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Mainstreaming climate change in policy frameworks for community-based natural resource management in a semi-arid savannah environment: case study of Botswana

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Community-based natural resource management (CBNRM) is a concept that was introduced in southern Africa back in the 1980s with the dual aim of biodiversity conservation and poverty reduction in communities endowed with natural resources. Community-based tourism (CBT), one of the major forms of CBNRM, depends on natural resources, particularly wildlife, and weather and climatic conditions. However, natural resources are under threat from climatic changes and other anthropogenic and natural disturbances. This calls for the need to interrogate the extent to which CBNRM initiatives mainstream climate change in their agenda. The main aim of this article is to assess the extent to which the climate change agenda has been mainstreamed into the policy framework of Botswana's CBNRM program. The specific objectives are to (1) document the impacts of climate change on CBNRM-related initiatives in Botswana; (2) determine the relationship between climate parameters (temperature and rainfall), extreme events (drought and extreme heat), and visitor trends in Botswana and the Okavango Delta; (3) establish a historical correlation between evolution of climate change policy and CBNRM policy and vice versa, policy initiatives, programs, strategies, and projects in Botswana; (4) explore the extent to which international, regional, national, and local climate policies mainstream CBNRM and tourism issues and vice versa; and (5) explore the challenges and opportunities related to climate change and CBNRM, with a particular focus on adaptation and mitigation initiatives. This study mostly used qualitative approaches (desktop review of policy documents and scholarly articles) as well as secondary quantitative data (time-series data) to explore the evolution of CBNRM in Botswana, providing an overview of its structure, policy initiatives, programs, and projects and how these correspond with climate change issues. A scoping review was conducted to identify relevant studies on the impacts of climate change on CBNRM initiatives published between 1992 and 2023. A total of 50 articles were identified to answer the following research question: What evidence is available regarding the impacts of climate change on CBNRM initiatives? The article further looks at how climate change–related extreme events, particularly drought, has affected tourism performance over the years. The article then zeros down on the effects of climate change on CBNRM initiatives and the challenges, threats, and opportunities, as well as the mitigation and adaptation strategies adopted by the CBNRM projects in Botswana. The findings indicate

that climate change–induced events, particularly drought, have affected nature-based tourism products in Botswana. However, it was revealed that although there is no statistically significant correlation between drought and tourism performance, evidence from the literature reveals that drought has impacted tourism in Botswana. The findings from policy analysis indicate that the climate change agenda is woven into more recent key legal and policy documents on CBNRM, on one hand, while the climate change policy documents also include components that speak to CBNRM, on the other. This implies that the tourism sector can leverage these provisions to strengthen climate resilience through transformative adaptation and mitigation action.

KEYWORDS

climate change, adaptation, mitigation, community based natural resource management (CBNRM), Botswana

1 Introduction

Climate change–induced extreme events pose a threat to community-based natural resources management (CBNRM) initiatives that support the livelihoods of natural resources–dependent communities in tropical savannah environments. Climate change has become a mandatory agenda item in most 21st-century national, regional, and international forums. The United Nations (2022), in its 17 Sustainable Development Goals (SDGs) included climate action (Goal 13) on its agenda. Climate change and its related concepts also echo in other SDGs, including no poverty (Goal 1), zero hunger (Goal 2), good health and wellbeing (Goal 3), and clean water and sanitation (Goal 6), among others. This has been necessitated by the scary current and projected effects of climate change on human livelihoods and biodiversity conservation (World Bank Group, 2020). The key global climate indicators of surface temperature, precipitation, ocean heat content, atmospheric carbon dioxide, ocean acidification, sea level, and Arctic and Antarctic sea-ice content all give an unpleasant trajectory of the global climate situation (Global Climate Observing System, 2017).

According to the World Meteorological Organization (WMO, 2023a), 2015 to 2022 were the hottest years on record despite the cooling effects of a La Niña event in the past 3 years (Borunda, 2020). The temperatures are expected to reach record highs in the next 5 years due to the greenhouse effect and El Niño (WMO, 2023b). The temperatures of the oceans have also significantly increased over the past decades. According to Borunda (2020), the oceans have sucked up much of the extra heat trapped by human-induced climate change, and this has resulted in heat waves in the oceans.

Tabari (2020) stated that precipitation intensity has been increasingly inconsistent in the past decade and the phenomenon is expected to continue as evapotranspiration increases. These significant changes in the key climate indicators have resulted in major catastrophes and disasters globally, including destructive wildfires, heat waves, hurricanes, floods, famine, and a massive decline in endangered species globally (Borunda, 2020). According to the Intergovernmental Panel on Climate Change (IPCC), *"The magnitude and rate of climate change and associated risks depend strongly on near-term mitigation and adaptation actions, and projected adverse impacts and related losses and damages escalate with every increment of global warming"* (IPCC, 2022).

