' affiliations) for the number of publications. The black bars represent the overall authorship contribution per country, while the grey bars represent the leadership of institutions in each country. (B) Comparison of publication metrics between all studies (61 publications, black bars) and studies conducted in South and Southeast Asia (31 publications, grey bars). Publications were assessed in four categories: all authors from the host nation, no authors from the host nation, leading authors from the host nation, and if the publications provided details of permit/ethics numbers when performing studies that require ethics approvals (i.e., interviews with local community members).

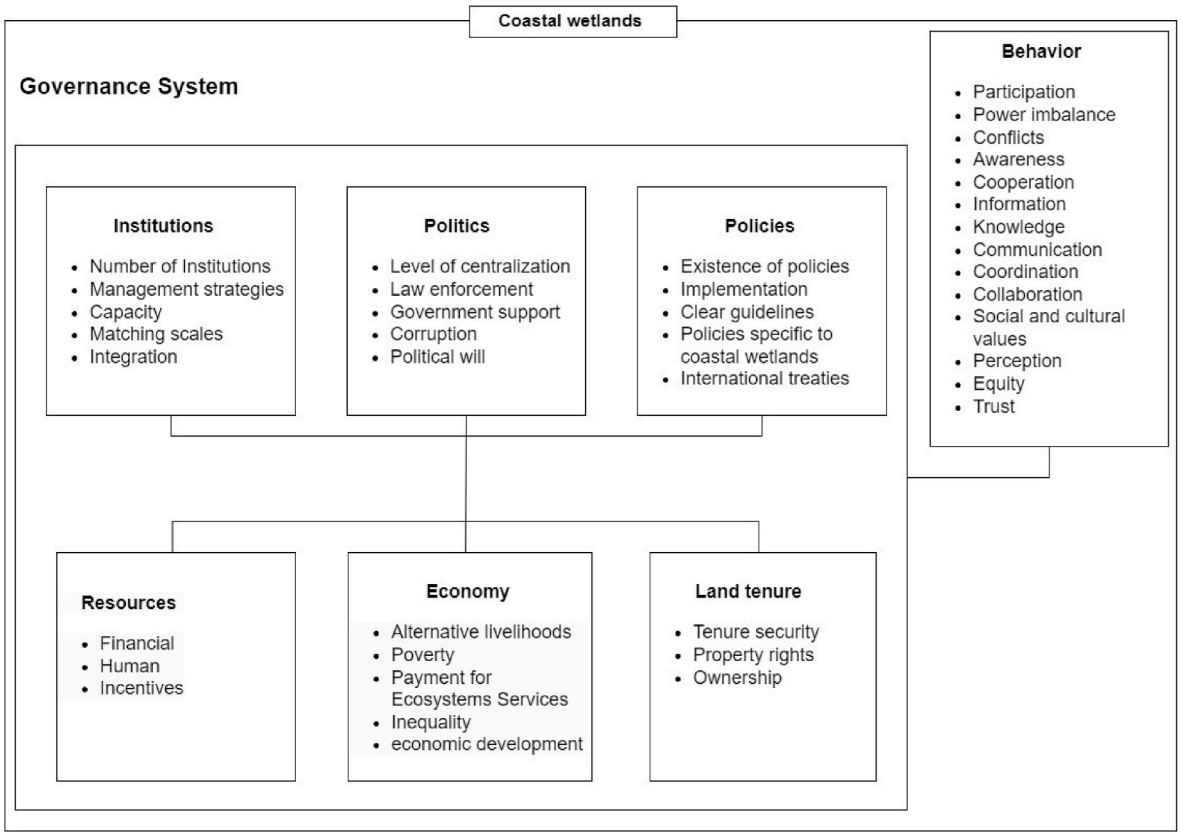

Fig. 3. The most frequently mentioned governance drivers influencing the protection and restoration of coastal wetlands. Drivers were assessed by inductively coding 61 published articles on coastal wetland governance. The governance drivers were classified into seven thematic categories (Politics, Institutions, Land tenure, Economy, Policies, Resources, and Behavior). The complete list of drivers coded from the literature review and their frequency are shown in Appendix B (Table B).

