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Negotiating wetlands: Convivial conservation and collective wetland management in Ada, Ghana

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Abstract

Across the rapidly urbanizing Global South, wetlands continue to experience intense socio-ecological pressures despite their numerous benefits to humans and wildlife. Protecting wetlands and other ecological resources requires a renewed sense of ecological stewardship, especially in endangered regions. This study contributes to this call by (1) analyze the drivers of land-use change and ecological vulnerability of the Ada-Songhor wetland area (2) explore the various conservation practices deployed and how they support livelihoods and wetland protection (3) examine the role of commons-based approaches (i.e. trust, community participation and social cohesion) in mediating the outcome of wetlands governance. Using a mixed-methods approach that combines satellite imagery analysis with stakeholder interviews, the study finds significant spatial transformations over the past three decades, including a 10% loss of vegetation cover and a 15% increase in bare land, largely due to anthropogenic activities. The findings further show that state-community collaborations have been useful in co-producing convivial conservation practices and community-based approaches to safeguard the wetlands. Overall, the study's findings highlight the socio-ecological and governance complexities of wetlands management and underscore the benefits of collaborative, well-coordinated, and socially attuned management practices for protecting ecologically sensitive areas.

Keywords: conviviality, wetlands, conservation, commons, livelihood

1. Introduction

Wetlands are dynamic ecosystems essential to the socioecological functioning of both the natural and the built environments (Maietta et al., 2020; Roy et al., 2025). They regulate hydrological processes, improve water quality through natural filtration, and provide habitat for a wide diversity of species (Shrestha et al, 2025). Wetlands are also well-known for their socioeconomic and cultural significance, which support rural and peri-urban livelihoods and sustain local economies through fishing, farming, and the extraction of raw materials (Alikhani et al., 2021; Atiim et al., 2022). (Ferreira et al., 2023; He et al., 2025). However, in sub-Saharan Africa, wetland ecosystems face mounting threats in cities and regions due to expansive urban development and poorly planned land-use and property management regimes (Kuusaana et al., 2021; Kundu et al., 2024; Ntiamoa-Baidu and Taye, 2025). Wetland conservation is further threatened by resource extraction, hydrological alteration, and pollution (Kundu et al, 2024). These threats occur amid growing socioeconomic challenges in many natural resource-dependent communities, including increasing poverty, food insecurity, and a lack of alternative livelihood opportunities (Matovu et al. 2024). The convergence of these challenges amplifies socioecological stressors for the more than 100 million wetland-dependent population in sub-Saharan Africa (Duku et al., 2022).

Additionally, recent evidence suggests that about 35 per cent of wetlands have been lost globally since the 1970s (Ramsar Convention, 2021). These trends have prompted governments and environmental institutions to introduce regulatory measures such as Ramsar site designations, protected area regimes, land-use planning controls, and restrictions on activities including sand winning, mangrove harvesting, and settlement development in wetland buffer zones (Kuusaana et al., 2021; Cobbinah et al., 2020). Despite these interventions, wetland degradation continues, raising concerns about the effectiveness of predominantly top-down conservation approaches. While the need for wetland protection is widely acknowledged, the debate often remains lopsided (Kundu et al., 2024; Feng et al., 2024), with strong emphasis on regulation and protection but limited attention to how conservation measures intersect with local livelihoods, access rights, and collective resource management. Evidence from Africa illustrates these tensions. In South Africa, Maseko and Moyo (2022) report conflicts between Simangaliso Wetland Park managers and surrounding communities due to livelihood restrictions. Similarly, Frimpong et al. (2025) highlight contestations among residents, planners, and developers over the management of the Sakumono Ramsar Site in Tema, Ghana, while Asante et al. (2024) describe “wetland gentrification” driven by rising property values and speculative development. These experiences point to the limitations of exclusionary conservation and highlight the need for more inclusive approaches, such as convivial conservation, which emphasize co-existence, participation, and equitable access to ecological resources.

Despite growing contributions to wetlands conservation, there remains a limited understanding of how these interventions shape the everyday livelihoods of local communities, and how state–community relations, trust, community participation, and social cohesion mediate wetland governance outcomes in Ghana. Consequently, this paper seeks to (1) analyze the drivers of land-use change and ecological vulnerability of the Ada-Songhor wetland area (2) explore the various conservation practices deployed and how they support livelihoods and wetland protection (3) examine the role of commons-based approaches (i.e. trust, community participation and social cohesion) in mediating the outcome of wetlands governance. These objectives are unpacked through the integrated theoretical lenses of Convivial Conservation (CC) and the Common-Pool Resource (CPR) to show how state-community collaborations are advancing wetland conservation despite glaring anthropogenic threats.

The findings of this study contribute to emerging knowledge on wetland management and community livelihood outcomes in regions experiencing expansive urban development without strategic land use planning and management. The findings also emphasise the practical value of wetland co-management approaches, protecting ecological resources while safeguarding people’s right to livelihoods. Finally, it offers practical implications for wetland policy and planning by identifying institutional, social, and ecological conditions that can support more equitable and sustainable co-management approaches in Ghana, Africa and beyond.

2. Theoretical underpinning of the study

Combining the theoretical perspectives of CC and CPR offers a potent analytical framework for addressing socio-environmental challenges by promoting locally engaged resource governance approaches and realising a global vision of human-nature coexistence in a Global South context. In this study, we extend the original thinking of Illich (1973) and Ostrom (1980) to provincialise how convivial conservation practices and community-based approaches are contributing to the sustainable and collective management of wetland resources in Ada, Ghana. This contributes to the broader global, regional, and local goals of realising the cohabitation of human and non-humans (wetlands) in overlapping spaces (Toncheva et al., 2022). Below, we advance deeper into these two theoretical perspectives.

2.1 Convivial Conservation: towards a just and participatory approach to wetland management

Convivial conservation is rooted in Illich's conception of conviviality, which emphasises participation, justice, interdependence, and the need for societies to live within ecological limits (Krauss, 2021). Krauss (2021) further describes conviviality as a unifying philosophy that promotes democratic decision-making and ensures that marginalised and indigenous groups have a meaningful voice in the use and distribution of natural resources. Such a logical disposition contrasts with market-based or industrial paradigms of conservation (Bryant, 2015). In practice, Illich's view calls for transformative approaches that prioritise equity, non-exploitative relationships with nature, and collective well-being. Entering the debate, Fletcher et al. (2020) argue that convivial conservation sits between two dominant conservation ideologies—market-driven conservation and strict ecological protection. At the centre of these two extremes, convivial conservation seeks to reconcile social and ecological priorities, acknowledging the political-economic systems within which conservation occurs while advocating for pragmatic pathways that enhance fairness and justice in ecological governance (Massarella et al, 2022).

Though evolving, the core principles of CC have gained prominence in conservation literature. Notably, there is an emphasis on justice and on recognising ecological resources for their ethical and intrinsic value rather than solely for their economic utility (Giarracca, 2010). This perspective encourages more responsible, participatory, and morally grounded stewardship of ecosystems. Another principle centres on grassroots decision-making and consultative processes, which foreground the needs, knowledge, and rights of marginalised and indigenous communities that are closely connected to ecological systems. In realising these principles, Büscher and Fletcher (2019) advocate for a conservation practice regime that pushes for shifting from “protected areas” to “promoted areas,”—a practice where nature is conserved not from people but through and with people. The effects of this relational framing view human presence not as a threat but as integral to sustaining ecological systems, reframing activities such as ecotourism through a sustainability standpoint rather than capitalist logic (Büscher & Fletcher, 2020). Büscher and Fletcher (2019) further call for moving away from a technocratic, top-down conservation management regime toward commons-based or engagement-oriented approaches. Asserting such logic positions local

communities as co-managers of ecological resources and helps counter the alienation and dispossession that often accompany conservation interventions.

Despite its transformative potential, CC faces several practical and political challenges in implementation. Hajjar et al. (2021) note that policies promoting community-based conservation sometimes reproduce existing bureaucratic controls, thereby limiting the devolution of power and restricting community rights to ecological spaces. This creates opportunities for elite capture and continued state dominance (Noe & Kangalawe, 2015). It also becomes difficult in engaging multiple actors with diverse political interests towards a collective conservation management regime. In response, Büscher and Fletcher (2019) argue that effective implementation requires navigating competing agendas, deciding when to apply pressure or negotiate, and ensuring that decisions ultimately prioritize ecological sustainability and community well-being. Another challenge concerns the pervasive influence of capital, which tends to commodify nature and shape power relations at multiple scales (Büscher & Fletcher, 2019). Responding to this requires collective organization, resistance, and transparency to prevent unequal power dynamics from undermining conservation goals and to minimize conflict in ecological management—an approach that can be likened to “*the new politics of conviviality*”, which emphasizes the practices of mutual adjustment and learning to live together (by humans and nature) (Büscher and Fletcher 2020).