These unfortunate events have not spared southern African countries and Botswana, in particular, whose economy partially depends on community-based natural resources. CBNRM as a concept and practice in southern Africa can be traced back to the 1980s, but in Botswana, it became prominent in the mid-1990s. CBNRM was introduced in a bid to achieve the dual aim of biodiversity conservation and poverty reduction in communities endowed with natural resources. One of the most common and valued natural resources in Botswana is its wildlife. The diverse wildlife species in Botswana have been a source of foreign currency earnings through tourism; hence the majority of the CBNRM projects in Botswana take the form of community-based tourism (CBT).

By their very nature, most natural resources are dependent on the weather and climatic conditions. This is particularly true with wildlife, which is based on the availability of water and pastures. Other resources, such as the Okavango Delta, rivers, and salt pans, are equally affected by the climate. As climatic conditions continue to worsen globally, the discourse on climate change impacts, coping, and mitigation strategies has been gaining momentum by the day. Botswana, being a semiarid country in sub-Saharan Africa, has, like any other country, not been spared from the effects of climate change. Recurrent droughts, warmer winters, and extremely hot summers are evidence of this (Saarinen et al., 2012; World Bank Group, 2020). In some cases, unprecedented amounts of rain have been witnessed in areas that are usually very dry. All these impacts of climate change have, most likely, affected CBNRM initiatives in Botswana.

It is an established fact that CBNRM in Botswana is primarily wildlife-based and comes in the form of CBT (Twyman, 2000; Ministry of Environment, Wildlife and Tourism , 2007; Hambira, 2011; Mbaiwa, 2017). From the beginning, the arrangement was that CBNRM projects were carried out in wildlife management areas (WMAs), and these were subdivided into controlled hunting areas (CHAs). These CHAs were then leased to Community-Based Organizations (CBOs) or trusts for CBNRM activities (Mbaiwa, 2014). An estimated 12,945,000 hectares of land (nearly 22% of

Botswana's land) was set aside for CBNRM, with the greater part being in WMAs. In these areas, tourism is the main economic activity. According to Hambira (2011), an estimated 3.5% of the total tourism value in Botswana could be attributable to CBNRM activities.

The effects of overreliance on wildlife-based tourism were felt when, in 2014, the government of the Republic of Botswana banned safari hunting. This had a massive impact on consumptive tourism, and the impact was felt at both the national and local levels. According to Mbaiwa (2017), at a national level, hunting used to contribute approximately 15% of tourism revenue and 1% of tourist arrivals, and the ban on hunting meant that this economic contribution was forfeited. Furthermore, more than US$6 million in the form of hunting license fees was also lost. More than 600 jobs were lost, and 800 families were adversely affected by the hunting ban. At the local level, the communities that depended on safari hunting proceeds for their livelihoods could not access the benefits anymore. These benefits included the construction of houses for the needy, scholarships, and funeral aid. They were forced to look for non-consumptive tourism options like photographic safaris for survival. Unfortunately, this option was not as economically rewarding as safari hunting (Mbaiwa, 2014, 2017). All this reveals the extent to which communities whose livelihoods are primarily dependent on natural resources, especially Wildlife-Based Tourism, are prone to any adverse events that threaten the natural resources. One of the greatest threats to the industry has been the effects of climate change.

This article analyzes the mainstreaming of climate change in Botswana's CBNRM program while also exploring the climate change adaptation and mitigation strategies adopted. While there are studies on mainstreaming climate change in policy documents, many such studies focus on national policies in general (not related to tourism; Reid and Huq, 2014; Enamul Haque et al., 2022). Among those related to either tourism or CBNRM, very few relate to the global South and none to Botswana (Henry, 2009; GIZ, 2019; Becken et al., 2020). To date, studies on tourism and climate change in Botswana have focused mainly on the impacts of climate change on tourism and vice versa (Mbaiwa, 2003, 2005; Hambira, 2011; Dube et al., 2018; Hambira et al., 2021). Therefore, this study on mainstreaming climate change in CBNRM initiatives in Botswana is a welcome addition to the literature on climate change and tourism studies globally and regionally in the context of the global South, where a dearth of such research exists (Van der Merwe, 2022).