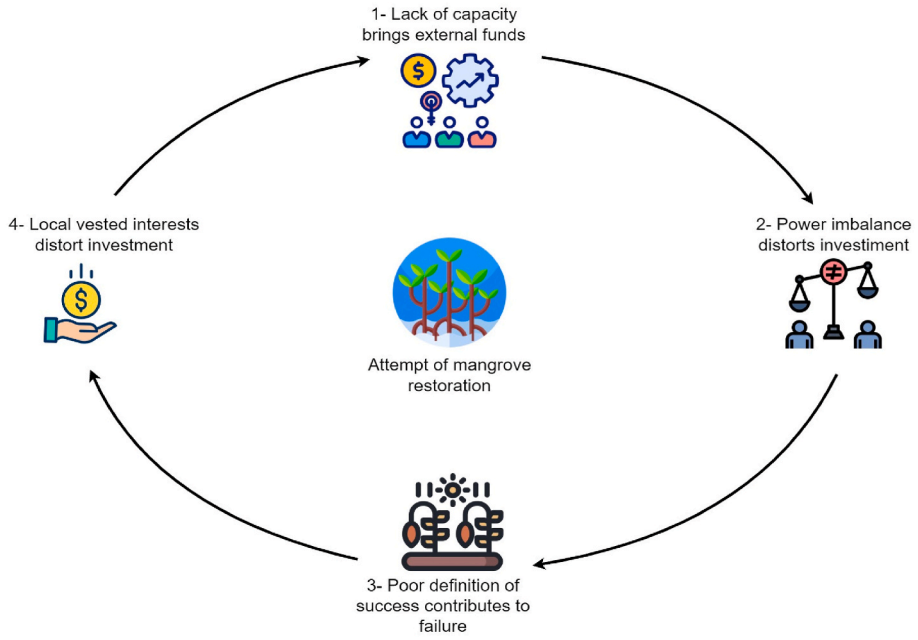

Fig. 4. Schematic view of the four phases of the 'cycle of failure' described by Thompson (2018). In Phase 1, the lack of financial capacity from the government makes government institutions rely on the private sector. Phase 2: The private sector has the power to choose which community they want to work with, neglecting other communities. Phase 3, there is no long-term monitoring, and actors use 'area planted' as a metric of success, leading to a false success. Phase 4 philanthropic institutions finance new attempts of restoration, reinitiating the cycle. Icon made by Noomtah from www.flaticon.com. Icon made by Kiranshastry from www.flaticon.com. Icon made by Freepik from www.flaticon.com.

Box 1
Mangrove rehabilitation: the cycle of failures (Thompson, 2018)

In this study, Thompson (2018) assessed mangrove restoration initiatives and policies in Thailand, focusing on how institutional arrangements and power dynamics can interact to contribute to the failure of mangrove restoration. Thompson (2018) identified a history of repeated failures in the attempts to restore and rehabilitate mangrove forests in Thailand that he named the 'cycle of failure' (Fig. 4).

Phase 1: National government and national policies stipulate restoration targets that are difficult to achieve. Despite the increased *'pressure to plant'*, state and local government institutions lack the financial capacity and workforce to implement the policy autonomously. This pressure and the lack of financial capacity made state and local governments rely on external institutions to financially support the initiatives, which is also a form of parachute or helicopter practice.
Phase 2: The power to make decisions regarding mangrove rehabilitation has shifted from the government to corporate financers. The corporate financers select partner communities and project sites according to their internal protocols, which can lead financers to choose communities they consider 'good' to work with or easier to control. Consequently, other communities can be neglected leading to unjust site selection, unfairness and inequity for mangrove rehabilitation.
Phase 3: Actors used 'area planted' rather than 'survival rate' as a success metric. Restoration areas were not managed or monitored, leading to 'false successes'. Actors were not concerned with the failed attempts.
Phase 4: Ideologies related to corporate philanthropy and public holidays associated with the Thai Royal Family encourage the re-financing of rehabilitation attempts.

The lack of capacity (financial and workers) and unequal distribution of power are the main factors affecting the restoration outcomes. The author recommended solutions to improve the governance and outcomes, including budget reform in the government and allocating financial resources to government agencies so they have the autonomy to decide upon appropriate restoration sites in a fair and just way. The author also recommended that local communities participate not only as workers in restoration initiatives but also in management, long-term monitoring, and decision-making for the restored forest.

Box 2
Drivers leading to success in community-based mangrove management (Kongkeaw et al., 2019)

In this study, Kongkeaw et al. (2019) explored the key factors leading to the success of Community-Based Mangrove Management (CBMM) in Thailand. They identified that the development of CBMM in the region occurred during four overlapping periods (Fig. 5).

(1) From the 1980s–1990s, community livelihoods were significantly reduced by aquaculture, logging concessions, human habitation, mining, charcoal production, and urban development. During this period, non-government organizations (NGOs) assisted villagers in understanding how they could claim collective forest management rights and protect mangroves from loss and degradation.
(2) From the 1900s–2000s, villagers claimed their rights to participate in management and worked on conservation activities together with NGOs
(3) From the mid-1990s to the late 2000s, the cooperation between NGOs and local communities with government institutions increased, promoting participation and the recognition of mangrove forests as community forests. Local community networks expanded, bringing in financial support.
(4) The 2000s to 2017 period is characterized by community mangrove forests' stability, consolidation, and sustainability.

Community leadership, support from NGOs, and eventual support from the government were important factors in implementing successful CBMM. Policies that shifted from mangrove exploitation towards mangrove protection and policies assuring community rights were key factors for establishing sustained community-based management in the region. Moreover, the dense network of community groups facilitated communities' engagement and participation, leading to collective action.

(discussed in 52% of articles), power (discussed in 51% of articles), awareness (discussed in 46% of articles), information sharing (discussed in 28% of articles), and cultural and social values (discussed in 22% of articles) are known to influence dynamics within institutions (North, 1991), affecting decision-making processes. Investigating the relationships between actors is important to identify the underlying causes of institutional failures and poor governance (Thompson, 2018).

Our review found that the participation of multiple stakeholders would give rise to transparent and equitable decision-making and can meet the demands and expectations of stakeholders (Van Dat et al., 2021). The exclusion of actors from the decision-making process led to difficulties in policy implementation and uncontrolled exploitation of natural resources (Siswanto and Wardojo, 2012; Thompson, 2018). Participation was recognized as a central driver in the governance of coastal wetlands for middle and low-income countries, where local communities are usually highly dependent on mangrove resources (Van Dat et al., 2021). In the articles reviewed, there were recommendations that traditional knowledge and the social and cultural norms of traditional communities should be considered in the management of coastal wetlands to facilitate the inclusion of local communities more fully in the management (Suman, 2019).

