TOURISM, GENDER, AND CLIMATE CHANGE ADAPTATION IN KENYA'S COAST

Doctoral Dissertation

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Article 1: Solely responsible for research question development, literature review, data collection and analysis, writing original draft, editing, and finalizing the manuscript

Article 2: Conceptualization of the research question, literature review, data collection, writing of original draft, editing, and finalizing the manuscript

Article 3: Conceptualizing the research question, fieldwork, data collection, data analysis, policy review, writing original draft, editing, and finalizing the manuscript

Declaration according to Article 6 (6) Promotionsordnung

1. The work was performed without unauthorized assistance
2. Only the referenced sources and tools were used and
3. Direct quotations from the published or unpublished work of any source are identified as such.

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Abstract

Tourism's development along Kenya's coast has undergone gradual yet significant transformation shaped by political dynamics, foreign investment, and local culture. Originating from colonial leisure pursuit in the early 1900s, Kenya's coastal tourism evolved into a key pillar in both national and devolved government plans. In recent years, the national government has taken a more active role in guiding tourism's trajectory, building on a legacy established by foreign investors who set up the region's early resort economy. These developments have had substantial impact on the livelihoods of coastal communities, influencing opportunities, for example employment opportunities for women who make up the majority of global tourism workforce. The developments also expose local communities to new vulnerabilities, particularly considering gendered risks in ocean governance and climate change.

As climate change intensifies threats to marine life, coastal settlements, and tourism infrastructure, every decision made about tourism development becomes even more significant. The sector's future depends not only on healthy marine environments, but also on resilience of local communities involved in tourism work. In this context, the central argument of this study is that adaptation with relevance to Kenya's coastal tourism is both relational and political, shaped by imbalances in power relations and competing sectoral priorities in the ocean economy. Framed through the lens of feminist political ecology, this study examines how power asymmetries influence climate adaptation in coastal tourism, taking note of incorporation or neglect of gender responsiveness within the process.

Despite tourism's consistent ranking among Kenya's top contributors to Gross Domestic Product and ocean economy, the sector has in the past failed to establish strong local community linkages. As a result, many coastal communities remain excluded from the sector's meaningful economic engagement and decision making. This exclusion becomes more visible as climate change impacts intensify, with the effects of tourism's vulnerabilities spilling over to communities that depend on the sector. A key challenge is that these communities are rarely central in adaptation planning, illustrating political hierarchies that feminist political ecology critiques, where local agency and gendered vulnerabilities are obscured. As this pattern eventually erases local and place based knowledge, it reflects tensions within development narratives shown to marginalize alternative ways of knowing.

This study is structured around three main objectives. First, a literature review investigates how gender is approached in tourism research on climate change, revealing persistence of disciplinary silos between sub fields. Second, through participatory photo voicing workshops with women in a coastal tourism destination, the research showcases how local coastal communities experience climate change impacts, detailing their descriptions of non-economic loses. This participatory approach ensures that women's voices are foregrounded, especially considering literature evidence of sidelining of women's voices on environmental matters. Third, the study uses mental modeling to compare how different stakeholder groups conceptualize climate risks to coastal tourism. The findings note striking differences between policy makers and tourism practitioners, with the latter, shown by literature and policy review, to be often excluded from formal decision making. Top-down processes and tokenistic participation, undermine effective, inclusive adaptation, as they reinforce existing hierarchies and overlook grassroots knowledge. Collectively, findings from this study contribute to debates on climate justice and the need to re-center local voices, particularly those of women, in shaping equitable and sustainable future for coastal tourism and ocean economy.

Zusammenfassung

Die Entwicklung des Tourismus entlang der Küste Kenias hat einen allmählichen, aber bedeutenden Wandel durchlaufen, der von politischen Dynamiken, ausländischen Investitionen und der lokalen Kultur geprägt ist. Ausgehend von kolonialen Freizeitaktivitäten zu Beginn des 20. Jahrhunderts entwickelte sich der Küstentourismus Kenias zu einer wichtigen Säule sowohl in den nationalen als auch in den dezentralen Regierungsplänen. In den letzten Jahren hat die nationale Regierung eine aktivere Rolle bei der Steuerung der Entwicklung des Tourismus übernommen und dabei auf dem Erbe ausländischer Investoren aufgebaut, die die frühe Toursimuswirtschaft der Region begründet haben. Diese Entwicklungen hatten erhebliche Auswirkungen auf die Lebensgrundlagen der Küstengemeinden und beeinflussten beispielsweise die Beschäftigungsmöglichkeiten für Frauen, die den Großteil der weltweiten Arbeitskräfte im Tourismussektor ausmachen. Die Entwicklungen setzen die lokalen Gemeinden auch neuen Risiken aus, insbesondere im Hinblick auf geschlechtsspezifische Risiken im Zusammenhang mit der Governance der Ozeane und dem Klimawandel.

Da der Klimawandel die Bedrohungen für das Leben im Meer, die Küstensiedlungen und die Tourismusinfrastruktur verschärft, gewinnt jede Entscheidung über die Entwicklung des Tourismus noch mehr an Bedeutung. Die Zukunft des Sektors hängt nicht nur von einer gesunden Meeresumwelt ab, sondern auch von der Widerstandsfähigkeit der lokalen Gemeinschaften, die im Tourismus tätig sind. Der Tourismus arbeitet mit anderen Sektoren der Meereswirtschaft wie Aquakultur, Fischerei und Schifffahrt zusammen, wobei die Verflechtungen zwischen den einzelnen Sektoren unterschiedlich stark ausgeprägt sind. Aufgrund dieser Verflechtungen hängt die Anpassungsfähigkeit des Sektors eng mit seinem Einfluss auf die Politikgestaltung im Bereich der Meereswirtschaft insgesamt zusammen. Vor diesem Hintergrund lautet die zentrale These dieser Studie, dass die Anpassung im Zusammenhang mit dem Küstentourismus in Kenia sowohl relationaler als auch politischer Natur ist und durch Ungleichgewichte in den Machtverhältnissen und konkurrierende sektorale Prioritäten in der Meereswirtschaft geprägt ist. Aus der Perspektive der feministischen politischen Ökologie untersucht diese Studie, wie Machtasymmetrien die Klimaanpassung im Küstentourismus beeinflussen, wobei die Einbeziehung oder Vernachlässigung der Geschlechtergerechtigkeit in diesem Prozess berücksichtigt wird.

Obwohl der Tourismus in Kenia seit jeher zu den wichtigsten Faktoren zum Bruttoinlandsprodukt und zur Meereswirtschaft zählt, ist es dem Sektor in der Vergangenheit nicht gelungen, starke Verbindungen zu den lokalen Gemeinschaften aufzubauen. Infolgedessen bleiben viele Küstengemeinden von einer wesentlichen wirtschaftlichen Beteiligung und Entscheidungsfindung in diesem Sektor ausgeschlossen. Diese Ausgrenzung wird mit der Verschärfung der Auswirkungen des Klimawandels immer deutlicher, da die Folgen der Vulnerabilität des Tourismus auf die vom Sektor abhängigen Gemeinden übergreifen. Während alle anderen Tourismusakteure mit vorübergehenden oder externen Verbindungen zu klimasensiblen Urlaubszielen als Reaktion auf klimabedingte Beeinträchtigungen umziehen, oder während der Nebensaison fernbleiben können, bleibt die Mehrheit der lokalen Bevölkerung, die fest mit dem Ort verwurzelt ist, das ganze Jahr über vor Ort. Die Auswirkungen des Klimawandels machen jedoch auch in der Nebensaison keine Pause, sondern entfalten sich kontinuierlich, und wenn diese Beeinträchtigungen auftreten, ist es die lokale Bevölkerung, die die Hauptlast des Risikos zu spüren bekommt. Eine zentrale Herausforderung besteht darin, dass diese Gemeinden selten im Mittelpunkt der Anpassungsplanung stehen, was die von der feministischen politischen Ökologie kritisierten politischen Hierarchien verdeutlicht, in denen lokale Handlungsfähigkeit und geschlechtsspezifische Vulnerabilitäten verschleiert werden. Da dieses Muster letztendlich lokales und ortsbezogenes Wissen auslöscht, spiegelt es Spannungen innerhalb von Entwicklungsnarrativen wider, die alternativen Erkenntniswege marginalisieren.

Diese Spannungen sind im Tourismus, einem Sektor, der sowohl als nachhaltig als auch als entwicklungsfördernd gilt, besonders ausgeprägt. Die ökologische Legitimität des Tourismus wird zunehmend in Frage gestellt, beispielsweise angesichts seines CO2-Fußabdrucks, was die Position des Sektors in politischen Arenen untergraben kann, insbesondere wenn seine Interessen mit denen traditioneller Ressourcennutzer wie handwerklicher Fischer kollidieren. In solchen umkämpften Bereichen hängt die Fähigkeit des Tourismus, seine Interessen durchzusetzen, davon ab, dass er seine klimabezogenen Schwachstellen sichtbar macht, insbesondere aus der Perspektive der Geschlechter und der Mitglieder lokaler Gemeinschaften, die im Tourismusbereich tätig sind. Die feministische politische Ökologie bietet einen analytischen Blickwinkel, um Fragen der Handlungsfähigkeit und Legitimität von lokalem Wissen bei der Entscheidungsfindung in den Mittelpunkt zu stellen.

Diese Studie gliedert sich in drei Hauptziele. Erstens untersucht eine Literaturrecherche, wie das Thema Geschlecht in der Tourismusforschung zum Klimawandel behandelt wird, und deckt dabei die anhaltende Interdisziplinarität zwischen diesen Teilbereichen auf. Zweitens zeigt die Studie anhand von partizipativen Photo voicing-Workshops mit Frauen in einem Küstentourismusgebiet, wie lokale Küstengemeinden die Auswirkungen des Klimawandels erleben, und beschreibt detailliert ihre Schilderungen der nicht-wirtschaftlichen Verluste. Dieser partizipative Ansatz stellt sicher, dass die Stimmen der Frauen im Vordergrund stehen, insbesondere angesichts der Literaturbelege für die Marginalisierung der Stimmen von Frauen in Umweltfragen. Drittens verwendet die Studie mentale Modellierung, um zu vergleichen, wie verschiedene Interessengruppen Klimarisiken für den Küstentourismus konzeptualisieren. Die Ergebnisse zeigen auffällige Unterschiede zwischen politischen Entscheidungsträgern und Tourismuspraktikern, wobei letztere, wie aus der Literatur und der Überprüfung der Politik hervorgeht, oft von formellen Entscheidungsprozessen ausgeschlossen sind. Top-down-Prozesse und symbolische Beteiligung untergraben eine wirksame, inklusive Anpassung, da sie bestehende Hierarchien verstärken und das Wissen der lokalen (Küsten)Bevölkerung übersehen. Insgesamt tragen die Ergebnisse dieser Studie zur Debatte über Klimagerechtigkeit und die Notwendigkeit bei, lokale Stimmen, insbesondere die von Frauen, bei der Gestaltung einer gerechten und nachhaltigen Zukunft für den Küstentourismus und die Meereswirtschaft wieder in den Mittelpunkt zu rücken.

Research articles in this thesis

Article 1: What matters most about gender? An overview of central unifying concepts in tourism focused research on climate change and gender.

Author: Lucy Atieno

Status: In preparation.

Article 2: Non-economic losses and other impacts of climate change affecting women in tourism work: A photo voice case study from Kenya's coast

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Status: Accepted for Publication at Frontiers in Climate.

Article 3: Gender, tourism, and climate change in coastal Kenya: exploring interconnections through mental models

Authors: Lucy Atieno and Marie Fujitani

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CHAPTER ONE
General introduction

1.1 Introductory overview and purpose

This research explores a case study from Kenya's coast, where sustainable and climate resilient tourism is crucial for the future of coastal livelihoods and fragile marine environments in the region. There, coastal tourism aspires to align with United Nations Sustainable Development Goal (SDG) 14, which pursues an agenda for conserving and sustainably using oceans, seas, and marine resources for sustainable development. Benefits from tourism fit with target 14.7 of the SDG, which is about increasing the economic benefits to countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture, and tourism. Today, the constantly changing marine environment due to diverse stressors threatens the future of ocean health. Climate change impacts on coastal areas necessitate urgent responses to pursue actions towards resilience for climate sensitive ocean economy sectors. The Intergovernmental Panel on Climate Change (IPCC 2014) defines resilience as the capacity of socio ecological systems (SES) "to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure" (p.1772). Actions for responding and reorganizing from this definition, are especially relevant for this thesis, as they directly relate to adaptation (for a review of definitions of the term see Table 1.1 in section 1.5), and establishing agency at grassroots level. Agency is the capacity of a person, group, or thing to independently act or influence change within contexts of power relations or structural constrains (Grillitsch & Sotarauta, 2023; Littlejohn & Foss, 2009), and along with adaptation is a central theme of the thesis.

The purpose of this study is threefold:

1. To explore the intersections of tourism, gender, and climate change adaptation, particularly the importance of women's grassroots agency in responding to effects of climate change in tourism destinations.
2. To apply participatory methods as elicitation tools and demonstrate their utility to fill in research gaps of gender focused studies on climate resilient tourism.
3. To generate knowledge and understanding of climate change experiences in coastal communities, thereby enhancing capacities of local communities to plan for climate

responses, and amplifying locally rooted perspectives on climate risks as well as grassroots visions for resilience, feeding to ocean economy decision processes.

Kilifi, at Kenya's coast, serves as a representative site for this research. Selected for its central role in Kenya's tourism, climate related risks to the region are politically and economically significant. These risks are further exacerbated by gendered inequalities within the tourism industry, reflecting societal inequalities from which the industry emerges (Calvet, 2022; Yang & Schänzel, 2023). These characteristics highlight unresolved questions about how coastal tourism can adapt to climate change, taking into consideration gender adaptive strategies.

Tourism has a vital role in ocean economy (Kepher-Gona et al. 2024; OECD, 2025; Wabnitz et al. 2021), alongside aquaculture, fisheries, maritime transport and other sectors, which make contributions to local livelihoods and conservation efforts in coastal areas. Globally, tourism dominates these sectors in view of ocean economic output and overall employment (OECD, 2025). Ocean and coastal based tourism's major contributions to countries development is explained by Wabnitz et al. (2021), who give examples of Cabo Verde, the Maldives, and Samoa, as countries whose transition from Least Developed Country status was largely supported by their tourism sectors. In Kenya where tourism is among lead contributors to Gross Domestic Product (GDP), coastal tourism accounts for about 93% contributions to the country's ocean economy (UN Environment Programme, 2023).

1.2 Problem statement and study objectives

Ocean sustainability efforts can be strengthened by drawing on social knowledge (Partelow et al. 2023) defined here as insights shaped through lived experiences and social relationships, and often explored in disciplines such as sociology, anthropology, and feminist studies (ibid). This includes knowledge of equity and ethics that is often absent in technical framings of environmental challenges. While this study engages with local knowledge more broadly, it particularly centers the lived experiences of women as a distinct form of social knowledge, recognizing their ability to illuminate power dynamics, cultural roles, and everyday survival strategies essential to inclusive development (Harding, 1991).

The Global Ocean Treaty, also known as the Agreement on Biodiversity Beyond National Jurisdiction (BBNJ), affirms the relevance of local knowledge in shaping ocean governance. Adopted under UNCLOS in 2023, the treaty acknowledges the value of community-held

insights for guiding environmental assessments and policy design. These provisions are especially pertinent to the tourism sector, which relies on healthy marine ecosystems and is increasingly affected by climate change. However, as momentum to include social knowledge grows, there remain critical gaps in understanding how coastal tourism can meaningfully draw on it to enhance climate resilience (See Chapter Three).

Within this context, women's engagement in tourism sector deserves attention, in terms of their economic participation and the situated social knowledge they contribute to climate resilience efforts. Women form a significant part of the tourism workforce, often concentrated in informal, seasonal, or low-paid roles (Ferguson, 2011), conditions that create precarity (Robinson et al. 2019). In many regions of the Global South, tourism work offers little security and is shaped by patriarchal structures that exclude women from leadership, fair pay, or workplace protections. These dynamics intersect with broader patterns of gendered vulnerability to climate change, placing women in tourism at heightened risk and limiting their participation in shaping climate responses.

Despite widespread acknowledgment of gendered climate impacts, tourism is often overlooked as a sector where these inequalities unfold. Climate adaptation research seldom reflects the realities of women working in tourism (Equality in Tourism, 2024), and in Africa, the gap is general on community level research (Hoogendoorn & Fitchett, 2018). This gap mirrors challenges in climate policy, where grassroots voices are often excluded from top-down decision processes. The absence of social knowledge, especially women's insights, within these processes' limits both the equity and effectiveness of adaptation strategies.

This research addresses these concerns by centering local perspectives, particularly women's experiences in coastal tourism, as crucial to advancing climate resilience in SES. In doing so, it responds to three interconnected problems:

1. The marginalization of social knowledge in climate policy and research;
2. The limited agency of vulnerable coastal populations, particularly women, in shaping environmental decisions; and
3. The deepening of gender inequalities when grassroots knowledge is excluded from climate adaptation efforts.

Framed by literature on gender and tourism (Alarcón & Cole, 2019; Bakas & Salman, 2024; Chambers, 2021; Cole & Ferguson, 2015; Robinson et al. 2019; Purcell, 1997), gender and

climate change (Wabnitz et al. 2021), and tourism and climate change adaptation (Bryan et al. 2018; Hoogendoorn & Fitchett, 2018; Jopp et al. 2010; Loehr et al. 2020; Njoroge, 2014; Njoroge et al. 2018), this study examines the political dimensions of making tourism climate resilient, particularly adaptation strategies, concurrent with considerations of gender as a dimension for grassroots agency in climate action. Adaptation is conceptualized as politics (Dolšak & Prakash, 2018) attending to conflicting preferences and interests in resource control, across diverse actors. By attempting to amplify diverse voices of how climate change impacts are experienced, this work seeks to contribute to climate resilience, in gender responsive ways. The research does not confine itself to listing out adaptation strategies at the study site, but looks at adaptation as a process, shaped by socio political context of tourism in ocean economy. This relates to definitions of adaptation provided in Table 1.1 showcasing a range of viewpoints, most of which share the view of adjusting human systems environment to minimize climate change induced harm.

Against this background, this thesis is organized around three independent yet related objectives. It starts by exploring how tourism, gender, and climate change has been studied, taking an interdisciplinary perspective in tourism research. Its second objective identifies climate change vulnerabilities for women in tourism work. The final study objective evaluates matches and mismatches between the current (male-driven or male-centric) strategies and the vulnerabilities, needs, and capacities of women, showing where excluding women would turn adaptation into mal-adaption.

Key findings from these study objectives points to different facets of inequalities and power imbalances between knowledge holding groups. In tourism publishing, as shown in Chapter Two, this results in maintaining knowledge silos at the intersections of tourism, gender, and climate change topics in research. In policy and practice, as shown in Chapter Four, the lower social status of women coincides with their environmental knowledge being untapped, suggesting sovereignty of masculine knowledge to inform efforts for climate resilience in tourism. Hence, Chapter Three heeds the call by Higgins-Desbiolles et al. (2022) to socialize tourism by centering it on local communities in places where it operates from. The study illustrates constrained grassroots agency of tourism community in climate action, and highlights their plight and preferences, with the aim that policy makers attune their plans to such.

1.3 Study context: Kenya and Kilifi case study

Kilifi is located at Kenya's coast and is one of the County governments of *Jumuiya ya Kaunti za Pwani*, Swahili for community of coastal counties. This is the regional economic bloc focused on development at devolved government units in Kenya's coast, leveraging on blue economy as their competitive advantage. Tourism holds strategic significance for these counties (Figure 1.1), which consistently secure nearly half of Kenya's hotel bed night occupancy, outpacing all other tourism zones in the country (Kenya National Bureau of Statistics, 2024). Tourism bed night occupancy is an important metric for assessing sector performance, and is widely employed in global analytical frameworks such as the Tourism Satellite Accounts, for evaluating economic contributions.

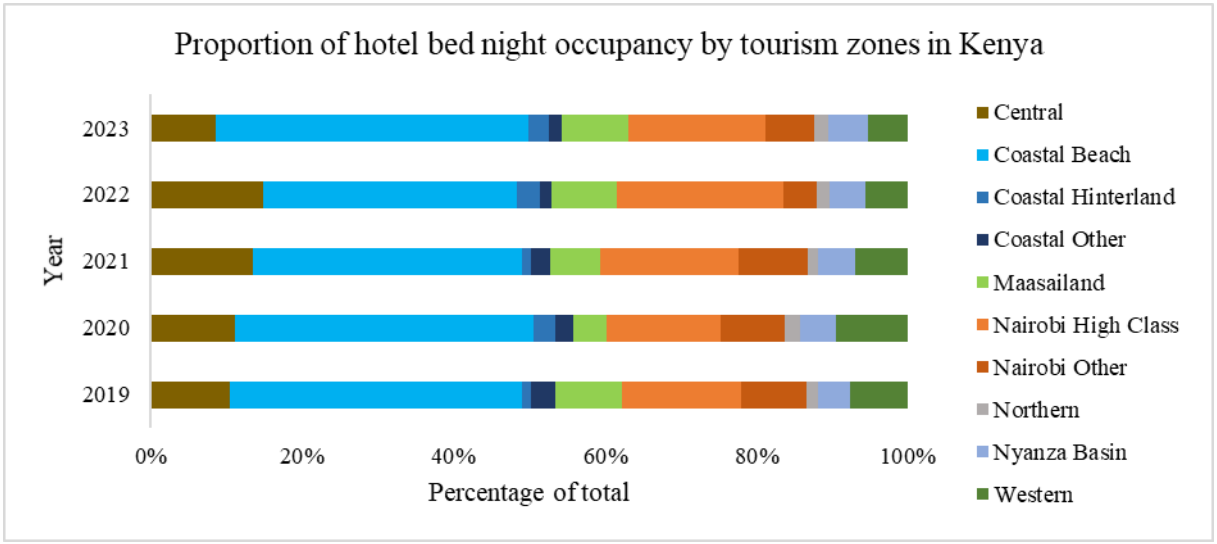

Figure 1.1: Proportion of hotel bed night occupancy by tourism zones in Kenya. Data source: (Kenya National Bureau of Statistics, 2024)

Kilifi's economy has a historic dependence on fishing and tourism, both with extensive linkages to other development sectors. The county receives about 150,000 tourists annually (Kenya Institute for Public Policy and Research Analysis, 2022), a significant contribution to the ocean economy and Kenya's tourism. Despite this contribution, Kilifi remains marginalized from Kenya's development. This comes from Kilifi being part of coastal Kenya, a region identified by scholars to be marginalized both politically and economically (Chome, 2013; Sjögren & Angerbrandt, 2019; Willis & Gona, 2013). In particular, land tenure struggles by local people reflects the neglect that the region faces (Willis & Gona, 2013). Historical land policies, for example the ten-mile strip, excluded local people from owning land with proximity to the ocean, in favor of foreigners (ibid). Among foreign beneficiaries of land from the ten-mile strip policy in coastal Kenya were tourism developers primarily from

Germany, whose investments contributed to land tenure insecurity and social upheaval in the region (Berman, 2016). Historical development of tourism in the region alienated local communities from the coastline, and from meaningful benefit in tourism work opportunities (Berman, 2016), resulting in a hierarchy between affluent tourism investors and local communities. Thus, marginalization in Kilifi occurs in multiple layers, including the region's marginalization from national progress, and locally, marginalization within a tourism sector that alienates local community integration. This pattern continues across much of the global south, where tourism becomes a vehicle for capitalist integration, through projects designed to serve global elites who exploit local natural and cultural heritage (Gauna Ruiz de León et al. 2025). Today there are efforts for better integration of local community to tourism value chains in Kenya's coast (Kepher-Gona et al. 2024), e.g. through programs that support micro small and medium enterprises run by local people. Similarly, popular song *Safari ya Bamba*, translated from local Mijikenda dialect as journey to Bamba, quoted in presidential talk (Tubei, 2017), directs attention to efforts for addressing marginalization in Kilifi. Bamba, an administrative location in Kilifi County, was mentioned repeatedly by study participants during interviews (Chapter Four) as a drought prone area.

Kilifi is classified as an Arid and Semi-Arid Land (ASAL) county, shown by recurrent droughts and vulnerabilities to food security (National Drought Management Authority, 2025). Drought, recognized as the prime recurrent natural disaster in Kenya (Government of Kenya, 2016), and at times driven by climate change, affects the local population in Kilifi in various ways. Recent analysis on Kilifi (Mostert et al. 2025), highlights the causal links between climate shocks and mental wellbeing, noting a severe impact of drought shock on mental health of vulnerable women. This study notes that baseline inequalities such as precarious work, inadequate access to water, and other gender-based disadvantages, leave women severely affected by climate change impacts (ibid), suggesting that vulnerabilities prey on existing inequalities. Kilifi is among the top most socio economically unequal counties in Kenya, shown by its high Gini index, for example 43% on wealth inequality (Kenya Demographic Health Survey, 2022), and 35.43% on consumption expenditure inequality (Kenya National Bureau of Statistics, 2024). These figures reflect a level of economic inequality that is among the highest in the country, compared to national figures of 28 % for wealth inequality and 38.42% for consumption expenditure.

Besides drought impacts, Kilifi's diverse coastal ecosystems, including creeks, mangrove ecosystems and extensive beaches (Kilifi County Government, 2021), make it vulnerable to climate change stressors on the shoreline and coastal habitats. Coastal flooding, a prominent climate related threat to coastal areas, is a relatively moderate risk to Kenya, compared to more exposed island nations (European Commission, 2025). Nevertheless, Kilifi (Figure 1.2) faces localized risks from flooding of rivers that originate in nearby upland areas. Compared to other coastal tourism counties in Kenya such as Kwale, Lamu, and Mombasa, the flood risk in Kilifi is eminent because of significant influence of the Sabaki river. River Sabaki is among Kenya's five major rivers, considering its extensive length and expansive drainage basin. The river originates from the central highlands in Kenya and drains to the Indian ocean in Kilifi County. Kilifi has extensive low lying flood plains along this large-scale river. The county's reliance on tourism and fishing, both climate sensitive development sectors, heightens its vulnerabilities to coastal flooding.

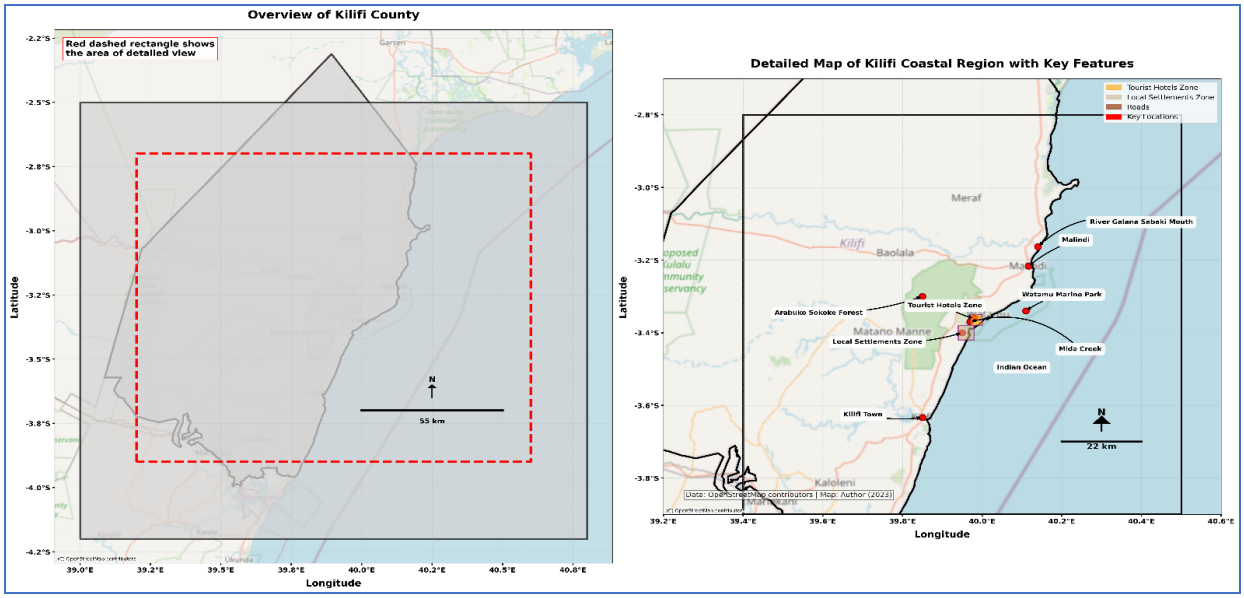

Figure 1.2: Map of Kilifi, showing Watamu, where data was collected

Exposure to climate related hazards like coastal flooding or drought, increasingly necessitates humanitarian support (European Commission, 2025), factors which Kilifi shows vulnerability to, as explored further in Chapters Three and Four of this study. United Nations Framework Convention on Climate Change (2019) vision of climate resilience strongly emphasizes the protection of vulnerable people, aiming to build their capacities to adapt, and withstand current and future climate shocks. Such protection for Kilifi requires that government planners integrate grassroots perspectives of vulnerable people into climate change decision

making processes, with emphasis on representation from the tourism sector, which employs majority of the local population.

Tourism in Kilifi thus provides an important case to explore the intersection of climate resilience and adaptation politics. Kilifi's significant contributions to Kenya's tourism, alongside the strategic importance of tourism to the county, give the impression of the tourism sector being politically influential in decision processes for ocean economy, and national economy. Yet, the marginalization of the region, and weaknesses in local community integration to tourism, play a big role in the sector's political influence. The examination of Kilifi provides a one stop for an analysis that goes beyond environmental impacts of climate change, to analyzing inequalities that underpin socio economic development.

1.4 Background and literature review

There is increasing recognition of climate change as a crisis of equity and human rights (Chancel et al. 2022; European Commission, 2025; Oxfam Canada, 2025). The tourism sector reflects clearly this humanitarian dimension of crisis intersecting with ecological crisis. For tourism, a sector greatly shaped by asymmetrical power relations, critical concerns arise about equity and justice in efforts for climate resilience, with worry that the needs of those without political influence will be overlooked.

1.4.1 Climate inequalities in tourism

Global disparities in income and wealth are closely linked to carbon emissions inequalities. The top 1% very wealthy are responsible for close to half share of global emissions that result to climate breakdown (Chancel et al. 2022). For the tourism sector, this is reflected in global inequality in flying, where Gössling & Humpe (2020) observe that most international tourism originates in wealthier, industrialized nations, with a small, privileged segment of the global population contributing disproportionately large share of air transport related emissions. Inequalities are also evident in historical pattern of country's emissions, where Ritchie (2019) shows that up to the year 1950, colonial powers were the main emitters, whereas many regions under their colonies, e.g. countries in Africa, had low emissions. Combining these factors places carbon footprint of a minority as causing climate emergencies that result in suffering of people whose economic or wealth status does not afford them resources to cope with climate shocks.