This article analyzes the extent to which climate change issues have been infused into the CBNRM policies since its inception. It also looks at the adaptation and mitigation strategies that the Government of Botswana and the communities in CBNRM areas have adopted in order to survive the effects of climate change. The specific objectives include (1) documenting the impacts of climate change on CBNRM-related initiatives in Botswana; (2) determining the relationship between climate parameters (temperature and rainfall), extreme events (drought and extreme heat), and visitor trends in Botswana and the Okavango Delta; (3) establishing a historical correlation between evolution of climate change policy and CBNRM policy vis-à-vis structure, policy initiatives, programs, strategies, and projects in Botswana; (4) exploring the extent to which international, regional, national, and local climate policies mainstream CBNRM and tourism issues and vice versa; and (5) exploring the challenges and opportunities related to climate change and CBNRM, with a particular focus on adaptation and mitigation initiatives.

1.1 Theoretical framework

This study adopted the common-pool resource theory and the global environmental change and sustainability theory to explore the extent to which climate change aspects have been mainstreamed in the CBNRM context. Founded on the common-pool resource theory (Ostrom, 1990), CBNRM seeks to achieve the twin objectives of poverty alleviation and biodiversity conservation in areas that are endowed with natural resources (Leach et al., 1999; Mbaiwa, 2014). It is premised on local communities' involvement in the management of their natural resources, such as wildlife, forests, rivers, and wetlands, among others [Department of Wildlife and National Parks (DWNP), 1999]. The concept recognizes the important role of local communities in the sustainable management of natural resources. The common-pool resource theory argues that sustainable resource utilization is only possible when (1) the community is given autonomy and recognition as an institution, (2) there are proprietorship and territorial rights, (3) the community has the right to make their own rules and mechanisms to enforce them, and (4) the benefits of managing the resources are greater than the costs (Ostrom, 1990; Bromley, 1992; Mbaiwa, 2014). The CBNRM approach also recognizes that communities that are closer to natural resources have more interest than the government and the private section in conserving their resources (Tsing et al., 1999 cited in Mbaiwa, 2017). It provides incentives for local communities to manage resources effectively and sustainably (Leach et al., 1999; Tsing et al., 1999). If well empowered, these communities are more likely to sustainably manage their natural resources because their livelihoods depend on them.

The sustainability of natural resources is a key aspect that guides the practical and theoretical application of policy in natural resources management (Chau et al., 2022). Sustainability, which is sometimes used synonymously with sustainable development (SD), has become both a fundamental global goal and a strategy for guiding the world's social and economic transformation (Shi et al., 2019). The theory of sustainability can be viewed from different dimensions ranging from environmental/ecological to social to economic (McGill, 2023). This article defines sustainability from a holistic view as a transformative concept that aims at improving human wellbeing and ensuring social equity for present and future generations while safeguarding the planet's life-supporting ecosystems (Roxburgh et al., 2020). Sustainability aims to find solutions through innovative approaches, expanding future options by practicing environmental stewardship, building governance institutions that continually learn, and instilling values that promote justice (Iqbal et al., 2020). This article therefore aims to interrogate policies with the aim of promoting sustainable management of natural resources toward climate-resilient CBNRM initiatives. Anthropogenic and naturally occurring changes in the

land and ecosystems affect sustainability and global environmental change (Millennium Ecosystem Assessment, 2005).

Many fields, including those in remote sensing, political ecology, resource economics, institution governance, landscape ecology, biogeography, and integrated assessment, among several others, are involved in global environmental change research (Turner et al., 2007). The theory of Global Environmental Change (GEC) suggests that environmental resources, that is, air (weather and climate change), land (soil erosion, deforestation, desertification, and ecosystem degradation), and water (scarcity and degradation), as well as three social challenges: (1) the human population (growth or decline based on the trends of fertility, aging, and migration, as well as changes in its value systems); (2) urban systems (services, industries, pollution) interact in various ways and make a substantial contribution to soil and water; and (3) food shortages (Brauch, undated). This, in turn, worsens environmental degradation and, when the unique international and national context is taken into account, results in major environmental stress in domestic economic and political crises and, in its worst-case scenario, violent outcomes (Brauch, undated). This article therefore adopts the GEC theory in a bid to identify the impacts of climate change on CBNRM-related initiatives and the consequences on adaptation and policy action.

Africa has therefore developed several policies and programs to promote sustainable use of natural resources for climate resilience building across the continent. For example, the Global Monitoring for Environment and Security and Africa program enhances the capacity of African policymakers and planners to design, implement, and monitor national, regional, and continental policies while promoting the sustainable management of natural resources by using Earth observation data and derived information (Africa Union, 2023).