Our review also highlighted that asymmetrical power affected local democracy, reducing local communities' participation and incentives, leading to uncontrolled and illegal exploitation practices (Meilasari-i-Sugiana, 2012). Socio-ecological systems in which power was shared and well-balanced were usually more collaborative and had stronger partnerships (Aheto et al., 2016; Mojica Vélez et al., 2018). Power can influence information sharing and knowledge flows and shape

institutional arrangements, as well as lead to the exclusion of powerless people and groups from the decision-making processes (Morrison et al., 2019).

People's perception and public awareness were also important to sustainable mangrove management (Arumugam et al., 2020; Badola et al., 2012; Martínez-Espinosa et al., 2020; Owuor et al., 2019). People support protection and restoration practices when they place high value on natural resources and understand ecosystem services provided (Suman, 2019). Overall, the literature review indicated that good governance practices required coordination and cooperation among the different sectoral agencies and actors at various levels of management (Asante et al., 2017; Beitl et al., 2019; Mojica Vélez et al., 2018). This required improved information and knowledge sharing, resolution of conflicts, building trust among actors, and agency coordination and integration.

3.2.2. Institutions and politics

Institutions can influence people's behavior toward protecting and restoring coastal wetlands. Institutions play an important role in shaping norms and choices and enforcing rules (North, 1991; Robinson et al., 2017; Vatn, 2007). They can influence the relationships between society and natural resources by controlling the access and the different uses of natural resources and determining how protection and restoration strategies are made (Thompson, 2018; Vatn, 2007). Institutions can ameliorate peoples' access to information, enhancing awareness and affecting how people value natural resources (Afonso et al., 2022; Chaikumbung et al., 2019). For example, in São Tomé Island, formal education is suggested to increase conservation awareness among local communities (Afonso et al., 2022). They can also provide incentives (Aheto et al., 2016; Damastuti and de Groot, 2017) and influence people's behavior and willingness to participate in the protection and restoration of natural areas (Chaikumbung et al., 2019). Moreover, institutions have the potential to influence the way government exercises authority and the formulation and implementation of policies (Cash et al., 2006; Chaikumbung et al., 2019). For example, in a case study in Thailand, Thompson (2018) pointed out that despite restoration success being based on ecological factors, institutions determine how effectively ecological knowledge is applied to management.

On the other hand, coastal wetland protection and restoration outcomes can be negatively affected by poor institutional capacity (mentioned in 48% of articles reviewed) (Friess et al., 2016; Thompson et al., 2017). Institutional capacity may affect the implementation of policies and management strategies, law enforcement, and reduce participation of local populations in governance (Canty et al., 2018; Suman, 2019). Authors of articles in our review criticized the capacity of the governments to manage coastal wetlands in middle- and lower-income countries. They highlight that government institutions in middle- and lower-income countries are prone to suffer problems related to lack of resources and capacity, corruption and fragmentation of authorities, lack of political will, and pressure from economic actors (Canty et al., 2018; Mojica Vélez et al., 2018; Suman, 2019). Box 1 illustrates a case study of the effects of low levels of institutional capacity on coastal wetlands in Thailand (Box 1). In this study, Thompson (2018) found that limited financial resources, lack of skilled workers, and lack of technical knowledge affected the implementation of policy for mangrove protection in Thailand.

Weak law enforcement (mentioned in 33% of articles), institutionalized corruption (within 21% of articles), lack of political will (mentioned in 21% of articles), and political instability (mentioned in 13% of articles) may also affect coastal wetlands protection and restoration (Begum et al., 2021; Canty et al., 2018; Primavera, 2000). Corruption can have wide-ranging consequences, including reduced implementation of policies and law enforcement and reduced monitoring of protected areas (Hosseini and Kaneko, 2013), accelerating environmental degradation and loss of environmental quality (Cole et al., 2006). Corruption may also affect the way people value natural resources, their willingness to pay for ecosystem services (Chaikumbung et al., 2019), and people's access to resources and property rights (Armitage, 2002; Datta et al., 2012).

Politically unstable countries are less likely to establish and enforce environmental policies and continue enforcement across successive administrations (Galinato and Galinato, 2012). For example, Fent et al. (2019) observed reductions in forest coverage in conflict areas in Casamance, where mangrove resources offer a potential source of livelihood. People displaced from agricultural land during armed conflict turned to collecting and selling mangrove wood as an alternative livelihood. Moreover, human migration caused by civil war also increased pressures on the mangrove forest in the region (Fent et al., 2019).

The high number of institutions (number of actors) (mentioned in 15% of articles) involved in coastal wetland management can limit institutional efficiency in resource use and create conflicts between implementing institutions (Adger et al., 2003; Feka, 2015). There was a mismatch between multiple institutions and their overlapping and/or conflicting jurisdictions, aims, and responsibilities (Friess et al., 2016), leading to decreases in ecosystem quality and resilience (Gunderson et al., 2016; Orchard et al., 2015). Thus, the number of institutions responsible for coastal wetland management and their multiple scales and jurisdictions may cause confusion and create economic, political, and management challenges (Canty et al., 2018; Orchard et al., 2015). Despite criticism of the high number of institutions involved in coastal wetland management, the dynamics and complexity of coastal wetlands require multiple institutions operating at different scales and across land-sea boundaries (Lebel, 2012). Thus, the complex nature of environmental problems requires the governance of coastal wetlands to be integrated, collaborative, multilevel (temporal, spatial, and governance scale), and decentralized (Friess et al., 2016; Mojica Vélez et al., 2018).