Against these shortcomings, CC has proven analytically valuable in studies seeking to promote human–nature coexistence and to design transformative conservation practices. For instance, Toncheva et al (2022) and Pettersson et al. (2022) have deployed CC as an analytical tool to understand and resolve human–wildlife conflicts in the Rodopi Mountains of Bulgaria and in northwestern Spain. Büscher et al. (2022) have also employed CC to examine how different actors shape biodiversity outcomes and to identify structural reforms necessary for meaningful conservation transformation. We build on these studies to extend the empirical rigor and the spatial application of CC by shifting the analytical gaze from Global North experiences and highlighting a Global South reality of how co-produced conservation practices are helping to address the challenges of wetland conservation. In doing so, this study contributes to sustainable mechanisms for addressing the biodiversity crisis ignited by the expansion of human activities (Ceballos et al., 2017). The study also extends the idea of a stewardship-based co-management model that emphasizes working with a range of stakeholders in the enforcement of environmental and conservation regulations (Frimpong et al., 2025).

2.2 Common-pool resource: collective management of ecological resources

A crucial element of the wetland management regime in the Global South, loosely addressed by the CC perspective, has to do with the contested logics over ownership and the collective management of wetlands. Here, differential ownership and access to land as a common pool resource on which wetland sit determines the effectiveness of management approaches. We deepen our understanding of this relevant but obscured area by deploying the theoretical lens of CPRs,

which refers to shared natural or human-made resource systems—such as fisheries, forests, irrigation networks, rangelands, and groundwater basins—that are characterized by non-excludability and rivalry in use, where individuals can access them at relatively low cost, but one user’s consumption diminishes what is available to others (Saijo and Kobayashi, 2017). Hinging on these characteristics, CPRs occupy a conceptual space between public and private goods and are highly vulnerable to depletion. A classic example of this vulnerability is demonstrated in Hardin’s depiction of the “tragedy of the commons,” where rational individuals, acting in pursuit of individual gain, collectively generate resource collapse (Wall, 2014). Although influential, Hardin’s model has been critiqued for overstating the inevitability of overuse and underestimating the capacity of users to cooperate. Subsequently, influential scholars such as Ostrom have demonstrated that many communities around the world have long prevented tragedies through locally evolved norms, monitoring systems, and rule enforcement (Ostrom, 2015). This sparked the foundation for a new institutionalist perspective, emphasizing how both formal and informal institutions structure behavior, reduce uncertainty, and lower transaction costs in CPR governance (Tucker et al, 2023). In fact, in some developing countries, where customary land norms often carry more authority than statutory law, these institutional dynamics are particularly significant for understanding resource-use decisions and collective stewardship (Tucker et al, 2023).

The extant CPR scholarship has evolved from diagnosing failure to identifying conditions for sustainable collective action. For instance, earlier comparative studies have highlighted that self-governing communities tend to succeed when they are relatively small, socially cohesive, able to communicate, and possess strong social capital that supports long-term goals over short-term benefits (Steins et al 1999; Berge and van Laerhoven, 2011). Other studies have also systematically mapped the diverse rule systems—boundary, authority, position, scope, aggregation, information, and payoff rules—through which communities align individual incentives with collective outcomes (Dunlop et al, 2021; Neef et al, 2022). In realizing the tenets of collective resource governance, Ostrom (1980) outlines eight core design principles, namely: clearly defined boundaries; context-specific rules; inclusive decision-making; effective monitoring; graduated sanctions; accessible conflict resolution; recognition of local rights to self-organize; and nesting of local institutions within broader governance systems (Robert et al, 2021). In essence, the CPR literature rejects universal, top-down policy prescriptions and argues that no single institutional blueprint can fit in all settings. Thus, successful governance depends on adaptive rulemaking, autonomy to revise arrangements, and alignment with local ecological and social contexts (Weston and Bollier, 2013). This recognition has driven a broader policy shift toward decentralization, participatory governance, and community-based management as viable alternatives to centralized control in many developing-country resource systems (Weston and Bollier, 2013). For instance, Slough et al. (2021) have found across some developing countries, including Brazil, Peru and Liberia, that community monitoring can improve CPR management even in contexts that belittle community participation.

The application of the CPR theory extends to contemporary systems such as fisheries, groundwater, rangelands, and large river catchments. Within these contexts, Ostrom's (1980) principles have been used to assess why some governance arrangements remain effective amid rising ecological and social pressures (Korol and Korol, 2025; Nsoh, 2022). Studies largely focus on polycentric and multi-level governance, where local institutions must interact with state agencies across broader and more diverse user groups (Armitage, 2008; Basurto, 2013). These modern contexts often feature heterogeneous actors with unequal power, as seen in catchments where expanding urban centers can appropriate resources at the expense of rural or downstream users (van Klingeren and de Graaf, 2021). Overall, while the CPR framework remains widely applicable, its implementation today requires navigating greater complexity, larger scales, and deeper distributional conflicts than those emphasized in earlier community-based studies (see e.g., Korol and Korol, 2025). Specifically, the application of CPR to understand the contested logic over ownership and collective management of wetlands remains underexplored. By tackling such crucial issues, we contend that adopting a 'commons' approach, awareness and understanding of the issues surrounding ownership and collective management will contribute to the sustainable conservation of communal resources such as wetlands in especially in the African context (Mombo et al., 2013).

Consequently, we deploy the CPR as a diagnostic tool to examine how shared ecological resources, such as wetlands, are shaped by contested logics over ownership, patterns of use, social cohesion and the broader collective management arrangements (Fleischman et al, 2014). Wetlands are ecological resources, yet contestations over who owns the land may result in land–use disputes. Hence, clarifying issues over ownership contestations contributes to identifying the pressures arising from competing livelihood needs and ecological constraints. It further enables an assessment of how existing conservation policies either enable or hinder convivial human–nature interactions (Díaz-Pinzón et al, 2024). In the analysis section, we make the case that the use of common-based approaches via multi-stakeholder collaborations has been significant in addressing issues of ownership disputes and contestations. An insight that demonstrates harmonized institutional governance and environmental education on the roles of both primary and secondary users of wetland resources (Mombo et al., 2013).

3. Institutional and regulatory framework for wetland management in Ghana

Wetland management in Ghana is centred on the Wildlife Division of the Forestry Commission, which is responsible for protecting wildlife and conserving habitats across the country (Ministry of Lands and Forestry, 1999). The Division works with local communities and the public to promote the wise use of natural resources and manages protected areas in ways that support education, research, and nature-based tourism. Several other institutions play complementary roles within this governance system. The Lands Commission supports wetland protection by administering public and vested lands, maintaining land records, and providing mapping and survey services that guide national land-use decisions (Frimpong et al, 2025). At the district level,

the Physical Planning Departments (PPDs) of the MMDAs regulate spatial development, prepare land-use plans, and issue building permits. Their ability to zone land places them in a strategic position to identify wetlands as ecological areas that require protection (Frimpong et al, 2025). The Environmental Protection Agency (EPA) adds another layer of oversight by regulating environmental quality, conducting impact assessments, and ensuring that proposed developments do not degrade wetland ecosystems (Donatus et al, 2022). These institutions collectively form a multi-layered governance structure, although coordination among them remains an ongoing challenge.

Several policies and laws guide how wetlands are used and protected in Ghana. The National Wetlands Conservation Strategy (1999) outlines the country's approach to sustainable wetland use, encouraging livelihoods such as farming, fishing, and salt production as long as they do not undermine ecological health (Ministry of Lands and Forestry, 1999). Key objectives of the strategy include promoting community participation, maintaining the ecological and cultural values of wetlands, integrating local knowledge into management practices, and strengthening national capacity for conservation. These principles are reinforced by the National Wetland Policy, which aims to safeguard the life-supporting functions of wetlands and enhance public awareness of their importance (Ministry of Lands and Forestry, 1999). On the legal front, the Wetlands (Ramsar Sites) Regulations, 1999 provide specific protection for designated wetlands and prohibit activities such as mining, settlement, waste disposal, and actions that alter wetland hydrology (Government of Ghana, 1999). Broader support comes from the Wildlife and Forestry Act (Act 571), which offers a legal basis for sustainable forest and wildlife management and emphasizes community involvement in protecting sensitive ecosystems (Forestry Commission, 1999). These policies and legislative instruments together create a strong framework for wetland conservation, even though enforcement and resource constraints continue to limit their full effectiveness.