2 Methodology

2.1 Description of the study area

Botswana is a landlocked country (Figure 1) in southern Africa, located between 20.0°-29.4° E and 17.8°-26.8° S (World Bank Group, 2020). The country has a total land area of 600,370 km^2 (Botswana Tourism Organisation, 2021) and shares borders with Zambia and Zimbabwe to the northeast, Namibia to the north and west, and South Africa to the south and southwest (Maruatona and Moses, 2022). Botswana has a distinct geography, which is dominated by the Kalahari Desert (a sand-filled basin averaging 1,100 m above sea level), with the Kalahari sands covering three-quarters of the land surface (Botswana Tourism Organisation, 2021). Botswana's climate is arid to semiarid with warm winters, hot summers, and highly erratic rainfall, most of which occurs from October to April (Botswana Tourism Organisation, 2021). Botswana's climate is determined by its inland location, astride the subtropical high-pressure belt. During the summer months (November to March), the Inter-Tropical Convergence Zone brings moisture to the northern areas and becomes progressively drier toward the country's western areas (Moses and Gondwe, 2019; Matenge et al., 2023). The mean annual rainfall ranges from more than 650 mm in the northeast to <250 mm in the southwest; annual rainfall covers a range from 620 mm in the northern Kasane area to 300 mm in the southwestern Tsabong area (Botswana Tourism Organisation, 2021). Botswana receives an average rainfall of 475 mm per year, with most rain occurring between October and April and falls as localized showers or thunderstorms (World Bank Group, 2020). The country generally experiences warm to hot temperatures, with mean monthly maximum temperatures ranging from 29.5°C to 35°C in the summer and 19.8°C to 28.9°C in the winter (World Bank Group, 2020). Mean monthly minimum temperatures range from 14.6°C to 20.8°C in the summer and 2.9°C to 11.6°C in the winter (World Bank Group, 2020). Botswana is highly vulnerable to climate change and sparse, highly variable rainfall (Moses and Gondwe, 2019). Botswana experiences high evaporation rates, which are coupled with the virtual absence of permanent surface water over large parts of the country, leading to water scarcity (World Bank Group, 2020).

2.2 Research design

Using a mixed-method approach, including a scoping literature review, document analysis, policy audits/analysis, and time-series data analysis, the study investigated the extent to which climate change is mainstreamed into the CBNRM initiatives, particularly community-based tourism. The study further examined the impact of climate change in Botswana, with a particular focus on how it has affected tourism performance over the years. It also presents documented climate change impacts on CBT and related coping strategies. The evolution of the climate change agenda and how this relates to CBNRM evolution, structure, policy initiatives, and programs in Botswana is also explored. Additionally, the article presents the opportunities and threats for enhancing climate change adaptation and mitigation in the context of CBNRM.

2.3 Data collection methods

2.3.1 Climate data (rainfall and temperature) and tourism performance in Botswana

Satellite climate (temperature and rainfall) data for the 1992–2022 period were obtained from online databases such as The World Bank Group (2020)'s Climate Change Knowledge Portal covering Botswana. Data on the number of tourism visitors across Botswana were obtained from the Botswana Tourism Organization. Tourism performance can be rated based on indicators such as tourist arrivals, overnight hotel stays, and occupancy rate by bedrooms or revenue (Steenbruggen et al., 2019). This study adopted the number of tourist arrivals and receipts as indicators for tourism performance during selected drought years.

2.3.2 Scoping review

This study adopted a qualitative desktop approach in which a scoping review was undertaken to identify literature on mainstreaming climate change in tourism policy and the impacts of climate change on CBNRM-related initiatives in Botswana. According to Munn et al. (2018), a scoping review is applicable when the purpose of the review is to identify knowledge gaps, scope a body of literature, and clarify concepts. A scoping review is also used when the purpose of the study is to set research agendas