The need for the inclusion of the local community as key stakeholders and the establishment of community-based organizations were reported in 67% of articles. Participative management strategies, such as co-management and community-based management, were reported as more successful than top-down and centralized approaches (Damastuti and de Groot, 2017). These approaches are more collaborative, allow the participation of local communities with other actors at multiple scales, create stronger networks, and reduce the overexploitation of mangrove resources (Beitl, 2017; Mojica Vélez et al., 2018). Box 2 illustrates the importance of local community engagement and participation in sustainable mangrove management. In this study, Kongkeaw et al. (2019) show how local community leadership and strong local community social networks may help reduce mangrove loss and degradation. Co-management approaches are characterized by shared authority from central to lower decision-making levels (Arumugam et al., 2020; Berkes, 2010) and are important in acknowledging that ecological regions are composed of unique ecological and socioeconomic attributes (Nagendra and Ostrom, 2012; Owens and Zimmerman, 2013). Because of the emerging shift from centralized to more participative strategies in many nations, the current governance of coastal wetlands tends to be polycentric (ELI, 2008; Endter-Wada et al., 2020).

3.2.3. Policies

The existence of environmental policies (mentioned in 76% of articles), policy implementation (mentioned in 39% of articles), and clear policy guidelines (mentioned in 18% of articles) were reported as important drivers controlling the loss of coastal wetlands. Coastal wetland policies usually span local to international scales. International treaties, such as the Ramsar Convention, can be an important guide and a driver to lower-level policies, motivating leadership, community engagement, and policy implementation (Fletcher et al., 2011). However, the positive effects of the Ramsar Convention were not observed in countries where implementation approaches were not integrated within different levels of governance (federal, state, and local) (Fletcher et al., 2011). The implementation of policies varies among countries and may differ among jurisdictions within nations (e.g., provinces or states)

(Bell-James et al., 2020; Feka, 2015). Implementation of policies can be affected by the institutional capacity and political will of a country to protect coastal wetlands (Endter-Wada et al., 2020), which seems especially the case in middle- and lower-income countries (Mojica Vélez et al., 2018). Examples in Thailand and the Philippines showed how weak law enforcement, corruption, and lack of political will influenced the conversion of mangrove areas to aquaculture pounds (Huitric et al., 2002; Primavera, 2000). The authors also described how countries often have strong policy frameworks and appropriate legal support for protecting and restoring mangrove areas. However, policies were usually not effectively implemented because of a lack of financial and human resources (DasGupta and Shaw, 2013).

Our review also found that there are often multiple policies addressing wetland protection issues, sometimes with different definitions and approaches (Bell-James et al., 2020; UNEP, 2019). This ambiguity affects the ability of actors to understand the policies, implement and enforce them (Bell-James et al., 2020). Moreover, high numbers of policies may affect actors' awareness of the full range of policies, influencing compliance with legislation. Consequently, policy approaches for coastal wetlands are often fragmented and ineffective (Endter-Wada et al., 2020; Mojica Vélez et al., 2018), with uncertain or competing responsibilities of different government institutions that work with a lack of cohesion, harmonization, and integration between the legal instruments and different jurisdictions. Therefore, in countries where multiple overlapping policies occur, protection of coastal wetlands may be inadequate (Bell-James et al., 2020).

Policies concerning economic development also affected the protection and restoration of coastal wetlands (Mojica Vélez et al., 2018; Primavera, 2000). They were reported as leading to changes in land use, stimulation of intense activities, and competition with environmental policies, mainly in areas where multiple actors with multiple interests coexist (Friess et al., 2016; Mojica Vélez et al., 2018). Primavera (2000) and Lee et al. (2019) highlighted that policies supporting aquaculture production stimulated the clearing of mangroves in the Philippines and elsewhere in Southeast Asia. It was recommended that policies for restoring coastal wetlands be coupled with policies focused on protecting mangroves and saltmarshes (Lee et al., 2019). These authors suggested that integration and harmonization of policies in different sectors are important for the regulation of existing uses of mangroves, such as agriculture and aquaculture, combining them with sustainable strategies (i.e., payment for ecosystems services, carbon credits) that ensure the livelihoods of local communities (Lee et al., 2019). Some authors also highlight that to overcome a lack of policy integration, policies can be based on polycentric governance, ensuring the participation of all actors and with power being equally distributed among actors (Mojica Vélez et al., 2018; Ostrom, 2010).

3.2.4. Economy and resources

Studies indicated that lack of alternative livelihoods (in 31% of articles), poverty (in 16% of articles), and inequality (in 12% of articles) stimulate marginalized populations to engage in environmentally unsustainable activities. Poor populations of South Asia were documented to be engaged in activities such as aquaculture (where mangroves are replaced by ponds), fishing for shrimp, and mangrove cutting (Datta et al., 2012; Zorini et al., 2004). These practices can lead to overexploitation of resources, reducing the provision of services and, thus, increasing the risk of "poverty traps"[3] (Uchida et al., 2019). Thus, governance and management strategies need to focus on providing and diversifying alternative livelihoods for local populations (Dahdouh-Guebas et al., 2021; Datta et al., 2012).

Payment for ecosystem services (discussed in 16% of articles) and other economic incentives (in 28% of articles) can increase local participation and engagement in the protection and restoration of coastal wetlands, strengthening people's responsibility by engaging them in decision-making (Aheto et al., 2016; Damastuti and de Groot, 2017). Furthermore, financial incentives for wetland protection and restoration were suggested as ways to reduce the dependence of local communities on coastal wetlands resources, offering additional sources of income for local populations (Damastuti and de Groot, 2017; Thompson et al., 2017).