4. Methodology

4.1 Study Area: Ada, Ghana

Ada East District is one of the 29 Metropolitan, Municipal, and District Assemblies (MMDAs) in the Greater Accra Region of Ghana. It is in the eastern part of the region, sharing boundaries with the Central and South Tongu Districts to the north and east, respectively, Ada West District to the west, and the Gulf of Guinea to the south (MOFEP, 2023). Geographically, the District lies between latitudes 5°45' N and 6°00' N and longitudes 0°20' E and 0°35' E (MOFEP, 2023). In terms of physical geography, Ada East is characterized by a generally low-lying and relatively flat terrain, situated within the coastal–riverine transition zone where the Volta River meets the Gulf of Guinea (see Figure 1) (Ada East District, 2014). The riverine and estuarine features make the district an important tourism and recreational destination within the region (Ada East District, 2014). The landscape is further shaped by lagoon systems, swamps, wetlands, and significant mangrove stands, which contribute to the ecological uniqueness of the area (Ofori-Danso, 1999).

The district is also endowed with substantial salt deposits—an important natural resource that supports local livelihoods and has historically shaped the area’s economic activities (MOFEP, 2023).

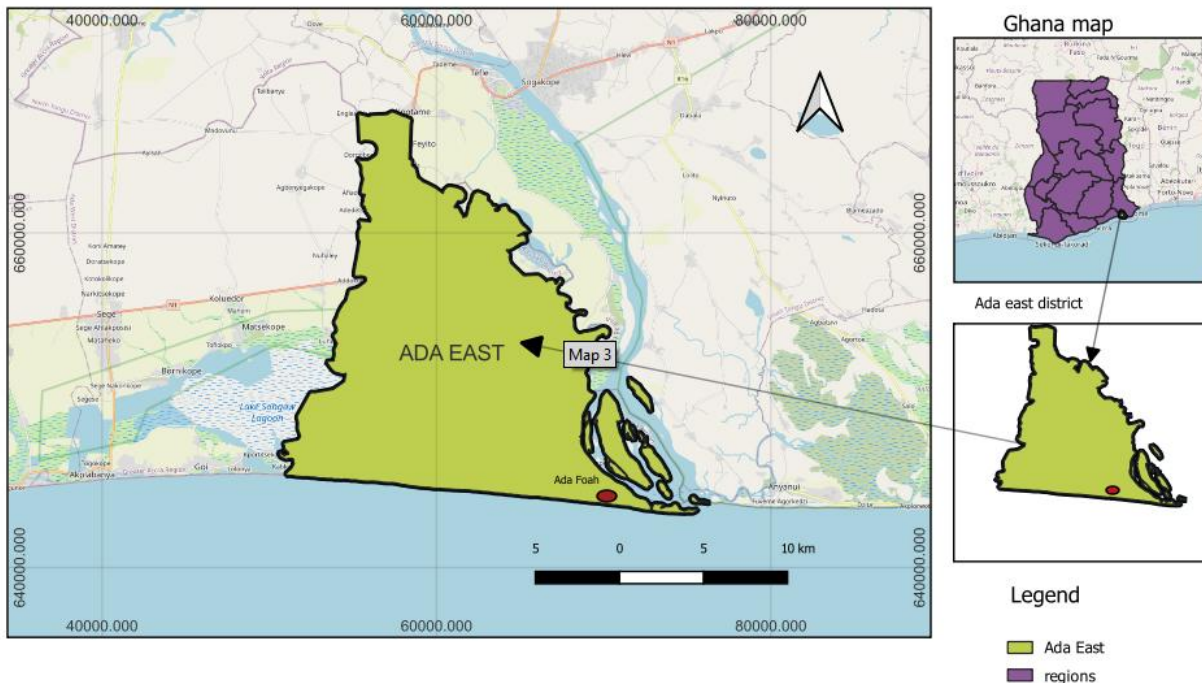


Figure 1: Map of Ada East District

From a socio-demographic and economic background, Ada East District has a population of approximately 76,411 and a land area of 268.7 km² (MOFEP, 2025). Females constitute 51.5% of the population, while males account for 48.5% (MOFEP, 2025). Like many districts in Ghana, the population structure is predominantly youthful, with about 60% of residents falling within the 15–64 age bracket (MOFEP, 2025). Spatially, the District is largely rural, with around 65% of the population living in settlements classified as rural. Farming and fishing remain dominant livelihood activities, complemented by salt mining as a significant economic pursuit (MOFEP, 2025). In recent years, tourism has expanded economic opportunities for residents, particularly through the growth of the hospitality industry. Ada-Foah, the District capital, has experienced a marked increase in tourist arrivals, especially to the Volta estuary and the surrounding wetlands, which have also attracted researchers and conservation stakeholders (MOFEP, 2025).

Land tenure arrangements constitute a critical dimension of social, economic, and political life in the district, as they determine ownership, access, resource use, and the negotiation of competing interests among local and state actors (NDPC, 2014). Land ownership in Ada East is notably complex and often contested, reflecting longstanding tensions between the Government of Ghana and local communities. Portions of land in the district are vested in the President of Ghana in trust for the people of Ada, enabling the state to regulate, lease, or manage these lands in accordance

with customary rights and the interests of clans and families who are the traditional custodians¹. The vesting of ecologically sensitive lands—such as the Songor Lagoon and associated wetlands—in the state is intended to ensure coherent and sustainable management, although such management is legally expected to occur in collaboration with local stakeholders (Ofori-Danso, 1999). In contrast, lands located farther from these ecologically fragile zones are owned by clans and families and are not under direct state control. Nevertheless, such lands are subject to statutory zoning regulations and require development permits for any form of construction or land-use change (NDPC, 2014).

Over the years, tensions have intensified between the state and local communities, particularly following the leasing of approximately 41,000 acres of land—including virtually the entire Songor Lagoon—to a private salt mining company in 2020 (Agbove, 2023). Many residents perceived this decision as a breach of communal ownership principles, arguing that they were not adequately consulted and that the concession threatened their long-standing livelihoods in artisanal salt production (Agbove, 2023). This dispute underscores the broader contestations around resource governance, community rights, and state authority in Ghana’s coastal districts.

4.2 Research design

The qualitative case study research design was employed to interrogate issues of convivial conservation practices and commons-based approaches to wetland conservation. The case study research design was considered appropriate because it allowed for the combination of multiple data sources to examine the study objectives (Creswell, 2014). The study involved both geographic information systems and remote sensing analysis (GIS/RS), and qualitative interviews with community residents, community leaders and key institutional actors whose work relates to wetlands management.

4.3 Data Collection and Participant Characteristics

The data collection process commenced with a familiarization visit to the study area to build rapport with the potential research participants. They included institutional representatives from the Lands Commission, Forestry Commission, the District Assembly, the community residents, and their local representatives. It was also to ensure that we identify respondents who are well-positioned to provide appropriate data and responses adequate to address the study objectives. Upon request, copies of the interview guides were given to the respondents to study so they can access any relevant information that could better position them to speak to the research objectives meaningfully during the actual data collection sessions. The entire data collection exercise occurred over a period of 3 months. This period included the time of preliminary community visits, the actual data collection exercise, and follow-ups with study respondents for clarifications. A total

¹ The Ada Songor Lagoon (Site for Salt Industry) (Vesting) Law, 1992 (PNDC Law 287). ADA-SONGOR LAGOON SITE FOR SALT INDUSTRY VESTING LAW-11. Retrieved from <https://kuclawstudentsunion.com/wp-content/uploads/2024/09/ADA-SONGOR-LAGOON-SITE-FOR-SALT-INDUSTRY-VESTING-LAW-11.htm>

of 44 people initially registered interest in the study, but only 30 fully participated. The final sample size of 30 was also based on saturation in the responses; this is the point at which additional insights are emerging from the data (see Saunders et al., 2018). The purposive sampling technique was used to select key-informant including the institutional representatives and the community leaders, while the convenience sampling technique was used to select community residents. Table 1 provides a profile of the study participants.