Inadequacies to cope with climate shocks are evident in capital intensive adaptation options that are exclusionary as they limit options accessible to resource poor women, worsening their experiences of climate change. Research from across Africa shows that women, confined to smaller land parcels, encounter difficulties in climate smart agriculture interventions, such as crop rotation, or are resource constrained to drill boreholes to mitigate drought impacts, or lack financial resources that will pave their way to engage in adaptation (Acosta et al. 2021; Azong & Kelso, 2018; Dibakoane et al. 2022; Dickin et al. 2020; Diouf et al. 2020; Gaisie et al. 2021; Henricksson et al. 2021; Hlahla et al. 2022; Maltitz & Bahta, 2021; Masinga et al. 2021; Mutenje et al. 2019; Wood et al. 2021). Women also face challenges in capitalizing on assets like jewelry for adaptation measures, which is often the resource that most women have ownership rights to (de la Torre-Castro et al. 2022). In such situations, addressing inequality e.g. in resource capacities is crucial to ease the disproportionate burdens that vulnerable women face from climate risks (Awiti, 2022; Nuhu & Matsui, 2022).

Within the tourism sector, studies (e.g. Ferguson, 2011) point to income inequality to the disadvantage of women. Income inequality leads to inequality in the accumulation of wealth. Because women have lower earnings than men in tourism (Ferguson, 2011), persistence of these inequalities deepens the gender divide. Higher income and wealth are factors that bestow power to people in terms of leadership and other facets of the economy. When wealth is exclusive to gender groups within an economy, they are likely to have control over political and economic decisions that support them to maintain or expand their wealth. Tourism literature points to women's unequal status from gendered income inequality in the sector, and disparity between tourism investors and the local resident community. Women at the study site in Kilifi stand at a crossroads between gendered income inequality in tourism, and the divide between tourism investors and the local community, making them more vulnerable to climate change impacts and weakening their influence in decisions for climate solutions.

In destinations where tourism has already imposed significant socio-economic costs, for example the social upheaval in coastal Kenya (Berman, 2016), the sector's carbon footprint not only makes local dependence on tourism problematic, but also underlines the realities of climate inequality. Climate risks for tourism (elaborated in the next section) illustrate the imbalanced distribution of burdens between tourism source markets and destinations. Data from UN Tourism (2024) (*formerly* United Nations World Tourism Organization-UNWTO),

shows European Union (EU) outbound travel holds a consistently dominant share of tourist arrivals to countries in the Western Indian Ocean (WIO) region (countries along Africa's coastline to the east bordering the Indian ocean). Long haul travel between these regions directly contributes to tourism's transport related carbon emissions, the main source of the sector's greenhouse gas emissions (Lenzen et al. 2018).

For majority of WIO countries, including Kenya, socio economic vulnerabilities to climate risks are high, coinciding with high inequality (European Commission, 2025). What is at stake for these countries with considerable dependencies on climate sensitive coastal tourism (Kepher-Gona et al. 2024), is the intensifying of social and economic disparities. As discussed earlier, vulnerable populations exposed to climate risks and have limited financial and other resources for action, for example the situation of resource poor women. In Conference of Parties (COP) meetings to the United Nations Framework Convention on Climate Change (UNFCCC), African countries have negotiated to prioritize climate adaptation financing, and more recently compensation through loss and damage mechanisms, citing devastating effects on livelihoods and economic sectors. Critical questions remain whether these efforts to access such resources, and actualization of such access, effectively translate to localized support attuned to plight of vulnerable populations living through climate crisis.

1.4.2 Adapting tourism to climate change

Scott et al. (2012) argued that tourism's slow integration of climate considerations makes it among the economic sectors least prepared for risks (and opportunities) posed by climate change. Similarly, a review by Becken et al. (2020) representing 61 countries shows climate change is not a priority focus for tourism policy makers, highlighting a disconnect between policy and climate risks facing tourism. Becken & Clapcott (2011) give the example of this shortcoming in climate policies formulated at national levels not necessarily addressing the needs of economic sectors like tourism. This thesis shows that the challenge in policy extends further, as policy makers at the Kilifi study site are aware of climate threats to ocean health, but they fail to perceive a direct causal link between tourism and ocean risks. As Chapter Four will explain, this oversight of perceived causality has implications on effectiveness and inclusivity of policy interventions within the ocean economy.

While assessing conduciveness of the policy environment for tourism adaptation to climate change, Wong et al. (2013) outline the following four categories of impacts of climate change to tourism, that need commitment of decision makers on the sector's adaptation agenda:

- Direct impacts to changes in tourist flows, that may be due to changes in weather patterns, diminishing aesthetic value of outdoor and nature-based products, and/or infrastructural damage that may be caused by extreme weather events.
- Indirect environmental impacts, for example reduced biodiversity, increase in vector-borne disease, and water shortages.
- Impacts on tourist mobility due to concerns for safety in areas prone to extreme weather events, or long-haul travel losing its appeal with policies to reduce aviation's carbon footprint.
- Indirect impacts on society. This includes consequences to destination hosting tourism, attributable to economic, political, or developmental challenges brought about by a changing climate.

With climate change impacts posing increasing challenges for tourism sector, the need for effective adaptation is urgent. For Loehr et al. (2020), managing climate risks through maintaining or enhancing ecosystem health, is at the core of destination adaptation in tourism. Their research conceptualizes tourism as SES with intricate interweaving of environmental and socio-cultural processes in destinations, identifies opportunities that systems thinking can afford to tourism and climate change research. According to the authors, systems thinking which is still limited in tourism and climate change research, can allow multi-disciplinary insights about how systems react to internal and external influences, e.g., climate challenge, providing a platform for examining anticipatory adaptation in the sector. Loehr et al. (2020) develop the Destination Ecosystem Based Adaptation Framework (DEAF), based on "the theory of SES and the hypothesis that tourism stakeholders can apply *Ecosystem based Approaches* to generate multiple systems benefits including climate resilience and destination well-being", (p.6). This framework considers outcomes for destination wellbeing, adding to contributions of other frameworks important for tourism adaptation to climate change.

Earlier on, Njoroge (2014) introduced the concept of sustainable adaptation to climate frameworks in tourism, building on and critiquing the Regional Tourism Adaptation Framework by Jopp et al. (2010), for overlooking the fact that not all adaptation options are sustainable. For Jopp et al. (2010), tourism adaptation to climate change must factor in regional dynamics, hence their framework, "Regional Tourism Adaptation Framework",

allowing for region specificity. For Njoroge (2014), the emphasis is that without consideration of sustainability in the framework by Jopp et al. (2010), tourism risks mal adaptation, i.e. adaptation pathway(s) that could have non-desirable outcomes for other(s) or self.

As much as both frameworks by Jopp et al. (2010), and (Njoroge, 2014) can be useful in destination preparedness for climate risks, they seem distant in connecting to communities hosting tourism, an aspect which Loehr et al. (2020) give salience to anchoring their framework to outcomes for destination wellbeing. While sharing common ground with the outcomes of DEAF, this study emphasizes role of grassroots agency in shaping well-being within SES. It applies participatory methods for its fieldwork, to provide locally grounded understandings of how climate risks in destinations are experienced from local perspectives, which can complement application of DEAF. It is from the focus on destination wellbeing, that elements of mal adaptation emerge in results from study in Kilifi, as discussed in Chapters Three and Four, raising concern if all stakeholders hold a shared vision of what adaptation means for the SES.

Table 1.1: Definitions of adaptation with application to human systems environment.

Author(s)	**Definition**
(Pielke, 1998)	Adjustments in individual groups and institutional behavior to reduce society's vulnerability to climate.
(Scheraga & Grambsch, 1998)	Involves responses or actions taken to enhance the resilience of vulnerable systems, thereby reducing damage to human and natural systems from climate change and variability
(Smit, et al., 2010)	Adjustments in ecological-socio-economic systems in response to actual or expected climatic stimuli, their effects or impacts
Intergovernmental Panel on Climate Change (IPCC) 2001	Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities
(Ford & Smit, 2004)	In a policy context, adaptation to climate change refers to consciously planned adjustments in a system to reduce or moderate expected negative effects of climate change
(Smit & Wandel, 2006)	In the context of human dimensions of global change usually refers to a process, action or outcome in a system (household, community, group, sector, region, country) for the system to better cope with, manage or adjust to some changing condition, stress, hazard, risk or opportunity.
(Moser & Ekstrom, 2010)	Involves changes in socio ecological systems in response to actual and expected impacts of climate change in the context of interacting non-climatic changes.
(Pilli-Sihvola & Vaatainen-Chimpku, 2016)	A process in natural systems to adjust to the actual climate and its effects, and a process in human systems to adjust to the actual and expected changing climate and its effects, “in order to moderate harm or exploit beneficial opportunities”.

Adaptation lends itself to multiple definitions (Table 1.1), showing its importance for societies and ecosystems to cope with adverse effects of changing climatic conditions. The interpretation of each is context dependent, reflecting understandings that are socially constructed and contested. Definitions of adaptation from Table 1.1 are clear in representing systems that are changing, but their sometimes-passive framing can erase representation of actors driving adaptation. It can be argued that where low activation of actors occurs in adaptation discourse, there could be implications through a passivated representation of those at the leading edge of adaptation processes, similar to when actors are treated as passive objects in environmental management (Fujitani et al. 2018). The low activation could also be tied to adaptation as politics (Dolšak & Prakash, 2018), where passivation serves to side-line certain actor involvement. This is discussed in Chapter Two, where gender establishes agency, though its influence on climate action varies depending on whether actors are positioned centrally or marginally. Gender is not a uniform concept, but rather encompasses diverse experiences and identities, as discussed in Chapter Two of this thesis. This thesis contributes to the discourse on what constitutes gender-responsive solutions to climate risk and vulnerability, which a review study in Africa by (Awiti, 2022) found no consensus on in the literature.

1.4.3 Driving climate resilience for tourism

The agenda for climate resilience is driven by multiple actors, where the involvement or agency of policy makers, local communities, researchers, international bodies, among others, plays diverse roles, to change or maintain development pathways. Because power imbalances and inequalities between stakeholder groups marginalize those without political influence (Dawson et al. 2024; Eriksen et al. 2021), efforts towards resilience are significantly undermined in multiple actor set-ups characterized by power asymmetries (Dawson et al. 2024). This is the likely reality for ocean based economic development, shown by Wabnitz et al. (2021) to side-line environmental conservation and social equity. Inequalities are also mirrored in the tourism sector, for instance unequal status of women who are underpaid in tourism work (Ferguson, 2011), or evidence that profiteering in tourism is based on the exploitation of social inequities (Cavaliere & Ingram, 2023; Higgins-Desbiolles, 2020).

At COP 26, the 26th Conference of the Parties to the UNFCCC officially launched the Glasgow declaration of climate action in tourism (United Nations Framework Convention on Climate Change, n.d.). This declaration has goals for connecting tourism stakeholders globally to implement climate action plans, aiming for a low carbon future while prioritizing ecosystem and community wellbeing (ibid). Climate action plans among stakeholders aim to include targets for regeneration in regions most immediately vulnerable to the impacts of climate change, ensuring the sector can support affected and at-risk communities in resilience building, adaptation and disaster response (One Planet Sustainable Tourism Programme, 2021). Moving beyond the growth metrics synonymous with reporting tourism assessments to include social dimensions of climate action, is a positive step in Glasgow declaration with implications for climate justice. Thus, this declaration marks a shift in industry discourse largely conceptualized in terms of tourist numbers, to reposition destination communities from the margins to a more inclusive tourism world. This direction is strengthened by the call to socialize tourism to be accountable to local communities in places where it operates from (Higgins-Desbiolles et al. 2022). These developments challenge the standard definitions of tourism centered on tourist activity, which has resulted in the marginalization of the rights and interests of local communities.

Long standing structural inequalities and power imbalances inherent in tourism development, hinder attainment of goals for inclusivity. Results from Chapters Three and Four of this thesis show that existing inequalities in the tourism world, and in the ocean economy, do not operate as a background conditions, but intensify the plight of disadvantaged populations in tourism destinations during climate induced disturbances. Inequalities are evident in a tourism order that dominates coastal Kenya, as shown by scholarly publications, especially in Kilifi, the study site for this thesis. In Malindi, within the wider Kilifi County, Pieke (1989) writes that tourism imposed a new order on the local community, creating new social roles, values, and conflicts, that shaped daily life and social relations. The order is maintained by inequalities in wealth and income, resulting in social stratification with the vulnerable local population at the lower rung. This order is also seen in spatial regulations and zones as an order for security in tourist places, controlling places where people work (Kay, 2023), an aspect that field results from this thesis reveals in Chapter Four. Both Chapters Three and Four of this thesis illustrate the gendered layers of inequalities at the study site, especially reducing resource capacities for local populations.

The direction taken to centre voices of local destination communities in climate action in Glasgow declaration (One Planet Sustainable Tourism Programme, 2021), can help mitigate the challenge of inequality inherent in tourism destinations, amidst environmental challenges, like climate change. Through Glasgow's declaration, tourism's sector imperative to prioritize voices of vulnerable groups, such as women, aims for equal gender participation in decision making where women were marginalized. My study documents how communities in tourism destinations experience and respond to climate change, as a step to inform and thus support actions set out in the Glasgow agenda.

1.5 Feminist Political Ecology as a Guiding Framework

Analysis and interpretation throughout the thesis is underpinned by the theoretical framework of Feminist Political Ecology (FPE) and related literature (Agostino et al. 2023; Cole 2017; Elmhirst, 2011; Harris, 2009; Mollett & Faria, 2013; Ramon-Hidalgo & Harris,2018; Resurrección & Elmhirst, 2021; Rocheleau, 1995), to anchor politics, history, and power relations, particularly with regards to marginalization of women and their knowledge, within decision processes for adapting coastal tourism to climate change. FPE merges insights from feminist theories with political ecology to explain gender as a key variable in ecological and social relations (Rocheleau et al, 1996). Feminist theories are philosophical frameworks that analyze and challenge gender inequality, oppressions, and power structures. Political ecology focuses on intersections of political factors with environmental change, and has addressed questions on environmental destruction, conflict, conservation, and identity (Robbins, 2004). My study engages with feminist and political ecology as distinct but intersecting theoretical sources, structuring core concepts within broader FPE frameworks. These theoretical perspectives bring together the following themes which are central to my work: power, access, and control of resources; marginalized groups and social inequality; local communities as agents of change; historical processes such as colonialism; and critiques of capitalism.

Recognizing multiple strands within feminist theory, part of my work relates to the collective understanding of feminist communication theories offered by Littlejohn & Foss (2009), paying attention to ways agency is realized when particular voices are centered, e.g. women's voices, to place women and their experiences of climate change at the center of decision processes for adapting coastal tourism to climate change. Feminist communication theories

offer explanations about communicative strategies used in language to oppress (ibid), an aspect that would relate to the framing of environmental discourse to reflects bias towards masculine ideologies (Vercillo et al. 2021). As discussed in Littlejohn & Foss (2009), the understanding from feminist communication theories is important for this study because they position voice as a central expression of agency. Core concepts of feminist communication theories center on voice, alongside access to public sphere and gender differences (ibid). The authors (p.391) draw attention to the question of who has access to public sphere and whose voices are heard within it, noting that communication as a discipline has often narrowed down what counts as meaningful public discourse, particularly through the neglect of women's voices in the discipline. My study takes up that concern, especially by exploring conceptual vocabularies central in understanding climate risks in tourism, amongst stakeholder groups. Chapter Two shows academic publishing on these topics has fragmented focus, limiting integrated discussion of how gender topics in tourism and climate change are framed in scientific publishing that informs public and policy debates. Chapter Three builds on this by providing evidence of women's knowledge of climate change, identifying aspects from their knowledge frequently left out in formal research and policy. Results from Chapter Four of this study shows that access to public sphere is shaped by knowledge differences between different actors, highlighting differences in how women and men spoke about their observations of climate change. Men's framing of environmental risks, e.g. mobilizing language around vegetation cover loss, draws parallels with government interventions such as tree planting programs, suggesting that such are privileged by masculine discourse. Gender difference is one of the core concepts of feminist communication theories that Littlejohn & Foss (2009) discuss.

Complementing the perspective of feminist theory, this study in Kilifi applies (Watts, 2000) definition of political ecology in seeking "to understand the complex relations between nature and society through a careful analysis of what one might call the forms of access and control over resources and their implications for environmental health and sustainable livelihoods" (p.257). Applying this perspective to my study about coastal tourism and ocean economy context helps to examine how the relationships between society (tourism actors) and marine ecosystems are reconfigured as climate changes, especially with implications for resource levels. In line with key concepts of political ecology outlined by Watts (2000), this study approaches the processes of adapting coastal tourism to climate change as a multi-scalar process, where politics of access, control, and recognition, unfold within interconnected

arenas, ranging from embodied experiences of tourism hosting communities as resource users in ocean economy, through their collective action in mitigating climate risks, to government policies on climate change, and global capitalism within the tourism sector.

Building on the core concepts outlined in previous paragraphs, which draw on feminist theories and political ecology to structure how FPE is applied in this study, this research brings attention to ways in which practice or activism incorporate gender and environment in a political perspective, challenging prevailing ways of knowing that reinforce oppression. Equity and justice are an important focus in feminist communication theories (*see* Littlejohn & Foss, 2009) and political ecology (Watts, 2000). This is evident from the concept of access to public arena in feminist communication theories (Littlejohn & Foss, 2009), synergistic with processes in policy arena in political ecology theory described by Watts (2000), which allow critical reflections of access, e.g. for women (Littlejohn & Foss, 2009) and representation of marginalized groups in public sphere or governance. Thus, taking the intersection between feminism, politics, and ecology, FPE in this research is theorized on intentions to achieve equity in socio ecological contexts, by questioning dominance that subverts agency of others, as well as initiating political action to confront systemized oppressions in gendered social arrangements, and the intersectionality of such oppressions. Intersectionality refers to "interlocking relations of dominance of multiple social, political, cultural, and economic dynamics of power that are determined simultaneously by identity categories of race, gender, class, sexuality, disability, and others" (Gouws, 2017, p.19).

FPE challenges standardized processes in SES that may be innately biased on patriarchy and result in oppressions on women, nature, and others. This is relevant for my study to offer explanations on whose involvement is subverted or advanced in agendas aiming for climate resilience tourism, especially considering influences of gendered societies that tourism typically develops from, and gendered climate risks, chronically affecting women. Applied to this study, the theory shows how knowledge held by groups, in tourism publishing, and in tourism practice, exists in unequal relationships between them. In publishing, the example is given of dominance of masculinized knowledge as objective (Chapter Two). Outside the publishing space, analysis breaks down this knowledge to that is held by men and women, and also knowledge held by policy makers and tourism practitioners, all playing in historically shaped and politically contested arenas of SES decision processes (Chapters Three and Four). These arenas cultivate gendered framing of climate risks, unequal access to public sphere, and

differentiated agencies to influence which knowledge matters. Women's climate change knowledge, framed by non-economic losses (Chapter Three) and on social consequences of climate impacts (Chapter Four), is often sidelined in climate policy, reflecting underlying power imbalances, inequality, and exclusion, rooted in colonial legacy of tourism development at the study site and sustained by greed in global capitalism within the tourism industry.

Yet, despite being sidelined, women present an important knowledge base for understanding localized experiences of climate change, due to their grassroots organizing or community building on climate change responses, and due to their active involvement in mitigating climate related risks. Considering climate change knowledge held by women (objective 2), relative to their status in tourism work (objective 3), and differences in knowledge between groups (objective 3), FPE theory draws attention to influences in knowledge flows to decision processes. Women's knowledge and local knowledge are at the margins of scientific and policy reality. Coming out of this margin, does not necessarily require that women's and local knowledge replace other perspectives: rather, it can contribute to pluralistic understanding, and without hierarchy.

1.6 Methodological overview

The study takes a mixed methods approach combining document reviews and field research with qualitative and quantitative participatory methods.

1.6.1 Document reviews

A literature review was conducted to examine how the topics of tourism, gender, and climate change have been studied together in tourism research, feeding into the first study objective (Chapter Two). A policy document review was done on climate change policies in Kenya, to explore how policies incorporate a gender perspective. This review feeds to the third research objective to examine matches and mismatches in climate knowledge between policy makers and local tourism practitioners (Chapter Four).

1.6.2 Field research: Photo voicing and mental modeling

Field research employed photo voicing and mental modelling as participatory methods for data collection. The study explores the use of photo voicing and mental modeling, as convening tools to capture a knowledge base of climate change experiences informed by local community. Application of both fits within participatory research, described across studies e.g. (Agostino et al. 2023; Cervoni, 2015; Fairey et al. 2022), as research that aims to forge partnerships between researcher(s) and study participants, who are now co investigators, involved in various steps e.g. data collection as done with mental modelling in Kilifi.

Participatory research, as highlighted by Fairey et al. (2022), emphasizes inclusivity and democracy in processes. This approach is important within feminist discourse as it addresses power relations in research practice (Agostino et al. 2023), e.g. by expanding control that participants have in collaborative creation of knowledge (Fairey et al. 2022; Rocheleau, 1995). Participatory processes of knowledge co-production also emerge in research drawing from theoretical viewpoint of FPE (Agostino et al. 2023), applying the theory to interrogate power in knowledge production (Resurrección & Elmhirst, 2021).

Participatory research, exemplified by methods like use of photo voice (Pernecky & Rakić, 2019), or participatory mapping (Rocheleau, 1995), is seen as a liberating and emancipatory force by these scholars, who agree that it allows researchers to gain knowledge that may not otherwise be accessible due to limitations of traditional methods. Such knowledge inclusion need not to be viewed as a separate agenda, and research should acknowledge its position in an interacting context with other knowledge systems (Rocheleau, 1995). Rocheleau's application of FPE to develop multi perspective mixed method research shows the strengths of such an approach in positioning gender as a subject of inquiry rather than an add on, and further evidence for accessing knowledge that has been made invisible and unaccounted for in standard analyses. Indeed, research direction within feminist studies leans towards methodological pluralism to embrace diverse perspectives (Agostino et al. 2023; Rocheleau, 1995). By drawing on women's lived experience and social knowledge as basis for climate change knowledge, this study in Kilifi resonates with feminist ideas to advocate for the inclusion of marginalized groups in mainstream climate change discussions. Analysis of the data looks at how this knowledge reflects concerns for women and for the local community supporting and being affected by coastal tourism.

Photo voicing supported the study's second objective, to identify climate change vulnerabilities for women in tourism. Chen (2022) describes photo voicing method as combining documentary photography with feminist principles, through its participant-led approach. A strength for this method lies in it yielding rich quality data (Kingsbury et al. 2020), since participant generated photos convey their lived experiences in an authentic way (Pierce, 2020). Photo voice was employed in this study, primarily for its ability to ensure active participation of women in research, rather than them being objects of research (Pierce, 2020), which is crucial for this study, since it aims to foreground grassroots agency in climate action. Photo voice data provided local roots to understanding how climate change impacts, e.g. sea level rise, drought, changes in precipitation, and changes in temperature, are experienced locally. The method is described in detail in Chapter Three.

Mental modelling was used for the study's third objective, to examine knowledge (mis)matches between tourism practitioners and policy makers in view of climate change. Researchers who have used mental modelling agree that the participatory approach fills a gap in methods to measure differences in knowledge systems (Halbrendt et al. 2014; Henly-Shepard et al. 2015; Nyaki et al. 2014) a critical step in adapting proposals to meet local socio ecological demands. A sample size with diversity applied to mental modeling enabled representation of many different viewpoints from study respondents in Kilifi. Analysis focused on measures of subjectivity, reflected in patterns of how respondents completed their mental models. Haraway (1988) discusses subjectivity as conditional on the position one cultivates knowledge from, challenging the idea of neutral or universal subject. This understanding guides interrogation of framings of climate change knowledge as produced by study participants situated, embodied experience of being a subject, shaped by their gender, race, class, and other axes of power. It also adds depth to voices challenging the idea of decision processes being informed by climate change knowledge that assumes universality of masculine subject, or policy maker subjectivity, as such justify exclusion of subjects whose knowledge differs.

Mental models are "internal constructs that provide interpretation and structure of an external environment and are therefore an important component of how individuals make decisions" (Halbrendt et al. 2014, p 51). Mental models as representations of how people view causal relationships in a given social ecological system, may encompass reasoning and predictions

held in people's minds about an issue affecting them. They are frames of reference that may be held individually or shared across groups.

Research emphasis regarding the usefulness of mental modelling in complex decision making is two-pronged: it helps avoid the blind spot of imposing externally generated management policies to communities for implementation, and it confronts the challenging assumption that strategies can be uniformly applied across communities. So as a methodology, mental modelling provides a format to integrate "diverse stakeholder knowledge and management strategies in a form that maintains the integrity of complex human understanding" (Hely-Shepard et al 2016, p.110).

Examining mental models therefore allows tapping into knowledge in the diversity of stakeholders involved or interested in complex decision making. This is particularly important for sensitive issues that may require cooperation, like deciding on strategies for climate action. In this study, I recognize that knowledge is not only held by individuals (e.g. what was obtained from individual mental models), but it is also held by groups working in different sectors like tourism, or fisheries, within the ocean economy. Knowledge held by these individuals or groups, form part of broader knowledge system, which can be understood as the network of actors, institutions and practices influencing how knowledge is created, shared, and legitimized in society (Forsyth, 2003; UNESCO, 2017). This understanding enables exploration of how knowledge held by stakeholders is similar or differs from what is recognized in governance. For instance, Berkes (1999) shows that cultural dimensions of knowledge systems may introduce distinct perspectives and challenges within governance contexts. Forsyth (2003) discusses how power dynamics shape which knowledge is legitimized. Yet, conventional top-down decision-making overlooks contributions of local knowledge systems. This not only misses out on local socio culturally contextualized knowledge to enrich strategy building but additionally risks rejection from communities where the strategy is being implemented.

A pilot study was done in April 2022 at the study site in Kilifi, Kenya, involving 8 tourism practitioners and 2 community leaders interviewed through an open mental modelling process. The theme of the interview was the effects of climate change observed, and how they affect tourism. Results from this pilot phase informed the development of a word bank of concepts. These were later used in interview and transcription processes, to guide

categorization of components fixed to respondent's maps. The fixed variables can be synonymous with scope setting in mental modelling, described by Jong & Kok (2021) as allowing researcher to frame maps by predefined concepts. Predefined concepts can be identified through earlier workshops (ibid), or through review of literature.

Data collection took place between January and April 2023. Respondents map-building was guided by interview questions, as in (Özesmi & Özesmi, 2004; Jong & Kok, 2021). The interview script prompted respondents to generate their own concepts, for example of observed climate change effects and related adaptation, add them to the map, and then associate relationships between variables within the map. For each association between two variables, respondents were asked to note the direction and strength of the relationship. The strength of these relations was quantified in fuzzy metrics, where 0.2, 0.5, and 0.9, showed low, medium, and high strength of variable relationship, respectively. Respondents were guided through each of these steps by the researcher, as they drew their maps, step by step answering questions through interview. The 49 interviews conducted lasted about 30 minutes to 1 hour each. The modelling interviews were audio recorded with consent from respondents, to capture their explanations made when introducing and linking variables to a map, as well as any other relevant information.

Prior to each interview, respondents were introduced to the mental modelling exercise, with a brief activity on drawing a conceptual map, establishing connections between variables on the map, identifying the direction of relationship in connections, and quantifying strength of relationship in each. This was followed by definition of important words for the tourism and climate change interview, as intended to be applied to the study. Since the interviews were conducted in a mix of English and Swahili languages, definitions were also translated to Swahili language, ahead of the interviews. Often, the key words would be introduced in English in the pre interview briefing, and respondents asked for the Swahili equivalent, which aligned well to the translations prepared for the exercise.

Figure 1.3: Left -Mental model construction during field work. Right -one of the mental models constructed by a research participant during field work.

Participants were then guided in composing a mental model of the coastal tourism system. Four starting variables were given to orient the maps to coastal tourism, with the question "where do you see connections between these variables?". The variables provided were based on an external choice frame of key components of the tourism system, covering tourism demand and supply (Scott & Gossling, 2022). Demand side variables were numbers of tourists visiting and numbers of tourists in ocean recreation activities. Supply side variables were financial well-being of people and livelihood opportunities for women, as representative of the destination community. These are also identified indicators for tourism sector performance, where tourist numbers and tourism employment, are regular components in official reports of tourism sector performance, e.g. UN Tourism, or Kenya tourism sector performance. Given the high involvement of women in tourism, "livelihood opportunities for women" was included as a variable of interest relating to well-being of tourism dependent community. Respondents were asked to identify the direction and then strength of the relationships between the four variables in the coastal tourism system, and then to suggest other variables they believed to be relevant in the system, and add them to the map. During the interview, if a concept from the word bank of concepts was named by a respondent, the interviewer would confirm whether the variable matched the definition from the word bank, to ensure that variables with the same name were comparable across maps.

Once the maps of the tourism system were complete, the next interview question involved climate change impacts. To facilitate map-building, one variable representing a climate change effect (unpredictable rain seasons) commonly mentioned in relation to tourism during the pilot study phase was provided. Respondents were then asked "what comes to mind, when you think of climate change effects observed here in the last 10 years?" This was followed

with subsequent prompts about climate change effects expected in the next 20 years, and also how women, and local people, would be affected on their constructed map scenario of climate change effects. Clarifications were necessary involving the terminology used to discuss climate change. During the pilot and translation, it was evident that climate change, had different descriptions in Swahili language. In discussion with local collaborators, we used terminology that equated to changes in weather patterns, *mabadiliko ya hali ya Hewa/Anga,* at times capitalizing weather like written here, to differentiate it from daily weather changes. Some research participants also identified *mabadiliko ya tabianchi*, a more precise translation for the term, acknowledging that it is a recent vocabulary and thus not familiar to all participants. Climate change effects were defined as observed changes to socio ecological components, that could be attributed to a climate change driver, directly or indirectly. Respondents were then asked to add variables based on the question "what solutions or responses need to be there to address climate change effects shown in the map?" For the study, adaptation was defined as any responses, currently being implemented or desired, to address identified effects of climate change.

Mental models are produced through a semi-structured interview, and as such, a lot of qualitative information is generated in the process. Qualitative data adds contextual richness to mental model's semi quantitative structure. Most studies applying this method primarily publish their results based on quantitative information (Furman et al. 2021; Gray et al. 2015; Nabong et al. 2022; Nyaki et al, 2014) with scarce, if any, reference to qualitative insights. In the fieldwork conducted for this thesis, a semi-open modelling approach was applied, and on different occasions participants added explanations to why they connected variables, or gave examples of how the connection between variables was observed locally. Mental modelling construction can include prompts for qualitative questions, after construction of systems or subsystems. For example, in this study, once the construction of a tourism system was completed, and enhanced by eliciting connections to climate change variables, participants were asked "how would you be affected in this situation?" Just by observing the connections they had on their maps, and variables included, this inspired individual imagination of the embodied experiences situated within the confines of the constructed map and prompted narrative responses. Occasionally, participants would refer to a variable included in their map and put more emphasis on the connections from it. It is not clear how elicitation of detailed qualitative information is possible with group mental modelling workshops and totally closed mental modelling processes based on entire sets of fixed variables.