Despite the suggested advantages of financial incentives, financial incentives may also decrease voluntary participation and create expectations and self-interest in local populations (DasGupta and Shaw, 2013; Mojica Vélez et al., 2018). As a result, people may only be interested in participating in protection and restoration if they are financially compensated (Gallup et al., 2020). Financial incentives may also reduce local traditions of cooperation and voluntary participation and increase community dependency on incentives (Damastuti and de Groot, 2017; DasGupta and Shaw, 2013). Therefore, paying people for protection and restoration is insufficient to ensure participation (Memon and Thapa, 2016). Inclusion of education, voluntary and regulatory instruments may also be necessary to increase people's willingness to conserve coastal wetlands (Mojica Vélez et al., 2018). Government and NGOs are important in raising awareness, encouraging local people's participation, and building capacity for secure livelihoods in mangrove areas (Pattanaik and Prasad, 2011).

From an institutional point of view, low funding to management agencies (discussed in 52% of articles) was characterized by limited human resources, lack of equipment, poor infrastructure (DasGupta and Shaw, 2013; Feka, 2015; Gallup et al., 2020), and low budget allocations for monitoring and developing restoration projects (Canty et al., 2018; Thompson, 2018). As a consequence, institutions operated at low capacity and with limited expertise, affecting the control, implementation, and reinforcement of policies, leading to unsustainable management of coastal wetlands (Feka, 2015; Mojica Vélez et al., 2018).

3.2.5. Land tenure and property rights

Forty-six percent of articles mentioned land tenure and property rights as governance drivers. Different tenurial arrangements can hinder or facilitate the protection and restoration of mangroves and saltmarshes (Leith et al., 2014; Xie et al., 2012). Depending on the economic, political, and social characteristics of the state or community, coastal wetlands may be public, private, or common property (Bruce, 1986).

The capacity of the government (either national or provincial/state) to protect coastal wetlands can be a challenge in countries where coastal wetlands are considered public property (Asante et al., 2017; Mojica Vélez et al., 2018; Primavera, 2000). Lack of economic and human resources, weak law enforcement, corruption, and lack of political will can reduce the capacity of government agencies to protect coastal wetlands (Asante et al., 2017). In the case of the Philippines, the property regimes and user rights of coastal wetlands were not clear, and consequently, they were considered open access, with the exploitation being carried out by actors with the ability and resources to do it (Primavera, 2000).

Coastal wetlands on privately held land may restrict protection and restoration when legal rights of private property are more important than environmental policies. Ha et al. (2014) observed that people used the privatization of wetlands to extract natural resources and exclude local actors in Vietnam. Additionally, private ownership in Ghana led to increased competition between the users and, thus, to the overexploitation of resources (Asante et al., 2017). Common property regimes (where land and resources are owned and managed by a specific group) were considered an appropriate regime for the sustainable use of natural resources - including coastal wetlands - when processes and conditions, such as cooperation, communication, conflict resolution, clear spatial boundaries, and local capacity to control and monitor the territory, occurred (Armitage et al., 2011; Berkes, 2005).

[3] Mechanism in which poverty is self-reinforced due to market failure and institution failures, resulting in low standards of living to persist (Azariadis and Stachurski, 2005).

4. Recommendations from the literature

The importance of the participation of empowered local communities for effective protection and restoration has become the central narrative in the governance of coastal wetlands (Badola et al., 2012; Damastuti and de Groot, 2017; Datta, 2017; Owens and Zimmerman, 2013). Most of the literature (67% of articles) in this study recommended that the participation of local communities was essential to achieve sustainable coastal wetlands management (Fig. 6). Authors stressed that mangrove management can be improved when local actors have strong rights and responsibilities (Ha et al., 2014), and the use of local knowledge and traditions have a vital role in mangrove management (Afonso et al., 2022; Datta et al., 2012). Moreover, communities were more willing to participate in coastal wetland management when their well-being and livelihoods were secured (Damastuti and de Groot, 2017; Datta et al., 2012)

However, local communities cannot manage coastal wetlands in isolation. Local communities usually have limited budget, capacity, and limited areas of jurisdiction, requiring engagement with institutions that can provide workers and technical and financial support (Aheto et al., 2016). Limited financial resources reduced local communities' (and local governmental institutions) capacity and the capacity of governments to implement policy (Marin, Delgado et al., 2018), often resulting in ineffective mangrove management (Orchard et al., 2015). Community-led projects supported by the government were observed to have higher levels of success than other approaches (Primavera and Esteban, 2008). Non-governmental and private institutions can also play an important role in coastal wetland management, filling voids in the management of coastal wetlands when government institutions lack capacity and resources (Box 2) (Canty et al., 2018), although there were risks in this approach, requiring safeguards (Box 1) (Thompson, 2018).

The dependency of lower and middle-income countries on external financial and technical resources (e.g., from NGOs and private organizations) can also be considered a parachute practice. Often, projects and programs were designed and led by international partners, which may result in power imbalances and limited inclusion of local community voices and recognition of their needs (Banks et al., 2015; Genda et al., 2022). Parachute practices are rooted in colonial heritage and may also lead to assumptions based on biases and stereotypes (Ahmadia et al., 2021). For example, most of the literature comes from middle- and lower-income countries, and thus, it may seem that they are more prone to suffer from a lack of political will and pressure from economic actors. Yet Morrison et al. (2020) found that these problems occur in all nations dependent on limited high-value natural resource industries, irrespective of national economic development. Cases from higher-income countries were limited in our data set (22% of articles). Thus, future research could increase the evaluation of governance drivers for protection and restoration in higher-income countries.