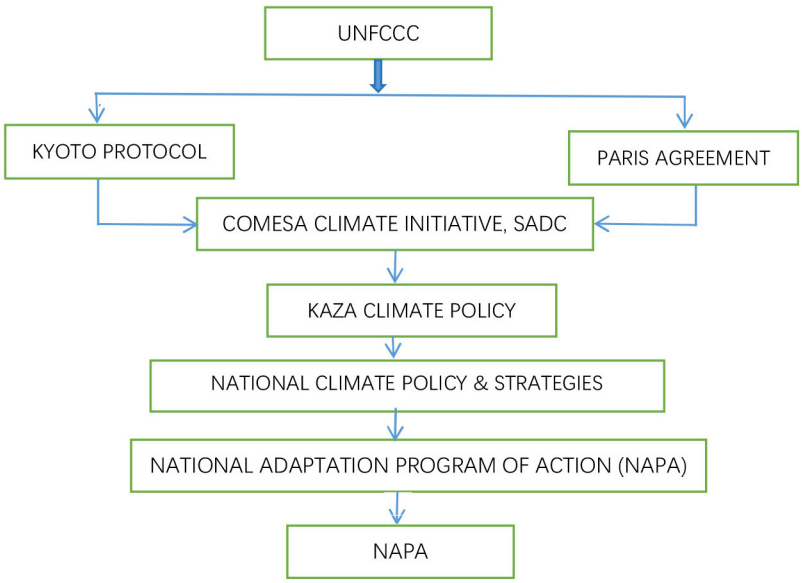

FIGURE 1
International, regional, and national climate change policies or guidelines. UNFCCC, United Nations Framwork Convension on Climate Change; SADC, Southern Africa Development Community.

and identify implications for decision-making (Tricco et al., 2016). Peters et al. (2022) noted that scoping reviews are concerned with collating and describing the evidence and presenting the summation in a clearly illustrated format. The literature search followed the steps described by Arksey and O'Malley (2005) and improved by Levac et al., 2010. The steps involved specifying the research question, identifying relevant studies, selecting studies, charting the data, collating, summarizing, and reporting the results. The search strategy is presented in Table 1 (the search terms and their rationale).

The authors further scanned Google Scholar and hand-searched—through citation tracking and snowballing from reference lists—to identify additional peer-reviewed and gray literature. The titles and abstracts of published primary and secondary articles, theses, policies, conference proceedings, books, reports, magazines, and web pages were scanned for content and expressions on CBNRM and climate change aspects that were written in English. A search for publications addressing climate change–related concepts (Ferreira et al., 2020), limited to literature published between 1992 and 2022, was done using the major scholarly literature databases, that is, the Google Scholar, Web of Science, and Scopus search engines. The following combination of keywords was performed using Boolean operators as identified by Ferreira et al. (2020): drought, floods, heat waves, nature-based solutions, climate change adaptation, climate change mitigation, climate-smart initiatives, green economy initiatives, afforestation, reforestation, forest conservation, and forest restoration. The search was conducted between May and October 2023.

2.3.3 Policy analysis

CBRNM initiatives rely on the available international, regional, and national policies for climate change management to guide climate action. Botswana is situated in the Southern Africa Development Community Transfrontier Conservation Areas; hence, it also relies on a number of natural resources management and biodiversity conservation-related international, regional, and local policy frameworks for their management. This section also applied desktop analysis of policy documents to assess progress regarding the mainstreaming of climate change into the policy and legal framework of the CBNRM program as well as the climate change adaptation and mitigation in the tourism sector in Botswana. Figure 1 shows the key international, regional, and national climate change policy frameworks, protocols declarations, and guidelines that are effect Botswana. The Okavango case study provides useful lessons that could be applied in other countries in the African region or globally.

Kupika and Nhamo (2016) noted that most climate policies in Africa were developed after the 1992 Rio Declaration when the climate change agenda became an international concern. The retrieved and examined legislation is presented in Table 2. The authors examined climate change–related policy documents to determine the extent to which they incorporate CBNRM issues. Thus, climate change–related legislation (1992–2022) was examined through word search or key phrases or words related to CBNRM such as "tourism," "community based natural resource management," "nature based tourism," "ecotourism," "wildlife economy," and "nature based tourism." In this policy review, we did not carry out a detailed analysis or comparison of policies.

2.4 Data analysis

Descriptive analyses were used to map existing evidence regarding the impacts of climate change on CBNRM-related initiatives and thematic areas (see Figure 2). The publication years of the reviewed articles, study types, and climate change impacts were examined.

Thematic analysis (Orr et al., 2022) was done based on the following dominant themes in the literature: (1) impacts of drought and heat waves on nature-based tourism and tourism

TABLE 1 Search terms and rationale.

	Search terms	Rationale
Setting	Botswana, Okavango, Chobe, Ngamiland, Kalahari	New topic, lack of evidence
Perspective	climate change impacts, tourism, CBNRM, community-based tourism, ecotourism, nature-based tourism, agrotourism, heritage tourism, wildlife tourism, wildlife economy, forests	Definitions identified by Ferreira et al. (2020)
Phenomenon	drought" OR "floods" OR "heat waves" OR "extreme heat" OR "climate change" OR "global warming" OR "greenhouse gases"	

TABLE 2 International, regional, and national policy documents related to climate change.