1.7 Thesis structural outline

By applying FPE as a theoretical lens to this study's findings, this study provides insights on why building resilience in coastal tourism requires more than technical adjustments: it demands fundamental changes in political and SES structures that shape knowledge contributions in tourism publishing and decision processes in marine environments. Applied to this thesis, this theoretical approach helps to reveal controversies about conceptualizations of climate change as a risk for tourism, reflecting on grassroots agency by women in tourism work. The theoretical angle details an interpretation of factors underpinning different conceptualizations across groups working towards climate resilience, showing that their influence in shaping pathways towards climate resilience is context dependent. In research, it is shaped by epistemic inequality in publishing, where intentional restriction of topics in interdisciplinary research areas marginalizes social knowledge. In practice it is dependent on conceptualization of space in tourism occupations, where positioning of work spaces from the shoreline is gendered in a way that determines which spaces occupied by women or men in tourism work are politically powerful in involvement with decision processes within the marine environment. The geographic separation of spaces for tourism work for men and women, is a factor that bestows unequal status in their earnings, with implications for capacities for climate change adaptation.

1.7.1 Chapter Two: What matters most about gender? An overview of central unifying concepts in tourism focused research on climate change and gender

The primary question explored in this chapter is what is researched at the intersections of tourism, gender and climate change. This information can help to assess what topics are considered most critical, and what are marginal, especially in tourism publishing.

Rapid improvements seen in addressing gender-related challenges (Andrijevic et al. 2020), position gender as a leverage for climate resilience in development sectors, e.g. tourism which is of interest to this research question. The study systematically maps the conceptual repertoire of gender in interdisciplinary studies of gender, tourism, and climate change, and probes the interest of tourism publishing to give salience to particular gender concepts, as a way of preserving sovereignty of masculinized environmental knowledge.

The paper draws from a systematic review of literature on the topics of gender, tourism, and climate change, in publications accessed from Web of Science. Most studies at the intersection of these topics are published outside tourism focused journals. Narrowing down to publications in tourism focused journal categories, the review examines intersections of these topics in research, as enabled by the concept of gender as a central unifying factor.

Author keywords in reviewed studies unpack conceptually dense framings of gender applied to studies, including; gender as biological identity, gender as social construct, gender as sexual orientations, attitudes on gender, and gendered power relations. Despite gender's rich set of concepts, its role in bridging tourism-climate change research is underdeveloped. Inter disciplinary ties across these study topics reveal an uneven publishing landscape; literature on tourism and gender leverages a rich set of gender concepts in exploring research questions, while literature on tourism and climate change has a cursory engagement with gender concepts. This is largely limited to gender as binary identity, suggesting a constrained thematic overlap; no relevant studies on gender and climate change are found in tourism focused publications. This indicates a blind spot that this focus is invisible to other fields where tourism enjoys interdisciplinary ties. Multiple interdisciplinary silos emerging from the uneven publishing landscape, result in limitations for tourism-climate change research to address gender questions in a fundamental way.

Referring to FPE, these results suggest an epistemological hierarchy in tourism publishing that results in marginalization of topics of gender, apart from where the concept of gender as bio social, often binary identity, is applied. These findings have empirical support from Eger et al. (2022); Figueroa-Domecq et al. (2015); Pritchard (2018), who show that gender topics are a minority interest in tourism research. In particular, the feminist ideology is overlooked in majority of studies (Figueroa-Domecq et al. 2015). This dials down the legitimacy of the gender focus in climate change research in tourism. Also, it reflects the fact that tourism journals may not be interested in these topics. It is ultimately the major challenge of epistemic inequality in publishing gender topics in tourism research, that results in minimal attention to gender questions, that presents knowledge struggles analyzed in this thesis.

In this study objective exploring how tourism, gender, and climate change topics have been studied, FPE provides an analytical lens to critically examine perspectives that are emphasized, marginalized, or normalized, by gender concepts applied in the studies. Multiple inter disciplinary knowledge silos created in publishing preserve sovereignty of masculinized

environmental knowledge. This thesis demonstrates and elaborates upon the absence of studies on gender and climate change topics in tourism publications.

1.7.2 Chapter Three: Non-economic losses and other impacts of climate change affecting women in tourism work: A photo voice case study from Kenya's coast

This chapter addresses the following core research question: how can the use of photo voice as a participatory method help to tap in social knowledge, often marginalized in conventional climate change discourse. Social knowledge refers to insights that arise from lived experiences and social relationships, typically studied within social science disciplines like sociology, anthropology, and feminist studies (Partelow et al. 2023). The chapter focuses on photo voice's elicitation of socially situated knowledge, based on women's observations and embodied experiences of climate change effects documented by their own generated photos. This chapter describes how climate change impacts in Kilifi, Kenya's coast, are experienced by women in tourism work. It singles out sea level rise, changes in air and sea surface temperatures, changes in precipitation, and their cascading effects, as key climate risks associated with the study site, affecting women in climate sensitive tourism work.

Studies have highlighted the fact that women present an important knowledge base for climate change knowledge, due to their grassroots organizing or community building on climate change matters, and due to their active involvement in mitigating climate related risks. Past studies on women's observations of climate change, or ocean changes, show how critical women's knowledge is when linked to management decisions (Lavoie et al. 2019). While Torre-Castro et al. (2022) observe that women's knowledge and scientific reports often correspond, it is important to note that both sources reflect independent and valid understandings from their respective knowledge systems. Chapter Three demonstrates the varied forms that local women's environmental knowledge takes. Further, it taps this knowledge by having them as agents in their own environmental photo stories, in a way that maintains authenticity of their narrations, as opposed to paraphrasing their observations of climate change effects. Use of participant-generated photos helps convey their lived experiences in an authentic way (Pierce, 2020).

As a participatory method, photo voicing centered participant generated photos to open up discussions of how climate change impacts are experienced at local level. The photo voicing project conducted at the study site in January and February 2023 and involved 10 women

whose work primarily draws earnings from the local tourism value chain. Photo voice was scheduled across multiple sessions allowing more engagement with research participants.

The combination of 52 photos taken by women participating in the project and their personal stories in the workshops suggests that for the study site, protection of the coastline is a pressing concern for climate resilience in tourism. Exposures of the beach, mangroves, and shoreline, to climate impacts, pose immediate risks for women's work and recognition in tourism, as part of the wider ocean economy. The degradation of mangroves caused by several compounding factors, including locals cutting down the trees to sell the wood, was identified by workshop participants as a behavior largely driven by drought related scarcities caused by climate change. Since mangroves are important breeding sites for marine organisms, effects of their degradation in reducing abundance of crabs and lobsters, significantly cuts off seafood supplies that women channel to tourist hotels and marine excursions. Women's photos describing that rising ocean waters leads to coastal erosion and shrinking beach space, voice concern that their fragile makeshift structures at the beachfront cannot withstand these impacts. For effects on their seafood supplies and damage to their beach stalls, women incur economic losses. These losses are likely to worsen their already constrained resource capacities to address cascading effects of climate induced risks.

The interpretive lens of FPE applied to these results brings out perspectives of how these effects destabilize boundary spaces defining women's engagement in work within the tourism value chain. Sea level rise and its cascading effects displace women's makeshift stalls from prime beachfront locations. Outsourcing seafood supplies from a neighboring county, as a coping strategy to scarcity linked to effects on mangroves as part of vegetated coastal ecosystems, distances women's presence from the shoreline. Since tourism at the study site is positioned on an ocean front, this produces a power charged coastline between occupational groups on sea and coast. Proximity to the ocean bestows influence on occupational groups, and the destabilization of boundary spaces for women's work in tourism reinforces their subordination, rather than equal participation in the ocean economy. Their displacement from work spaces close to the shoreline stands to weaken their agency in tourism, and wider ocean economy decision processes.

Most important for this chapter, is that the local roots to understanding how impacts of climate change are experienced are shown by photo voicing, revealing a methodological

strength of its effectiveness to elicit a knowledge form that is socially situated. It provided evidence of women's environmental knowledge, depicting effects of climate change on the shoreline. Beaches, coastal walls, and mangroves, which were prominent from photo voicing workshops in Kenya, is one aspect suggesting its strengths as an elicitation tool. The second aspect of this strength is where photo voices contributed to conceiving of non-economic losses as central to descriptions of climate threats. The UNFCCC (2013) mentions the need for positioning non-economic loses as a central aspect of climate policy. These losses, e.g. loss of territory, or loss of cultural heritage, hardly get attention in climate talks (Hirsch et al. 2017).

Increased awareness of these strengths from use of photo voicing as a participatory method in research can contribute bridge gaps in feminist approaches to data collection. The chapter describes how field processes can be more inclusive, especially considering participants with lower literacy levels, and those with access needs, across different steps, from photo generation to reporting workshops. For this study objective, FPE highlights domestic and productive spaces occupied by these women, as a less visible layer at which SES processes take place. By intentionally drawing on knowledge held by women in tourism work, the objective amplifies the agency of women as knowledge contributors in ocean economy governance. Photo voice results identified a unique stream of knowledge held by women in view of local understandings of how climate change impacts in the coastal area affects people.

1.7.3 Chapter Four: Gender, tourism, and climate change in coastal Kenya: exploring interconnections through mental models

At the heart of this chapter lies the question of what knowledge (mis)matches exist among stakeholder groups in conceptualizing the relationship between tourism, gender, and climate change. This chapter is concerned about conceptualizations of the interplay between gender, tourism, and climate change, across stakeholder groups in Kilifi, coastal Kenya. The interest in this question is to use FPE as a theoretical lens to construe influences of knowledge (mis)matches on flows to decision processes.

The background to this chapter includes an overview that marine environments encompass multiple knowledge systems interacting with each other, for example knowledge held by actors in different sectors of the ocean economy. The study employs participatory mental modeling, semi structured interviews, and review of policy documents, to capture diverse

views on vulnerabilities and solutions at the intersections of tourism, gender, and climate impacts.

Mental modelling took place as a one-time interview with each participant, lasting between 30 minutes to one hour. The models reveal not only quantitative differences but also distinct ways participants conceptualize the gender-tourism-climate nexus, shaped by their roles in public (policy), productive (tourism), and reproductive (women's domestic) spheres. Men and women in tourism work prioritize differently key factors in conceptualizing the interplay between gender, tourism, and climate change. Policy makers and tourism practitioners too, have stark differences in identifying key factors in this conceptualization. In this chapter, the interpretive lens of FPE shows where differences across respondents' mental models indicate knowledge sovereignty controls. FPE identifies power relations in stakeholder groups, revealing where such filter out gendered knowledge flows to climate decision processes.

What stands out in differences between policy makers and tourism practitioners, is the question of where climate risks for tourism are. Policy makers' mental models overlook the connection between risks to ocean health and tourism work. While tourism practitioners' mental models emphasize climate risks to the shoreline and ocean, policy makers' mental models point to climate risks further inland away from the shoreline. The terrestrial focus emerging from policy makers' mental models, draws parallels to results in study by (Furman et al. 2021), where respondents' mental models miss out on typical depictions of the shoreline, unless prompted. This result from policy makers does not necessarily mean that they are not aware of climate threats to the ocean, but to the fact that they do not envision these as risks for tourism. The mental modelling activity framed the SES within the boundaries of a typical tourism destination. From the perspective of FPE, the policy maker's omission could be interpreted as having implications for tourism at the study site to remain peripheral in government driven interventions focusing on ocean risks.

Differences in conceptualizations between men and women are seen in women's emphasis on social vulnerability, particularly for young girls, at times of climate induced drought. Men have less emphasis on domestic or social consequences of drought. Chapter Four additionally shows that beyond drought which destabilizes household food security (Mostert et al. 2025), Kilifi is subject to multiple other compounding climate risks, conditioning socio-political realities for the local population: sea level rise which also increases the baseline for flooding,

risks displacement of local communities; thermal discomfort and overheating for residents due to warmer temperatures.

A central conclusion of the chapter is that climate change and exacerbated vulnerabilities remain because of how people conceptualize the problem is different. An important highlight for this chapter is examples of adaptation interventions described to pose negative outcomes to the SES. Maladaptive consequences of built coastal walls on turtle nesting sites, and local community access to public spaces, are given as examples from mental model data. The chapter equally discusses negative evaluation of mangrove restoration, as an adaptation strategy implemented by targeting involvement of women's groups at the study site. Chapter Four also highlights women's struggles in fighting unfair exclusion of local community from access to prime beach front locations where they carry out their tourism work.

FPE suggests that power differentials associated with domestic and productive spaces occupied by men and women in tourism, determine whose perspective dominates multi scale decision making processes. Using FPE as an interpretive lens to understand the differences, provided a critical context for examining the geographic separation between men and women, in productive and domestic spaces, considering ideological positions emanating from these spaces. There is evidence of unequal status between men and women in tourism work, influenced by geographic separation of places which define their workspaces, positioning women to the lower rungs. Unequal status of women, in tourism and access to the marine environment, denies them agency in decision processes. Thus, their knowledge stream fails to feed planning for climate action and climate information is partial, missing out on understandings of women's and tourism experiences of climate change. This gap weakens their capacities for climate resilience: they lack agency in climate plans; therefore, their priorities are not factored in as part of climate plans.

Indeed, the accompanying review of policy documents suggests unequal relationships between women and government planners in view of environmental policy or climate action. Climate vulnerabilities for women are shown to be increasing, despite their increased presence in planning circles that reflect a balance in gender diversity within high level decision forums. This suggests that their presence lacks power to incline government plans to prioritize policies that mitigate vulnerabilities for women. Inequalities between men and women, and between women and policy makers, weakens the presence of women in inclusive

spaces, resulting to their presence lacking power for knowledge contributions. The effect of this is overlooking social sustainability as a dimension of climate change interventions. FPE theory interrogates the dominance of masculine and policy perspective, in defining knowledge that matters for addressing effects of climate change, where women have been shown to have higher vulnerabilities.

The overlooked women's climate change knowledge is a product of power struggles for policy makers' perspectives to dominate decision processes. This interpretation provides a basis for why women's presence should not be implemented as an inclusion strategy, but a political necessity to refocus policy, particularly disaster risk reduction and climate finance. Deliberate inclusion of women, and tourism as marginalized groups in decision processes, in ways that intentionally address power imbalances that limit their contributions, helps to elevate the cause for climate justice.

1.7.4 Maladaptation

Maladaptation is a critical thread linking grassroots agency with the identification of climate change effects and implemented solutions. Adaptation options being implemented at the study site reveal asymmetry in power between tourism investors and the local resident community. While protection of the coastline amidst sea level change is essential for resilience of the tourism sector, building coastal protection walls by tourism investors results in unequal outcomes, especially indirect displacement of the local resident community from beach access and use (Chapters Three and Four). When the coastline is not protected, hotel investors secure their premises by erecting coastal protection walls. This measure is counterproductive, with ecological harms as it affects turtle nesting sites, and socio-economic problems as it restricts local's access to beach area where they draw their earnings from. There are also costs for beach erosion, with research evidence by Brucal & Lynham (2021) showing that seawalls on individual property can potentially double or triple erosion rates on neighboring unprotected property, leading to further sand loss. The fact that tourism investors override interests of the local resident community in this intervention reveals the structural exclusion of residents where they have minimal say if any, to decisions affecting them. The vulnerable bear the costs because unequal structure in the SES excludes their voices in defining the terms of adaptation. To achieve climate justice, grassroots agency is necessary to disrupt the current direction of climate solutions being implemented by a select few. Interventions to protect the coastline, or

to lessen burdens faced by local community from effects of sea level rise, will only be fairer if they address inequalities that marginalize such groups from decision processes.

Mangrove restoration is one of the nature-based interventions implemented at the study site to protect the coastline. Mental model data linked women's work in mangrove restoration to several positive benefits in the study site including: increased abundance of ocean crustaceans and fish, most of which are signature seafood delicacies for the area; possibility of cooling effects from rising temperatures in the area; and natural defenses against sea storms and flooding. Mental model data on the causal relationship between mangrove restoration and marine organism abundance shows that they believe such interventions can reduce the burden on women when faced with seafood scarcity for supply to hotels.

Implementation of the predominantly women targeted mangrove restoration measures, reveals imbalances in ocean access and economic returns between men and women. Women's efforts in mangrove restoration are in line with initiatives to develop ecotourism in the area, which allows tourist activities centered on mangrove planting. Earnings from the initiative are not stable, despite time spent by women in preparing seedling nurseries and transplanting. Women nurture their mangrove seedlings on shallow edges of shores, rather than deeper ocean waters. This access with spatial restriction, shaped by norms of women's access to marine environments, undermines effectiveness of their efforts. One participant mentioned that seedlings planted in these marginal areas are vulnerable to drying up during low tide and dry conditions. Thus, while the activity has undertones of expanding women's access to ocean spaces, in practice it reinforces their exclusion from more productive ocean spaces. Furthermore, women's work in nurturing mangrove seedling nurseries has minimal compensation and is perceived as unfulfilling by some, with one participant likening the repetitive task of filling seedling bags with soil as child's play. These aspects reveal the maladaptive nature of the intervention, as it restricts women's engagement with more productive ocean spaces, and relegates their labour to low status, poorly remunerated roles that offer minimal satisfaction.

1.8 Impact and dissemination of research

This research has produced three academic articles submitted for review. Through these publications, the study advances knowledge on grassroots agency in climate action, with a particular emphasis on the roles of women. It argues that achieving a climate resilient tourism

sector requires not only technical adaptation but also political and socio-ecological transformation to foster effective grassroots engagement. Inequalities persist without grassroots engagement, limiting opportunities for fair outcomes from adaptation interventions. In addition, the research contributes methodological approaches for eliciting social knowledge on environmental challenges, highlighting how communities perceive and respond to climate impacts. A key contribution includes the identification of non-economic losses associated with climate change in coastal tourism hosting communities. This is often overlooked in resilience planning.

The research has also informed regional policy discussions. In 2024, a co-authored regional policy brief on blue tourism in the Western Indian Ocean (Kepher-Gona et al. 2024) was published. This brief offers guidance on aligning tourism development with the protection of fragile marine ecosystems and the promotion of social sustainability. The recommendations are particularly relevant to Kenya, the primary study site, as it falls within the Western Indian Ocean region.

Beyond academia and policy, the research has also influenced activism-oriented knowledge dissemination. A co-authored chapter, developed in collaboration with an industry partner, explores carbon offsetting practices and the rights of tourism-hosting communities in Kenya. Although not part of the core thesis, this book chapter aligns with the broader research themes of climate justice and social sustainability. The chapter is forthcoming in the edited volume *Climate Justice in Tourism* (Higgins-Desbiolles, Rastegar, & Shtestha, expected 2026). My case study contribution in (Equality in Tourism, 2024), calling for a gender-based research agenda in tourism, reflects my commitment to knowledge sharing beyond academic world. Taken together, these efforts show policy relevance and industry relevance of my doctoral work, building up on the contributions that my thesis makes to academic publishing.

1.9 Concluding remarks

This thesis has examined the intersections of tourism, gender and climate change in coastal Kenya, providing new perspectives on the structure of knowledge production on these topics and engagement with policy. By tracing the interdisciplinary scope of tourism, gender, and climate change research, the climate vulnerabilities faced by women in tourism work, and the knowledge disconnect between policy makers and tourism practitioners, this work advances

our understanding of both the complexity and urgency of gender responsive climate change adaptation, for tourism as part of the wider ocean economy.

The significance of the study's findings lies in their challenge to conventional assumptions and practices. First, the spread of tourism, gender, and climate change topics across academic publications reveals the limitations of a siloed form of interdisciplinarity, pointing to the need for critical feminist analysis in tourism debate. The intersections of tourism, gender, and climate change, currently sidelined in disciplinary boundaries, can be brought to the fore by reconsidering how research agendas are set.

The voices of women in tourism, as part of women's voices often excluded from formal policy focus, emerge as important knowledge sources about climate change experiences, especially highlighting non-economic losses. Their insights about climate change experiences show the need for a more inclusive approach to research and interventions, with meaningful grassroots involvement. This is necessary for designing policies that are responsive to the realities on the ground, and for advancing justice.

The striking knowledge differences between policymakers and tourism practitioners raise questions on political influence in deliberative processes, and about the efficacy of participatory processes. The paradox of increasing women's representation in formal policy spaces alongside growing vulnerability suggests that formal inclusion alone is not sufficient. Grassroots agency really matters in participatory process, for women's knowledge to inform decision making.

These study findings reveal the gaps between policy and tourism practice in the context of the ocean economy, between formal representation and grassroots agency with political influence, and between interdisciplinary silos and lived realities of climate change as a gender problem in tourism. They call for rethinking tourism research and policy, to being more attuned to voices of those most affected by climate change. Overall, the study affirms the necessity of bridging epistemic divides, centering marginalized knowledge, and supporting grassroots agency in participatory processes. These steps can foster climate resilience for coastal tourism.

CHAPTER TWO
What matters most about gender? An overview of central unifying concepts in tourism focused research on climate change and gender.

Prepared as a standalone manuscript for inclusion in this dissertation.

Author: Lucy Atieno

Abstract

This review examines how tourism research has addressed the intersections of tourism, gender, and climate change, with a focus on identifying conceptual synergies and blind spots between the three development inclined disciplines. Given the core importance of gender focus in accelerating outcomes for developmental interventions, this paper provides an overview of gender's conceptual repertoire discursively constructed by research at the intersections of these inter disciplinary sub fields. Review takes the keyword analysis approach applied in an earlier scoping review of tourism, as indicative of central unifying concepts in research. Gender-oriented author keywords were evaluated from relevant publications at the intersections of these topics. Tourism and gender are frequently studied together, leveraging gender's rich set of concepts, especially gender as biological identity, gender as social construct, gender as sexual orientations, attitudes on gender, and gendered power relations. Even though the topic of gender is conceptually dense, its role in bridging tourism-climate change research is underdeveloped. So, while research across tourism-gender and tourism-climate change sub fields is common, studies integrating all three are rare, reflecting a siloed form of interdisciplinarity. These silos are on one part sustained by disciplinary habits in tourism, where research shows gender studies are marginal, and is suggestive of political nature of tourism publishing through epistemological hierarchy that results in marginalization of knowledge. Review finds that majority of publications on interdisciplinarity of these topics are published outside tourism focused journals. For tourism-climate change studies, critical evaluations of gender are minimal. Siloed interdisciplinarity constrains holistic knowledge exchange across the fields, limiting potential for more comprehensive solutions for sustainable development. By systematically mapping the conceptual repertoire between tourism, gender, and climate change, this work demonstrates strides made in interdisciplinary connections, and the pressing need to address gaps for underexplored intersections in tourism, gender, and climate change research.

Keywords: feminist political ecology, interdisciplinary, knowledge politics, tourism research

2.1 Introduction

The United Nations Sustainable Development Goals (SDGs) unpack the topics of tourism, gender, and climate change through different goals and targets, and show networked interlinkages between the goals (Blanc, 2015). The connections typify these issues as part of complex systems with non-linear processes; it follows logically that research should take a nexus approach to study these topics together. SDG 5 outlines goals for achieving gender equality, while 13 is about climate action. Tourism has specific mentions in targets on SDG 8 about decent work, SDG 12 on sustainable consumption and production, and SDG 14 to sustainably use oceans and marine resources. These goals connect with each other extensively, especially at the target level (Blanc, 2015). That is, gender and climate action goals link directly to SDGs where tourism has targets. The fact that climate change presents compounded risks with cascading effects across scales, sectors, and systems (Intergovernmental Panel on Climate Change, 2022), gives additional perspective to interconnected nature in these subfields. Indeed, acknowledging and better understanding connections between strategies in these goals is critical for wins in sustainable development (Blanc, 2015). This is the essence of a nexus approach, which according to (van Zanten & van Tulder, 2021) acts on interactions between SDGs to optimize positive ones while minimizing negative ones, to create benefits and reduce trade-offs.

Tourism already shows both positive and negative interactions with the SDGs, making it appropriate to strategize beneficial outcomes and minimizing trade-offs from the sector's development. An example of positive interactions is in the sector's potential for poverty alleviation (SDG 1), especially in developing countries, but these benefits are uneven and conditional on inclusive destination specific strategies that address socio ecological risks (Medina-Muñoz, et al., 2016). Tourism's negative interactions with SDGs are in the case of the sector's carbon footprint, e.g. emissions linked to international travel in tourism (Gössling & Peeters, 2007), burdening climate action goal (SDG 13). However, interdependencies between tourism and climate change yet to be realized in country policy frameworks (Becken, et al., 2020), neglect of community level social dynamics in tourism research on climate change, e.g. in Africa (Hoogendoorn & Fitchett, 2018), and tourism performance metrics that overlook non-economic indicators (Butler, 2022), collectively reveal weaknesses that hinder tourism's capacity to engage in full spectrum of interactions necessary for a nexus approach.

The nexus challenge is not isolated to tourism; Blanc (2015) cites a lack of nexus approach to Millennium Development Goals, as reason why its objectives fell short of intended results. It

remains uncertain whether the current realities of SDGs with high dependencies on economic sectors will solve the nexus challenge. At present, while economic activities can help achieve the SDG-nexus, a clear assessment of the combined economic, social and environmental impacts from each remains absent, therefore constraining progress for goals integration (van Zanten & van Tulder, 2021). Having extensive interlinkages with the SDGs, tourism's potential to advance the SDG-nexus is contingent on integrated policy interventions aimed at sustainable holistic development.

Tourism is of global economic importance, and offers opportunities to vulnerable groups in developing countries, as it is one of the sectors easily accessible by the poor. Despite the economic promise of tourism, the reality for many women in tourism employment is precarity (Robinson et al. 2019), a situation characterized by a lack of security and certainty, and accompanied by psycho-social distress. Precarity in tourism work is common in developing countries, where the tourism sector is also under threat from climate change, as key tourism products are often nature-based and outdoors. Bearing in mind the fact that coastal areas are particularly at risk (Putten et al, 2014), and that climate impacts are a threat to stability of countries dependent on tourism (Hoogendoom & Fitchett, 2018), and climate change-driven risks are gendered (Wabnitz, et al. 2021), more research is needed on the intersection between the impacts of climate change with gender and tourism (Wabnitz et al. 2021; Scott 2011; Becken and Clapcott 2011). Bryan et al (2018) propose that incorporating gender aspects into climate change adaptation strategies increases effectiveness as well as equity. Yet, an overview of how gender is discussed in policy at the intersection of climate change adaptation and tourism development is a necessary first step to a nexus approach to sustainability targets.

This study provides an overview of what gender-oriented concepts tourism researchers consider as important at the intersections of tourism, gender, and climate change studies. It presents an overview, by categorizing bibliographic texts from publications at the intersection of these topics, to gender topics. Gender topics informing the analysis, mentioned in other definitions of gender in this paper, include: gender as biological identity; gender as bio social identity; intersectionality; LGBTQI+; feminism; femininity; masculinity; gendered power systems; and oppressive attitudes. (Wiese, et al., 2018) describe bio social identities as resulting from the body's sustained interactions with its social and environmental surrounding. This viewpoint opens the door to consider how gender too, can be viewed as an identity drawing on both biological and social dimensions. An example is in the word "mother", which is shaped by biological factors basing the identity on genetics or reproductive functions, and social factors shown in identity as a relation to others.

Rapid improvements seen in addressing gender related challenges (Andrijevic et al. 2020), position it as a leverage for climate resilient developments in tourism. Moreover, gender has been shown to provide a reliable dimension for evaluating performance across the SDGs (Equal Measures 2030, 2024). Gender related indicators are intergrated across multiple goals, enabling tracking of progress at country levels (ibid). However, a clear gender concept has proved elusive, especially as shown with evolving language to define terminologies relating to gender, which is not a settled concept across cultures (Ashley, et al., 2024). The work of (Littlejohn & Foss, 2009) acknowledges the view of gender as binary referring to female or male, being foundational in much communication research. Despite the fact that the binary view of gender tends to be conceptually coercive, especially as it overlooks other gender groups (Boas, et al., 2022), gender in the SDGs is viewed in binary terms (Equal Measures 2030, n.d.). Diverse terminologies applied to gender are useful, but still present struggles for policy and practice to recognize or attend to categories which are core or peripheral to understandings of gender.

Gender, defined in sociology as a construct differentiating behavioural aspects of biological sexes (West & Zimmerman, 1987), has dynamics of its relations shaping tourism development processes and related activities (Kinnaird & Hall, 1996), just like in other societal processes where gender relations have profound influences. Practices, activities and behaviours in tourism are gendered (Figueroa-Domecq et al. 2015). Prevalent understandings of gender distinguish between male and female categories (Eisend & Rossner, 2022), including the SDGs which fail to reflect gender categories beyond the binaries (Equal Measures 2030, 2024). This binary view of gender is socially constructed (Lorber, 1994), often by roles and relations. It is well captured in gender schema theory first proposed by Bem (1981), proposing the role of gender in organizing meaning for self and others. The gender schema is an anticipatory mental structure that assigns meaning to self and others when relevant cues activate the schema or cognitive structure (Littlejohn & Foss, 2009).

Not all identities will be male or female, and as such will exist as non-binary or genderqueer (Monro, 2019). This is reflected in phenotypical traits associated with biological sex that exhibit a spectrum between feminine and masculine traits (Rehmann-Sutter, et al., 2023). Thus, between the bimodal peaks of the distribution exists a diversity of identity groupings. The queer categorization also brings to light understandings of gender based on sexual orientations, for example associated with transgender groups, for example transwomen, who are women, or transmen who are men. Diversity encompassing different gender identities and

sexual orientations, is often listed as Lesbian, Gay, Bisexual, Transgender, Queer, and Intersex Plus (LGBTQI+). Thus, the gender critical view stands in opposition to the dominant gender binary assumption (Dembroff, 2019).

Apart from identity dimensions, the understanding of gender is seen through relational power structures (e.g., patriarchy, matriarchy), whose organizing in communities' vests authority on binary gender groups. Oppressions in patriarchy not only harm women, but also result in gender inequalities (Manne, 2020). Mechanisms of oppression intensify when victims have multiple marginalized identities, e.g., race, gender, social status (Chambers, 2021). Therefore, the concept of intersectionality of gender identities is prevalent in some discussions of gender related oppression. According to Gouws (2017), intersectionality refers to "interlocking relations of dominance of multiple social, political, cultural, and economic dynamics of power that are determined simultaneously by identity categories of race, gender, class, sexuality, disability, and others" (p.19). Gender has cues for it rooted on oppressive attitudes, for example misandry, and misogyny. A response to gender related challenges, relating to rights, recognition of diversity, and oppressions on gender groups, is through feminism, which has several theoretical standpoints. Feminism is firm on equality and diversity, providing a critical look to gender concerns, noted to be vague in their understandings, especially owing to the diverse forms of identity categories it lends itself to. As there is no conceptual clarity on gender, a question remains on what shared understandings of the term apply to studies with research contributions to climate resilient tourism.