Diversity in science is important for the equitable representation of diverse voices that generate knowledge (scientific, technical, and Indigenous), avoiding biases, and determining priorities and solutions toward sustainable approaches (Ahmadia et al., 2021). Stafanoudis et al. (2021) argue that achieving international targets depends on equitable and ethical partnerships between international researchers and host nations. Few of the articles in this review directly addressed the impact of colonial scientific practices on the governance of coastal wetlands; thus, this remains an important research topic for the future. (Stefanoudis et al., 2021).

Multilevel, integrated, and decentralized management approaches, such as co-management and community-based mangrove management, were recommended (Kongkeaw et al., 2019; Mojica Vélez et al., 2018). These approaches improved integration, collaboration, and communication between different jurisdictional levels (vertical) and between institutions (horizontal), promoting equal distribution of power in the governance system. However, decentralization was not advantageous if there was a lack of cooperation and coordination between institutions and between different levels of governance and if power was not equally distributed through the system (Arumugam et al., 2020; Friess et al., 2016).

There was general agreement in the literature that to enable successful restoration (including by planting), the formulation of policies for mangrove restoration should be aligned with policies for mangrove protection (Feka, 2015; Ishtiaque and Chhetri, 2016; Lee et al., 2019). Policies focused on restoration and protection could secure local communities' rights to mangrove forests and forest resources and their participation. Policies should be collaborative and decentralized and promote adaptive and integrated strategies (Orchard et al., 2015).

There were important gaps in knowledge that can be strengthened to improve the governance of coastal wetlands. Solutions for clarifying and strengthening land tenure and local community rights, characterizing and balancing power dynamics, and creating alternative livelihoods were highlighted as knowledge gaps needed to improve the governance of coastal wetland protection and restoration.

5. Conclusions

This review identified that studies of the governance of coastal wetlands remain focussed on the protection (as opposed to restoration) of mangroves in lower-middle income countries at local scales. The number of articles on the governance of coastal wetlands was small compared to the number of articles published on coastal wetlands in general. Only one paper focused on saltmarshes was found in this review, revealing a significant bias in the literature toward the governance of mangroves, with little attention paid to the governance of coastal wetlands in high to middle-income nations where most salt marshes occur. Correcting this imbalance in the literature will provide further insights into saltmarshes' governance and the drivers affecting coastal wetlands in high-income countries.

While it is well-recognized that local community participation is important for the sustainable management of coastal wetlands, knowledge of how to implement and maintain local community participation remains a gap. There is a key challenge of balancing expediency and best practices in community participation that comprises a diversity of institutions and actors. There was a strong recommendation in the literature that mangrove governance and mangrove management practices include provisions for alternative livelihoods and institutional support to communities, which may address this challenge. Implementing multilevel, decentralized, and integrated policies and approaches, such

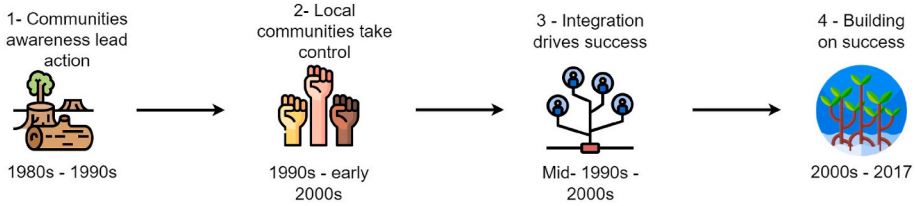

Fig. 5. Schematic view of the key factors explaining success in community-based mangrove management in Thailand (Kongkeaw et al., 2019). Icon made by Eucalyp from www.flaticon.com. Icon made by Parzival'1997 from www.flaticon.com. Icon made by Freepik from www.flaticon.com.

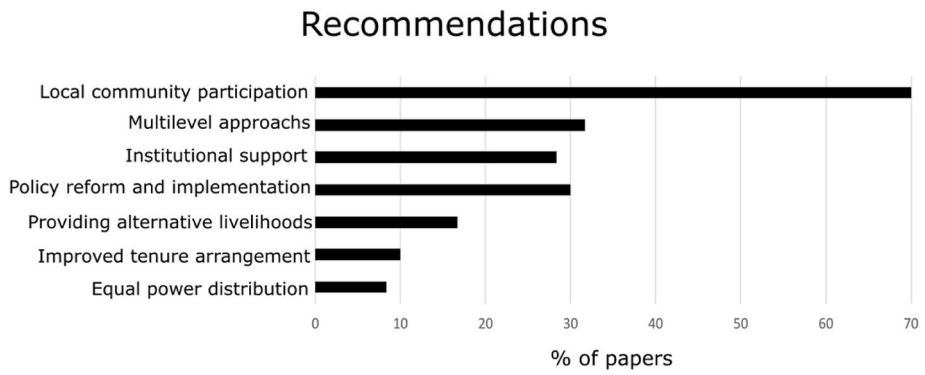

Fig. 6. Key recommendations from the literature, and the proportion of articles (as a percentage) that included each recommendation (note, articles may include more than one recommendation).

as co-management and local community-based management, were favored to promote equitable power distribution and assure local community rights to land and resources.