The interviews were conducted in both Ga-Adangbe (a Ghanaian language) and English (Ghana's official language), depending on the participants' preference. An unstructured interview guide containing questions on the topic was used to solicit participants' responses on the research objectives. Before the interviews, participants were briefed about the anonymity and confidentiality of their responses. All participants gave their outright verbal consent and voluntarily agreed to participate in the study. This study was approved by the Institutional Review Board of the University of Environment and Sustainable Development, Somanya, Ghana, with protocol number UESD/UEC/ECC/23/0004. The interviews lasted between 40 and 60 minutes and were audio-recorded with the outright permission of the participants. Secondary data sources such as the District Assembly Medium Term Development Plan (DAMTP), Ghana National Wetland Policy and the Ghana National Wetland Conservation Strategy were used to make inferences and deduce the process of wetland governance in Ghana.

Table 1: Profile of Study Participants

Informants	Number of Participants	Gender of Respondents	
		Male	Female
Interviews			
Community Residents	18	12	6
Community Leaders (Chief, Assembly members, Opinion leaders, etc.)	5	3	2
Lands Commission	1	1	-
Forestry Commission	1	1	-
Ada East District Assembly (Physical and Development Planning Officers)	2	2	-
Developers	2		
Salt Miners	1	1	-

4.4 Data Analysis

The interview transcripts were imported into NVIVO 12 and assigned codes for analysis. Following this, the data analytical procedure followed the six-step process of thematic analysis,

which is widely accepted and utilized for qualitative data analysis (see Braun and Clarke, 2006). The first step involved detailed reading and coding of every interview transcript, which allowed familiarization and themes to be derived from the data. This process was appropriate as it allowed for grounded themes to emerge from the data analysis (Manning, 2017). In the second step, initial codes regarding vulnerabilities, convivial conservation practices and community-based approaches to wetland management were generated. In the third step, the codes were compared to ensure they appropriately fit the initial themes generated. The fourth step involved a review of the themes to ensure that they appropriately address the study objectives. In the fifth stage, the themes were defined and finalized. The sixth step involved the writing and discussion of the study findings. The results and discussion were underpinned by the principle of sense-making, where interpretative narratives and quotations were implied from the codes and the themes as used in other qualitative studies (see Thapa, 2017; Frimpong et al., 2022; Pedrosa et al., 2021). The GIS/RS analysis involved LULC analysis to estimate the extent of wetland encroachment over the years.

5. Results

5.1 Vulnerabilities of the wetland due to anthropogenic activities

This part of the results lays the premise for appreciating some of the challenges facing authorities in protecting the wetlands. It is out of these anthropogenic threats that convivial strategies and communal mechanisms have become necessary for securing the ecological integrity of the wetland; these issues are presented later in the results. Indiscriminate sand and mangrove harvesting have altered the natural boundary of the wetland, leading to massive land-use and land-cover transformations over the past three decades despite its legally protected status. Figure 2 shows that approximately 10% of the vegetation cover has been lost between 1990 and 2020, while bare land increased by about 15% within the same period (see Table 1). This ecological loss raises serious issues about community attitude and conservatory powers of institutions mandated to render ecological stewardship over the wetlands.

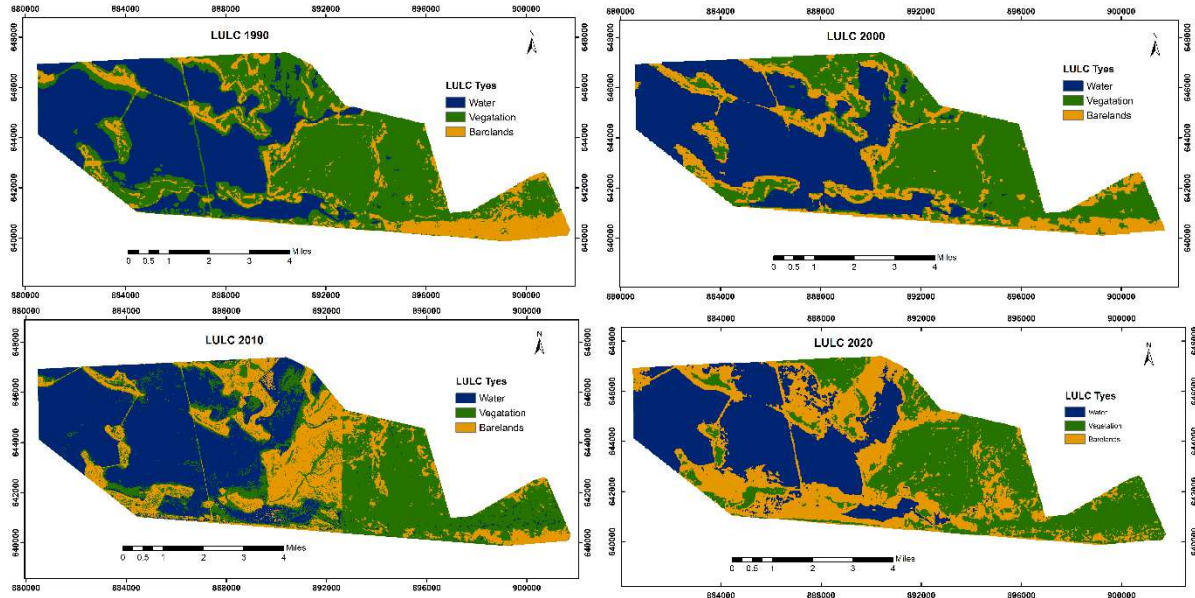


Figure 1: Land Use and Land Cover Map (1990-2020)

Table 1 Area coverage for LULC of Ada Songor Ramsar site

Area coverage for each class (sq.km) over the given period (1990-2020)				
LULC Class	1990	2000	2010	2020
Water	37.40	39.43	39.48	32.44
Vegetation	43.55	22.06	33.71	33.34
Bareland	15.19	34.65	22.94	30.37
Total	96.14	96.14	96.14	96.14

Interviews with state officials and community leaders corroborated the evidence of ecological degradation. Informants consistently noted rising physical development, particularly residential and recreational infrastructure, driven by population growth and an expanding tourism economy. These observations confirm a trend where the ethical and altruistic value of the wetland is rather traded for economic expeditions. The officials remarked that:

“The Ada estuary has become one of the most popular tourist destinations in Ghana, and the hospitality sector has increasingly targeted the area for new property investment” (Forestry Commission official).

“For Ada, the wetlands I knew at that time... I couldn't locate it anymore... there's been a lot of encroachment... for residential purposes. (Community Leader)”

There were also instances where encroachment activities continued into the buffer zones of the wetland, and in opposition to regulatory mechanisms. These buffer zones are deliberately created to serve as critical boundaries between the core conservation zones and the transition area, where limited livelihood activities such as farming are permitted. An act that reinforces positive human-nature relationships. Yet, developers do not heed the limits of these transitional zones. In a demonstrable act of accumulation by dispossession attempt to push construction projects deep into ecologically sensitive areas, prompting reactive regulatory interventions. Currently, *“...there is one estate developer who wanted to put up a hotel... but where he was putting up the building is within the core conservation boundary... we intervened and halted it and up till now he has not been able to put up the project”* (Forestry Commission official). Such cases not only show disregard for ecological stewardship but also undermine convivial conservation goals, especially in realizing the practice of mutual adjustment and peace of human-nature coexistence.