2.1.1Research problem

This review study responds to a recognized gap in literature identified by Equality in Tourism (2024), that studies at the intersection of tourism, gender, and climate change, lack in current tourism scholarship. Cavaliere & Ingram (2021) highlight the importance of encouraging feminist ideologies to guide tourism narratives in relation to climate change, positioning this angle as critical to understanding how tourism systems are shaped by underlying gendered and political structures. Such an exploration fills in the gap for gender analysis in tourism research, by uncovering mechanisms through which gendered inequalities are produced and maintained, therefore providing critical insights to expand current understanding of tourism to incorporate justice and equity dimensions of climate change. Apart from literature gap, research problem derives from evidence of lack of synergies for countries to integrate the gender angle, for achieving targets for the SDGs. Data from Equal Measures 2030 (2024), aptly captures this challenge, one example being gender score performance on SDG 13

(Figure 2.1). The gender lens in this data, with standardized scores out of 100%, grades country performance as: very poor 0-59%, poor 60-69%, fair 70-79%, good 80-89%, and very good 90% to 100%. An overwhelming majority of countries attain poor ratings on SDG 13. The index is, however, optimistic of improvements in 2030, estimating better rubric scores: slight decrease on country numbers with poor ratings, and first time for countries posting very good scores (Figure 2.1).

Literature also captures this practical challenge in the environmental/conservation fields, where gender responsiveness is yet to be fully integrated, and is often implemented as an add on (Westerman, 2021), or an afterthought. Advancements in gender responsiveness that have been quite successful in the development field are still a challenge in application to the environmental field, whose goals may not neatly map on gender concerns (Westerman, 2021). While in practice, socio ecological systems (SES) may have inclusion of gender commitments, often these are not yet optimized to a level of integration (Lawless et al. 2022). Layered on top of the insufficient integration and implementation of gender-responsive concerns in environmental fields, is the lack of diversity in the concepts of gender used.

As outlined above, the literature increasingly recognizes that the traditional binary view of gender (i.e., male/female) fails to capture the lived experiences and vulnerabilities of all individuals. Gender identity intersects with other social determinants-such as race, class, ethnicity, and disability-to shape how people experience and respond to climate impacts. Thus, for a nexus approach to intersectional challenges at the intersection of tourism, gender, and climate change systems, the concept of gender used is a salient topic of inquiry. For example, non-binary, transgender, and gender-diverse individuals often face systemic marginalization, limited access to resources, and exclusion from policy and decision-making processes, which can amplify their vulnerability to climate risks. Given these gaps from literature and practical viewpoints, it is timely for research to explore synergies between these subfields of study.

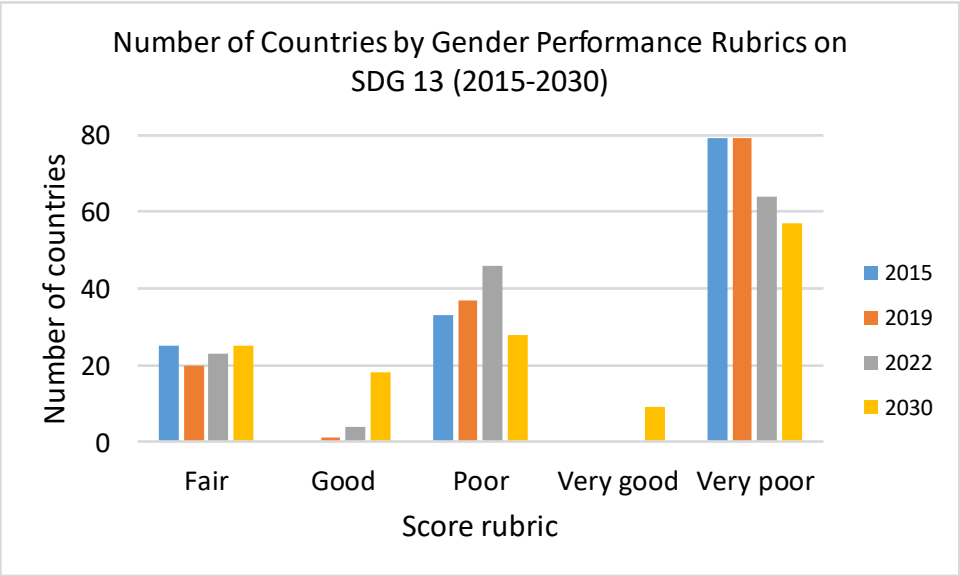

Figure 2.1: Global track of countries gender performance score on SDG 13. Data source: (Equal Measures 2030, 2024).

2.1.2 Research question and theoretical framework

With understanding that theory-based approaches are applicable to literature review studies in tourism, e.g. where conceptual clarity or integration lacks (Souza-Neto et al. 2023), this review uses Feminist Political Ecology (FPE) theory as an analytical lens, to critically examine perspectives that are emphasized, marginalized, or normalized, by gender concepts articulating the intersection of examined research subfields. The review looks at FPE as a theory connecting to practice or activism to incorporate gender and environment in a political perspective, challenging prevailing ways of knowing that are oppressive within SES. FPE places equity at the core of valued practices and assumptions in SES, in order to eliminate bias from a dominating standpoint.

Taking the intersection between feminism, politics, and ecology, FPE is theorized on intentions to achieve equity in socio ecological contexts, by questioning dominance that subverts involvement of others, as well as initiating political action to confront systemized oppressions in gendered social arrangements, and the intersectionality of such oppressions. Against this background, the theoretical outlook on FPE for this study is on one hand informed by the conceptualization of climate action as politics by (Dolˇsak & Prakash, 2018). On the other hand, the theoretical approach is informed by affirmation of power relations in tourism, e.g. as hierarchized in relational gendered arrangements (Chambers, 2021; Cole, 2017; Cole & Ferguson, 2015; Elledge & Faria, 2020; Kinnaird & Hall, 1996; Purcell, 1997), or capitalist economic structures (Cavaliere & Ingram, 2021; Dashper, 2020; Elledge & Faria,

2020). FPE offers ethical scrutiny to examine such power in situations where tourism is perceived as a form of domination.

The research questions were thus informed by the FPE theoretical framework:

1. What gender-oriented concepts articulate the intersection of tourism and gender research in current tourism focused studies?
2. What gender-oriented concepts articulate the intersection of tourism and climate change research in current tourism focused studies?
3. What synergies and blind spots on gender-oriented concepts are possible when gender and climate change are studied together under tourism focused studies?

2.1.3 The nexus of gender, tourism, and climate change through the lens of FPE

The fields of tourism and climate change are each strongly influenced by gender dynamics. Tourism develops out of gendered societies (Calvet, 2022; Yang & Schänzel, 2023). Climate impacts, adaptation, and vulnerabilities, are not gender neutral, e.g. ocean risks pose severe consequences for women (Wabnitz et al. 2021). Multiple studies have examined pairwise intersections of tourism, gender, and climate change. Tourism presents a paradox for destinations dependent on it; it offers pronounced economic gains among other benefits, while simultaneously contributing to climate burdens that weigh down local communities in destinations popular with international travel markets. An example of the unequal contribution to climate change can be seen in transport emissions. Reflecting on data from 2000, Gössling & Peeters (2007) show that less than 20% of European Union outbound air travel, accounted for nearly 80% of tourism-related emissions. More than 50% of emissions from tourism are from transport, where air travel has immense and growing contributions. Boston Consulting Group (2023) notes that tourism's share contribution to global emissions, at 10%, surpasses other categories. The pattern of global tourism shows significant outbound flows from developed countries and that an extreme minority of the global population is responsible for most transport emissions (Gossling & Humpe, 2020).

Even though developing countries benefit from international tourism, their heightened climate burdens are well shown by (Notre Dame Global Adaptation Initiative, nd), for example on African countries individually score highly in global indices of vulnerability to climate change. This situation emphasizes imbalance in distribution of climate burdens between tourism source markets and destinations. Higher carbon footprint associated with developed world, and the resulting climate change burdens borne by developing nations, highlight

concerns for climate justice. Climate justice fits with principles of environmental justice, which Thom & Mah (2020) define as equal protection for everyone from environmental harm, and for each, access to a clean and healthy environment. Rastegar & Becken (2024) categorize such burdens as a distributive justice concern in tourism. Thus, combining studies on tourism and climate change raises questions on climate justice. Whereas climate justice is rarely addressed in tourism research (Rastegar & Becken 2024), the topic has considerable attention gender research, for example (Centeno, 2020; Guedes, et al. 2024; Leduc, 2010).

Only a small number of studies on tourism and climate change mention some aspects of gender, highlighting implications for adaptation. One such study is by Angula, et al. (2021), who give an assessment of gender-differentiated impacts of climate change on community-based tourism, a sector where many women in the arid areas are involved. This study in Namibia finds that gendered norms "exclude women from diversifying income sources in ecosystem-based adaptation projects as a means to secure livelihoods", (p. 6). Other than gendered dimension of adaptation on communities hosting tourism, Pouta, et al. (2009) show that climate change has gendered implications for tourist leisure participation, with shrinking opportunities for leisure activities, and a challenge to provide these to all, including those who have weaker opportunities to adapt. They examine changes in skiing behavior, as a reaction to new constraints imposed by climate change, showing a higher sensitivity to climate change by females, as compared to males. In their findings, required adaptations for skiing, e.g. travelling to a more distant skiing location, or learning new skiing skills that may demand new equipment, may not be easier for females, who are shown in this research to have a higher sensitivity to climate change than males (ibid). These two studies bring out challenges of adaptation interventions that overlook gender dimension from both local community and tourist perspective.

Knock on effects of climate change on tourism destinations (Njoroge et al. 2018; Filho 2022), and on critical livelihoods dependent on the sector (Filho, 2022), make adaptation measures very necessary for tourism sector. However, protections afforded by adaptation measures, risk not being fully efficient due to structural inequalities present in societies, therefore resulting in climate injustices. For instance, reviews on gender and climate change research in Africa (Awiti, 2022; Vercillo et al. 2021) identify unequal resource rights as a challenge facing women in efforts for climate action. These reviews (Awiti, 2022; Vercillo et al. 2021) reveal compelling evidence of imbalances in climate burdens at the community level on basis of gender.

While these pairwise interactions of studies have provided important insights on gender dynamics, their findings remain fragmented across their interdisciplinary subfields. This results in a lack of comprehensive insights on what matters most about gender within the fully integrated tourism, gender, climate change context.

2.2 Methods

This study is structured by procedures described in the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) (Liberati et al. 2009). The study selection process, following PRISMA guidelines, is shown in Figure 2, which outlines number of studies identified, screened, and considered for the final systematic review. A review protocol for the study was developed in March 2024. The final search was conducted on March 1st, 2025.

The review process started by conducting a keyword exploration utilizing the key concepts of tourism, gender, and climate change, to guide the search. A scoping search was then performed, which uncovered alternative terminologies associated with these concepts. This exploration of related research, based on preliminary results from a trial search strategy incorporating the key concepts, facilitated the identification of additional terminology that could enhance the comprehensiveness of the search. Subsequently, a search string was developed incorporating both the original concepts and the alternative terminologies. This search string was employed for the initial search on the Web of Science (WoS) database. The search string utilized on Web of Science is as follows:

> (touris* OR vacation* OR leisure* OR hospitality* OR hotel* OR travel* OR "aviation") **AND**
>
> (Wom?n OR gender* OR fem* OR masculin* OR sex* OR patriarchy* OR matriarchy* OR misogyny* OR misandry) **AND**
>
> ("Climat* change" OR "global warming" OR carbon OR drought OR "sea level rise" OR "temperature rise" OR (climat* NEAR/3 extreme) OR (climat* NEAR/3 disaster) OR (flood NEAR/3 disaster))

For the search string, a block-by-block strategy, with one line per search concept (including alternative terminology) was used to develop initial database for review. A topic search was done for all concepts. Results were paired, tourism and gender, tourism and climate change, gender and climate change, and finally tourism, gender, and climate change. Raw publication results were filtered to Web of Science Categories of Hospitality, leisure, sports, tourism,

which we consider as tourism focused journals. Studies on gender and climate change had no results in this category. Thus, presented results in this paper are limited to tourism-gender, and tourism-climate change pairs, and the intersection of the three.

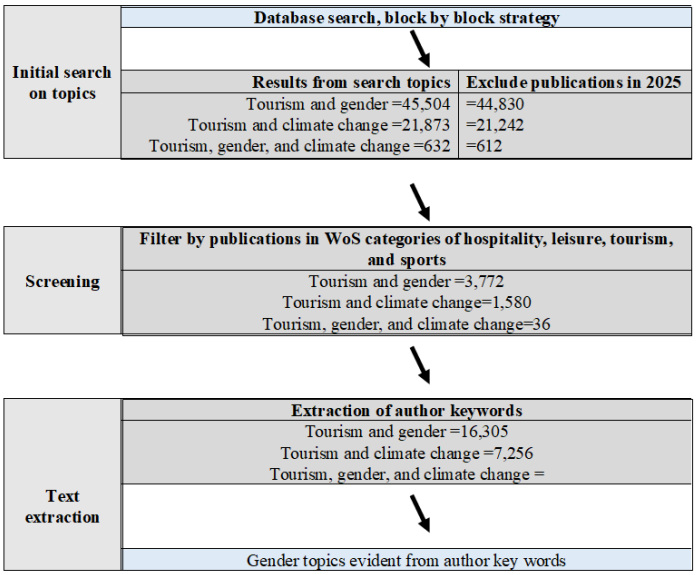

Figure 2.2: Flow chart on identification of studies and analysis

Author keywords were evaluated on gender-oriented concepts evident from intersections of studied sub fields from publication results. Keyword analysis has been applied to bibliometric tourism research to identify themes developed for studies across time (Chiang, 2020; Hall et al. 2014; Hunt et al. 2014; Wu et al. 2012), and to examine integration of interdisciplinary perspectives (Bielański et al. 2022). Researchers who use this approach (Chiang, 2020; Hall et al. 2014; Kwon, 2018) agree that keywords are indicative of central unifying concepts in research fields, as core elements to summarize content of research.

Initial analysis focused on individual term frequency. Keywords were later grouped into broader categories to manage their volume to a size that enhances interpretation. The words with frequent mentions in raw author keywords remained as categories, which other related words were grouped under, based on synonyms or extended base word with adjectives. Gender is positioned within 6 conceptualizations: gender as binary, gender as a social construct, gender intersectionality, masculinity, feminism, and queer. After grouping, analysis was done on category-level frequency within the dataset. To contextualize the keywords, each is further examined within the abstract texts in which it appears. This allows us to assess which gender topics the context with keyword closely aligns with.

2.3 Results

Web of Science lists 250 core subject categories (Web of Science, 2025). When publication results were filtered to Web of Science Categories of Hospitality, leisure, sports, tourism, there were few results on gender, tourism, and climate change. Many publications on these topics were found to be published outside tourism-focused journals (Figure 2.3).

Study topic	Publications count	% share of publications
Tourism & gender	41048	91.59
Tourism & gender	3772	8.41
Tourism & climate change	19662	92.56
Tourism & climate change	1580	7.44
Tourism, gender, & climate change	576	94.3
Tourism, gender, & climate change	36	5.7

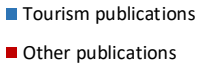

Figure 2.3: Share of publications on study topics of gender, tourism, and climate change, in tourism versus other journals.

2.3.1 Tourism and gender research

Publications resulted in 16,305 listed author keywords, which were examined, and filtered to gender-oriented keywords. The resulting lists were categorized into base words, to group together words that would have same root or shared meaning. For keywords which consisted a gender identity plus other identity, the categorization was written as base word + intersections. It is important to note that this does not necessarily imply intersectionality, but stands for points of intersections. Nonetheless such points are proxies for intersectionality, when analysis is critical of oppressions.

Our analysis of the base word dataset shows that gender was the most frequently occurring word (Figure 2.4). The results also show diverse other words that were a common author inclusion as keyword. Some of these words relate to sexual orientations, bio social gender identities, and gender related traits e.g. masculinities, among others. The diversity of these words indicate that while gender and women are prevalent in the keyword list, a rich repertoire of gender related concepts offers complimentary but underutilized perspectives to inform the focus of tourism research.

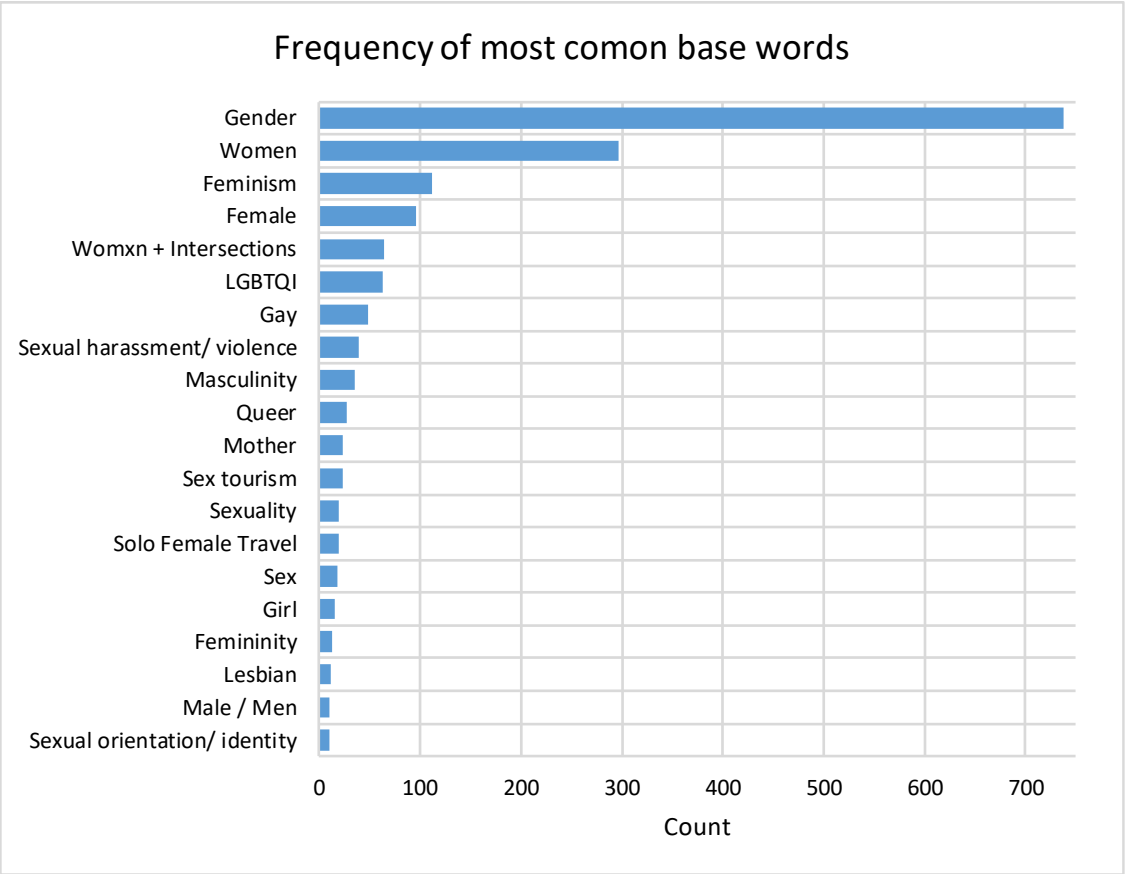

Figure 2.4: Top 20 most frequent base words from author keyword list.

Each of the keywords were systematically coded and grouped into several overarching gender concept categories (Figure 2.5). The categories used covered gendered identities and traits, sexual orientations, attitudes on gender, and relational power influences on gender. The list from bio social identity shows that tourism research acknowledges diverse manifestations of gender, even though much attention is given to women topics. Multiple intersecting identities are also recognized across most categories, shown by root word listed plus intersections. For instance, as shown in relation to tourism activities, e.g. girlfriend getaways, solo female travel. These example from keywords, alongside other bibliometric data, equally shows female is marked for neutral words in tourism, female traveler, etc., female CEO, female chef. Biological identity has a narrower list, signaling that studies primarily align to view of gender as binary. This identity is often used as a variable to be controlled for evaluations of differences between gender groups.

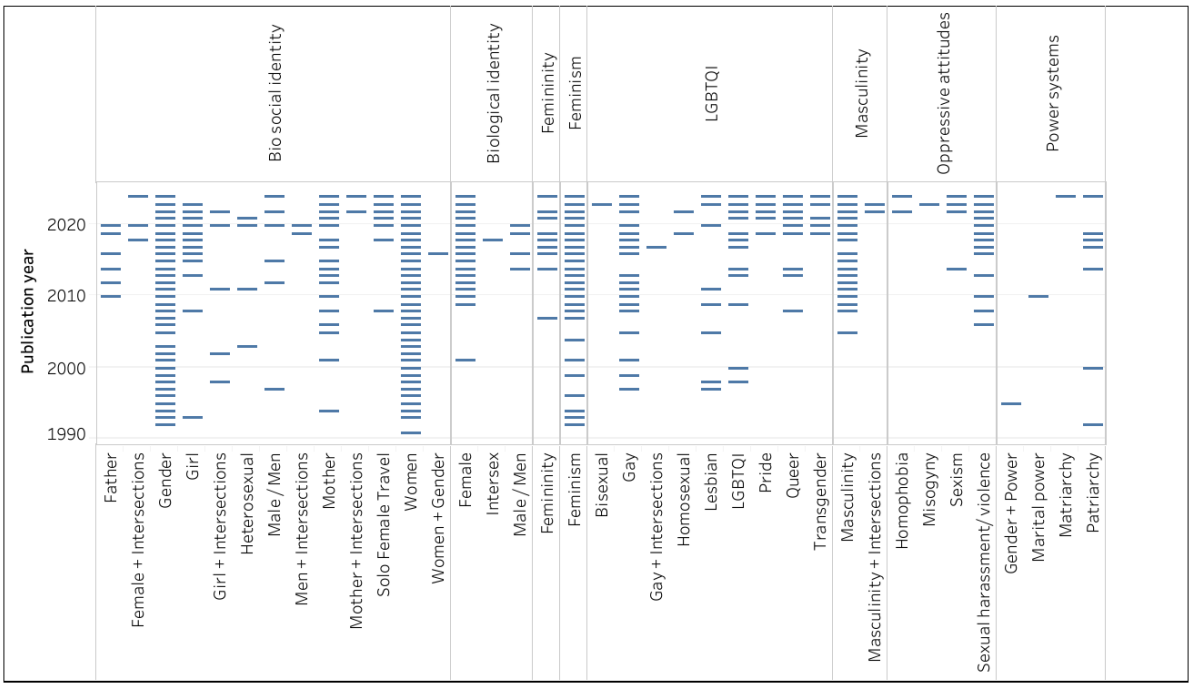

Figure 2.5: Keywords in each category of gender concept across publication years.

Building on discussions of keyword frequencies and their categorizations, subsequent analysis shows popularity of these keywords across the years, as part of wider gender concepts. Figure 2.6 presents a 100% stacked bar chart, illustrating the relative prevalence of gender concept categories, coded from keywords across the years. Each color-coded segment of the bars represents gender concept categories adopted for this study. Feminism had an early start in the author keyword list, sustained across publication timeline. Bio social identity leads in popularity across the years. There are more diversified concepts of these topics from author keywords since 2008 to present time, showing possibilities that gender could lend multiple perspectives to examine research questions in tourism.

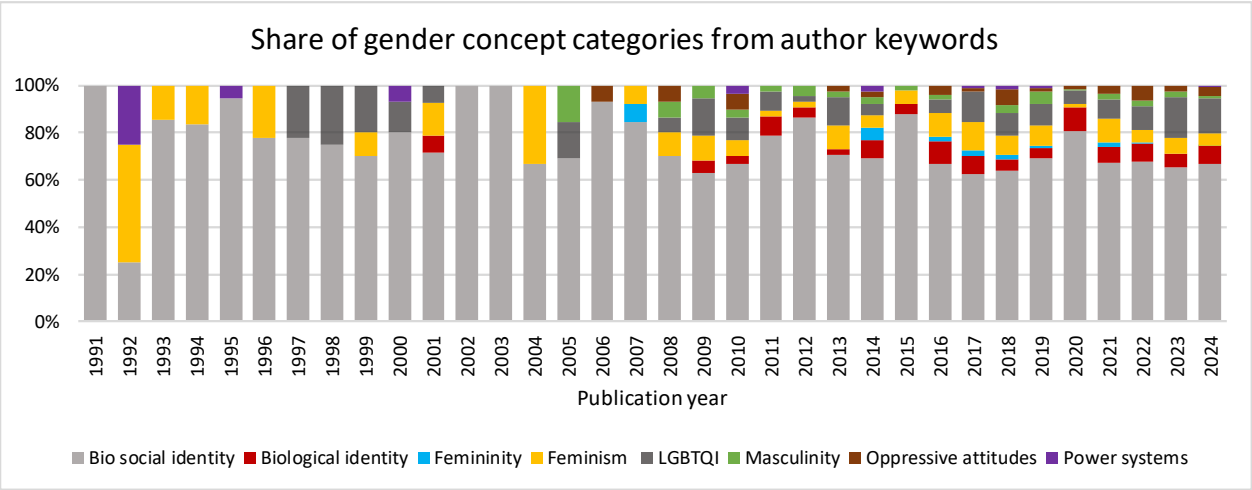

Figure 2.6: Categories of gender topics from author keywords across the years.

Central unifying gender-oriented concepts

This section overviews papers that fall into categorization of gender concept categories, highlighting how their applications align to diverse understandings of gender.

a) Gendered identities and traits: Feminine, femininity, masculine, and masculinity

Topics on masculinity are discussed in relation to femininity, for example in the hospitality industry (Joosten et al. 2014), or in airline employment (Smith et al. 2021). Masculine leadership is normalized as a benchmark for serious leadership in hospitality (Joosten et al. 2014). In cockpit employment roles, masculinity is privileged, whereas service roles in the cabin are typically feminized (Smith et al. 2021). Engles (2022) critiques dominant ideas of masculinity in outdoor leisure spaces, portrayed through the concept of white male spatiality. From these studies, masculinities perspective emerges from traits gendered as masculine, tied to assertion and dominance, whereas femininity those gendered as feminine, tied to subservience positions. The essential message for these studies on masculinity, is the need for equality in situations where masculinity dominates as normative, in a hierarchical way rendering other traits invisible.

Authors also present masculine and feminine identities tied to biological sexes. Inclusion of intersex in author keywords show recognition that biological sex is not binary. Diversity is also acknowledged in bio social identities, with a rich list of keywords, some reflecting intersectional identities.

b) Sexual orientations: LGBTQI+

A study by Girman (2012) builds on earlier research by Johnston (2001) who argued that by focusing on the body as defined by gender and sexuality, tourism research can challenge its ways of knowing dominated by masculine viewpoints. Girman (2012) takes accounts of own erotic encounters with Dominican men, posting results to show that such focus opens up possibilities to emphasize the porousness of power relations between tourists and locals. Research is biased in portraying hierarchies in tourist local relationships as stable Girman (2012).

Contributions relating to LGBTQI, show findings to disrupt stereotypical tourist identities (Lewis et al. 2024; Wong & Tolkach, 2017). Research by Wong & Tolkach (2017) draws on qualitative interviews with Asian gay men, highlighting their preferences, to emphasize the heterogeneity of gay travel markets. They critique the assumption that LGBT travelers are a single market. Lewis et al. (2024) suggest intersectional identities to challenge stereotypical queer representations.

Spaces frequented by LGBTQI+ travel markets are sites for contested power (Monterrubio & Dashper, 2024; Johnson & Samdahl, 2005; Lewis et al. 2024; Reddy-Best & Olson, 2020; Xu, 2023). For example, male privilege is enacted by gay men to maintain spatial dominance in queer spaces occupied by other groups too (Johnson & Samdahl, 2005). Andriotis's (2010) ethnographic study centers on experiences of gay travelers to offer a glimpse of gay nude beaches, important spaces as tourist attractions. For trans individuals, Reddy-Best & Olson (2020) shows that power is central to their negotiations of gender authenticity, for example expressed through choice of dressing options. These negotiations are sometimes shaped by their need for safety and social acceptance in places visited (Reddy-Best & Olson, 2020; Myrdahl, 2011). Relatedly, LGBTQI+ events offer space for attendees and hosts to celebrate social acceptance (Coetzee, 2023). Noting that rights in queer spaces are unevenly distributed and often conditioned by both social and government frameworks, Xu (2023) calls for power-conscious approach in researching about these spaces.

c) *Relations and structures of power: gender and power, matriarchy, marital power, patriarchy*

Keywords on power systems are isolated in the studies. Majority of studies addressing this topic bring out structure of society under male dominance or authority, through keywords relating to patriarchy, e.g. (Cole, 2017; Peng et al. 2024; Pritchard & Morgan, 2000; Shahzadi, 2018), contrasted to only one by Gu et al. (2024) on a community which is matriarchal at its core. This matriarchal background presents opportunity for shaping women's empowerment in tourism (Gu et al. 2024). On the other hand, gendered power relations maintained in patriarchy are to the detriment of women, e.g. those in communities hosting tourism (Cole, 2017), in tourism employment (Peng et al. 2024) or taking part in tourist leisure activities (Pritchard & Morgan, 2000; Shahzadi, 2018).

Patriarchal cultural norms, intertwine with other local factors to intensify constraints for Labuan Bajo's women's water access in times of tourism driven scarcity (Cole, 2017). Examining the language of patriarchy in tourism promotion, Pritchard & Morgan (2000) not only pinpoint gendered tourism landscapes but also find that tourism imagery privileges the male heterosexual gaze above all others. Such privileging is a tool for othering, making others, e.g. women, or feminized landscapes peripheral in tourism knowledge. Further, such perspectives feed heterosexual regulation of public space, with implications for female leisure (Pritchard & Morgan, 2000). Patriarchal norms perpetuate occupational stigma faced by female employees in tourism industry (Peng et al. 2024).

Relations of power happening in tourism spaces are fluid (Bokek-Cohen & Lissita, 2010; Pruitt & LaFont, 1995). Fluidity is enabled by individual performance of traits to a profile desired by tourists who wield economic power (Pruitt & LaFont, 1995). Pruitt & LaFont (1995) link gender and power to economic status that gives Euro-American female tourists dominance in relations with Jamaican men, contradicting the notion of male hegemony (Pruitt & LaFont, 1995). This way, economic disparity afforded in tourism context reverses relations of power between men and women (ibid). Economic power is not the sole influence, but interpersonal power is highly influential in enabling power fluidity, especially in marital context (Bokek-Cohen & Lissita, 2010). The study by Bokek-Cohen & Lissita (2010) examined marital power in exerting influence over vacation purchase decisions. External circumstances, for example migrant married women opting to visit friends and relatives (VFR) as a way of temporarily escaping their disadvantaged position under patriarchy, causes patriarchal power to become latent (Moon et al. 2019). Majority of research reviewed on this

concept admits that exclusion, inequalities and oppression perpetuated in tourism sector, are because of persistent gender power imbalances.

d) Oppressive attitudes: homophobia, misogyny, sexism, sexual harassment

Oppressive attitudes result in hesitations of potential victims showing up in spaces where they do not feel safe, therefore result in exclusion in tourism activities or work opportunities. LGBTQ individuals taking part in leisure activities worry about threat of sexual harassment and homophobia when in public spaces (Kavasoglu et al. 2024), largely perceived by them as heteronormative, thus not inclusive of LGBTQ community (Desjardins, 2022). Gendered leisure spaces in urban areas fail to be inclusive of women, when design is informed by sexist ideologies (Zhu, et al., 2024). Structural exclusion of women chefs from their professional role is ingrained through sexism, necessitating them to conform to gendered spaces of their profession (Chen & McIntosh, 2023).