Finally, the governance of coastal wetlands is complex. The governance drivers assessed in this study interact, influence each other, and act cumulatively and simultaneously. Governance drivers are difficult to measure and may vary in different contexts, such as over varying cultural, economic, and political regimes, as well as based on local ecological features and causes of deforestation. Due to this complexity, the literature on the governance of coastal wetlands typically analyzes a specific aspect of governance and/or highlights challenges for governance. However, few papers quantified conservation success associated with a particular governance factor or specified how to improve or implement governance to enhance protection and restoration success. Correcting this imbalance in the literature will provide further insights into effectively improving and implementing governance to enhance coastal wetlands protection and restoration.

CRediT authorship contribution statement

Mayara de Oliveira: Writing – review & editing, Writing – original draft, Visualization, Software, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Tiffany Morrison:** Writing – review & editing, Validation, Supervision, Conceptualization. **Katherine R. O'Brien:** Writing – review & editing, Validation, Supervision, Conceptualization. **Catherine E. Lovelock:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Appendix A. List of papers

Table A
Details of 64 papers examining the governance of coastal wetlands protection and restoration

Papers	Journal	Location
Afonso et al. (2022)	Regional Studies in Marine Science	Sao Tome and Principe
Aheto et al. (2016)	Ocean And Coastal Management	Ghana
Arumugam et al. (2020)	Estuarine, Coastal and Shelf Science	Senegal
Asante et al. (2017)	Forest Policy And Economics	Ghana
Badola et al. (2012)	Estuarine, Coastal and Shelf Science	India
Begum et al. (2021)	Journal Of Environmental Management	Bangladesh
Beitl (2017)	Bulletin Of Marine Science	Ecuador
Beitl et al. (2019)	Geoforum	Ecuador
Bell-James et al. (2020)	Ecosystem Services	Australia
Canty et al. (2018)	Ocean And Coastal Management	Mesoamerica
Chaikumbung et al. (2019)	Ecological Economics	Not Applicable
Dahdouh-Guebas et al. (2021)	Estuarine, Coastal and Shelf Science	Malaysia Sri Lanka
Damastuti and de Groot (2017)	Journal Of Environmental Management	Indonesia
Das and Mandal (2016)	Ocean And Coastal Management	India
DasGupta and Shaw (2013)	Ocean And Coastal Management	India
Dat and Yoshino (2013)	Procedia Environmental Sciences	Vietnam
Datta et al. (2012)	Journal Of Environmental Management	Not Applicable

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Table A (*continued*)

Papers	Journal	Location
de Blaeij et al. (2011)	Ecology And Society	Netherlands
Endter-Wada et al. (2020)	Environmental Science and Policy	USA
Feka (2015)	Ocean And Coastal Management	West Africa
Fent et al. (2019)	Global Environmental Change	Senegal
		Gambia
Finlayson (1999)	Aquatic Conservation: Marine and Freshwater Ecosystems	Australia
Fletcher et al. (2011)	Marine Pollution Bulletin	England
		Japan
Friess et al. (2016)	Conservation Biology	Southeast Asia
Gallup et al. (2020)	Ocean And Coastal Management	Senegal
Gunderson et al. (2016)	Journal Of Environmental Management	USA
Ha et al. (2014)	Land Use Policy	Vietnam
Hattam et al. (2020)	Estuarine, Coastal and Shelf Science	Malaysia
Huitric et al. (2002)	Ecological Economics	Thailand
Ishtiaque and Chhetri (2016)	Environmental Development	Bangladesh
Khan et al. (2020)	Ocean And Coastal Management	Bangladesh
Kongkeaw et al. (2019)	Ocean And Coastal Management	Thailand
Ladd (2021)	Proceedings of the Geologists' Association	Great Britain
Lee (2014)	Water International	China
Lee et al. (2019)	Nature Ecology and Evolution	Not Applicable
Lovelock and Brown (2019)	Nature Ecology and Evolution	Not Applicable
Marín et al. (2018)	Socioeconomic Aspects of Wetlands	Chile
Martínez-Espinosa et al. (2020)	Forest Ecology and Management	Malaysia
Moriizumi et al. (2010)	Journal Of Cleaner Production	Thailand
Mursyid et al. (2021)	Forest Policy And Economics	Indonesia
Orchard et al. (2015)	Resources	Vietnam
Ounvichit and Yoddumnern-Attig (2018)	Kasetsart Journal of Social Sciences	Thailand
Owens and Zimmerman (2013)	Review Of Policy Research	USA
Owuor et al. (2019)	Ocean And Coastal Management	Kenya
Pinto et al. (2018)	Environmental Science and Policy	USA
Primavera (2000)	Ecological Economics	Philippines
Purandare et al. (2020)	The University of Queensland Law Journal	Australia
Rodríguez-Rodríguez et al. (2021)	Forest Ecology and Management	Colombia
Rogers et al. (2016)	Marine Policy	Australia
Ruzol et al. (2020)	Environmental Science and Policy	Philippines
Satyanarayana et al. (2013)	Ocean And Coastal Management	Sri Lanka
Saunders et al. (2008)	Environmental Management	Tanzania
Song et al. (2021)	Journal Of Rural Studies	Philippines
Meilasari-Sugiana (2012)	Sustainable Mangrove Governance	Indonesia
Suman (2019)	Coastal Wetlands an Integrated Approach	Not Applicable
Thompson and Friess (2019)	Journal Of Environmental Management	Thailand
Thompson et al. (2017)	Ecosystem Services	Philippines
Thompson (2018)	Land Use Policy	Thailand
Thuy et al. (2021)	Land Use Policy	Vietnam
Triyanti et al. (2017)	Ocean And Coastal Management	Indonesia
Van Dat et al. (2021)	Natural Resource Governance in Asia	Vietnam
van Oudenhoven et al. (2015)	Ocean And Coastal Management	Indonesia
Vande Velde et al. (2019)	Ocean And Coastal Management	Singapore
Mojica Vélez et al. (2018)	Environmental Science and Policy	Not Applicable

Appendix B. Frequency of governance drivers influencing coastal wetlands protection and restoration

Table B
Frequency of governance drivers influencing coastal wetlands protection and restoration. *Abs* represents the absolute number of articles that addressed the governance driver (of a total of 67 cases) and relative percentages.