Beyond physical encroachment, we also find that ecological (wetland) stewardship is under siege through the undertaking of harmful and unsustainable environmental practices occurring within the wetland landscape. Such practices include improper disposal of waste directly into water bodies, sand mining along the beaches, and the cutting of mangroves for fuelwood. We observed that there is sloppiness in realizing ecological stewardship because these practices are deeply embedded in local cultural and livelihood systems, making behavioral change difficult. For instance, *“Most of their liquid waste is directed into the wetland”* (Municipal Planner). Officials also further shared that:

“Residents hold the view that their grandfathers have been winning sand since time immemorial... so when you talk to them to discontinue, they have a problem with that... Some people will also cut the mangroves... They hold a traditionally informed view that when they use it to smoke fish, it gives a good taste, hence they prefer cutting mangroves as a source of firewood” (Community Leader)

While some of the community's residents recognized the ecological value of wetlands, they also admitted contributing to the ongoing wetland degradation. For some residents, this was due to *“inadequate public education and limited community engagement by state agencies”* (Community resident). A blame denied by the informant as they claimed: *“residents often lack adequate understanding of the wetland's ecological functions and long-term benefits, leading to misuse of the resource”* (Forestry Commission official). Other residents corroborated this by stating that:

“Most residents don't appreciate the ecological value of the wetlands... so they would rather go in to cut the trees or try to fill it and use it for residential or commercial development” (Community Resident)

Residents' lack of appreciation for the intrinsic and ecological value of wetlands contravenes the intent of convivial conservation and highlights a deeper challenge of residents' (dis)engagement in ensuring ecological stewardship. The contrasting perspectives on the ecological value of

wetlands also illustrate weak institutional enforcement, growing development pressures, entrenched cultural practices, and socio-economic vulnerabilities in wetland dispossession.

5.2 Convivial conservation practices

Though authorities found it challenging to ensure ecological (wetland) stewardship behaviors, several strategies that aligned with convivial conservation goals were being introduced to restore the integrity of the wetlands. The paper contends that such conservation practices should be encouraged to safeguard the natural ecosystem of the wetlands. Notably, an informant shared that: *“the main conservation practices involve mangrove planting and pruning, particularly at the edges of the boundary near the core zone and within the core zone itself”* (Forestry Commission official). Mangrove planting contributed to convivial conservation by ensuring that the goals of realizing ecological integrity are tied to community well-being. For instance, it helped to realize a symbiotic relationship where the mangroves helped in coastal protection and discouraged encroachment into the wetlands. This highlights a mutually beneficial endeavor on how planting mangroves benefits both the ecosystem and the community. An official explained that:

“...for instance, if you plant mangroves and the fish come to lay eggs when it rains, the water moves the fish into the other lagoon. When they go fishing, they get more fish from the Lagoon. They know that the work we are doing is for community purposes, so they have embraced it” (Forestry Commission Official).

Other officials corroborated this, highlighting that *“wetland conservation is treated as a development priority of the municipality, that is why we have extended a significant support to the Forestry Commission.”* (Municipal Planning Officer). NGOs also encourage community members to participate in mangrove planting, reinforcing conservation awareness and community engagement.

Beyond reforestation, officials also ensured the maximum enforcement of wetlands regulations. Livelihood activities such as salt mining, unauthorized farming, and overfishing undertaken in and around the wetland were strictly controlled, sometimes requiring collaboration with the Police when individuals fail to comply with notices and warnings. Education and awareness campaigns were also integral to the conservation efforts, often facilitated by traditional leaders who help bridge communication with the local communities. An official mentioned that:

“The Forestry Commission has been engaging in community education and sensitization on the dangers of encroaching on the wetland, and we have been supporting local leaders. They educated people about the importance of these sites to us as human beings and the world, and how we can also plant trees to protect them.” (Representative of Traditional Authority)

The traditional authority largely facilitated community engagement by *“...assisting the forestry commission to strengthen bonds with the communities for community education programs to be successful”* (Representative of Traditional Authority). These community-based approaches

conducted in collaboration with traditional authorities are crucial for wetland conservation through the integrated application of indigenous knowledge and empowering community-engaged stewards to ensure ecological protection.

Conservation practices were reported by residents to have positive outcomes, albeit with some challenges. Positive impacts included enhanced fish breeding and yield due to mangrove protection, as well as employment opportunities through ecotourism. One of the Officials noted that, *“...when they go fishing, they get more fish from the Lagoon, because of some of the restrictions we have placed on the lagoon to allow for spawning. The residents appreciate that the work we are doing is for community purpose”* (Forestry Commission Official). It was also noted that *“...the wetlands attract endangered species of birds and animals, creating tourism-related employment that trickles down to the common person in the community”* (Lands Commission Official). In terms of the challenges, some residents occasionally attempt to encroach on the core conservation zones of the wetlands, even though farming and other livelihood activities such as salt mining are allowed within the buffer and transitional zones. An official mentioned that:

“...we don't encourage or allow them to farm in the core conservation zone. But some of them are trying to come and farm within the protected areas... we allow them to farm in the buffer and the transition area so that they can also benefit from the wetland. (Lands Commission Official)

“Salt mining in the lagoon areas close to the wetland poses potential threats to the protected ecosystem, especially given that leasing arrangements by the central government could allow mining in sensitive zones” (Forestry Commission Official).

There were also reports of conservation as a source of inconvenience. For some residents, the planting of mangroves resulted in the breeding of snakes and mosquitoes. This was corroborated by community informants. The participants mentioned that:

“...we have complained that the dense mangroves have been breeding mosquitoes and snakes, and restricted access to water bodies, which affects our livelihood activities in the wetland” (Community Resident).

“Some of the residents complained that mosquitoes have been invading their communities...I liaised with the forestry officials and went to cut down some of the mangroves” (Assembly Member)

Officials responded by ensuring that conservation practices do not end up displacing livelihoods. They introduced mechanisms such as the pruning of mangroves and controlled mosquito infestations. It can be deduced that while regulations and conservation activities impose certain restrictions, proactive engagement, communication, and adaptive management can effectively mediate tensions and promote coexistence between humans (the community) and ecological systems (wetlands).

5.3 Contested logics over ownership and the commons approach to wetland management

Multiple actors make competing claims over the ownership of the wetland. While institutions such as the Forestry Commission and the District Assembly are sponsored by the state and some NGOs to safeguard the ecological integrity of the wetlands, Traditional authorities and family heads, on the other hand, hold significant overlapping influence over land use patterns because some portions of the wetland fall under their control. This is due to the plural land tenure system in Ghana, where lands are owned by the state, clan or the family, with inherent contestations that often generate land disputes. In the case of Ada, the land is owned by the clan. An official remarked that

“...here in Ada, the lands are owned by clans or chiefs, who sell portions of the wetlands to developers. The problem is that, as an individual, I don't have any right to go and stop the people [developers], who are sometimes wealthy and powerful” (Assembly Member).

“One of the challenges in managing the wetlands has to do with the inappropriate [illegal] sale of the land [wetland], by the traditional authorities, without our permission” (Municipal Planning Officer).

“The people believe that the wetland is their land and the trees planted there belong to them. Meanwhile, state institutions think otherwise...this has resulted in a misunderstanding over the use of the trees and other ecological resources” (Community Leader).

In the wake of the contested logics over land ownership between Traditional authorities, residents, and state institutions, officials have utilized several commons approaches to mitigate negative outcomes. Notably, they sought the support of the community leaders and the residents to ensure the timely enforcement of the wetland rules and regulations: *“Yes, because if you don't act quickly, more people will come in and then try to convert these areas [wetlands] into salt pans...We need to enforce the rules and regulations together so that we can protect the wetlands (Municipal Planning Officer).”*

Through this state and non-state collaboration, both interpersonal and institutional trust is built, a virtue that stimulates a unified approach to wetland management. This involved multiple stakeholders like traditional authorities, community committees, state agencies, and NGOs. For instance, interpersonal trust is fostered through fair mediation, particularly around land and seasonal farming disputes. An informant mentioned that: *“when there is a land use dispute between multiple families and clans over portions of the wetland, we rely on the collaboration and the trust we have established over the years to resolve it” (Municipal Planning Officer).*

Authorities also dwell on community participation as a commons approach to wetland management; it ranges from active engagement in management to tokenistic involvement in decision-making, such as the introduction of site management committees, training programmes, eco-tourism initiatives, and mangrove monitoring to enable communities apply indigenous knowledge in support of state-led initiatives. The officials explained that:

“...one of the NGOs came and we selected some communities for training on how to identify and protect endangered birds...this has helped protect birds on the site.” (Forestry Commission official)

“We have established a committee comprised of different stakeholders from the communities, state institutions [e.g. the forestry commission] and NGOs to develop community-based strategies for sustainable wetlands management...we meet every quarter” (Municipal Planning Officer).”

The interviews also revealed the significance of social cohesion in wetland management, particularly among families and local communities. This helped to reduce disputes around land access and allocation, which also significantly enhanced conservation efforts. Respect for traditional leadership ensures compliance with their directives and reduces disputes among competing family factions on the use of the wetland.