Misogynistic attitudes are shown to be enabled by internalized sexism (Wigglesworth, 2022), or oppressive patriarchal structures (Benjamin et al. 2023). Examining politics maintaining discriminatory naming of outdoor rock-climbing routes, Wigglesworth (2022) shows how climbing women negotiate misogynistic route names. Faced with misogynistic attitudes, female travelers' expression of anger is a powerful tool to counter perceived threat, violation, or injustice (Benjamin et al. 2023), also in workplace situations (Park et al. 2024). Travel experiences of female tourists are often shaped by their need to protect themselves, when facing societal pressures of sexual harassment (Brown & Osman, 2017; Wynne-Hughes, 2023). Travel guidebooks suggest women's behavioral modifications to enhance respectability and earn masculinized protections (Wynne-Hughes, 2023).

Topic of sexual harassment/ violence is the most visible among keywords categorized under oppressive attitudes. Scholars relate it to women's work in hospitality sector, and safety concerns for female travelers. Sexual harassment is particularly evident in hospitality employment (Cheung et al. 2018; Chen et al. 2023; Mensah, 2022; Nimri et al. 2024; Park et al. 2024) and field work for tourism research in remote locations (Schänzel & Porter, 2023). This problem meted on women is ongoing due to patriarchal dominance of societies tourism exists in, and sexualization of the sector in media discourses (Nimri et al. 2024). Aggressive behaviors linked to sexual harassment can be within the hospitality workforce itself (Ram, 2018) or be initiated by guests (Booyens et al. 2022), e.g. evidence of guests sexually harassing hotel room attendants (Nimri et al. 2021), or female spa workers risk of sexual harassment initiated by their clients (Frost et al. 2022). Hospitality industry is rife with sexual

harassment of female employees and students on internship experience sexist and sexual hostility from male managers, coworkers, and customers (Lopa & Gong, 2020). Existing literature (Lin, 2006) finds that 91.7% of their respondents experienced gender harassment, and 71.1 % experiencing seductive behavior during internship period, indicates that this is a persistent and long-standing challenge for tourism workplaces. Victims are largely expected to tolerate this misbehavior as part of the job (Booyens et al. 2022). Some employees tolerate sexual harassment, conceiving it as an economic coping strategy (Oriade et al. 2023).

e) Feminism: theories applied in studies

Scholars explore diverse theories on feminism, and in process open new questions on political social issues, arising from discontent with oppressive gendered ideologies in travel and tourism communities. Feminism theories applied to these studies reflect ideas of gender equality in employment practice, gendered practices in work environment, gendered entrepreneurial performance and leadership. They apply broad goals of feminism, to recognize diversity and support effort for equality among gender groups. This approach challenges patriarchal bias that exists in understanding gender, in a way that is oppressive to minority gender groups. This bias disregards differences and is upheld in hierarchical and stratified tourism workspaces. The small number of studies on this topic confirms the finding that tourism research is disconnected from feminist and gender focused efforts (Figueroa-Domecq et al. 2015). Nonetheless, these studies continue, exploring new directions, to incorporate justice perspective to tourism encounters with local community. Some introduce a political approach to research, e.g. rights to leisure, macro and micro political aspects.

2.3.2 Tourism and climate change research

Reviewed publications yielded 7,256 author keywords. Only 3 of these (from publications in 2011, 2022, and 2024) relate to gender topics. The three list gender as author keyword. They examine gender as a bio social identity, highlighting differences between gender groups in pro environmental behavior, or group attitudes towards the environment. Behavioral differences between men and women in sustainable water use during hotel stay (Casado-Diaz et al. 2022), and climate offsetting behavior as efforts to mitigate climate impacts (Sousa et al. 2024) is examined. The focus on gender, though minimal from these studies, is on the tourist, revealing both adaptation and mitigation roles they play. Gender is applied as a socio demographic variable that informs analysis of data.

2.3.3 Tourism, gender, and climate change research

The three keywords on tourism and climate change presented earlier on are repeated in these results. Additionally, three new keywords on feminism topics are included in this focus, to address challenges arising from male dominated structures in socio ecological interactions (Camargo et al. 2016; Kline et al. 2023; Thorpe et al. 2021). These studies therefore position feminism theories as a central unifying gender-oriented concept in tourism-climate change research. Thorpe et al. (2021) use feminist theory to rethink human centered perceptions of world, overlooking existence of non-human. For (Camargo et al. 2016; Kline et al. 2023) the ecofeminist approach enables addressing environmental problems while simultaneously fixing related social injustices relating to gender and power. This theoretical focus sets momentum that when researchers speak about gender in tourism and climate change research, they speak about justice and equality related needs.

2.4 Discussion

Gender as a central unifying concept reveals uneven landscape of inter disciplinary ties across fields of study reviewed. Studies on tourism and gender have a rich conceptual exchange in reviewed literature, reflecting a diverse repertoire of gender topics namely; gender as biological identities; gender as social construct; gender as sexual orientation; attitudes on gender; and gender in relational power. Literature on tourism and climate change reveals a cursory engagement with this repertoire, limited to gender as binary identity, suggesting a constrained thematic overlap. No relevant studies on gender and climate change are found in tourism focused publications, a clear blind spot that this focus is invisible to other fields where tourism enjoys interdisciplinary ties. The representation of studies in gender and tourism is rich but has minimal intersection with climate change. Across these studies, the male/female dichotomy dominates. These imbalances, where tourism-gender has rich engagement, tourism-climate change has limited engagement, climate change-gender is largely absent, in tourism focused research, point to untapped potential in integrating the three topics holistically. These findings expand (Equality in Tourism, 2024) recognition of a gap for studies at intersections of tourism, gender, and climate change, specifying that while tourism researchers have extensively studied tourism-gender, they have underexplored gender-climate change questions.

Gender was a high frequency keyword (Figure 2.4). Lecuona (2024) finds gender as a terminology to be too general and recommends need to break it down to specifics. Each

research sub field approaches the gender framed problem from distinct perspectives. In tourism-climate change research, authors emphasize the socio demographic dimension of gender as a binary. This is slightly different from tourism-gender research, where diversity of gender-oriented author keywords (Figure 2.5) shows there is a rich distinction of gender concepts. Even within this rich distinction, some concepts, e.g. gender and women are over emphasized while others remain peripheral. This internal diversity among researchers in understanding problem framed on basis of gender, suggests that similar differences may be a reality for development practitioners as well as other stakeholders. Challenges remain for example in tokenistic representation of women community activities (Evans, et al., 2019) (Jannat & Kusakabe, 2024), eventually constraining their political agency. Research subfields may lack common ground on place of gender in tourism climate change nexus, presenting challenges to coordinate cross disciplinary dialogues to address such problems. As lack of alignment in conceptual clarity of gender problem hinders cohesive problem solving, it is likely to impede efforts on achieving SDG targets. This is reflected in 2030 estimates from SDG gender index where majority countries still score poor ratings, hinting that challenge of gender integration to climate goals remains unresolved (Figure 2.1) (Equal Measures 2030, 2024). Therefore, there is need for research that explores how diverse stakeholder perspectives influence prioritization of solutions for climate challenges for tourism, when framed as a gender problem.

While literature has shown that tourism research is distanced from feminist ideology (Figueroa-Domecq et al. 2015), this review results point to a practical gap resulting from tourism publishing practices, of detachment from social realities of climate change to the sector. We attribute this to sparse overlaps across the diverse gender concept repertoire in studies reviewed, yet gender is an important mirror for societal concerns, most of which weave through cascading effects and compounded climate risks. As this dimension of cascading effects and compounded risks has been identified in global climate policy (Intergovernmental Panel on Climate Change, 2022), incorporating its lens in tourism research is important to align academic inquiry with practical world problems. This approach will enable tourism research to have a broader appeal in informing climate solutions, due to extensive linkages tourism has with other development sectors. Opening to this research angle, addresses equity challenges, where research (Hoogendoorn & Fitchett, 2018) has shown that questions with community voice have a narrow scholarly standing in tourism publications.

Community voice is given agency in tourism-gender studies, which considers diverse gender concepts beyond women's identities (Figures 2.4 & 2.5). The diversity points to topics where future research can focus, to open space for overlooked connections between tourism, gender and climate change. For instance, the concept of masculinities which is weakly integrated in these studies, and risks remaining peripheral and less influential in research. This is likely since papers with high frequency keywords tend to be cited more often (Lu, et al., 2020), therefore current patterns of domination may direct future research to consistently align with these high frequency topics, women, gender. Overlaps of this diversity across sub field keywords, shows their potential as unifying concepts for strengthening nexus approach to research. Gender as a bio social identity, features in both tourism-gender research, and tourism-climate change research. It is a predominant focus in tourism-gender research, though a recent attention as socio demographic variable in tourism-climate change research. A fundamental gender analysis will consider how these identities can appeal to intersectional focus in research analysis.

Gender's rich conceptual repertoire offers fertile grounds to discuss complex socio ecological concerns affecting both tourism and climate change. The diversity points to topics where future research can focus, to open space for overlooked connections between tourism, gender and climate change. It also allows tourism research to analyze developmental problems for the sector from multiple perspectives. In tourism and climate change research, the view is one sided on the tourists, whereas tourism and gender research present a balanced view of tourists and hosts. This perspective normalizes climate change research in tourism, that overlooks community perspectives, a gap for the African continent identified by (Hoogendoorn & Fitchett, 2018). Majority of publications on interdisciplinarity of these topics are published outside tourism focused journals. This agrees with prior research by (Hall, et al., 2014) confirming that many researchers on tourism studies publish their work in non-tourism discipline-based journals. In our review, for those published in tourism focused research, critical evaluations of gender are minimal. Topics of feminist theories, gender intersectionality, and masculinity concepts are overlooked in the interdisciplinary silos. Feminism, masculinity, power relations, attitudes, appear only in tourism-gender research, therefore considered as gaps for inter disciplinarity in tourism-climate change research. Feminism agenda promises great unifying potential for research on these topics, as review already shows it has early steps at the intersection of such research. Because many papers are published outside tourism focused journals, gender theory is not sufficiently visible in tourism journals. This absence limits interdisciplinary exchange, with implications for slowed

progress on inter-sector communication and awareness. It also constrains tourism capacities to critically address gender questions.

Overall, much of the research at the intersection of these topics is published outside tourism focused journals, despite tourism's status as a well-established academic field. This pattern reveals a form of indirect marginalization, likely through publishing criteria that excludes critical perspectives of gender. This reflects forms of epistemic hierarchies, where interdisciplinary topics on gender, tourism, and climate change, are rendered peripheral in tourism journals. The displacement of such interdisciplinary scholarship, not only silences voices on social dimensions of climate change within tourism publishing but also shows how disciplinary boundaries reinforce what perspectives or voices are considered legitimate.

Theoretical contributions

Limited attention to feminist topics outside tourism gender studies, points to marginalization of justice and rights problems in these studies, consistent with feminist critiques of knowledge politics to marginalize non-conventional voices. Despite gender being a conceptually dense topic, its application to reviewed research marginalizes topics of masculinities, and overlooks feminist perspectives which would bring attention to justice questions. By showing these patterns, this study demonstrates the strengths of FPE in revealing indirect forms of marginalization in research priorities. Its identification of gender groups, in view of power structures, calls for intersectional approaches to research. These findings demonstrate a case for the need for justice-oriented approaches for tourism research, sufficiently distinguishing gender concepts in terms of climate change adaptation and vulnerabilities. Current studies have been on tourist centered impact mitigation, a trend likely to overlook agency and needs of local communities in tourism destinations.

If gender responsive adaptation to climate change is open to being a conceptually driven process, then the lack of full spectrum of gender in literature about climate change and tourism is its weak point that leads to flawed outcomes.

2.5 Conclusion

Addressing the nexus-challenge of tourism, gender, and climate change requires more than procedural tools, such as provisions in policy for gender integration or representation. Often, their implementation on a stand-alone basis lacks influence to change status quo of male normative or other dominant systems. Predominant binary gender framing in such tools or frameworks excludes gender diverse identities, and oversimplifies categories of women,

therefore marginalizing their political agency in environmental decisions. Solving the nexus-challenge of tourism, gender, and climate change thus necessitates conceptually driven processes grounded on meanings held in reciprocal interactions of each with the SDGs. This entails recognizing diverse dimensions of climate change as a gender problem in tourism, and framing solutions not only through policy integration, but fundamental interrogation of gendered power and relation structures parallel in tourism and development spaces. Yet this need for conceptually driven process remains obscure because existing inter disciplinarity between tourism and gender studies, is an under-integrated dimension in climate change research. Tourism's contributions to intersections in these sub fields help in integrating knowledge from social and environmental aspects of tourism, for effective solutions to cross cutting problems in these development focused disciplines. There is need to extend the rich conceptual landscape of gender topics to tourism-climate change research. Fragmented findings across publications in reviewed subfields impose nearsighted limits to guide tourism for climate resilience that is gender responsive. This review demonstrates the value of feminist perspectives in questions of rights and justice, which emerge at the intersections of these subfields, and a reality for tourism sector where results point to dominance leading to oppressions. There is risk that siloed interdisciplinarity of these topics encourage a reactive approach to embrace new research directions when marginalised concerns escalate to a crisis for tourism sector.

CHAPTER THREE
Non-economic losses and other impacts of climate change affecting women in tourism work: A photo voice case study from Kenya's coast

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Abstract

Coastal areas drive much of the world's tourism growth while being highly sensitive to climate change. This sensitivity poses significant climate risk to tourism because environmental degradation can reduce attractiveness of destinations. Tourism sector's strong dependencies on women's work exposes it to gendered impacts, as climate risks in coastal environments are not gender neutral but affect women disproportionately. Despite growing attention to climate change in tourism research, methodological limitations have often left out household and community scales underexplored, sidelining women's knowledge and lived experiences. This study addresses these gaps by using photo voice which created a participatory space that enabled participants to frame and articulate climate related changes in their own terms based on their lived experience. Participants photo voices highlighted changes to natural resources and coastal infrastructure corresponding to spaces women's work exists in and is dependent on. Feminist political ecology lens shapes interpretation of these results, suggesting that that growing uncertainty of climate change has destabilized boundaries for some of these spaces organizing the core of women's work in tourism, reshaping women's work ways that allow their subordination, rather than equal participation in the ocean economy. Moreover, the photo voices reveal economic and non-economic losses as complementary perspectives on the same processes of change. The interaction of climate change and tourism therefore introduces multidimensional gender-related vulnerabilities, which go beyond economic impacts, to implications for women's political agency and sense of cultural pride. By centering women's experiences, this study advances understanding of gendered vulnerabilities in coastal tourism and offers insights for more inclusive practices for advancing gender and diversity balance in marine environments.

Keywords: climate change, gender, ocean economy, photo voice, political agency

3.1 Introduction

Coastal and ocean-based tourism plays a vital role in the ocean economy, standing alongside maritime transport, fisheries, and other ocean-based sectors. Globally, tourism dominates the ocean economy in both output and employment (OECD, 2025). It provides livelihood opportunities for coastal communities, supports conservation, and shapes development. For instance, in Kenya, the tourism sector rebounded impressively in the post-pandemic period, with a 163.5% increase in cruise tourism recorded in 2024 compared to the previous year (KNBS, 2024). This recovery shows the sector's potential to spur economic growth (Kepher-Gona et al. 2024), a potential that necessitates sustainability and equity (ibid), particularly as

climate changes. Climate change to coasts poses serious challenges to coastal tourism (Simpson et al. 2008), making it one of the most vulnerable sectors to environmental stressors. Compared to aquaculture, maritime transport, or infrastructure, tourism responds more sharply to changing ecological and socio-economic conditions (Nicholls et al. 2007; OECD, 2025). When scenarios prioritize local solutions and environmental sustainability, tourism shows a sharp decline in growth potential, unlike the steadier adjustments seen in other sectors (Nicholls et al. 2007). This contrast illustrates tourism's disproportionate capacity to shape ecosystem outcomes during abrupt climate-induced transformations. Rising temperatures, altered precipitation patterns, sea level rise, and extreme weather events are already reshaping coastal landscapes (Moreno, 2010; Jarratt & Davies, 2020; Soontiens-Olsen et al. 2023). These changes present current realities that threaten tourism infrastructure, ecosystem services, and community livelihoods (Simpson et al. 2008).

Tourism research on climate change has expanded considerably, however with scant attention to the lived experiences of local communities (Hoogendoorn & Fitchett, 2018), failing to capture how climate change is understood by communities themselves. This leaves the household scale underexplored, even though it is central in community members daily negotiations with climate risks. From a feminist political ecology perspective (FPE), such neglect sidelines knowledge and agency of groups whose contributions are essential for inclusive adaptation (Elmhirst, 2011; Walker et al, 2021), e.g. the marginalizing of women's knowledge. As shown in recent review (Bagge-Petersen et al. 2025), photo voice as a methodology is well suited to capture this angle of how people understand climate change, as well as articulating vulnerabilities.

The gap in tourism scholarship extends to questions of gender, which despite gaining recognition in global climate change discourse, remains insufficiently addressed in tourism research (Eger et al, 2022; Pritchard, 2018), and significant gaps remain at the intersection of climate change and tourism (Equality in Tourism, 2024). In adaptation research, this gap is reflected in low coverage of gender as a social dimension of adaptation (Prakash et al. 2022). Often, such omissions reflect systemic barriers that sideline women's environmental knowledge, for instance where studies have shown a glaring absence of women in climate policy spaces (Spencer et al. 2022; Yiridomoh et al. 2022; Ndlovu & Mjimba, 2021), suggesting that such miss out on women's knowledge contributions. Nchu et al. (2019) show evidence where women's voices are downplayed by hierarchies that dictate issues on which decisions can be made. Women, especially younger ones, are often subject to decisions made

by others (Rao et al. 2019; Wood, et al. 2021), or married women subject to decisions made by their spouses (Khoza et al. 2019; Nchu et al. 2019; Myeni & Wentink, 2021), as men dominate ideas in patriarchal societies (Lawson et al. 2020), e.g. men dominate decisions over family assets, most of which are critical resources to support adaptation (Jeil et al. 2020; Ndlovu & Mjimba 2021). Young women lack decision-making power to choose adaptation strategies (Wood et al. 2021). These systemic barriers reinforce masculinized knowledge systems which Vercillo et al. (2021) note are presented as objective but are in reality partial. Attention to women in aforementioned studies should not be read as equating gender solely with women; the intention is instead to acknowledge that women's persistent marginalization offers an important lens for understanding how gendered inequality structure adaptation. This equally informs the focus on my research.

The gaps for integrating gender in tourism research, especially on climate change, persist due to limitations of conventional methods lacking tools to access depth of lived climate experiences (Eger et al. 2022; Figueroa-Domecq et al. 2015; Higgins-Desbiolles et al. 2019; Hoogerndoorn & Fitchett, 2018; Pritchard, 2018). Hoogerndoorn & Fitchett (2018) stress the importance of in-depth community level inquiry, yet such approaches remain rare, leaving everyday understandings of climate risks largely invisible. This erasure is reinforced by the ways local communities are excluded from standard definitions of tourism (Higgins-Desbiolles et al. 2019), echoing the marginalization of feminist and qualitative methods that Pritchard (2018) and Eger et al. (2022) identify as a barrier to integrating gender in tourism research. Figueroa-Domecg et al. (2015) similarly show that feminist perspectives are largely absent from tourism scholarship, which narrows the field's capacity to capture the complexity of lived experiences. Collectively, these studies demonstrate methodological constraints as driving gaps in gender research questions for tourism scholarship, underscoring the need for approaches that can capture the depth of lived experiences.

Indeed, a systematic review by Anderson et al (2023) highlights that photo voice excels in deeply engaging participants to articulate their lived experience with critical reflections. As Pierce (2020) shows in the context of aquaculture and fisheries, photo voice addresses these limitations by shifting interpretive authority to study participants, enabling women to narrate their visualized climate experiences, in a way that embodies feminist research principles of inclusion and empowerment. Participant's framing of their climate experiences at personal level, echoes feminist perspective (Harding, 1986), and reflects methodological strength of

photo voice (Masterson et al. 2018), to allow participants to actively share knowledge form that is socially situated.

Against this background, photo voice applied to this paper addresses three interrelated research gaps: bringing forward community level perspectives, that remain underdeveloped in tourism research; allowing gendered experiences to be documented on participants own terms, a step that counters the systemic sidelining of women's knowledge; and expanding conventional notions of expertise by redistributing interpretive authority in a way that allows grassroots agency in knowledge production. As such, building on evidence from coastal aquaculture (Pierce, 2020), this study applies photo voice to research on women in coastal tourism, extending the method's feminist potential to a sector where disregard of topics of gender, has implications for overlooking voices of women who are a considerable workforce supporting the sector development.

Kenya's coast is already facing multiple climate impacts that compound tourism's vulnerabilities. In the Western Indian Ocean region, which includes Kenya, sea level is rising faster than the global mean (Kenya Meteorological Department, 2023). Sea level rise, a persistent risk for tourism infrastructure (Schliephack & Dickinson, 2017; Yong, 2021), also shrinks size of beaches (López-Dóriga et al. 2019; Nidhinarangkoon et al. 2020; Toimil et al. 2018), and is visibly eroding Kenya's coastline with serious implications for tourism and agriculture (United Nations Environment Programme, 2021). Sea level rise is an escalating threat, as it encroaches coastal settlements and infrastructure (IPCC 2022), paving way to multiple other cascading risks directly affecting coastal communities, e.g. on coastal livelihoods, food security especially in vulnerable regions, and heritage (IPCC 2022). Coastal heritage sites, such as the Vasco da Gama monument in Kenya, are deteriorating due to increased salinity and shoreline erosion (National Environment Management Authority 2020), resulting to structural weaknesses of the monument's supporting pillars, therefore putting off visitor numbers. Coral bleaching is a major risk to Kenya's coast, diminishing the appeal of marine tourism (Obura et al. 2017). Coastal flooding (Wabnitz et al. 2021), previously seasonal, is becoming more frequent and unpredictable, damaging infrastructure, and disrupting livelihoods (Kenya Meteorological Department, 2023). These impacts threaten the environmental and cultural capital that underpins coastal tourism.

Tourism is unique among ocean economy sectors because it faces both supply and demand side risks from climate change. Impacts from changing climate weaken tourism demand (Scott & Becken, 2010) that can be indicated by changes in tourist numbers in a destination

(Baig et al. 2021; Falk & Lin, 2018; Veeken et al. 2016), at times driven by tourists choosing alternative destinations (Atzori et al. 2018). Relatedly, negative consequences of climate change on tourism supply at destinations include impacts on development and delivery of tourism products, or reduced attractiveness of destinations (Wolf et al. 2022; Dube & Nhamo, 2020). Sea level rise likely leads to more frequent coastal flooding, as well as modification of coastal ecosystems including beaches, corals, and mangroves (Hoegh-Guldberg et al. 2014), whose natural, aesthetic, and use value among others, are important in tourism product development. Scholars such as Horne et al. (2022) show climate change impacts on possible supply chain disruptions evident in changes in well-being of tourism dependent communities, as the threat disrupts their livelihood opportunities. Cascading impacts of climate change, such as water scarcity, food insecurity, disease outbreaks, undermine the social fabric upon which tourism depends. Recent analysis on Kilifi (Mostert, et al. 2025), where this study is situated, highlights the causal links between climate shocks and mental wellbeing, noting a severe impact of drought shock on mental health of vulnerable women.

Because rapid tourism growth concentrates more people and infrastructure to coastal areas (Nicholls et al. 2007), vulnerabilities of coastal ecosystems intensify with combined sensitivities of both population and infrastructure exposed to coastal hazards (Chandra & Gaganis 2016; IPCC 2022). To address such escalating risks, e.g. effects of rising ocean waters, governments and private developers have prioritized infrastructure interventions such as sea walls (Furman et al. 2021; IPCC 2022; Owusu-Daaku 2018). While these efforts aim to protect economic investments, they often neglect socio ecological realities of marine environments (Furman et al. 2021; Owusu-Daaku 2018). They therefore result to unintended consequences, particularly when they fail to account for diverse community perspectives. Differences in how various stakeholders perceive and experience adaptation measures (Furman et al. 2021), points to diverse community perspectives, which is not just a procedural hurdle for consensus in decision making, but reflects political concerns on whose knowledge is actionable in decision spaces strongly structured on hierarchal asymmetries, such as in tourism, or ocean economy.

FPE offers insights into these asymmetries (Elmhirst, 2011) by interrogating how power and knowledge intersect with environmental governance. It emphasizes that ecological processes are socially mediated and considers the view by Djoudi et al. (2016), Riverra-Ferre (2022), that gender is a key axis through which environmental change is experienced and understood. Experiences of women in situations of climate risks stand out in showing where

intersectionality, anchored on overlapping parts of their gender identity, is a disadvantage to their adaptive capacities or intensifies their vulnerabilities (Djoudi et al. 2016). This drawback finds an additional layer of setbacks in sectors like tourism which to some extent reflect unequal gendered structures of societies they are built from (Calvet, 2022; Yang & Schänzel, 2023). Gender, defined in sociology as a construct differentiating behavioural aspects of biological sexes (West & Zimmerman, 1987), has dynamics of its relations shaping tourism development processes and related activities (Kinnaird & Hall, 1996), just like in other societal processes where gender relations have profound influences.

For ocean economy, FPE would draw attention to the invisibilization of gendered labor, knowledge, and vulnerabilities, in environmental planning. For instance, women in intertidal zones (Resurrección, 2013) or informal tourism spaces are often excluded even though their livelihoods are directly at stake. Exclusion reinforces inequalities (Harris, 2009; Mollett & Faria, 2013), and misses critical local insights (Nightangle, 2011) therefore undermining community resilience. This exclusion has implications for the production of actionable knowledge. Women possess valuable environmental knowledge gained through daily interactions with coastal ecosystems (Kitolelei et al. 2022), yet their contributions are often dismissed or undervalued (Fache & Breckwoldt, 2023). Bridging this gap requires women's agency as a critical element for their inclusion in decision processes, to allow rethinking of whose knowledge is actionable to inform policy. Agency is capacity of a person, group, or thing to independently act or influence change within contexts of power relations or structural constrains (Littlejohn & Foss, 2009). Establishing agency for marginalized groups within such inclusive processes is essential for developing resilient and just adaptation pathways. As women gain greater representation in decision making, it is important to ask whether their inclusion leads to genuine agency and influence. Representation alone does not imply that their perspectives shape outcomes in decision processes, or that their participation translates to influence in decision making.

In situation of knowledge differences, FPE centers on need to reconcile diverse perspectives, for a change effect that is positive for socio-ecological system. This reconciliation is evasive, e.g. when interventions overlook peripheral workspaces where women are involved (Wabnitz et al. 2021) or ignore less visible scales e.g. households (Elmhirst 2011) where women have significant involvement in domestic duties. Maladaptive outcomes in milieu of diverse knowledge points to a shallow understanding of vulnerability contexts and lack of critical

engagement of how adaptation success is defined (Eriksen et al. 2021), factors which suggest the exclusion of marginalized groups from adaptation planning. In tandem with FPE literature suggesting that exclusion reinforces or compounds inequalities (Harris, 2009; Mollett & Faria, 2013), the findings by Eriksen et al. (2021) show that exclusion intensifies vulnerabilities by failing to engage diverse perspectives, socially validated meanings, and local knowledge shaping how different groups experience and define vulnerabilities. In general, this is a failure that results from overlooking differences in perceptions and also reflects inequality in how voices of unrepresented groups are treated.

Tourism has high participation of women in its workforce, most of them in hospitality and retail jobs, involved in activities that reflect socially constructed roles based on gender. Many typically female areas that reflect women's aptitudes tend to be underpaid and undervalued in tourism (Purcell, 1997), especially in informal tourism work (International Labour Organization, 2023) for example in coastal tourism (Wabnitz et al. 2021). Much of informal work in the tourism value chain is through destination activities, e.g. those relating to handicrafts, heritage, and nature-based excursions, comprising income-generating activities for local communities. The activities are crucial entry points for local communities to benefit from tourism, e.g. through opportunities for local small-scale entrepreneurship (Wabnitz et al. 2021), making them important subjects of focus for research on sustainable tourism. There is evidence of unpaid work done by women in family tourism business (World Tourism Organization, 2019), or in tourism marketing promotion (Elledge & Faria, 2020). Elledge & Faria (2020) explain that their findings from Uganda about tourism promotion work pushed by beauty pageants being largely unremunerated, can be generalizable to countries in the global south. Beauty-based hiring practices (Calvet et al. 2021) limit women's opportunities for upward mobility in tourism work. Moreover, poor representation of women's clerical and service work at professional levels has been noted (World Tourism Organization, 2019), signaling that women face challenges for recognition of their work within tourism economy.

The described lower status of women in tourism, has implications on how severe their experiences of climate change would be. This is because gender research on vulnerabilities to climate change (Enerson et al. 2006; Wabnitz et al. 2021) contends that when people are exposed climate induced risks, inequalities determine who will be chronically affected or not. Inequalities, e.g. in land resource ownership or access (Awiti, 2022) hinder women's participation and contributions to planning and decision making, therefore their voice remains peripheral (Wabnitz et al. 2021) or ineffective (Hügel & Davies, 2020) in informing strategies

or action plans. Further, women's unequal status in tourism marginalizes their involvement within the sector, a factor that is compounded by broader gender norms that limits their decision agency within households and in public spaces.

In practice, adaptation planning tends to be top-down and detached from the lived realities of those most affected. These challenges are mirrored in policy, where integrating grassroots agency remains challenging, as illustrated by top-down nature of climate change policy making processes, e.g. as observed in Kenya (Njoroge et al. 2018). National adaptation strategies often categorize women as a vulnerable group (Tanner et al. 2022), but research to complement these strategies, for example across Africa, fails to disaggregate vulnerability or consider how intersecting gender identities, such as age, social status, influence women's experiences of risk and resilience (Vercillo et al. 2021). For ocean equity, Bennett (2022) discusses the need for tracking social indicators in ocean policies, arguing for the need of social data as knowledge contributions for informed decision making.

In other environmental literature, efforts taken up by scholars such as Hanson (2016), Pienaah et al. (2024), to identify or describe women's environmental knowledge, reflect feminist counterstatements to possible historical neglects of environmental knowledge sources based on gender. Findings from such studies can be interpreted to challenge tendencies for core understandings of climate discourses to overlook diversity of knowledge sources, especially those of women. This is relevant for marine environments, considered as a female sphere due to women's involvement in fisheries (Weeratunge et al. 2010), and due to high activities in tourism, a sector which has high participation of women. A feminist approach to adaptation emphasizes the importance of lived experience as basis for social knowledge on environment. Considering masculinised environmental knowledge, feminist approaches can guide methodologies to center women's voices and foster critical reflection on environmental change. Participatory tools such as photo voice as applied to this study, show diverse ways in which women experience and act on climate risks for livelihoods sustenance. These methods reveal not only vulnerability but also grassroots agency.