Country or region	Policy	Year
Global Area	UNFCCC	1992
	Kyoto Protocol	1997
Continental (Africa)	Draft African Climate Change Strategy (2020–2030)	2020
	AFRICAN UNION CLIMATE CHANGE AND RESILIENT DEVELOPMENT STRATEGY AND ACTION PLAN (2022–2032)	2023
SADC	SADC Climate Change Strategy and Action Plan	2015
	Regional Climate Resilience Program for Eastern and Southern Africa Stakeholder Engagement Plan (SEP)	2023
	SADC Climate Change Strategy	2023–2025
Botswana	Constitution of Botswana	1994
	Vision 2036 Achieving Prosperity For All	2016
	Botswana national Climate Change Response Strategy	2009
	Nationally-Determined Contribution to the UNFCCC in 2016	2016
	UNDP (2018)	2020
	Draft Botswana National Climate Policy	2017

UNFCCC, United Nations Framwork Convension on Climate Change; SADC, Southern Africa Development Community.

FIGURE 2
Tree map showing community-based natural resource management–related thematic areas covered across the publications on climate change and tourism in Botswana.

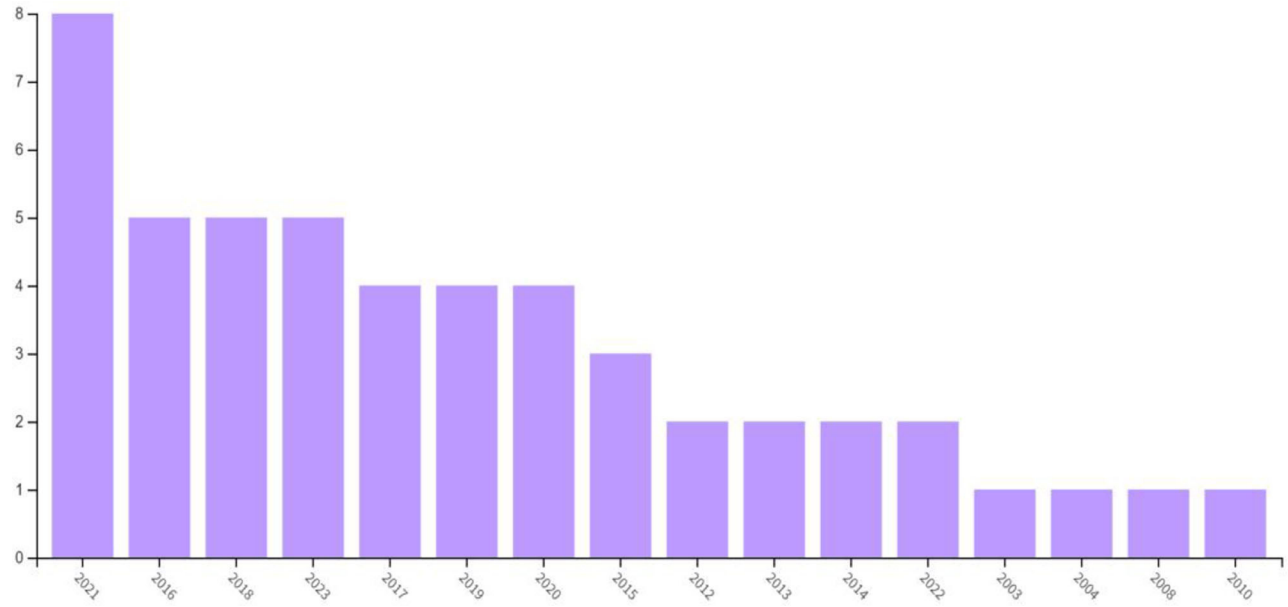

FIGURE 3
Number of reviewed articles published by year.

sector in general, (2) climate change impacts (drought) on tourism performance, and (3) adaptive measures taken in the tourism sector. These themes span different levels of involvement in the tourism sector, from the industry level to the organization level (organizations—tour operators, hoteliers, and lodge operators) to the individual level (tourists). Historical timelines were used to establish historical linkages between events on the evolution of climate change policy and CBNRM policy vis-à-vis structure, policy initiatives, programs, strategies, and projects in Botswana.

A trend analysis was performed to determine the relationship between climate parameters (temperature and rainfall), extreme events (drought and extreme heat), and visitor trends in Botswana and the Okavango Delta. Microsoft Excel Analysis ToolPak was used to analyze the quantitative data.