“The respect that we have for our leaders [traditional authorities] has helped in resolving some of the misunderstandings between the communities on the wetlands. Some communities are of the view that they have control over the wetland, and others disagree, but our chiefs have always brought us together.”

6. Discussion

6.1 Land-use and land-cover change and the drivers of wetland transformation

The land-use and land-cover changes documented in the Ada–Songhor wetland, particularly vegetation decline and the expansion of bare land, reflect governance and institutional failures rather than population growth alone. Although the wetland is legally protected, weak monitoring, fragmented institutional mandates, and limited enforcement capacity undermine effective boundary control. From a Common-Pool Resource (CPR) perspective, this condition approximates de facto open access, where formal rules exist but are insufficiently enforced, weakening incentives for collective restraint (Ostrom, 2015; Tucker et al., 2023). The resulting pattern of gradual encroachment aligns with studies of African wetlands and urban ecological commons where formal protection coexists with persistent conversion due to institutional fragmentation (Cobbinah et al., 2020; Kuusaana et al., 2021).

Tourism-led development emerges as a particularly powerful driver of wetland transformation. The influx of residential and recreational infrastructure reflects rising land values and speculative investment in coastal spaces. These pressures reconfigure local land markets and enable developers to negotiate access to ecologically sensitive areas, sometimes through informal transactions. Similar dynamics have been observed in other Ghanaian Ramsar sites, where tourism and real estate development accelerate wetland loss despite regulatory frameworks (Asante et al., 2024; Frimpong et al., 2025). CPR theory explains this outcome as a breakdown of rule legitimacy: when influential actors can bypass regulations without meaningful sanctions, rule compliance among other users deteriorates.

Culturally embedded practices such as sand winning and mangrove harvesting also contribute to wetland degradation, but their persistence is better understood as a governance failure rather than a purely cultural problem. The results show that residents' limited appreciation of wetland ecological functions coexists with claims of inadequate public education and weak engagement. This reinforces evidence from other contexts that behavioral change is unlikely where conservation messaging is sporadic and disconnected from everyday livelihood realities (Kundu et al., 2024). Thus, wetland vulnerability in Ada is produced through the interaction of development pressure, weak enforcement, limited ecological awareness, and inadequate community engagement, rather than livelihood dependence alone.

6.2 Conservation practices, livelihoods, and community access

The results indicate that convivial conservation practices in Ada generate clear ecological benefits while simultaneously producing localized tensions around access and inconvenience. Mangrove restoration and protection enhance fish breeding and lagoon productivity, confirming established links between mangrove ecosystems and fisheries sustainability (Duku et al., 2022). These outcomes demonstrate that conservation can support livelihoods when ecological improvements translate into tangible benefits. However, tensions arise where conservation interventions alter everyday interactions with wetland spaces. Complaints about mosquito breeding, snakes, and restricted access to water bodies illustrate how conservation measures can generate perceived costs even when they are ecologically justified. Importantly, these tensions do not suggest that conservation inherently undermines livelihoods. Rather, they point to the need for adaptive management that acknowledges unintended side effects and responds to community concerns. Convivial conservation emphasizes precisely this principle: coexistence depends on continuous negotiation, mutual adjustment, and responsiveness (Büscher & Fletcher, 2019; Massarella et al., 2022).

The results further show that regulatory dynamics do not completely deny livelihood access. Farming and salt mining are permitted in buffer and transition zones, indicating an attempt to balance protection and use. The more fundamental challenge lies in weak spatial enforcement and blurred zoning boundaries, which allow some actors to push activities into core conservation areas. From a CPR perspective, unclear boundary rules and inconsistent enforcement undermine collective action by creating uncertainty over legitimate access (Robert et al., 2021). Consequently, vulnerability arises less from conservation restrictions themselves and more from governance inconsistencies and weak integration between conservation, spatial planning, and livelihood support.

6.3 Tenure complexity, trust-building, and collective management

The results show that wetland governance in Ada operates within a context of tenure complexity and overlapping institutional roles, where clans, traditional authorities, state agencies, and NGOs all claim some degree of influence over wetland spaces. Such plural tenure systems are widely recognised in African land governance and often generate ambiguity over authority, access, and enforcement (Cobbinah et al., 2020; Kuusaana et al., 2021). From a CPR perspective, these conditions weaken the clarity of authority and boundary rules, which are essential for effective commons management (Ostrom, 2015). However, rather than resulting in a complete governance

breakdown, the Ada case demonstrates how actors actively mobilise trust-building and participatory arrangements to sustain collective management.

The reliance on collaboration between state institutions and traditional authorities reflects a pragmatic response to tenure complexity. Officials' engagement with chiefs and clan leaders to mediate land disputes and enforce wetland rules illustrates how relational trust substitutes for formal legal clarity. CPR scholarship recognises such negotiated governance as a functional pathway in contexts where statutory authority alone is insufficient (Robert et al., 2021). Trust in Ada is therefore not abstract, but operational: it is built through repeated interaction, joint problem-solving, and shared responsibility for enforcement.

Community participation further strengthens this relational governance system. The establishment of site management committees, training programmes, community-based monitoring, and NGO-supported conservation activities positions residents as co-managers of the wetland rather than passive rule followers. These practices align with CPR design principles on collective-choice arrangements and local involvement in rule implementation. At the same time, participation is uneven and often mediated through chiefs, opinion leaders, and selected representatives. From a convivial conservation perspective, this partial participation may limit deeper democratization of decision-making but still represents an important step toward coexistence-oriented governance (Büscher & Fletcher, 2019; Massarella et al., 2022).

Overall, the Ada case suggests that wetland governance is sustained not through clear-cut authority structures, but through negotiated cooperation built around trust, participation, and shared problem-solving. Collective management thus emerges as a coping strategy within institutional complexity, rather than a product of institutional coherence. Strengthening these relational and participatory arrangements offers a more realistic pathway for improving wetland governance than reliance on enforcement alone.

7. Conclusion and Policy/Governance Implications

This study examined land-use change, conservation–livelihood interactions, and governance dynamics in the Ada–Songhor wetland using the combined lenses of CPR theory and convivial conservation. The findings demonstrate that wetland vulnerability persists despite formal protection because governance arrangements are fragmented, enforcement is weak, and conservation is poorly integrated with spatial planning and livelihood support. Therefore, Wetlands in Ghana constitute not only ecological systems under threat but also contested social spaces where access, authority, and survival are continuously negotiated. Theoretically, the study extends CPR scholarship by highlighting how contested tenure arrangements and weak boundary enforcement undermine collective action even where community norms exist. It also advances convivial conservation by showing that coexistence between humans and wetlands is most likely when conservation visibly supports community wellbeing and when participation enforces shared decision-making.

There are several policy ramifications. First, wetland governance should move beyond enforcement-centered approaches toward strengthened co-management arrangements that institutionalize community roles in decision-making, monitoring, and benefit-sharing. Second,

spatial planning agencies must more firmly embed wetland protection within local development and environmental planning. Third, conservation programmes should explicitly support livelihood diversification strategies linked to environmentally supportive activities such as sustainable fisheries, eco-tourism services, and wetland-friendly enterprises. Finally, clearer protocols are needed to align customary authority with statutory conservation objectives and reduce opportunities for informal wetland dispossession. Aligning CPR design principles with convivial conservation ideals offers a pathway for balancing ecological sustainability with social justice in Ghana's wetland governance.

8. Limitations of the Study

This study is based on a single case study, which limits the generalisability of the findings to other wetlands in Ghana and beyond. Although the mixed-methods approach strengthens analytical depth, the remote sensing analysis relies on available temporal imagery that may not capture short-term land-use fluctuations. In addition, while diverse stakeholders were interviewed, private developers and national-level policy actors were underrepresented, potentially limiting insights into elite decision-making processes. Nonetheless, the range of stakeholders engaged as part of the research process provided valuable insights on wetland management and conservation in Ghana. Future research could adopt comparative multi-site designs, incorporate longitudinal livelihood data, and include a broader range of private- and national-level actors to deepen understanding of wetland governance dynamics.