Already, women's agency is evident where they make decisions at household levels (Mekonnen, 2022; Wrigley-Asante et al. 2017), the scale of their effort here, oftentimes as proactive measures to reduce adversity of climate induced risks at home, e.g. food insecurity (Tecklewold et al. 2020; Etale & Simatele, 2021; Mekonnen, 2022), is a pointer to their knowledge. Relatedly, recent literature examples (Ranjitkar & Haukanes, 2022; Mubaya et al. 2017) foreground active role of women in adaptation processes. However, their agency should

not obscure barriers that they face, as Nightangle (2006) flagged possible risk of additional responsibility is shifted onto already burdened individuals or groups. Effective adaptation allows opportunities for grassroots agency, e.g. in knowledge contribution, in tandem with transforming structures that reproduce vulnerabilities.

This study argues that women working in coastal tourism develop a strong identification with, and extensive understanding of, the local environment, which they draw upon to support their work. They continue to cultivate this knowledge over time. Women's position in tourism work on- and off-shore, provides context to examine diverse yet distinct observations of climate change effects, as well as local roots to understanding the concepts and interconnectedness of gender relations in tourism and climate change. At its core, this study heeds the call to socialize tourism by making it accountable to destination hosting communities (Higgins-Desbiolles et al. 2022), in its society driven approach in data collection, which foregrounds local women's voices, filling in knowledge gaps to inform alignment of development plans with local interests.

Study site

This study was conducted in Watamu, a tourist hot spot in Kilifi County, coastal Kenya. Watamu is popular with international tourists, for relaxation on its pristine beaches, marine excursions to experience the underwater world, and visits to several tourist islands located in front of Watamu coast (Fig. 3.1). Leisure ranks as the top motivation for traveling to Kenya, with about 50% of visitors in 2024 stating it as their primary motivation (Tourism Research Institute, 2025). The peak tourism season in October to March coincides with the drier season in the region.

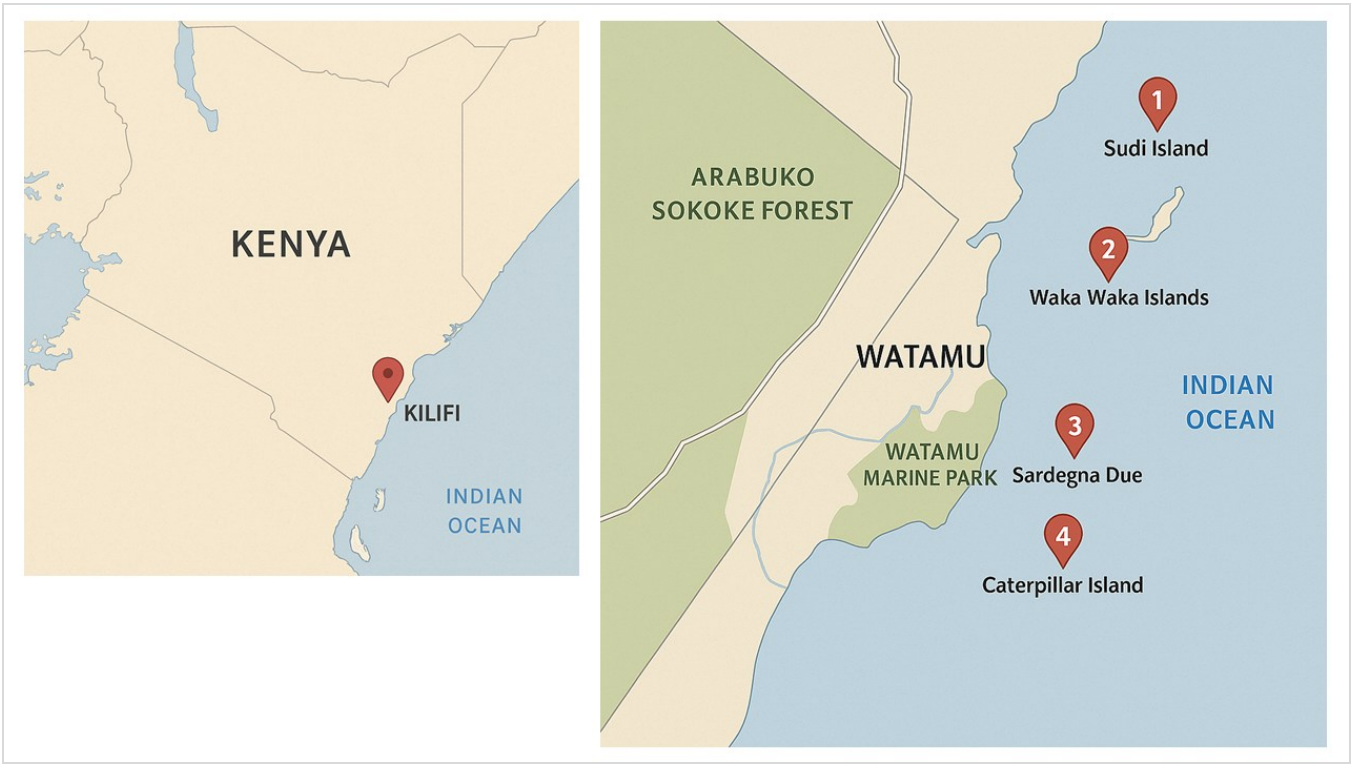

Figure 3.1: Left, - Kilifi on Kenya's Indian ocean coast. Right, - A closer look at Watamu in Kilifi, highlighting its marine attractions and Islands popular for tourist visitations.

3.2 Methods

Photo voicing collects data from participant-generated photos and accompanying short narrations. It has had applications in health research, and is increasingly applied to diverse other fields, e.g. environmental research among others. Chen (2023) describes the photo voicing method as combining documentary photography with feminist principles, through its participant-led approach. The strength of this method lies in its yielding of rich quality data (Kingsbury et al. 2020; Masterson et al. 2018), since participant-generated photos convey their lived experiences in an authentic way (Pierce, 2020) as situated knowledge (Masterson et al. 2018). Kingsbury et al. (2020), who examine residents' experiences and responses to tsunami impacts in a coastal tourism setting, state that photo voice remains largely absent in qualitative research. Most importantly for this study, is that photo voice data provides an understanding of the dynamics of power relations in adaptation (Garcia et al. 2020).

Photo voice was employed in this study, primarily for its ability to ensure active participation of women in research, rather than them being objects of research (Pierce, 2020). Women's active participation in photo voice activities enabled a listening of narratives that hold social meaning in climate change knowledge held locally. Photos offer valuable way to access

public understandings of environmental questions, away from pre-framed expert led approaches (Kohsaka & Flitner, 2004).

The study's three photo voicing workshops, which involved ten female participants, all long-time residents of Watamu in Kilifi, drew upon previous research using photo voice (such as Graziamo, (2004), Mcintyre (2003), or Side (2005)), in which depth rather than breadth or prevalence was the focus. As confirmed in systematic review by Anderson et al (2023), photo voicing thrives on engaged small number of participants highlighting lived experience with depth to enable critical reflection. Such studies could also take up to a few weeks or an even more extended duration of time. In Watamu, participants were approached through two local women's organizations. They had to be residents of the study area for at least five years and be involved in work where earnings draw directly or indirectly from tourism. Those interested were asked using free prior informed consent, to confirm their availability for contributions to the photo voice approach in January and February 2023. Selection of participants aimed for diversity in age, and representation of various tourism sub sectors, or various value chain activities.

The first workshop was for project introduction, and the remaining two for reporting photo voice tasks. Each workshop discussion session was about two hours, after which participants were free to leave. Often, personal conversations followed up after workshops, prompting more explanations on what was raised in the discussions. More time was spent with some of the women in between the three workshop sessions, as researcher visited sites shown on photos or places mentioned, e.g. public spaces where they work from, for own observations.

The initial workshop was set up as a session for group introduction, and for the researcher to introduce the project idea, as well as provide guidance on ethics applied in photos. The researcher acted as a facilitator and was supported by one of the women participating in the workshops, a leader from one of the women's group organizations. The participants introduced themselves, mentioning their work in tourism, partly describing the destination activities. The researcher explained that she wanted to learn about their concerns on how climate change is experienced by the destination community. In the first workshop, participants agreed that they had made observations of changes where they believed climate change was a driving factor. Suggestions for themes that they would like to cover, and a plan of activities were agreed on in this session. The task for participants after the introductory workshop was to capture their observations through photos of what mattered to them.

After photo production, two discussion workshops were scheduled. Participants had the option to identify what they felt was a typical observation on climate change affecting destination activities, and capture it through photos, taken by mobile phones, which the participants are familiar with. Photos were shared via WhatsApp with the researcher. Since they did not put captions on their photos submitted, they had discussion sessions to voice what their photographs represented. Captioning photos may be a challenge for participants with low literacy levels. All the photos were printed by the researcher prior to the discussion workshops, and participants agreed that they be displayed on a workshop table. This physical set up worked well for participation of all, considering technology challenges for participants using old phones during the sessions, and those who would benefit from larger print formats of photos. The essence was interactive communication shaping what is constructed as social knowledge from photo data. The workshops served simultaneously as exhibition sessions, where the photos shared were displayed for all participants to see, and no privacy concerns were raised. Participants were asked before the session which photos they would like to speak about. The selected photos were shared on a projector during the discussion session.
Each participant had multiple photos, and during the workshops, they were allowed to pick one and speak about it, to allow everyone enough time for presentation. Participants were invited to respond to two questions when speaking about their photos: What impact is portrayed in this photo? Which jobs can be affected by this impact? These questions guided their reflections on climate change factors that come to mind from their photo, and subsequent discussion on which destination activities workshop participants felt would be affected by the described climate change effect. Photo voices are a valuable way to access public understandings of environmental questions, complementing rather than replacing conventional expertise, by making space for interpretations that emerge outside of pre-framed expert-led approaches (Kohsaka & Flitner, 2004). Participants spoke about their photos in turn, and the researcher allowed others to comment on the photos. Seven photos were discussed in the second workshop. Since some participants did not have ready photos by the time of this workshop, a follow-up and last workshop was scheduled. During this final workshop, the presentation was open, and participants made their presentations in groups.

Additional photos were submitted, and a total of 52 photos collected from all workshop participants. Workshops were audio-recorded, notes taken, and personal conversations followed up after all workshops with available participants. After these workshops, the researcher was able to visit some of the public places shared in participants' photos, making

her own observations of what was shared in the discussion. Audio recordings were helpful in capturing verbatim participants' voicing of their photos, ensuring that their meanings were preserved with minimal influence from researcher's own framing. Nonetheless, facilitating photo voice discussions shaped the co-produced nature of knowledge generated.

What was identified in the workshop was used later to guide categorization of other photos, converging to a list of climate change effects, e.g., from photos relating to drought, to sea-level rise, etc. This study acknowledges that observations shared by women are complex, diverse, and followed an inductive approach in analysis. Qualitative analysis involved an initial step of code development from photo voice workshops transcripts. The workshop discussion transcripts provided a basis for identifying themes, based on the question what kind of climate change effect was portrayed in the photos. Workshop recordings were transcribed and coded on main ideas, categorizing the codes to themes. Audio recordings as each respondent spoke about their photos, also guided the codes assigned. Names of respondents and some places were anonymized as data protection measures. Codes developed from workshop transcripts were then applied to the entire set of 52 photos collected during this study.

Analysis of photo voice additionally applied a set of codes for visual features (Kress & van Leeuwen, 2020), to uncover salience of particular factors in the photos. This allowed to identify the degree to which some factors were represented prominently in the photos, from strong salience where an issue is almost entirely featured, to weaker forms of salience where it is represented occasionally.

3.3 Results

Women's photo voices draw attention to the fact that contrary to 'panicky' representation of climate change threats, observations can be presented in a space of conviviality, reckoning authentic livelihood experiences. Workshop discussions identified effects of climate change depicted in photos, and participants added comments on which destination activities they thought were affected by the effect stated. When coded, these photos converged to three main categories of climate change effects: changes in ocean resource levels (Fig. 3.2); changes to coastal infrastructure (Fig.3.3); and changes to farmland resource levels (Fig. 3.4). Categorization of their photos in groups, presents a balanced view of effects of climate change and related adaptation responses (Fig.3.2, Fig.3.3, Fig.3.4). Photo voice discussions show that

these categorizations are important change contexts, with implications to various destination activities. For anonymity, participants quoted in results discussion are referred by numerical identifiers, WT1 to WT 10.

3.3.1"My fishermen don't have deep sea equipment, now I have no fish for sale": Changes relating to ocean resource access.

The quote in this subheading, voiced in a photo from one of the workshop participants, sums up shifts in ocean resource levels, where climate change was mentioned to be a driver. Photo voice discussions trace the flow of this shift from shallow ocean waters with vegetated ecosystems, to deep sea, and outsourced seafood supplies from neighbouring county, linking them to women's role in meeting demand for seafood as a restaurant menu item for tourist consumption. Reduced availability of fish in shallow waters, drives fishers to venture further offshore. The decline of fish stock in shallow waters is due to multiple factors including effects of climate change, and overfishing concepts such as "fishing down the food web" and "roving bandits". Even though the subheading quote here singles out deep sea equipment as important to enable fishers venture into deeper waters, skills and manpower play a significant role in such ventures.

WT1 a souvenir items seller at the beach front knows that degraded mangrove area, shared from her photo (Fig. 3.2a), is indicative of climate change effects. She attributes part of this to a rise in environmentally destructive behavior, like cutting down trees and mangroves for charcoal and wood, as these are the only resources at reach during times of climate-induced scarcity. This is in reference to extended periods of dry spell and failed rains, where farm production declines. Monetary value obtained from mangroves helps some people to meet their needs in absence of farm yields. Food insecurity in communities with high poverty levels increasingly leads to over-exploitation of environmental resources, e.g. forests (Food and Agriculture Organization, n.d.). Environmental destructive behavior is attributable to multiple factors, e.g. unstainable behavior due to not having a choice, some to unsustainable behavior while having a choice, or a combination of these. WT1 adds that degradation of mangrove area is an immediate disadvantage to tour guides, who miss out income from tourism, as such a degraded environment is likely to repeal visitor numbers. WT2, an ecotourism guide shared a photo of a mangrove restoration site (Fig. 3.2b), mentioning that mangroves are important breeding grounds for marine organisms. It is important to note that the framing of environmental degradation as linked to poverty reflects what political ecology identifies as the

degradation and marginalization thesis (Robins, 2004). At the same time this case also connects to political ecology's other central questions: conservation and control (ibid) as seen in the governance of marine protected areas; and environmental conflict (ibid), where resource scarcity intensifies competition and inequities. Thus, local narratives of blame may reflect broader dynamics of power and access, rather than subsistence pressures.

WT3 is in the seafood trade, delivering these supplies to hotels for consumption by tourists. She and other workshop participants agree about the importance of mangroves for marine organisms, especially those whose habitat is in shallow waters.

> When the mangroves are flourishing, we get crabs and prawns. Fishermen get their catch, and then we benefit too. Other times they go by boat, but here on foot because the waters are shallow. Prawns and crabs like shallow areas, that's where they are found. -WT3.

Figure 3.2: Participants' photos presented at workshop categorized as resource level changes at ocean. a) degraded mangrove area, b) site for women's mangrove restoration project, c) landing site where local traders source their fish supplies from, and d) seafood supplies outsourced from neighboring county Lamu.

WT4 discusses her photo (Fig. 3.2c) with the group, it shows a landing site with tuna fish catch. She explains that she sources bulk of her supplies from her husband, who is a small-scale fisher, and he lacks equipment to venture to deep sea fishing. WT4, a fish monger also engaged in supplies to tourist hotels, knows that declining fish catch indicates rising ocean surface temperatures. It is important to note that overfishing, mentioned earlier, plays a role too in decline of fish stock. WT4 learnt from her husband about sea surface temperature rise, and how this is a challenge for his fish catch as most fish move to cooler waters deep in the

ocean, out of reach for many small-scale fishers like him. While it may be questioned if this was the participant's knowledge or that of her husband, it is essential to note that knowledge is shaped by experiences and social contexts (Harding, 1986). The social nature of knowledge acquisition is a concept in Bandura's social learning theory, showing individuals are active gatherers of information which is internalized as knowledge (Littlejohn & Foss, 2009). Harding writes about this, referring to feminist standpoint theory, "women's social experience, structured by gender stratification, can provide the grounds for developing a distinctive and less partial and distorted understanding of nature and social life" (p.26). This does not suggest that women's knowledge is free from partiality, but that they represent a grounded standpoint among others. With these considerations, the understanding of WT4 is validly her knowledge, regardless of how she acquired the knowledge. Also, the workshop questions focused on what participants know as shown in their photos and was not able to question in detail how they acquired this knowledge.

WT3, a seasoned seafood supplier to island excursions, knows that outsourcing seafood supplies (Fig. 3.2d) indicates climate-induced damage to mangrove ecosystems (Fig. 3.2a), important breeding and nursery grounds for crabs, prawns, and lobsters. Figure 2d is among the photos she shared at the workshop, where she mentioned that here, she was collecting lobster and other seafood supplies delivered from the neighboring county Lamu. It is important to reflect here on why seafood supplies seem to be more abundant in Lamu county compared to Kilifi County, though this is a question that can only be adequately addressed in a separate research looking at compounding factors that affect species abundance in these areas. Reframing the question to why supplies appear to be more scarce in Kilifi, one reason that can possibly explain the scarcity is Kilifi county's significantly higher tourist numbers than in Lamu county, so increasing tourist driven demand for seafood in Kilifi. According to Tourism Research Institute (2025) Kilifi is among the leading counties in terms of tourist numbers and tourism infrastructure developments, whereas Lamu doesn't make it to the top list. Tourism leads to higher fishing intensity, to meet demands for seafood consumption by tourists (Miller, 2022).

> If mangroves are flourishing, we get plenty of prawns. But now that all this has been cut, those prawns run away, and they are not found. Crabs are also found here in the mangroves. - WT3.

WT3 who has been in the seafood supply for over 40 years, explains that their role extends beyond supplying tourist hotels, and is a critical support to itineraries for visits to nearby creeks and islands. During the peak tourist season, each day, many touristic boats depart to the creeks or islands, including the popular Sudi Islands, Waka Waka islands, or Sardegna Due

(pronounced Italian-style “Sardegna 2”), among others (see Fig.3.1). She explains that for many of these trips, she supplies a combination of octopus, lobster, prawns, and fish. These are a must-have package for tourists to get to taste seafood delicacies while on the islands, otherwise the tourist trips do not materialize for lack of such packages. She however notes the difficulties in locally sourcing some of these species, primarily due to destruction of their habitats, e.g. cutting down of mangroves. According to WT2, their efforts for mangrove restoration face a challenge during periods of excessive dry weather, when seedling growth pace is slow.

Just like WT4 who has observed scarcity of seafood supplies, WT3 points out that this scarcity has pushed her to outsource her supplies from the neighboring county Lamu, in order to meet the demand for seafood consumption by tourists in Kilifi. Besides the degraded mangrove habitats, WT3’s other concern is raging ocean waters for which she sees climate change as a driver. Both WT3 and WT2 link it to safety of water transport, and thus a challenge for fishers as that suppresses their catch. Other workshop participants add to this discussion the idea that for ocean excursionists, these changes limit views of diverse species in glass bottom boats. In general, boat trips for fishers and tourists are all affected during wavy conditions and raging oceans.

> At times there is an unusual strong wind. The wind blows so much that it is not safe for those going for fishing. - WT2.
> The shortage of lobsters is because the ocean is sometimes rough, now it is deep sea. Lobsters are found in deep sea, about sixty feet. That is, from top to bottom it is sixty feet. - WT3.

In explaining shortage of seafood supplies, WT3 reverts back to the point on dependence on small-scale fishers who lack adequate gear for fishing in deep waters. She gives the example on dependence on small-scale fishing methods, e.g. spear gun fishers to catch octopus and fish, as problematic to their businesses, as the spear marks darkens them in a short time, making it difficult to sell to hotels that prefer fresh-looking produce.

3.3.2 “What is important to me is that I found some space right there”: Rising ocean waters and changes to coastal infrastructure.

The sentiment expressed in this quote by one of the participants “what is important to me is that I have found some space right there”, echoed in diverse ways as other participants spoke about changes they observe from their position at the coastline.

WT5 shares Figure 3.3a of beach stalls, where she has worked for over 30 years. She speaks of the shade depicted in the photo of beach stalls, which provide shelter from the scorching sun. As a result, many beach traders whose activities are outdoors, mostly women, gather

under beach stall shades. WT5 goes on to list different activities, mostly done by women, which converge at the beach stalls. As statement from WT6 during the workshop shows, these stalls are located at a convenient place, close enough to beachfront hotels, where tourists who are on the way to the ocean can get a glimpse of items on sale, and buy some. WT6 is a henna artist who operates from the beach stalls, a space shared with other women whose primary earnings are dependent on the tourist dollar.

> Those beach stalls provide shade. If you go to their backside, you will find a woman making beads, you will find those who apply henna, that's where they do their work, because there is shade. It's not just pareos that we sell in these stalls. We even sell souvenirs. Animal souvenirs sculptured from soapstone and wood. If you get a client who wants to be massaged, there is space to spread mat for massage there. - WT5.

> What is important to me is that I found some space right there, I don't walk, I know that visitors must go to the ocean. They get to see what we sell, if it interests them, if it's a pareo, they will take printed design of pareo they want. - WT6.

> There are children who want to be taught Swahili language. When I am at the stalls and the children hear us speaking, they ask their mother, who in turn asks us to explain and teach them some bit of Swahili. All this while we are right there at the backside of the beach stalls, mother and child. - WT7.

These women organize to collectively operate from beach stalls. Their use of beach stalls creates in turn a space defining their everyday activities for informal tourism work. Often it is a woman's only space, not shared by others, and is a converging point for women's work in tourism. Pareos and other items sold from the beach stalls are on display from the side facing the ocean. This way, most beach stalls at the study site face the east, where the sun rises from, and will have a shade on their back side in the morning hours. In this area, many tourists go to the ocean during morning hours for boat excursions or relaxation at the beach when the sun is not scorching hot.

The beach stalls are not permanent, their fragility shown as tourism seasons change from peak to off-peak, and strong tides break them down. WT5 further points out that to salvage their belongings from possible damage, they temporarily relocate their beach stalls from this prime trading location, during the low tourism season.

> During the low season, our stalls are carried away by the water. So, when the low season comes, we carry our stalls, we tear them down, we take them away, our work is just to build and tear them down - WT5

Further highlights of local experiences of diverse climate change effects at the shoreline are by WT1, a trader at the beachfront, who knows that shrinking space for beach activities indicates land loss to the sea, occasioned by sea level rise overlapping with coastal erosion. This is a threat to their beach stalls, which have to be relocated away from the rising waters. Although WT5 had earlier linked the threat to seasonal tides, built coastal walls shared from

some of the women's photos opens up discussions of sea level rise, as an immediate risk for built infrastructure at the coastline. WT8, a masseuse who operates from a beach stall, highlights the severity of this problem with her photo (Fig. 3.3b), when she spoke of how she has seen coastal protection walls rebuilt over and over again after every damage by rising waters. These walls have been built by tourist hotels, to shield their premises from rising ocean waters.

Figure 3.3: Participants photos presented at workshop, categorized under changes to coastal infrastructure. a) makeshift beach stalls used by traders, b) built coastal wall in response to rising ocean waters.

3.3.3 "Coconut is used for everything": Changes to farmland resource levels.

At home settings, the effects of climate change are shown on farmlands, where failed rains and drought seasons negatively affect crop harvests. Repeated mentions of coconuts in photo voice discussions, as representative of farm produce, emphasized its importance at home for food preparation and at work settings, e.g., restaurants specializing in local cuisine.

WT9 runs a coastal dishes restaurant and knows that fading taste in coconut flavoured coastal delicacies indicates drought impacts on farm produce. She uses her photo (Fig. 3.4a) to speak about drought impacts on coconuts, cashew nuts, and baobab seed harvests. WT9 who prepares a variety of coastal dishes and snacks, divulges that she has a considerable number of tourists visiting from upcountry taking specially made snacks with them as a souvenir of their trip to the coast. She remarks that special locally sourced ingredients, like coconuts, are important for their aroma, taste, and nutritional value in food preparation. Workshop

participants add their voices to her photo, noting increased commodity prices due to this scarcity. WT9 mentions that her clients are very sensitive to price changes, yet her production costs are getting higher with scarcity of farm produce. Prices in hotels and restaurants go up as well, disappointing customers who prefer lower prices.

Participants also speak of the coconuts harvested being smaller in size, as the harvesters are impatient to wait for them to come to maturity. Drought slows down maturity of crops, as observed by Kim & Byung-Moo (2023), an effect brought forth by participants in photo voice discussions. In the workshops, the women mentioned that prolonged drought prompts early harvesting of immature coconuts. Harvesting is done by men, who may also act as middlemen in selling the coconuts. As a result, such early harvested coconuts do not have the same taste as expected in previous dishes. During the workshop there was a brief talk of early harvested coconuts not being useful for making coconut oils. WT10's photo (Fig. 3.4c) of farm irrigation, and WT5's photo (Fig. 3.4b) of her kitchen garden, discussed at the workshop, equally highlight this plight of declining crop harvest as a result of failed rains and drought. Workshop's participants add that climate threats to the gastro destination identity of the region poses a risk to their livelihoods in tour guiding and hospitality.

> *Matobosha*, a local food, is prepared using coconut. Coconut is used for everything, it is a good thing, used when cooking *matobosha*, or beans, or coconut fish, coconut rice, *kashata*. We use coconut for many things. We also make coconut oil. - WT9

Coconut is a major crop along many coasts (Daa-Kpode et al. 2021; Nenci et al. 2023), with its diverse uses highlighted in photo voice workshops also reflected in aforementioned research. Most important for women is that coconuts in different forms are an ingredient to various coastal dishes, e.g. coconut rice, coconut beans, coconut fish, evident from study site, providing additional nutritious benefits to homemade meals. Coconut trees have a variety of uses in the local community. Coconut wine is brewed locally by men while women make coconut oil. The palm reeds are woven by women to make mats. Palm reeds are also roofing material, which provide a cooling effect to indoor spaces in the tropical coastal warm temperatures. Some tourist style accommodation facilities in the area use palm reeds for roofing, representing local roof style design that appropriate for area's warm temperatures. There are reservations though on the safety and durability of reed roofing during fire incidences, as they provide fuel to build up fires. Coconut trees provide wood for building material.

Figure 3.4: Participants photos presented at workshop, categorized as food security risks. a) preparation of a local dish using coconut as main ingredient. b) kitchen garden. c) using piped water for farm irrigation.

3.4 Discussion

Existing methodological gaps in tourism and climate change research often results in the neglect of lived experiences. This study's use of photo voice as a participatory visual method addresses these gaps and centers women's lived experiences of climate change. The study demonstrates the value of photo voice in redistributing interpretive authority and enabling women to define what aspects of their lives and environments mattered most in the context of coastal change. By prioritizing women's agency in generating and interpreting images, the research foregrounded their situated knowledge and revealed how grassroots perspectives enrich understanding of climate impacts on tourism and the blue economy. These findings align with Anderson et al. (2023), who argue that photo voice effectively captures rich experiential knowledge. The results further show that women's contributions extend beyond economic roles to include symbolic, cultural, and political dimensions of coastal life, all of which are threatened by climate change. For instance, climate experiences detailed in photo voice data revealed that the local community is doubly disadvantaged by combined risks from tourism affected by beach loss (López-Dóriga et al. 2019; Toimil et al. 2018) which they depend on, and cascading risks at households (IPCC, 2022).

In particular, the combination of women's photos and their personal voices in this study, points to shared concern about changes to land and ocean-based resources as forms of economic capital to support their work in tourism, and in form of a heritage they are proud of.

Economic capital matters for women's place in the social hierarchy of coastal tourism, structured under blue economy. Climate induced changes to resource levels have implications for status of women in tourism work. Reduced resource levels are linked to reduced earnings, a measure for status difference between women and others in coastal tourism. Also, photo voice data points to symbolic recognition of women's place in this hierarchy, through their use and access to various spaces organizing their work, which solidifies their position in tourism as part of blue economy. Most importantly, womens locally held knowledge, covering in-depth social dynamics, helped to identify non-economic losses directly affecting women. These losses have eventual costs for tourism, yet risk being overlooked in the sector which is largely positioned in economic context.

3.4.1 Resource scarcity and women's dependence on tourism livelihoods

Women's photo voices pointed to concerns over declining fish stocks and unstable supplies of seafood. Their work in tourism depends on artisanal fishers whose ability to operate is constrained by rising ocean temperatures and hazardous conditions, limited technology, limited technology, and competition from industrial fleets. These pressures diminish local catch and undermine women's opportunities to supply seafood to tourist hotels. Besides climate-driven scarcities, Ochiewo et al. (2020) note that small-scale fishers in Kilifi target demersal fish, which is at risk of overfishing. Women's dependency is further complicated by the impact of illegal, unreported, and unregulated fishing by larger industrial operators, which reduces available stocks. Sumaila and Tai (2020) highlight that the majority of global fishing subsidies disproportionately benefit large-scale operations, while foreign subsidies in African waters are nearly twice those of African countries. These dynamics spill over to women's livelihoods, leaving their seafood businesses vulnerable.

Attempts to source seafood from neighbouring regions such as Lamu county bring additional transportation costs that are not accessible to all traders, weakening community linkages to the tourism value chain. This illustrates how capital-intensive responses can exclude small-scale actors. Similar exclusionary patterns have been observed in other contexts. For instance, Dube and Nhamo (2020) show how rising electricity costs during drought years burden small food-service businesses in tourism that cannot afford alternative energy sources. Awiti (2022) likewise recommends resource-based climate interventions for Africa to be gender responsive, noting the challenges women face in accessing capital to mitigate climate risks.

3.4.2 Insecure spaces for women's work

Women's informal enterprises are primarily located along the shoreline, where they face direct exposure to sea level rise, beach erosion, and coastal land loss. These risks threaten makeshift structures that house small-scale retail activities, contrasting with the permanence of hotels protected by seawalls. Photo voice data revealed that seawalls constructed to protect tourist infrastructure simultaneously displace women's stalls and reduce community access to beaches. Such outcomes demonstrate how adaptation measures can inadvertently reinforce inequalities. Similar counterintuitive consequences have been documented elsewhere in Africa. For example, tree planting projects promoted as restoration strategies have been critiqued for displacing grassland ecosystems (Parr et al. 2024). In Ghana, Owusu-Daaku (2018) shows how construction of sea defense systems incentivized large-scale tourism development that displaced local communities.

At the study site, displacement of women's trading spaces diminishes their visibility in the blue economy and weakens their symbolic recognition in coastal governance. The shift to inland market centers for seafood collection disconnects women from ocean spaces and exacerbates their marginalization. This is consistent with findings that women's contributions in tourism are poorly recognized at professional levels (World Tourism Organization, 2019) and that men disproportionately access state aid (Rao et al. 2019) and seed system channels (Otieno et al. 2021). Women may be excluded from assistance because their work is viewed as secondary or unproductive (Myeni et al. 2019, cited in Dibakoane et al. 2022).