Content analysis was also used to explore the extent to which international, regional, national, and local climate policies mainstream CBNRM and tourism issues and the challenges and opportunities related to climate change and CBNRM, with a particular focus on adaptation and mitigation initiatives. Content analysis was done to extract components that relate to CBNRM-related initiatives in Botswana. Findings from thematic and content analysis were presented in text format as descriptive paragraphs, summary tables, or text boxes.

3 Results and discussion

3.1 The effects of climate change on tourism in Botswana

This section presents a narrative of documented studies (1992–2022) on the impacts of climate change on CBNRM-related initiatives in Botswana. A total of 50 articles with a focus on climate change and tourism in Botswana were identified from the Web of Science. Document types included journal articles (48 = 96%), proceeding papers (4 = 8%), early access articles (2 = 4%), book chapters (1 = 2%), and review articles (1 = 2%). The tree map in Figure 2 shows the distribution of articles based on thematic areas closely linked to CBNRM initiatives.

3.1.1 Publication year

Two notable points can be observed regarding publication year. First, while we searched for articles that were published from 1992 onward, the oldest article identified through our scoping review was from 2003. Generally, there appears to be a steady increase in the number of publications from 2003 to 2021, with a sharp decrease in 2022 (Figure 3).

Climate change is posing a threat to the ecosystem on which tourism is anchored (Nyaupane and Chhetri, 2009; Hambira, 2011). While this is a global phenomenon, Botswana's semiarid to arid climatic conditions, coupled with its overreliance on nature-based tourism, make it more vulnerable (Hambira, 2011). The country's landscape is also unique as it is made up of the Kalahari Desert, the Okavango swamps, and the Chobe River. Its weather is characterized by having hot summers, warm winters, and erratic rains, and all these make it much more susceptible to any further negative changes in the global climate (World Bank Group, 2020). Botswana's tourism policy, however, positions Botswana as the most authentic and exciting wilderness tourism destination in the world. The idea is to promote the natural environment and its quality in the future as the country's main attraction (Saarinen et al., 2009). The tourism product in Botswana is concentrated in the northern region of the country, particularly Chobe and Ngamiland (Okavango and Maun; Hambira, 2011; Mbaiwa, 2014; Motlhoka, 2023). The fact that the tourism sector depends on natural resources

such as wildlife, water, and wetlands makes it vulnerable because these resources are affected by climate change.

Studies have shown that economies dependent on tourism are at a greater risk of suffering the effects of climate change (Mfundisi, 2009; Hambira, 2011). The fact that Botswana and other southern African countries depend on climate-sensitive sectors, such as agriculture and tourism, puts them at a higher risk compared to manufacturing and technology-based economies (Smith et al., 1996). Climate is an economic resource for tourism (Hambira, 2011; Saarinen et al., 2012), and this is particularly true for Botswana. Outdoor tourism activities like wildlife safaris, backpacking, and water sports directly depend on the climate and weather. This can be evidenced by the fact that the Okavango Delta, Botswana's prime tourist attraction, is highly seasonal, with the peak being from July to October (Turpie et al., 2006). This is due to the water levels in the delta, which is dependent on upstream hydrological activities.

Researchers have identified climate change as a serious potential threat to the functioning of the delta [Department of Environmental Affairs (DEA), 2008; Mfundisi, 2009]. These threats include reduced inflow into the delta from both upstream and rainfall and increased evapotranspiration as a result of extremely high temperatures [Department of Environmental Affairs (DEA), 2008]. According to Mfundisi (2009), if the swamps of the delta become dry due to climate change, riparian forests on the islands will die and grass will dominate, which will lead to altered soil composition and increased water salinity. When water levels and quality fall, wildlife populations and habitats will be impacted, tourist activities will decrease, the natural aesthetic value will be affected, visitor experiences will be affected, and, ultimately, visitor turnover is likely to take place (Perry, 2003; Richardson and Loomis, 2005). These will, consequently, affect tourists' choice of destinations, duration of stay as well as their time of travel (Buzinde et al., 2010).