References

- Ada East District (2014). 2010 Population and Housing Census Analytical Report Ada East District. <https://new-ndpc-static1.s3.amazonaws.com/CACHES/PUBLICATIONS/2016/06/06/Ada+East.pdf>
- Agbove, P.T (2023). Ada protesters warn against dealing with Paramount Chief over salt concession. The Fourth Estate. Retrieved from <https://thefourthstategh.com/2023/05/ada-protesters-warn-against-dealing-with-paramount-chief-over-salt-concession/>
- Alikhani, S., Nummi, P., & Ojala, A. (2021). Urban Wetlands: A Review on Ecological and Cultural Values. *Water*, 13(22), 3301. <https://doi.org/10.3390/w13223301>
- Armitage, D. (2008). Governance and the commons in a multi-level world. *International Journal of the Commons*, 2(1), 7–32. <https://doi.org/10.18352/ijc.28-1-283-4-10-20080528>
- Asante, L. A., Akomea Bonsu, B., & Helbrecht, I. (2024). Wetland gentrification: the African variant on ecological gentrification. *Environment & Urbanization*, 36(2), 460-477. <https://doi.org/10.1177/09562478241253179> (Original work published 2024)
- Atiim, J. A. N., Alhassan, E. H., & Abobi, S. M. (2022). Correction: Evaluating the contribution

- of wetlands to food security and livelihoods improvement in the Savelugu Municipality, Ghana. *Wetlands Ecology and Management*, 30(6), 1303-1304.
<https://doi.org/10.1007/s11273-022-09881-5>
- Basurto, X. (2013). Linking multi-level governance to local common-pool resource theory using fuzzy-set qualitative comparative analysis: Insights from twenty years of biodiversity conservation in Costa Rica. *Global Environmental Change*, 23(3), 573–587.
<https://doi.org/10.1016/j.gloenvcha.2013.02.011>
- Berge, E. & van Laerhoven, F. (2011). Governing the Commons for two decades: A complex story, *International Journal of the Commons*, 5(2), p. 160-187.
- Bryant, R. (2015). *The international handbook of political ecology*. Cheltenham Edward Elgar
- Braun, V., & Clarke, V., (2006). *Using Thematic Analysis in Psychology*. *Qualitative Research in Psychology* 3(2): 77–101.
- Büscher, B., & Fletcher, R. (2019). *Towards convivial conservation*. *Conservation and Society*, 17(3), 283-296. https://doi.org/10.4103/cs.cs_19_75
- Büscher, B., & Fletcher, R. (2020). *The conservation revolution: Radical ideas for saving nature beyond the Anthropocene*. London: Verso Books.
- Büscher, B., Massarella, K., Coates, R., Deutsch, S., Dressler, W., Fletcher, R., ... & Kok, M. T. (2022). The convivial conservation imperative: Exploring “Biodiversity Impact Chains” to support structural transformation. In: Visseren-Hamakers IJ, Kok MTJ, eds. *Transforming Biodiversity Governance*. Cambridge University Press; 2022:244-263.
- Ceballos, G., Ehrlich, P. R., & Dirzo, R. (2017). Biological annihilation via the ongoing sixth mass extinction signaled by vertebrate population losses and declines. *Proceedings of the national academy of sciences*, 114(30), E6089-E6096.
- Cobbinah, P. B., Asibey, M. O., & Gyedu-Pensang, Y. A. (2020). Urban land use planning in Ghana: Navigating complex coalescence of land ownership and administration. *Land Use Policy*, 99, 105054. <https://doi.org/10.1016/j.landusepol.2020.105054>
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*. SAGE Publications.
- Díaz-Pinzón, L., Sierra, L., Trillas, F. & Verd, J.M. (2024). The social-ecological system framework of urban wetlands: The role of collective management at local level’, *International Journal of the Commons*, 18(1), p. 649–669.
- Donatus, D., Idrees, M., Saleem, N., Mwinboubu, G., & Sattar, A. (2022). The management of wetlands in Ghana as a compliance to the Ramsar Convention. *Journal of Marine Biology and Aquatic Research*, 2(1), 103. Annex Publishers.

<https://www.annexpublishers.com/articles/JMBAR/2103-The-Management-of-Wetlands.pdf>

- Duku, E., Mattah, P. A. D., & Angnuureng, D. B. (2022). Assessment of wetland ecosystem services and human wellbeing nexus in sub-Saharan Africa: Empirical evidence from a socio-ecological landscape of Ghana. *Environmental and Sustainability Indicators*, 15, 100186.
- Dunlop, C. A., Kamkhaji, J. C., Radaelli, C. M., & Taffoni, G. (2022). Measuring design diversity: A new application of Ostrom's rule types. *Policy Studies Journal*, 50(2), 432–452. <https://doi.org/10.1111/psj.12440>
- Feng, J., Wen, Y., Zhang, H., Duan, W., & Hao, H. (2024). Wetland restoration, household income, and livelihood structure of farmers. *Frontiers in Sustainable Food Systems*, 8, 1256115. doi: 10.3389/fsufs.2024.1256115
- Ferreira, C. S. S., Kašanin-Grubin, M., Solomun, M., & Sushkova, S. (2023). Wetlands as nature-based solutions for water management in different environments. *Current Opinion in Environmental Science & Health*, 33(11), 100476. <https://doi.org/10.1016/j.coesh.2023.100476>
- Fleischman, F.D., Loken, B., Garcia-Lopez, G.A. and Villamayor-Tomas, S. (2014) 'Evaluating the utility of common-pool resource theory for understanding forest governance and outcomes in Indonesia between 1965 and 2012', *International Journal of the Commons*, 8(2), p. 304-336.
- Fletcher, R., Buscher, B., Massarella, K., & Koot, S. (2020). 'Close the tap!': COVID-19 and the need for convivial conservation. *Journal of Australian Political Economy*, The, (85), 200-211.
- Forestry Commission. (1999). *The Forestry Commission Act, 1999 (Act 571)*. Parliament of the Republic of Ghana. <https://ir.parliament.gh/bitstream/handle/123456789/1837/FORESTRY%20COMMISSION%20ACT%2C%201999%20%28ACT%20571%29.pdf?sequence=1&isAllowed=y>
- Frimpong, L. K., Mensah, S. L., Okyere, S. A., Gbedemah, S. F., Kwang, C., & Boateng, F. G. (2025). 'We are not the ones to blame': Stakeholders' conflicting rationalities in wetlands management in Ghana. *Environment and Planning E: Nature and Space*, 0(0). <https://doi.org/10.1177/25148486251386254>
- Giarracca, N. (2010). Espacios de esperanza" y "buen vivir" ["Spaces of hope" and "buen vivir"]. https://www.biodiversidadla.org/Noticias/Espacios_de_esperanza_y_buen_vivir
- Government of Ghana. (1999). *Wetland Management (Ramsar Sites) Regulations, 1999*. Ministry of Lands and Forestry. <https://fcghana.org/wp-content/uploads/2021/11/Regulation-1999.pdf>

- Hajjar, R., Engbring, G., Kornhauser, K., et al. (2021). The impacts of REDD+ on the social-ecological resilience of community forests. *Environmental Research Letters*, 16(2), 024001. <https://doi.org/10.1088/1748-9326/abd7ac>
- He, H., Li, X., & Li, T. (2025). The sustainable development of wetlands and agriculture: A literature review. *Agronomy*, 15(3), 746. <https://doi.org/10.3390/agronomy15030746>
- Illich, I. (1973). *Tools for conviviality*. New York: Harper & Row.
- Korol, E., & Korol, S. (2025). Governing the Commons through Rule Hybridity: Interactions Between Formal Institutions and Informal Norms in CPR Management. *Journal of Business and Management Studies*, 7(4), 88-102. <https://doi.org/10.32996/jbms.2025.7.4.4>
- Krauss, J. E., (2021) “Decolonizing, conviviality and convivial conservation: Towards a convivial SDG 15, life on land?”, *Journal of Political Ecology* 28(1), 945–967. doi: <https://doi.org/10.2458/jpe.3008>
- Kundu, S., Kundu, B., Rana, N. K., & Mahato, S. (2024). Wetland degradation and its impacts on livelihoods and Sustainable Development Goals: An overview. *Sustainable Production and Consumption*, 48, 419-434. <https://doi.org/10.1016/j.spc.2024.05.024>
- Kuusaana, E. D., Ahmed, A., Champion, B. B., & Dongzagla, A. (2021). Characterisation and typology of urban wetlands in Ghana: Implications for the governance of urban commons in secondary cities in Africa. *Urban Governance*. <https://doi.org/10.1016/j.ugj.2021.09.002>
- Maietta CE, Hondula KL, Jones CN and Palmer MA (2020) Hydrological Conditions Influence Soil and Methane-Cycling Microbial Populations in Seasonally Saturated Wetlands. *Front. Environ. Sci.* 8:593942. doi: 10.3389/fenvs.2020.593942
- Manning, J. (2017). In vivo coding. In J. Matthes (Ed.), *The International Encyclopedia of Communication Research Methods* (pp. 1–?). Wiley-Blackwell. <https://doi.org/10.1002/9781118901731.iecrm0270>
- Maseko, Z. T. M. (2022). Conflicts between conservation and community livelihoods (Chapter 14). In *Conservation, Land Conflicts and Sustainable Tourism in Southern Africa* (pp. 16). Routledge. <https://doi.org/10.4324/9781003188902-14>
- Massarella, K., Krauss, J. E., Kiwango, W., & Fletcher, R. (2022). Exploring convivial conservation in theory and practice: Possibilities and challenges for a transformative approach to biodiversity conservation. *Conservation and Society*, 20(2), 59–68. https://doi.org/10.4103/cs.cs_53_22
- Matovu, B., Lee, M-A., Mammel, M., Lukambagire, I., Lutalo, B., Mwangi, A. R., Mwabvu, B.,