3.4.3 Economic and non-economic losses

The photo voices also illuminated forms of loss that extend beyond direct income. Drought-induced scarcities of coconuts and other produce disrupt culinary traditions central to women's identities and food businesses. Participants expressed pride in culinary heritage, yet scarcity of ingredients erodes traditions passed down through everyday cooking and food service roles. This resonates with the debate on non-economic loss and damage (NELD) under the United Nations Framework Convention on Climate Change (UNFCCC, 2013). While NELD categories include cultural heritage, local knowledge, and biodiversity, institutional attention tends to prioritize losses that can be economically quantified (Hirsch et al. 2017).

At the study site, non-economic losses are closely linked to economic outcomes. Coconut, a key farm product, supports women's businesses by reducing operating costs in food services. Scarcity of coconuts and other crops therefore undermines women's ability to sustain both livelihoods and cultural identity. This intersects with broader debates on gastro-tourism, where food heritage is central to tourism markets. Bowlby et al. (1997) note that household resources such as crops shape gendered hierarchies within families. Their scarcity diminishes women's capacity to challenge economic domination and reinforces inequalities. It is important to note that while economic and non-economic losses are often presented as separate categories, they can also be understood as different perspectives on the same processes of loss. Economic losses capture the quantifiable, financial aspects, whereas non-economic losses reflect the more intangible, experiential dimensions. Rather than being mutually exclusive, these perspectives may be complementary in the context of coastal tourism. Recognizing both economic and non-economic losses is therefore critical for designing climate and tourism responses that are equitable, culturally grounded, and inclusive of women's knowledge and contributions.

Through women's photo voices that illustrate how economic and non-economic climate induced losses are intertwined, the study advances debates in tourism-climate research by reframing adaptation as more than a matter of economic resilience. For example, loss of cultural continuity, loss of recognition, are shown as constitutive of women's vulnerabilities, and not secondary to economic impacts. Photo voice's feminist orientation, as Pierce (2020) shows, is suited to capturing such overlooked dimensions, as it privileges lived experiences and elevates participants from being subject of inquiry to active involvement in research steps.

3.4.4 Policy implications

Findings from this study point to the need for policy approaches that address both material and symbolic dimensions of climate impacts on women in coastal tourism. First, recognition of non-economic losses, such as the erosion of culinary traditions and displacement from coastal workspaces, should be integrated into adaptation frameworks alongside economic considerations (UNFCCC, 2013; Hirsch et al. 2017).

Secondly, adaptation measures such as seawall construction require gender-sensitive assessments to prevent further exclusion of women's informal enterprises from coastal spaces. Planning processes should balance the protection of large-scale tourist infrastructure with safeguarding community access and livelihoods (Owusu-Daaku, 2018). Current evidence of interventions that have maladaptive outcomes (Parr et al. 2024), show the need of scrutiny of interventions prior to implementation.

Thirdly, strengthening local seafood supply chains is critical for women's participation in the tourism economy. This includes supporting artisanal fishers through fair regulation, protection against industrial competition, and provision of appropriate technologies that enhance their resilience (Ochiewo et al. 2020; Sumaila and Tai, 2020).

Finally, governance structures in the blue economy need to create avenues for women's direct participation in decision-making. Policies that prioritize women's knowledge, and that acknowledge their economic and non-economic contributions, will foster more inclusive and equitable adaptation strategies (World Tourism Organization, 2019; Rao et al. 2019; Otieno et al. 2021).

3.5 Conclusion

By applying photo voice as a participatory method, this study was able to reveal less recognized details of how impacts of climate change are experienced by women in coastal tourism. Use of photo voice in this study, allowed collection of socio ecological information relevant to ocean economy, whose results contributes to conceiving non-economic loss from climate change, and exchange between these losses as experienced by women, relevant to coastal tourism, where concrete actions are needed as part of efforts to advance gender equity in ocean economy. Non-economic losses are really pressure points at grassroots levels, while economic losses commonly associated with macro indicators, e.g. GDP, which for tourism, has not been a panacea for host community development. Studies can employ participatory methods, e.g. photo voice, to make a case for what non-economic loss and damage means for climate sensitive sectors in coastal and ocean economy.

Geographic space is central to gender inequality in coastal economies because access to specific locations along the shoreline determines both livelihood opportunities and political recognition. Women's economic activities, such as small-scale trade and services, depend on proximity to the coastline, yet climate change and tourism development are displacing them

from these spaces. When women lose access to these spaces, they miss out income opportunities, and risk being excluded from local governance structures such as Beach Management Units (BMUs), that draw legitimacy from direct connections to ocean spaces. It is thus important to safeguard women's physical and institutional access to the shoreline, as environmental stressors coupled with tourism development reshape it. This can involve formal recognition of women's roles within community-based coastal management bodies, and mechanisms that equally safeguard their participation in climate adaptation planning.

The ocean, coastal shore, and farm fields, are shown as important contexts linking women's activities with the tourism value chain. The situation of climate change at the study site shows that women's access to economic capital, plus symbolic recognition of spaces organizing their work, are critical in shaping their influences within tourism in marine environments. At the study site, there is growing uncertainty of climate change destabilizing boundaries for spaces organizing women's work, thereby relegating their involvement in ocean economy to the periphery. Emerging themes in this study's photo voice analysis, draw from both social and environmental dimensions, to give examples that show how gender inequalities in coastal tourism may inform subordination of women's climate change knowledge. Loss of political agency is shown in women's detachment from male dominated ocean governance structures as a result of displacement of their trading activities further from the coastline, due to rising ocean waters or climate impacts on marine biodiversity. By displacing women from coastal spaces, climate impacts erode their economic livelihoods and political agency, as exclusion from ocean-based institutions like BMUs severs the spatial and social ties through which recognition and influence in the coastal economy are conferred.

CHAPTER FOUR
Gender, Tourism, and Climate Change in Coastal Kenya: Exploring Interconnections through Mental Models

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Abstract
Tourism, a fast-growing sector in ocean economy, features strong female workforce participation. Given disproportionate climate impacts affecting women, this workforce underscores the sector's heightened sensitivities to climate threats, which are often gendered and shape tourism's climate vulnerabilities. Our study uses mixed methods to examine the interplay between gender, tourism, and climate change, from the perspective of both a local tourism-hosting community and tourism policy makers. We employ participatory mental modeling, complemented by a review of policy documents, to capture diverse views on vulnerabilities and solutions at the intersection of tourism, gender, and climate impacts. Mental modeling reveals not only quantitative differences but also distinct ways participants conceptualize gender-tourism-climate nexus, shaped by their roles in public (policy), productive (tourism), and reproductive (women's domestic) spheres. These conceptualizations are closely tied to respondents' primary places of association, -sea, shore, or home, reflecting status quo access and occupational roles for men and women in coastal tourism. Applying a Feminist Political Ecology lens, we show that prevailing power structures filter out gendered knowledge from climate decision-making. Our findings demonstrate that overlooking gender issues in decision processes leads to less effective adaptation in coastal tourism. By identifying where and how knowledge is excluded, our research provides actionable insights for integrating gender perspectives into policy and practice. This approach enables more inclusive, effective solutions for climate resilience in coastal tourism, offering a clear pathway for change in both policy development and on the ground adaptation strategies.
Keywords: tourism, Feminist, Coastal Economy, Women, Policy

4.1 Introduction

This paper explores how tourism, gender, and climate change intersect, focusing on how these issues are imagined and experienced by a local community engaged in tourism, in Kilifi, Kenya's coast, as well as by policy actors in the region. In doing so, it draws on the view articulated by (Robbins, 2004) that environmental changes and processes reflect human imagination. Thus, the paper refers to individual mental models to capture this imagination, considering that mental models are "internal constructs that provide interpretation and structure of an external environment" (Halbrendt, et al., 2014) (p. 51). These models are frames of reference in people's minds, and may be held individually, or shared across groups, in their knowledge about the external environment. The interest in this paper is to identify from mental models the intertwined connections of climate change impacts and gender within the tourism system, especially the pathways these impacts take through; different hazards; exposure points in populations, infrastructure, and ecosystems; vulnerabilities; and eventual risks for coastal tourism.

Much tourism development is in climate sensitive coastal areas, forming a significant part of the ocean economy. Globally, tourism dominates other ocean economy sectors, e.g. aquaculture, fisheries, maritime transport, in view of ocean economic output and overall employment (OECD, 2025). Here, coastal tourism sustains livelihoods while relying on fragile marine environments exposed to climate change impacts. Rising sea levels, changes in precipitation patterns, increased temperatures, and extreme weather events, represent some of the pressing climate change impacts facing coastal areas (Jarratt & Davies, 2020; Moreno, 2010; Soontiens-Olsen et al. 2023). These changes threaten tourism infrastructure, ecosystem services, and community livelihoods (Simpson et al. 2008). For example, increased rainfall can result in flooding, especially in areas with poor drainage systems, with implications for human mobility and health. For populations exposed to these hazards, existing inequalities, e.g. wealth inequality, make a difference on the severity of impacts experienced between those who have resources to proactively address looming risk, and those who have no capacities for action.

Within the ocean economy, environmental risks, especially climate threats to ocean health are experienced differently across genders (Wabnitz et al. 2021). Despite this, research on gender within the ocean economy remains scarce (Wabnitz et al. 2021). The focus on tourism within the coastal economy compounds this scarcity, as gender issues have long been minority and marginal interest for tourism scholarship (Pritchard, 2018). In particular, Eger et al. (2022)

highlight the marginalization of gender studies in tourism research, due to misconception that the field deals only with women issues. Consequently, gender considerations receive minimal attention in studies examining climate change and tourism, e.g. as noted by Equality in Tourism (2024). The idea for our study emerges from gaps in tourism research overlooking gender questions (Eger et al. 2022; Pritchard, 2018), which in Africa, coincides with the gap for tourism research in the continent to examine "in-depth, location specific and community level research into climate change and tourism" (Hoogendoorn & Fitchett, 2018, p.12).

In this context, our research is guided by an overarching question: How do mental models reveal intersections of gender and climate change within the coastal tourism system, and how do these understandings differ across women, men, tourism practitioners, and policy actors? Three sub-questions refine this inquiry:

1. How do mental models illustrate gendered climate risks faced by women in tourism work, especially through economic dimensions such as employment and earnings?
2. In what ways do the mental models of women and men, as well as those of tourism practitioners and policy actors, differ in their understanding of climate risks in coastal tourism?
3. How do participants mental models reflect gendered environmental knowledge, gendered resource relations, and gendered agency?

The research draws on Feminist Political Ecology (FPE), as an interpretive framework for analysis of results, and its key themes (Rocheleau et al. 1996) are explicit in guiding the framing of third sub-question of inquiry. The paper proceeds as follows: The next section reviews tourism research on climate change. It is followed by a section that situates the study in Kilifi, Kenya's coast, highlighting local climate impacts on marine environments. Aforementioned are within this chapter's introduction section. The methodology comes separate and explains the use of mental modelling and FPE. Study results section focuses on mental model data that shows gendered climate change risks, differences in mental models from study participants, and influence of FPE core themes on mental models. The discussion refers to FPE literature, to explain the results. The study's conclusion reflects on the implications for climate-resilient tourism and gender responsive policy.

Tourism research on climate change

East Africa will experience continued warming and changes in precipitation, posing risks to coastal economies. For instance, by mid-to-late century, the number of potentially lethal heat days per year could rise sharply, from fewer than 50 today to as many as 150 - 350, with the

largest increases projected along the coast (IPCC 2022, p.1327). The short rains in October, November, December, are likely to intensify, e.g. longer duration, or increased total rainfall of more than 100mm on average under high warming scenarios, posing flooding risk in low lying coastal areas (IPCC 2022, p.1328). For Kenya's coast, including Kilifi, our study site, these projections pose challenges for tourism, including but not limited to; heat stress posing health risks for local community as well as tourists; flood risks resulting to infrastructure damage; and changes in precipitation disrupting scheduling outdoor tourist activities.

Scott et al. (2012) argued that tourism's slow integration of climate considerations makes it among the economic sectors least prepared for risks (and opportunities) posed by climate change. Similarly, a review by Becken et al. (2020) representing 61 countries shows climate change is not a priority focus for tourism policy makers, highlighting a disconnect between policy and climate risks facing tourism. Becken & Clapcott (2011) give the example of this shortcoming in climate policies formulated at national levels not necessarily addressing the needs of economic sectors like tourism. Thus, perspectives from policy actors are relevant to our paper, as we explore not only if they recognize climate threats to ocean health, but if they imagine its connections with tourism, both as an activity exposed to and affected by these risks, to question how effective policy interventions for coastal economy are.

While assessing conduciveness of the policy environment for tourism adaptation to climate change, Wong et al. (2013) outline the following four categories of impacts of climate change to tourism, that need commitment of decision makers on the sector's adaptation agenda:

- Direct impacts to changes in tourist flows, that may be due to changes in weather patterns, diminishing aesthetic value of outdoor and nature-based products, and/or infrastructural damage that may be caused by extreme weather events.
- Indirect environmental impacts, for example reduced biodiversity, increase in vector-borne disease, and water shortages.
- Impacts on tourist mobility due to concerns for safety in areas prone to extreme weather events, or long-haul travel losing its appeal with policies to reduce aviation's carbon footprint.
- Indirect impacts on society. This includes consequences to the destination hosting tourism, attributable to economic, political, or developmental challenges brought about by a changing climate.

Besides the impacts outlined by Wang et al. (2013), it is important that climate policy takes into consideration climate inequality in tourism sector, for justice and equity in responses. This is necessary when current climate risks for tourism illustrate the imbalanced distribution of burdens between tourism source markets and destinations. Data from UN Tourism (2024) (*formerly* United Nations World Tourism Organization-UNWTO), shows European Union (EU) outbound travel holds a consistently dominant share of tourist arrivals to countries in the Western Indian Ocean (WIO) region (countries along Africa's coastline to the east bordering the Indian ocean). Long haul travel between these regions directly contributes to tourism's transport related carbon emissions, the main source of the sector's greenhouse gas emissions (Lenzen et al. 2018).

For majority of Western Indian Ocean (WIO) countries, including Kenya, socio economic vulnerabilities to climate risks are high, coinciding with high inequality (European Commission, 2025). What is at stake for these countries with considerable dependencies on climate sensitive coastal tourism (Kepher-Gona et al. 2024), is the intensifying of social and economic disparities. Vulnerable populations exposed to climate risks and have limited financial and other resources for action, for example the situation of resource poor women. In Conference of Parties (COP) meetings to the United Nations Framework Convention on Climate Change (UNFCCC), African countries have negotiated to prioritize climate adaptation financing, and more recently compensation through loss and damage mechanisms, citing devastating effects on livelihoods and economic sectors. Critical questions remain whether these efforts to access such resources, and actualization of such access, effectively translate to localized support attuned to plight of vulnerable populations living through climate crisis. In this regard, comparison of mental models between local tourism community and policy actors, serves to present data to shed light on the question with focus on tourism.

Climate change has potential to impact on the seasonal rhythm of tourism, which is already a source of precarity for those in informal tourism sector. The seasonal nature of tourism in coastal Kenya forces local tourism hosting communities to ramp up during peak season and scale back when demand falls. With climate change impacts posing increasing challenges for tourism sector likely to downscale destination activities, the need for effective adaptation is urgent. For Loehr et al. (2020), managing climate risks through maintaining or enhancing ecosystem health, is at the core of destination adaptation in tourism. Their research conceptualizes tourism as a socio ecological system (SES) with intricate interweaving of

environmental and socio-cultural processes in destinations and identifies opportunities that systems thinking can afford tourism and climate change research. According to the authors, systems thinking which is still limited in tourism and climate change research, can allow multi-disciplinary insights about how systems react to internal and external influences, e.g., climate challenge, providing a platform for examining anticipatory adaptation in the sector. Loehr et al. (2020) develop the Destination Ecosystem Based Adaptation Framework (DEAF), based on "the theory of SES and the hypothesis that tourism stakeholders can apply *Ecosystem based Approaches* to generate multiple systems benefits including climate resilience and destination well-being", (p.6). This framework considers outcomes for destination wellbeing, adding to contributions of other frameworks important for tourism adaptation to climate change.

Earlier on, Njoroge (2014) introduced the concept of sustainable adaptation to climate frameworks in tourism, building on and critiquing the Regional Tourism Adaptation Framework by Jopp et al. (2010), for overlooking the fact that not all adaptation options are sustainable. For Jopp et al. (2010), tourism adaptation to climate change has to factor in regional dynamics, hence their framework, "Regional Tourism Adaptation Framework", allowing for region specificity. For Njoroge (2014), the emphasis is that without consideration of sustainability in the framework by Jopp et al. (2010), tourism risks mal adaptation, i.e. adaptation pathway(s) that could have non-desirable outcomes for other(s) or self.

As much as both frameworks by Jopp et al. (2010), and (Njoroge, 2014) can be useful in destination preparedness for climate risks, they seem distant in connecting to communities hosting tourism, an aspect which (Loehr et al. 2020) give salience to anchoring their framework to outcomes for destination wellbeing. While sharing common ground with the outcomes of DEAF, this study emphasizes role of grassroots agency in shaping well-being within SES. It applies participatory methods for its fieldwork, to provide locally grounded understandings of how climate risks in destinations are experienced from local perspectives, which can complement application of DEAF.

4.2 Methods

This study uses mental modelling as a participatory method to collect diverse information on gender in tourism climate change nexus in Kilifi, Kenya. Foundational and early research on mental models (Craik, 1943) (Gentner & Stevens, 1983) defines them as an individual's internal picture of how a system works and how its parts are connected. Researchers use elicitation methods to externalize them, because they internally in the minds of people. Common methods include interviews, sorting tasks, and cognitive mapping (Jones et al. 2011). Interviews allow participants to describe their imaginations in their own words, whereas sorting tasks to elicit mental models shows how they prioritize different issues. Cognitive mapping uses diagrams to visualize concepts and connections between them. Our field work combined interviews and cognitive mapping to elicit individual mental models, co-constructed by the researcher during data collection.

Mental models can be structured into semi-quantitative Fuzzy Cognitive Maps (FCMs). Originally developed by (Kosko, 1986) and later applied in participatory research (Özesmi & Özesmi, 2003) (Özesmi & Özesmi, 2004), FCMs quantify strength of connections shown on a cognitive map. Variables, or components, or nodes in these maps represent elements that can increase or decrease, with causal relationships between them. Relationships are assigned a positive influence for a change effect that increases, and negative for one that decreased. Simultaneously, strength is assigned to these relationships, measured using fuzzy estimates, which for our research was estimated as (low = 0.2, medium = 0.5, high = 0.9). This approach allows to capture structure and intensity of perceived variable interactions in mental models.

Mental modelling is relevant for complex decision processes, because it integrates diverse knowledge while avoiding imposition of externally designed policies. As Hely-Shepard et al (2016, p.110) argue, the method "maintains integrity of complex human understanding", while synthesizing knowledge from multiple stakeholders. This is essential for sensitive issues like climate adaptation, where cooperation is necessary, yet governance overlooks local knowledge systems (Berkes, 1999; Forsyth, 2003). This oversight can lead to rejection of externally imposed interventions at community level.

Pilot study

A pilot study in April 2022 involved eight tourism practitioners and two community leaders. Through open-ended mental modelling interviews, they described observed climate change effects and their implications for tourism. The results informed a word bank of concepts used in subsequent interviews to ensure comparability of variables across maps. This process corresponds to "scope setting" in mental modelling, where predefined concepts help frame maps (Jong & Kok, 2021).

Field work

Data was collected between January and April 2023. Studies employing mental modelling show varied numbers of respondents, e.g. 23 in a study by (Furman et al., 2021), 11 in a study by (Whitley, et al., 2017), as saturation had been achieved at these numbers. Sampling in Kilifi continued until saturation was reached, meaning now new concepts emerged from additional interviews. Saturation occurred at the 36th interview, but the study proceeded to include 49 participants (Figure 4.1). Each modelling interview in Kilifi lasted 30 minutes to one hour. Participants constructed individual mental models by identifying variables, specifying their interconnections, and assigning direction and strength of influence. Respondents map-building was guided by interview questions, as in (Özesmi & Özesmi, 2004; Jong & Kok, 2021). The modelling interviews were audio recorded with consent from respondents, to capture their explanations made when introducing and linking variables to a map, as well as any other relevant information.

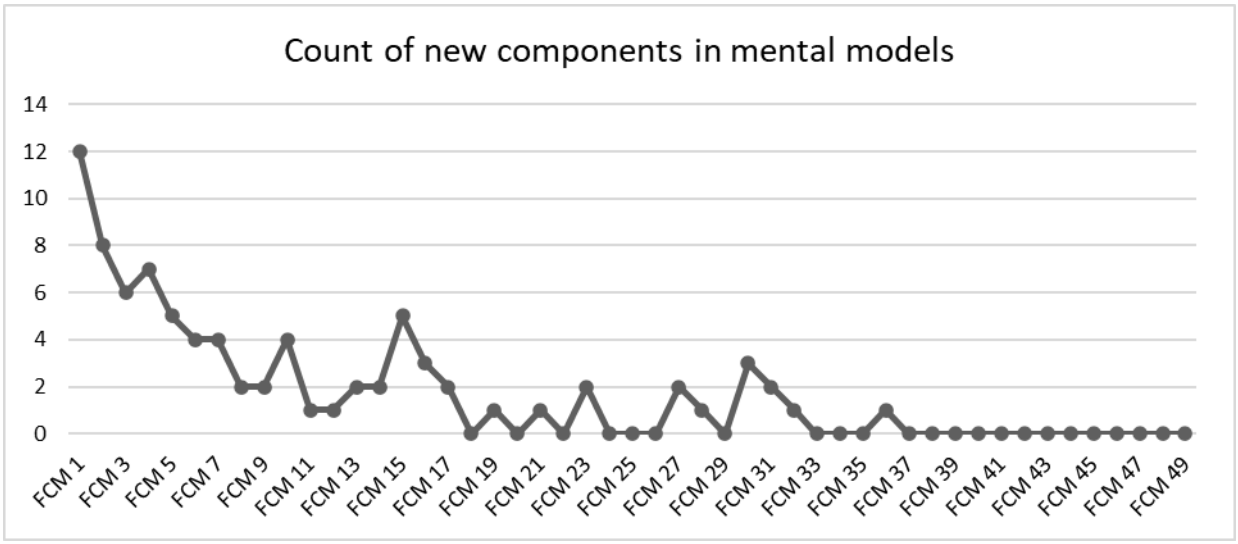

Figure 4.1: Component saturation in mental modelling process.

Prior to the main task, participants were introduced to mental modelling through a brief orientation exercise. Given that interviews were conducted in both English and Swahili, key terms were defined and translated in advance. Collaborators helped refine Swahili terminology for climate change, balancing common expressions such as *mabadiliko ya hali ya hewa/anga* (word to word translates to changes in weather patterns, but could mean climate change) with the more precise but less familiar *mabadiliko ya tabianchi*.

To orient the mental models to coastal tourism, four starting variables were provided: numbers of tourists visiting, numbers of tourists in ocean recreation activities, community financial well-being, and women's livelihood opportunities. These variables reflect established tourism performance indicators (Scott & Gössling, 2022; UN Tourism; Kenya national tourism reports), and the recognized involvement of women in tourism sector. Study participants were then asked to connect these starting variables, add new ones if they wished to, and specify causal relationships with strength and direction of each relationship.

After completion of tourism system maps, study participants were prompted to incorporate climate change variables. One pilot derived variable, unpredictable rain seasons, was introduced to the maps to facilitate discussion. Participants then described climate change effects observed in the past decade, anticipated impacts over the next 20 years, and implications for women, local communities, and tourism. Finally, they were asked to identify adaptation strategies, defined as any ongoing or desired responses to effects of climate change.

Qualitative dimension

Although the mental models generate quantifiable data, our study also emphasized the qualitative narratives provided during interviews. Participants often explained why they connected particular variables or illustrated variable relationships with local examples. Such qualitative insights add contextual richness that is minimal or lacks in studies relying solely on quantitative metrics, e.g. (Furman et al. 2021; Gray et al. 2015; Nabong et al. 2022; Nyaki et al. 2014). Additional prompts encouraged reflection on embodied experiences, for example asking, "How would you be affected in this situation?". These narratives deepened interpretation of the constructed maps and made the modeling process more conversational.

Sampling

Purposive sampling was employed to capture diverse perspectives across gender, and institutional positions. Respondents included national and county government actors stationed in Kilifi County (n=17), as well as local tourism practitioners in hospitality, tour guiding and retail (n=32). The sampling grid ensured representation of both women and men, though our study reached more women engaged in hospitality and retail, consistent with patterns documented in literature. Attention to heterogeneity was essential, as ignoring differences in socio-ecological dynamics can hinder conservation and adaptation efforts (Nyaki et al. 2014).

FPE lens

The study applied FPE framework (Rocheleau et al. 1996) to interpret gendered dimensions of tourism and climate change adaptation. FPE merges insights from feminist theories with political ecology to elucidate gender as a key variable in ecological and social relations (Rocheleau et al 1996). Addressing key themes on gendered environmental knowledge, gendered rights, and gendered grassroots activism (ibid), FPE challenges standardized processes in SES that may be innately biased on patriarchy and result in oppressions on women, nature, and others. Within tourism studies, FPE has been used to examine gendered access to resources, power imbalances, and marginalization of women's voices (Cole, 2017; Ramon-Hidalgo & Harris, 2018). This perspective informed both the sampling strategy, use of mental models as a participatory method to capture diverse knowledge, and interpretation of findings, ensuring that women's voices were not overlooked.

Policy document review

Complimenting mental modelling interviews, a thematic analysis of policy documents was conducted to identify how climate impacts, vulnerabilities, and adaptation strategies are framed in governance. Kenya climate change policies comprise a range of instruments serving different purposes, including an action plan for implementation, a bill for enforcement, an Act for legislation, and strategic plans for guidance, some at national and some devolved government levels. Those considered for this analysis are at national level (Table 4.1) .

Table 4.1: Kenya's policy framework for national climate change.

Policy	Description
National Adaptation Plan (NAP) 2015-2030	Sets out priority adaptation action across key planning sectors.
National Climate Change Action Plan (NCCAP) 2018-2022	Sets out adaptation and enabling actions for the five-year time frame.
Adaptation Technical Analysis Report (ATAR) 2018-2022	A planning tool for adaptation across different sectors.
National Climate Change Framework Policy (2018)	Aiming at integration of climate change into sectoral processes.
Kenya Climate Smart Agriculture Strategy (2017-2026)	Focus on agricultural systems with planned actions for enhanced food security.
Kenya's Nationally Determined Contribution (NDC) (2016)	Includes adaptation contributions and is submitted to the UNFCCC.
Climate Change Act 2016	A framework for climate change governance in Kenya.
National Climate Change Action Plan (NCCAP) 2013-2017	Established to operationalize the National Climate Change Response Strategy (NCCRS).
National Climate Change Response Strategy (NCCRS) 2010	First national policy document on climate change.

4.3 Results

4.3.1 How do mental models illustrate gendered climate risks faced by women in tourism work, especially through economic dimensions such as employment and earnings?

Participants mental models show women's employment and earnings are negatively affected by climate change (Figure 4.2). This is compounded by women's livelihood opportunities having dependencies on tourism, yet the sector is directly exposed to climate change impacts. For instance, the study site has two rain seasons, March, April, May and October, November, December, which fall outside the peak tourism seasons. Interviews reveal that an early onset of rain disrupts outdoor tourist activities, rendering roads impassable, resulting to early departure of tourists visiting. This unpredictability shortens the tourist season and presents a challenge to marketing plans firmly fixed outside rain seasons. The strength of influence from climate impacts and tourism as drivers shows individualized links, as it is a mix of low, medium, and high influence (Figure 4.2).

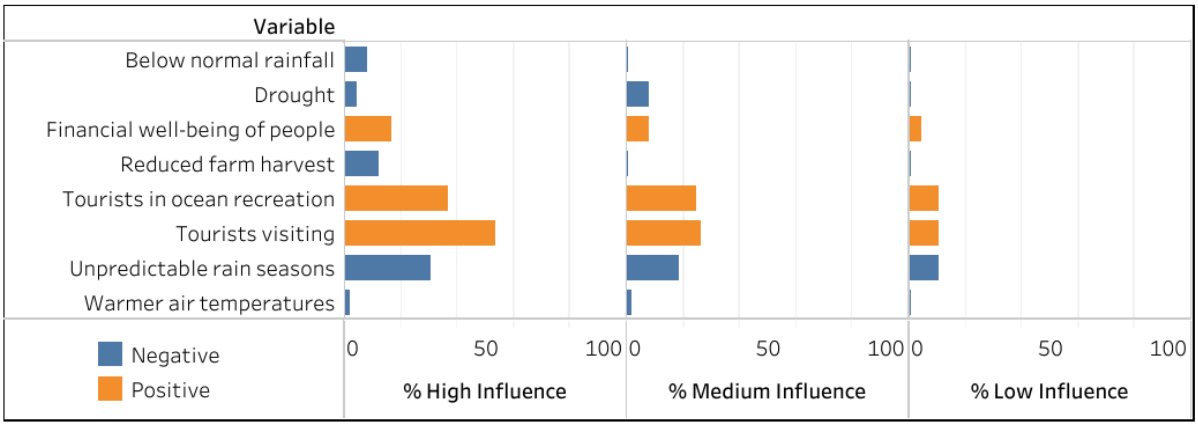

Figure 4.2: Direct influences on livelihood opportunities for women, as shown by share of mental models.

4.3.2 In what ways do the mental models of women and men, as well as those of tourism practitioners and policy actors, differ in their understanding of climate risks in coastal tourism?

a) Structure of mental models.

Differences in mental model structures were observable by participant's professional background and not by participant's gender (Figure 4.3). Policy participants have a higher number of components and connections in their models compared to tourism participants.