Governance Factors	All cases		Low		Lower middle		Upper middle		High	
	(n = 67)		(n = 1)		(n = 32)		(n = 12)		(n = 15)	
	abs	rel (%)	abs	rel (%)	abs	rel (%)	abs	rel (%)	abs	rel (%)
Institutions	63	94	1	–	31	94	10	83	14	93
local communities	45	67	1	–	27	82	8	67	5	33
institutional capacity	32	48	–	–	18	55	6	50	5	33
management strategies	32	48	–	–	12	36	7	58	7	47
matching scales	30	45	1	–	14	42	3	25	8	53
NGOs	22	33	–	–	14	42	4	33	1	7
existence of institutions	21	31	–	–	10	30	5	42	2	13
integration	19	28	–	–	6	18	3	25	8	53
strong networks	15	22	–	–	9	27	4	33	0	0
institutional arrangements	11	16	–	–	5	15	3	25	3	20

(*continued on next page*)

Table B (*continued*)

Governance Factors	All cases		Low		Lower middle		Upper middle		High	
	(n = 67)		(n = 1)		(n = 32)		(n = 12)		(n = 15)	
	abs	rel (%)	abs	rel (%)	abs	rel (%)	abs	rel (%)	abs	rel (%)
amount of institutions	10	15	–	–	5	15	–	–	4	27
institutional failures	8	12	–	–	4	12	–	–	1	7
Politics	55	82	1	–	30	91	10	83	7	47
centralized systems	25	37	–	–	15	45	5	42	3	20
law enforcement	22	33	–	–	13	39	4	33	1	7
government support	19	28	–	–	13	39	4	33	1	7
corruption	14	21	–	–	7	21	1	8	2	13
political will	14	21	–	–	9	27	–	–	3	20
transparency	9	13	–	–	5	15	1	8	2	13
political instability	6	9	1	–	3	9	1	8	1	7
local governance	5	7	–	–	3	9	–	–	2	13
governance effectiveness	4	6	–	–	1	3	1	8	–	–
democracy	2	3	–	–	1	3	–	–	–	–
Policies	58	87	–	–	28	85	9	75	15	100
existence of policies	51	76	–	–	24	73	8	67	13	87
policy implementation	26	39	–	–	12	36	6	50	4	27
clear guidelines	12	18	–	–	9	27	2	17	1	7
policies specific to mangrove	9	13	–	–	5	15	1	8	2	13
harmonization of policies	5	7	–	–	2	6	1	8	2	13
amount of policies	2	3	–	–	–	–	–	–	2	13
weak regulation	2	3	–	–	1	3	–	–	–	–
policy cohesion	1	1	–	–	–	–	–	–	1	7
policy innovation	1	1	–	–	–	–	–	–	1	7
Land tenure and property rights	31	46	–	–	18	55	5	42	2	13
Economy	35	52	–	–	21	64	6	50	3	20
alternative livelihoods	21	31	–	–	13	39	4	33	–	–
payment for ecosystem Services	11	16	–	–	5	15	2	17	1	7
poverty	11	16	–	–	9	27	–	–	–	–
inequality	8	12	–	–	2	6	3	25	1	7
economic development	3	4	–	–	1	3	–	–	1	7
Resources	42	63	–	–	22	67	9	75	4	27
financial and human resources	35	52	–	–	21	64	8	67	2	13
incentives	19	28	–	–	8	24	3	25	2	13
Behavior	67	100	1	–	33	100	11	92	15	100
participation	38	57	–	–	17	52	8	67	7	47
conflicts	35	52	–	–	21	64	6	50	4	27
power	34	51	–	–	19	58	7	58	3	20
awareness	31	46	–	–	16	48	5	42	6	40
knowledge	23	34	–	–	9	27	5	42	4	27
information	19	28	–	–	11	33	2	17	4	27
cooperation	19	28	–	–	7	21	4	33	5	33
communication	17	25	–	–	12	36	2	17	2	13
coordination	17	25	–	–	10	30	2	17	4	27
perception	16	24	–	–	7	21	2	17	4	27
social and cultural values	15	22	–	–	4	12	4	33	3	20
social justice and communities' rights	16	24	–	–	9	27	2	17	2	13
illegal activities	15	22	1	–	9	27	2	17	–	–
equity	11	16	–	–	8	24	1	8	–	–
collaboration	9	13	–	–	3	9	3	25	2	13
partnership	8	12	–	–	4	12	1	8	3	20
trust	9	13	–	–	5	15	1	8	–	–
influential groups lobbying	5	7	–	–	5	15	–	–	–	–
trade-offs	5	7	–	–	2	6	–	–	1	7
sense of ownership	4	6	–	–	1	3	3	25	–	–
willingness	4	6	–	–	3	9	–	–	–	–
informal rules	3	4	–	–	2	6	1	8	–	–
people acceptance	2	3	–	–	1	3	–	–	1	7
social learning	1	1	–	–	–	–	–	–	–	–

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