- Mim, T. A., Bbira, Y., Lubega, Y., & Muhoozi, Y. (2024). Mobilizing evidence-based knowledge for sustainable wetlands co-management and co-governance amidst increasing anthropogenic and environmental stressors: Key lessons from Mityana District, Uganda. *Environmental Challenges*, 17, 101014. <https://doi.org/10.1016/j.envc.2024.101014>
- Ministry of Finance and Economic Planning (MOFEP). (2025). Ada East district composite budget estimates – 2025 (Programme-Based Budget). Ministry of Finance and Economic Planning, Government of Ghana, Accra. Retrieved from https://mofep.gov.gh/sites/default/files/composite-budget/2025/GR/Ada_East.pdf
- Ministry of Lands and Forestry (1999). *Managing Ghana's wetlands: National wetlands conservation strategy*. Government of Ghana, Accra. https://www.ramsar.org/sites/default/files/documents/library/national_wetland_policies-ghana.pdf
- Mombo, F., Speelman, S., Hella, J., & Van Huylenbroeck, G. (2013). How characteristics of wetlands resource users and associated institutions influence the sustainable management of wetlands in Tanzania. *Land Use Policy*, 35, 8-15.
- National Development Planning Commission (NDPC) (2014). *Ada West District medium term development plan 2014–2017 (GR_Ada West 2014-2017 DMTDP)*. National Development Planning Commission, Government of Ghana, Accra. Retrieved from https://new-ndpc-static1.s3.amazonaws.com/CACHES/PUBLICATIONS/2016/04/04/GR_Ada+West_2014-2017+DMTDP.pdf
- Neef, R., Busscher, T., Verweij, S., & Arts, J. (2022). How rule directions influence actors to achieve collective action: an analysis of Dutch collective infrastructure decision-making. *European Planning Studies*, 31(8), 1612–1633. <https://doi.org/10.1080/09654313.2022.2085030>
- Noe, C., & Kangalawe, R. Y. M. (2015). Wildlife protection, community participation in conservation, and (dis) empowerment in southern Tanzania. *Conservation and Society*, 13(3), 244–253. <https://doi.org/10.4103/0972-4923.170396>
- Nsoh, W. (2022). Achieving groundwater governance: Ostrom's design principles and payments for ecosystem services approaches. *Transnational Environmental Law*, 11(2), 381-406.
- Ntiamoa-Baidu, Y., & Taye, E. N. A. (2025). Wetlands of Ghana: Biodiversity, community livelihoods, and conservation. In *Wetlands of tropical and subtropical Asia and Africa: Biodiversity, livelihoods and conservation* (pp. 241-264). Wiley. <https://doi.org/10.1002/9781394235278.ch11>
- Ofori-Danso, P.K. (1999). Coastal wetlands management project (CWMP) Songor Ramsar site management plan. Downloaded from https://rsis.ramsar.org/RISapp/files/5621441/documents/GH566_mgt1506.pdf

- Ostrom, E. (2015). *Governing the commons: The evolution of institutions for collective action*. Cambridge university press.
- Ostrom, E. (1980). Public entrepreneurship: A case study in ground water basin management. Los Angeles: University of California.
- Pedrosa, E. L. J., Okyere, S. A., Frimpong, L. K., Diko, S. K., Commodore, T. S., & Kita, M. (2021). Planning for informal urban green spaces in African cities: children's perception and use in peri-urban areas of Luanda, Angola. *Urban Science*, 5(3), 50. <https://doi.org/10.3390/urbansci5030050>
- Pettersson, H. L., Quinn, C. H., Holmes, G., & Sait, S. M. (2022). "They belong here": understanding the conditions of human-wolf coexistence in North-Western Spain. *Conservation and Society*, 20(2), 113-123.
- Ramsar Convention (2021). Ramsar convention on wetlands of importance especially as waterfowl habitat. <https://apps.snh.gov.uk/>
- Robert, G., Williams, O., Lindenfalk, B., Mendel, P., Davis, L. M., Turner, S., ... & Branch, C. (2021). Applying elinor ostrom's design principles to guide co-design in health (care) improvement: a case study with citizens returning to the community from jail in Los Angeles county. *International Journal of Integrated Care*, 21(1), 7.
- Roy, A., Hulot, F. D., & Soudani, K. (2025). Landsat-based remote sensing of surface water dynamics in southern African wetlands in drylands from 1986 to 2022. *Ecosphere*, 16(7), <https://doi.org/10.1002/ecs2.70332>
- Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., ... & Jinks, C. (2018). Saturation in qualitative research: exploring its conceptualization and operationalization. *Quality & quantity*, 52, 1893-1907.
- Saijo, T., Feng, J., & Kobayashi, Y. (2017). Common-pool resources are intrinsically unstable. *International Journal of the Commons*, 11(2), 597–620.
- Shrestha, A., Benjankar, R., Kalra, A., & Bhusal, A. (2025). Effectiveness of wetlands for improving different water quality parameters in various climatic conditions. *Hydrology*, 12(8), 216. <https://doi.org/10.3390/hydrology12080216>
- Slough, T., Rubenson, D., Levy, R. E., Alpizar Rodriguez, F., Bernedo del Carpio, M., Buntaine, M. T., ... & Zhang, B. (2021). Adoption of community monitoring improves common pool resource management across contexts. *Proceedings of the National Academy of Sciences*, 118(29), e2015367118.
- Steins, N. A., & Edwards, V. M. (1999). Collective action in common-pool resource

- management: The contribution of a social constructivist perspective to existing theory. *Society & Natural Resources*, 12(6), 539–557.
- Thapa, D., Budhathoki, N. R., & Munkvold, B. E. (2017). Analyzing crisis response through actor-network theory: The case of Kathmandu living labs. *Communications of the Association for Information Systems*, 41(1), 19.
- Toncheva, S., Fletcher, R., & Turnhout, E. (2022). Convivial conservation from the bottom up: Human-bear cohabitation in the Rodopi Mountains of Bulgaria. *Conservation and Society*, 20(2), 124-135. doi: 10.4103/cs.cs_208_20.
- Tucker, C. M., Šmid Hribar, M., Urbanc, M., Bogataj, N., Gunya, A., Rodela, R., Sigura, M., & Piani, L. (2023). Governance of interdependent ecosystem services and common-pool resources. *Land Use Policy*, 127, Article 106575. <https://doi.org/10.1016/j.landusepol.2023.106575>
- van Klingerren, F. & de Graaf, N.D. (2021). Heterogeneity, trust and common-pool resource management. *J Environ Stud Sci* 11, 37–64 (2021). <https://doi.org/10.1007/s13412-020-00640-7>
- Wall, D. (Ed.). (2014). *The commons in history: Culture, conflict, and ecology*. MIT Press. <https://dokumen.pub/the-commons-in-history-culture-conflict-and-ecology.html>
- Weston, B.H., & Bollier, D. (2013). The commons as a model for ecological governance. In: *Green Governance: Ecological Survival, Human Rights, and the Law of the Commons*. Cambridge University Press; 2013:123-154.