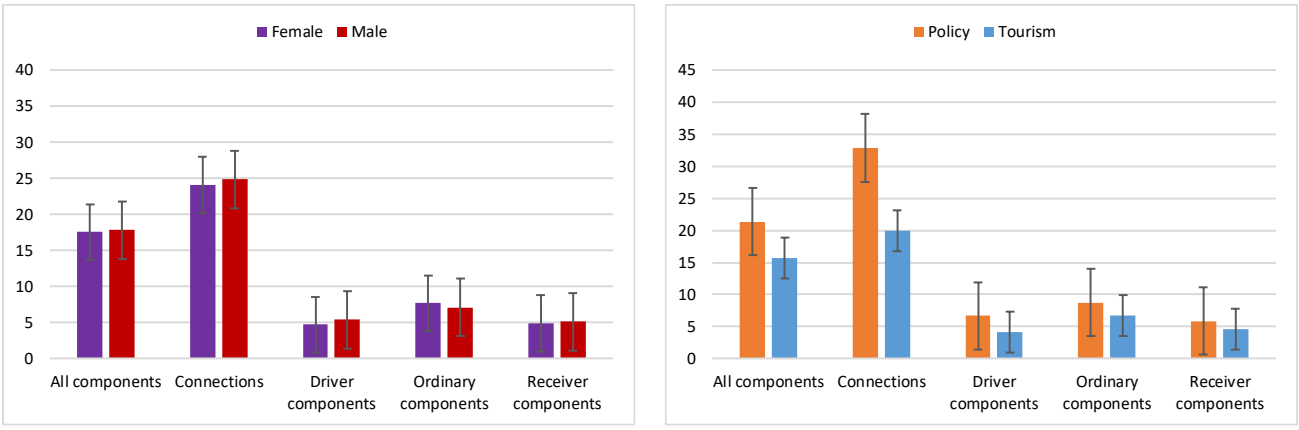

Figure 4.3: Mental model average characteristics (±SE) by participant's gender and employment background

Driver components are characterized by their outdegree strength (how many other variables a particular variable influences), receiver components by indegree strengths (how many variables are influencing this variable), and ordinary components exhibit both outdegree and indegree influences (i.e., an ordinary component influences and is influenced in equal measure). Centrality scores show the importance of a variable (in terms of connectivity and influence) in mental models.

b) Participant's view of tourism from mental models.

Mental models confirm local population has strong dependency on tourism (Figure 4.4). The pattern is similar when all models are pooled, that livelihood opportunities for women and financial wellbeing of people are high in indegree scores while tourist numbers are high in outdegree scores. Compared to tourism participants, policy participants report lower centrality and outdegree of tourist numbers, particularly for ocean recreation activities. This indicated that policy stakeholders did not recognize the strength of the marine tourism sector, as it was not seen at all as a driving force in the system, nor central in policy mental models. No major differences are noted between female and male participants.

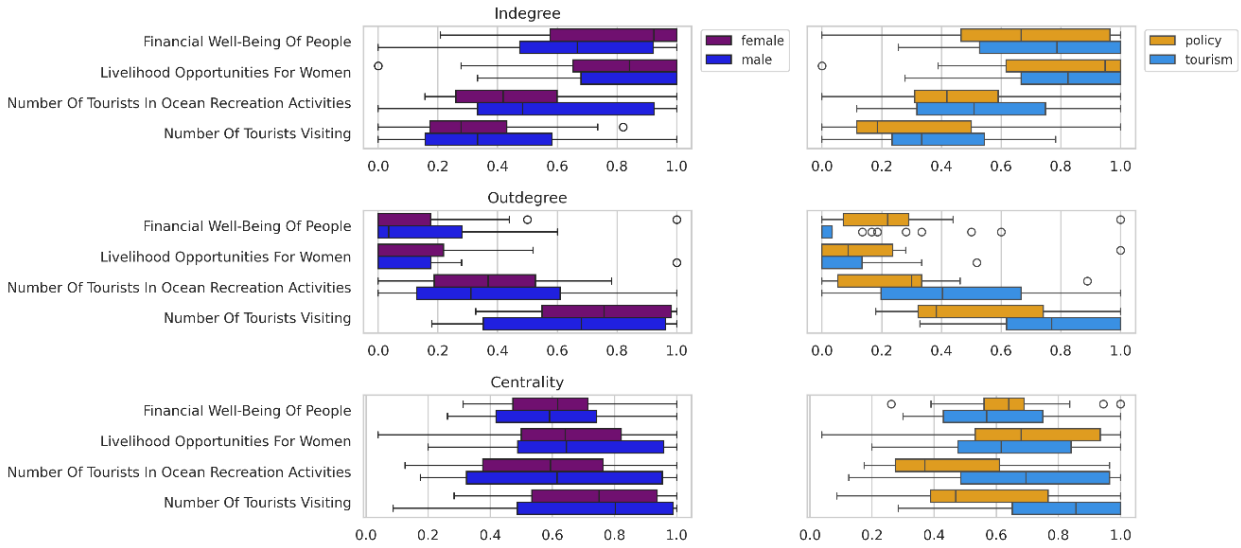

Figure 4.4: Indegree, outdegree, and centrality of tourism variables ≤ 1

While quantitative results suggest a pattern of dependency from tourism (Figure 4.4), qualitative data from modeling interviews shows diverse ways this pattern is experienced. Besides benefits in tourism earnings, local communities have also benefited from charitable donations made by tourists. However, as the excerpts translated from Swahili to English illustrate, these donations have declined significantly due to reduced visitor numbers during the COVID-19 pandemic. Tourist donations, typically facilitated through organized village visits, marketed as part of tourism experience, have historically helped distribute the economic benefits of tourism beyond the primary coastal attraction sites, as one participant described:

> "When the white people come, they come to our villages, the big boys pick them from ocean recreation, they want to come see the villages. They have taught them the habit of giving villagers flour, sugar, even if it's one kilo of flour and a quarter of sugar, beans, whatever" (WT 36, female, tourism)

yet the decline in tourist numbers has curtailed these informal support systems, with another respondent reflecting that:

> "When I was a young girl, sometimes when seated outside, visitors would call us, sometimes give out a t shirt and a pen, but not anymore" (WT 8, female, tourism);

This reduction in both tourist arrivals and associated charitable giving is further compounded by environmental stressors, such as decreased rainfall, which are anticipated to intensify with ongoing climate change, underscoring the vulnerability of local livelihoods to both economic and climatic fluctuations.

From the interview excerpts, it is evident that economic differences within tourism depend on whether an individual's job is directly tied to core ocean- based activities or supports these primary roles. Those with jobs anchored on ocean-based activity are the primary earners from tourism and share this benefit with the rest. The ocean front is important for activities that generate income for women, who operate makeshift beach stalls, run restaurants that specialize in in local cuisine, and participate in regenerative tourism through mangrove restoration. For women, reliance on tourism earnings is cross-generational, supporting both themselves and their families. As one respondent explained:

> "We are not the only ones using this ocean money. When I get this money, I can share it with up to five people up there. There are women with their trading stalls. There are women who sell spinach. And they have families" (WT 12, male, tourism).

Another interviewee further emphasized this interconnectedness:

> "There are some women working here at the ocean, they sell *pareo*[1], they sell beads. …There are others up there, doing their business up there. They depend on us to earn, so that we buy from their stalls, and they benefit. Without us earning, they do not earn" (WT 10, male, tourism).

Interviews provide context on locations from which local people tap onto benefits from tourism. Participants described locations for their work in tourism using the terms "up" and "down", which were translations of original words stated in Swahili language. The use of these words revealed geographic separation between places where women and men work. "Down", referred to areas very close to the ocean, and where tourists were. This was commonly mentioned in relation to men's work. "Up" was used to describe locations which were quite distanced from the coastline. Most women's work was associated with "up" location.

c) Variables commonly associated with study site.

Besides the 5 starting variables that were fixed to each mental model, this study identifies other variables commonly associated with the study site. The goal was to explore patterns on

what was included in participant's mental models, and identify what components appeared most frequently across different participant groups (Figure 4.5). For each group, a list of top ten components commonly included in mental models was made. These patterns help to shed light on how the relationship between gender, tourism, and climate change is conceptualized across the minds of participants. It is important to clarify that not all components included in mental models made it to the top ten list. These lists are meant to bring out the components of the system that are most prominent in participant's thinking, for broad comparisons that are explored in more depth in the next section.

Figure 4.5: Top 10 most frequent variables presented in mental models, by participant's employment background (A) and gender (B)

Both adaptation and climate change variables made it into the list of most frequently mentioned components across all mental models, taking into account the system components in the individual mental models. These results show different priorities between policy and tourism participants, as well as between female and male participants. Drought regularly appears in women's, not men's, mental models. Policy actor mental models miss out connections between ocean risks and tourism, as their top list lacks ocean related variables, contrasted to that of tourism practitioners.

[1] A wrap-around rectangular piece of printed cloth, sold by women to beach goers.

4.3.3 How do participants mental models reflect gendered environmental knowledge, gendered resource relations, and gendered agency?

a) Gendered environmental knowledge

This study finds clear gender differences in how the environment in terms of climate change and tourism is imagined by study participants. Women's mental model interviews transcripts frame drought in terms of social consequences to households and families. They describe drought as a driver of household food scarcity, school exclusion for young girls, teenage pregnancies, and early marriage:

> "There has been a drought, to a point that in Ganze young girls were being sold, people have had problems. Give the family about three thousand [about 23 Euros] and you will be given a girl. When a girl is married, at least there she will no longer have problems where she is married, she will be getting food. They were doing that." (WT 34, female, tourism).

One participant mentioned the problem of teenage pregnancies in connection with household food scarcity:

> "We have nothing when there is drought, no food, and then for our children, incidences of early pregnancies. If you, the parent, do not have anything to provide for the child, you tell them to get food on their own. Where will they get that yet they do not work? …. in the past we used to say *bajaji*[2] riders, but now we have to say, it is a *bajaji*, a *bajaji* has made someone pregnant" (WT 7, female, tourism).

Another study participant highlighted the problem of school exclusion:

> "Everything is difficult because of drought; children now are not going to school. You get a girl who has grown physically and is noticeably bigger than other students, returns to school at lower elementary level grade 2, because she spent some time away from school, because of hunger and drought" (WT 34, female, tourism).

Food and water provisioning being the responsibility of women, puts multiple stressors on top of tourism work during periods of drought. The effects of drought extend to girls, who, as they are socialised into food provisioning roles, bear increased responsibility during periods of scarcity. This heightened burden exposes young girls to additional risks, including child labour, early marriage, and school exclusion, concerns voiced by both male and female policy participants, but highlighted most strongly by women in tourism. This way, environmental stress intersects with gendered divisions of labour to reproduce vulnerability to younger generations.

[2] A brand name for three wheeled vehicles, used for local transport at the study site. Often driven and owned by men.

These descriptions of drought effects emphasise that women connect environmental stressors to social consequences on family and community well-being. This is also shown in a separate example describing the effects of sea level rise, where women also spoke of flooding of homes along the shoreline. They also spoke on its impacts at domestic spaces:

> "Houses by the shore are covered by water. Ocean waters are breaking their borders. There's a beacon marking the land boundary for a certain man, it's now submerged under water. Initially the beacon was on dry land, now it is surrounded by water" (WT 4, female, tourism).

In contrast, men's mental models rarely had drought among their central concerns (Figure 4.5). Instead, men tend to focus on broader environmental changes, e.g. the need for tree planting, water scarcity, and the loss of vegetation cover as primary concerns. One participant noted:

> "Underground water is drying up, then forests dry up naturally" (WT 42, male, tourism).

Reflecting on recent changes, another participant explained:

> "Those past years, we had a problem, before I came here. If you were to stand outside this gate, you could see across the ocean. All these trees were not there, these trees growing here. We planted all these trees, these small ones, it was quite hectic. There were no trees at all. There was nothing at all, if you stood there, you could see people fishing" (WT 44, male, tourism).

These perspectives highlight men's orientation towards landscape level interventions, rather than household vulnerabilities.

Coconuts serve as a shared environmental indicator across both groups, but with distinct meanings. Men view withering palms and reduced yield as pointers of changing climate. As one male participant observed:

> "I see trees dying anyhow, coconuts are not bearing fruit, the land becomes dry" (WT 2, male, tourism).

Women emphasize coconut's central role in food preparation and sense of pride in culinary heritage. These differences show that different gender roles shape environmental knowledge.

b) Gendered resource relations

Built sea walls generate gender differentiated forms of conflicts around access, mobility, and livelihoods. This is because of local tourism investor groups securing control of access to the beachfront at the expense of local community members. For women, their concern is mobility that is restricted by privatized boundaries:

> "When you build walls, we do not have access to get to the ocean freely, because those put up their boundaries, only allow their people (clients) to pass through (WT 24, female, tourism).

An excerpt from a male participant, shows that their concern is presence within coastal economy. Built walls are perceived as a barrier that prevents beach traders from getting a view of tourists and activities at the hotels. This view is important for excursion sellers trading at the beach, who have no formal bookings, but need to be in the know of arrivals, to plan their activities:

> "We are supposed to sit and see hotel activities, not to sit and stare at a wall. We should be able to see inside the hotel, when guests arrive, we see that. But that wall is spoiling that" (WT 12, male, tourism).

Environmental concerns were also raised, questioning the construction of coastal walls:

> "Whoever has thought of building a wall, has built a wall. But is it the right thing to do? It is impacting the turtle nesting sites" (WT 36, female, tourism).

Mangrove restoration work at the study site provides a further example of gendered resource relations. Women nurture their mangrove seedlings on shallow edges of shores, rather than deeper ocean waters. This access with spatial restriction, shaped by norms of women's access to marine environments, undermines effectiveness of their efforts. One participant mentioned that seedlings planted in these marginal areas are vulnerable to drying up during low tide and dry conditions. Thus, while the activity has undertones of expanding women's access to ocean spaces, in practice it reinforces their exclusion from more productive ocean spaces.

c) Gendered agency

Women's everyday practices to resist exclusionary enforcement at the coast constitute significant forms of resistance. Despite the constraints they face, women actively mobilize strategies to defend access to resources. Along the coast, when young men were arrested for trading without licenses, women often intervened collectively to secure their release. The ocean front has some restricted access for locals who must obtain licenses for trading activities by the beach. Study responses showed that licenses are not easily affordable for everyone. The beach area is guarded by law enforcement officers, who often arrest young men found to be working without licenses. Following these arrests down by the ocean shore, it is women, who often come to the rescue of "their children", and their effort illustrate women's agency in defending community livelihoods and resisting exclusionary enforcement practices. As one participant explained:

> "Sometimes you can be arrested down here by the shore, and then taken up there, the women will help you out. They will come out in numbers, asking what the problem is. The enforcement officer will then see no need of arresting you, if that bothers the women, so he will let free their son to go back to work. The women are helpful. Because they know we their children are down here, and if we earn, they too will get to earn" (WT 12, male, tourism).

By defending young men's access to trading spaces, women assert moral authority and local legitimacy over state regulation. Their actions are evidence of gendered dimensions of community resilience and political agency. Women's efforts, however small, still make a difference, and represent new forms of political action, since their ecological strands connect disparate groups along gender, class, and ethnicity. For women and these men, they assert their identities through the way they make a living, mainly from tourism related income.

Women's participation in mangrove restoration also reflects agency, albeit in constrained ways. Women's efforts in mangrove restoration are in line with initiatives to develop ecotourism in the area, which allows tourist activities centered on mangrove planting. Conservation programs often targeted women's groups for participation in these activities, positioning them as key actors in community adaptation. Women's interviews reveal differences in attitudes towards this activity. Mangrove restoration, predominantly undertaken by women at study sites, is described as a form of nature-based adaptation. Yet not all women are eager to participate. One participant noted that preparing seedling nurseries, by spending long hours filling in plastic bags with soil and planting seedlings, is sometimes perceived as "child's play" expressing resistance with externally defined expectations. This perspective shows how gender mediates the value attributed to conservation labour.

> "Some women are not happy with the work involved in setting up mangrove nursery. They say it is childish work; I will not do childish work. It is childish because it is like playing childhood games with soil, it's like you are playing with soil" (WT 28, female, tourism).

Earnings from the initiative are not stable, despite time spent by women in preparing seedling nurseries and transplanting. As this initiative imposes a new routine for women linking to gendered conservation labour, it has implications for their control via inequitable inclusion. Sentiments of dissatisfaction from some study participants involved in this activity shows that gender mediates the value of conservation labour.

d) Policy and conceptual gaps

Our study reveals contrasts between how tourism practitioners and policy makers conceptualize the interactions of tourism, gender, and climate change. These differences have implications on whether adaptation planning prioritizes concerns of local coastal communities.

Meanwhile, policy makers rely on different conceptual vocabularies. The 12 mental models collected from policy makers in Kilifi emphasize terrestrial ecosystems with "disruptions to wildlife populations" making it to top count in their category (Figure 4.5). Policy makers'

mental models were compared with key themes in climate policy documents. Policy makers' views align with views of climate impacts on wildlife, which are prominent in official climate policies. Closely related to tourism are drought impacts to wildlife populations, indicated in ATAR 2018- 2022, which mentions that the Kenya Wildlife Service is concerned that wildlife deaths caused by drought, exceed those caused by poaching. National documents, such as the NCCAP and NAP describe drought as a recurrent national disaster, with devastating economic and environmental impacts. NCCAP 2018-2022 emphasizes drought impacts on Kenya's GDP, citing about 3% drop for periods between 2007 and 2011. These documents also emphasize widespread emergencies and human wildlife conflict. Such framings overlook livelihood and household perspectives voiced by tourism practitioners. Gendered vulnerabilities may be rendered invisible when policy framing does not align with local conceptualizations.

4.3.4 Thematic content analysis of policy documents

The Climate Change Act 2016 requires compliance with the two-thirds gender principle when appointing members to the National Climate Change Council. The NCCAP 2018-2022 and NCCRS 2010 acknowledge consultations with stakeholder groups including women as a social category. These examples of having women in deliberative policy processes, can serve as confirmation that on gender matters, concerns for women are thought of by government planners.

Women show up in policy documents when vulnerable groups are being listed. This pattern is reflected across reviewed documents, where word vulnerable is ever in proximity with women, identifying women as a high-risk demographic regarding climate change impacts. Women are seen as vulnerable because of preexisting gender discrimination, limited resource rights and their primary roles.

The NCCAP 2018-2022 is keen on women's political empowerment and highlights their participation in political processes. Nonetheless, women's participation in policy processes does not necessarily imply their contribution to decisions. This insight can be related to African countries that made effort in having women representation at the United Nations (UN) climate talks. Their aims for gender balanced delegations have not yielded sufficient effort in aligning decisions for climate action to respond to unique needs of women (Figure 4.6), e.g. as reflected in gender scores for Kenya on Sustainable Development Goal (SDG) 13 about climate action. The 2024 Gender Index assessment (EM2030 SDG Gender Index, 2024), shows that the Global average score on climate goal on the Gender Index is very poor,

with Sub-Saharan Africa countries recording the least average among all regions evaluated globally.

The gender index evaluates SDG 13 based on 3 indicators; extent to which delegation representing country to Conference of the Parties (COP) meeting is gender balanced; proportion of women who report that they are satisfied with efforts to preserve the environment; and level of climate vulnerability. Kenya, like other African countries score high on gender balanced climate diplomacy delegations, contrasted with other equality indicators. This comes out as an affirmation of the imprecise notion that participation implies inclusion of voices of the vulnerable in decision making and is a gendered provision.

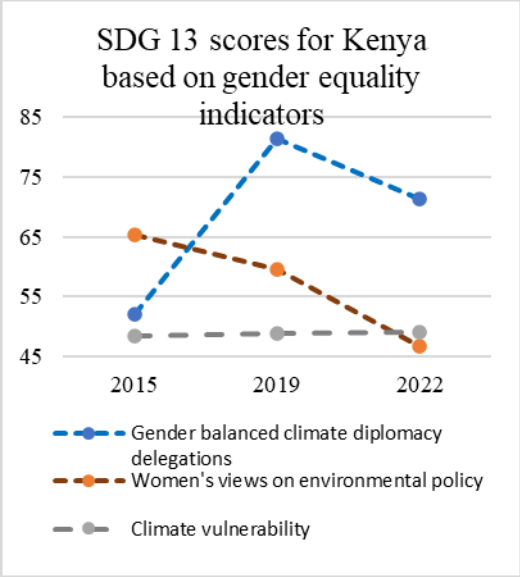

Figure 4.6: SDG 13 Gender equality progress by regions, and highlights for Kenya. Score of ≤100. Data source: EM2030 SDG Gender Index. https://www.equalmeasures2030.org

4.4 Discussion

This section discusses three key themes shown by our empirical findings, to be central to the interactions of tourism, gender and climate change. It details gendered climate vulnerabilities for women, differences in understanding of climate risks, and which understandings dominate amidst differences.

Climate vulnerabilities for women

Women's situation is precarious as they face both climate stressors and social barriers to participate in the tourism economy. This is especially evident in gendered access to the coastline, which limits their participation in tourism related activities, and results to ineffectiveness in their conservation efforts, as shown in mangrove restoration. Climate change effects to them span across generations, shown by consequential impacts to their daughters. This focus exemplifies where the problem of climate change marginalizes

vulnerable school going girls, who risk dropping out of school because of teenage pregnancies, early marriages, or extended absenteeism from school. The example from drought shows that these vulnerabilities are unique to women, to their daughters, due to their traditional gender roles in food provisioning. At the study site, normalization of sexualization in tourism worsens this problem, emerging as a systemic force that entrenches gendered vulnerabilities. Morgan (2024) describes sexualization as occurring when one person treats the other as a sexual object against their will. In this study, sexualization is unequal because mental modeling interviews show it has a one-way tendency to be directed towards females. Interviews show how climate stressors, such as drought, worsen these dynamics by placing girls in socially constructed roles that increase their exposure to harm.

Exploitative practices, like *bajaji* riders targeting young girls, illustrate how climate-driven economic precarity creates opportunities for violations. Narratives around such acts are manipulated to shield perpetrators from accountability, perpetuating a cycle of impunity. This aligns with national data: 32% of Kenyan women report experiencing physical violence by men since age 15 (Kenya National Bureau of Statistics, 2022).

Essentially, tourism exacerbates these patterns. Evidence from coastal Kenya (Berman, 2017; Kibicho, 2009) and Haiti (Chambers, 2021), infer that unequal sexualization is promoted and deepened by tourism. While this is a persistent feature of daily life with tourism, climate-driven exploitations manifest intermittently. With continued exposure to such exploitation, there's a chance that gentrification at the study site shaped local population consciousness on what their purpose is; to serve the tourism industry subduedly. For women, this means engaging in undervalued work reducing their roles within the tourism industry and marine conservation. As Berman (2017, p.65) notes of Kenya's coast, "Tourism industry marks the beginning of the end of traditional way of life and control of resources by local coastal people, who decide not to blame expatriates."

The result is a liminal system where climate change and tourism intersect to deepen gender-based exploitation. The system is on the edge of tourism deepening gender related exploitations allowed by climate change but still holding on to climate change worsening gender related exploitations in tourism. The liminal environment created resists simple interventions to isolate and address each issue separately. Kenya's SDG 13 performance illustrates the disconnect: climate risks for women increase even as their representation in

decision making grows. This disjuncture suggests that the absence of genuinely comprehensive approaches, capable of linking climate action, gender equity, and structural transformation, possibly drives persistence and deepening of vulnerabilities for women.

Different understandings of climate risk

Drought was identified as one of the central forces driving connections and changes, therefore providing a base on which gender issues are given form from participant's mental models. Women's experiences and mental models foreground cascading impacts of drought on food security and social vulnerability, particularly for girls. Men, by contrast, place less emphasis on domestic or social consequences. These divergent perspectives highlight the importance of inclusive approaches to understanding and addressing effects of climate change at community level.

Literature reflects how such divergences are reproduced across scales. Development research (SDG Gender Index) shows disconnect between climate action and gender responsiveness; and relevant to our case study, tourism and climate policies shown to be operating in separate tracks (Becken et al. 2020). Our empirical findings show that participants conceptualize climate risks differently, and this provides basis from which such disconnect surfaces. Climate risks are differently understood in terms of impacts, severity, and social consequences. These differences are structured by participant's relations within work and life spheres. Public sphere for policy makers, productive sphere for men and women in tourism, and reproductive sphere for women. This positioning has implications for whose perspectives are prioritized in decision spaces addressing climate risks.

One salient example of these differences emerges in contrasting perceptions between policy makers and tourism practitioners regarding where climate-induced risks occur. Tourism practitioner's points to changes in the ocean, an aspect that is absent from policy maker's priorities (Figure 4.5). Policy makers focus predominantly on terrestrial changes, such as disruptions to wildlife populations. This divergence is not incidental but comes from tourism practitioners' close association with ocean environment, while policy makers' perspectives are shaped by Kenya's tourism marketing emphasis on wildlife safaris, a well-established sector. As Gona et al. (2024) observe that despite the significance of blue tourism in the Western Indian Ocean region, national tourism policies rarely connect with ocean governance frameworks.

Which understandings of climate risk dominate amidst differences

In a patriarchal society where land ownership is in the hands of men, also trees are men's crops, one would expect that land, trees, and vegetation cover, are trigger words that would frame the views of environment in the minds of men. Thus, their descriptions in modelling interviews centered around vegetation cover, which already brings forth the view of a landscape. Men's conceptual vocabularies around landscapes and trees, is an aspect that privileges government and donor interventions for climate action. For example, national tree planting initiatives and mangrove restoration projects along the coast, often supported by donor funding, are ideated in terms that resonate with men's framing of climate risks in terms of landscape and vegetation. These are executed through women's labour, with ineffective outcomes especially tree seedlings outgrowing their plastic bags, often due to absence of buyers willing to transplant them. Women are further burdened by the ongoing responsibility of watering and maintain these seedling nurseries, a conservation routine that controls their daily activities, despite absence of buyers and viable planting opportunities. It also shows that gender mediates value attributed to conservation labour, through clear distinctions of who carries the burden of conservation work, and who has authority.

The care and nurturing involved in taking cultivating a seedling nursery, positions women's labour as an extension of domestic roles rather than as positions of authority. This positioning helps to explain why despite women's important contributions they remain marginal in governance processes. Similar patterns can be seen in the labelling of women's work with the prefix mama. Expressions in daily conversation in informal work done by women have the prefix "*mama*", Swahili word for mother, to describe informal occupations that have considerable women's involvement. *Mama mboga*, loosely translates to women who sell vegetables, and sell other sparse items too. For the fisheries sector in Kenya's coast, Chambon (2024) documents how *mama karanga* and *mama chemsha*, are not fully included in small scale fisheries decision making, where the locally constituted Beach Management Units (BMUs) speak for community voice. The symbolic weight of *mama mboga* entered the political arena during Kenya's 2022 presidential election. It was politicized by a presidential candidate campaign team to refer to a voter profile of majority women in micro small businesses, most of which are informal. Acknowledging that *mama mboga* had been marginalised in governance processes, this campaign assured *mama mboga* of being part of government once voted in. Our review of policy documents reveals similar rhetorical efforts to measure up women's representation in decision-making.

Seen alongside our results, the domesticity attached to descriptions of women's work reveals how their work is symbolically diminished, sustaining same gendered boundaries of space and power observed in patriarchal community, and in relation to crops. Our study builds on this by showing how geographic separation between men's and women's work, underpins unequal governance in coastal tourism. In both contexts, women's work is tied to domestic spheres, obscuring their contributions to productive and environmental decision processes.

FPE scholarship helps explain why men's perspectives dominate. For instance, differentiation in crop ownership reflects gendered power imbalances. Studies have shown that trees are men's crops for various reasons, including their use as boundary markers on lands where they have ownership rights, or for their characteristic monetary value, and non-laborious care needed for trees as compared to other crops. Trees are also resilient to harsh climatic conditions. Most subsistence crops, e.g. bananas, are female dominated (Nyabaro et al. 2019). Yet when these crops acquire commercial value, men assume control over the income stream (Nyabaro et al. 2019). Thus, crops are points of power differentials between men and women in gendered productive spheres (Rocheleau et al 1996: Rocheleau & Edmunds 1997), and result to differences in bargaining power within households. Ultimately, crops play a role in reifying patriarchal authority; men have finality in decisions on income, loading on women and children every laborious baggage involved in coffee farming and harvest processes, at no pay (Williams, 2022). Hence across policy, it is men's perspectives that matter most, defining value and authority while marginalizing women's contributions.

A possible risk from these differences is the marginalization of locally held knowledge within conventional climate change discourse. This risk is heightened in top-down policy processes, where elite contributions disproportionately shape policy inputs. Although Njoroge et al. (2017) describe Kenya's climate change policy making as deliberative, they highlight persistent issues of exclusion and control. Our policy analysis reveals that women's perspectives on environmental policy are underrepresented, and their climate vulnerabilities are increasing (Figure 4.6), indicating the marginalization of women's concerns in policy and related climate actions. Policy analysis shows there is a lot of recognition of gender imbalance due to climate change impact, but only few implementing measures. Specific information lacks in policy, as part of it is too vague to clearly identify causes of gender imbalance due to climate change and to determine appropriate measures. Impacts by climate change, climate

mitigation, and climate adaptation are not sufficiently differentiated in policy. Angula et al, (2021) exemplify these imbalances in the context of adaptation. Our interviews, such as the case where mangrove restoration activities targeting women were equated to child's play, further suggests adaptation-related gender imbalances, subtly reinforcing women's lower status. These examples show the gendered dimension of maladaptation, to the detriment of women. Ultimately, climate vulnerabilities remain because how people conceptualize the problem is different. The people with more power, men and policy makers, fail to account for women's lived experiences.

Marginalization extends in the undervaluation of women's roles in preserving local knowledge, particularly through regional kitchen cultures. Interviews showed that women are the faces behind regional kitchen cultures, holding a central role in transmission and preservation of culinary heritage. As these cultures draw from local environmental resources, associated heritage is a repository of environmental knowledge. Preserving such cultural heritage is important for safeguarding local wisdom that can enrich other environmental interventions, including climate action. The importance of integrating local knowledge is highlighted by the 1978 government intervention in Orissa, India, to modernize cattle breeding in response to drought, where dismissal of local practices left communities worse off (Robbins, 2004). Dawson et al, (2024) similarly find that ecological outcomes are less favourable when interventions are marked by power asymmetries, reinforcing the need for inclusive approaches.

The undervaluation of local and women's knowledge is further compounded by global power structures in knowledge production. Tamale (2020) highlights how colonial legacies continue to gatekeep what is considered legitimate knowledge through publication infrastructures based in the global North. This dynamic is mirrored in the political significance of heritage, as seen in the numerical dominance of high-income countries among UNESCO World Heritage sites (Bertacchini, et al. 2016; Brumann & Gfeller, 2021; Brown, et al. 2019). Heritage, therefore, is not only a cultural asset, but also a potential source of political influence (Farias, 2003).

At household level, these dynamics show up in everyday lives of women. Kawarazuka (2019) shows that in patriarchal Kilifi, traditions in food preparation empower women in their provisioning roles, granting them bargaining power. However, as climate change increasingly

undermines women's ability to fulfil domestic duties, their decision-making power within households diminishes, reflecting broader societal loss of their agency. Thus, both climate impacts and entrenched power asymmetries risk invisibilizing a form of knowledge that could position women as reliable actors in environmental stewardship, particularly adaptation governance.

4.5 Conclusion

This study helps to understand how climate change affects populations at the community level, at the intersection of tourism and gender. It showed some vulnerabilities are independent to climate change and need to be focused on independently. But solving climate change won't solve these problems. The entanglement where climate change and tourism intersect to deepen gender-based exploitation demands holistic interventions that address both structural inequities and the material conditions enabling harm. Most important is that climate change and exacerbated vulnerabilities remain because of how people conceptualize the problem is different. The people with more power, men and policy makers, miss certain concerns about women's experiences. If women's voices are not included in climate change policies, they are not included elsewhere, especially in productive spaces within coastal economy. This way, there can be risks for maladaptation when concerns of women are side lined in decision spaces.

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