According to Motlhoka (2023), the accelerated desertification being caused by climate change is putting pressure on wildlife habitats, especially due to water shortages. In the same vein, the continued shrinking of the Okavango Delta over the years has affected biodiversity including the migration of wildlife species across Chobe and the delta. According to the International Finance Cooperation (IFC), water scarcity remains a high climate risk for Botswana despite significant adaptation efforts. The decline in rainfall and increasing temperatures will exacerbate the crisis of water availability and quality [International Finance Cooperation (IFC), 2022; Motlhoka, 2023]. The stream flow for the Okavango Delta is projected to continue to decrease over time, and this will have adverse effects on water-based tourism activities. In addition, Barnes et al., 2009 expressed concern that prolonged drying in the Okavango Delta could result in the loss of tourist attractions, resulting in a decimation of the tourism sector in the region. As water becomes scarce, an increase in human–wildlife conflict is expected as they compete for the precious resource. The situation is, unfortunately, expected to worsen as Botswana is expected to record an average temperature increase of 2.9–3.8 °C by 2100 [Intergovernmental Panel on Climate Change (IPCC), 2007]. Figure 4 shows the temperature trajectory for Botswana for the past century.

It is clear from Figure 4 that the average temperature has been rising since the early 1900s. This temperature rise, coupled with negative changes in other climate indicators, is a clear call for appropriate action. There is therefore a need to employ effective adaptation and mitigation strategies. In 2020, Botswana ranked 94th out of 181 countries in the Notre Dame Global Adaptation Initiative index (Motlhoka, 2023), and this is not good enough for such a vulnerable country. The effects of climate change on tourism in Botswana are summarized in Figure 5.

3.2 The influence of drought episodes on tourism performance in Botswana

The study revealed that there is no scientifically proven relationship between climate change and tourism performance, particularly arrivals and receipts. While there are years when drought and decline in tourist numbers or receipts correspond (e.g., in 1996, 2009, 2012, and 2013), there is no consistency in this pattern. There are years during which there was a decrease in tourist arrivals yet there was no drought (e.g., 2005 and 2006), and interestingly, there were years during which tourist arrivals increased significantly despite drought episodes (from 2014 to 2016). One cannot therefore claim with certainty that episodes of drought resulted in low tourist arrivals or receipts.

A study by Mathivha et al. (2017), who investigated the correlation between drought and tourist arrivals at Kruger National Park in South Africa, revealed that there was no statistically significant relationship between tourist arrivals and drought. Like the current study, it was, however, highlighted that there were years (19% of the 31 years under study) when tourist arrivals corresponded with drought. It can therefore not be ascertained that droughts have a direct effect on tourism performance.

Table 3 shows the years in which there was a drought in Botswana and the corresponding tourism statistics.

While there may not be a statistically significant correlation between drought and tourism performance, evidence from other scholars (already cited) reveals that drought has impacted the tourism sector in Botswana.

3.3 Evolution of CBNRM and climate change agenda in Botswana

The 1980s witnessed a decline in wildlife populations due to poaching, habitat degradation, and human–wildlife conflicts [Department of Wildlife and National Parks (DWNP), 1999]. In a bid to redress this, the government came up with Communal Wildlife Areas in 1984, a program meant to involve the communities that lived close to wildlife zones. These were to be incorporated into the establishment of community-based hunting schemes. In the late 1980s, the idea of CBNRM was muted and eventually adopted and housed in the Department of Wildlife and National Parks (Mbaiwa, 2014).

In 1993, the first CBNRM project, the Chobe Enclave Conservation Trust, was piloted. This was followed by

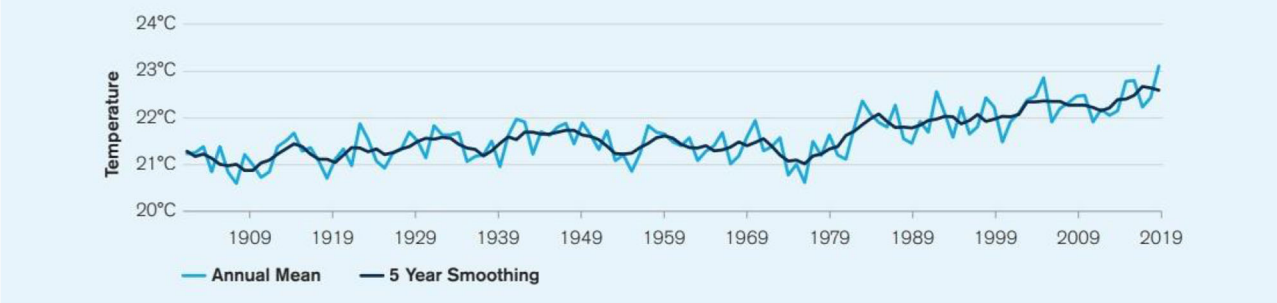

FIGURE 4
Botswana temperature rtrends, 1909–2019 (Source: World Bank, 2021).

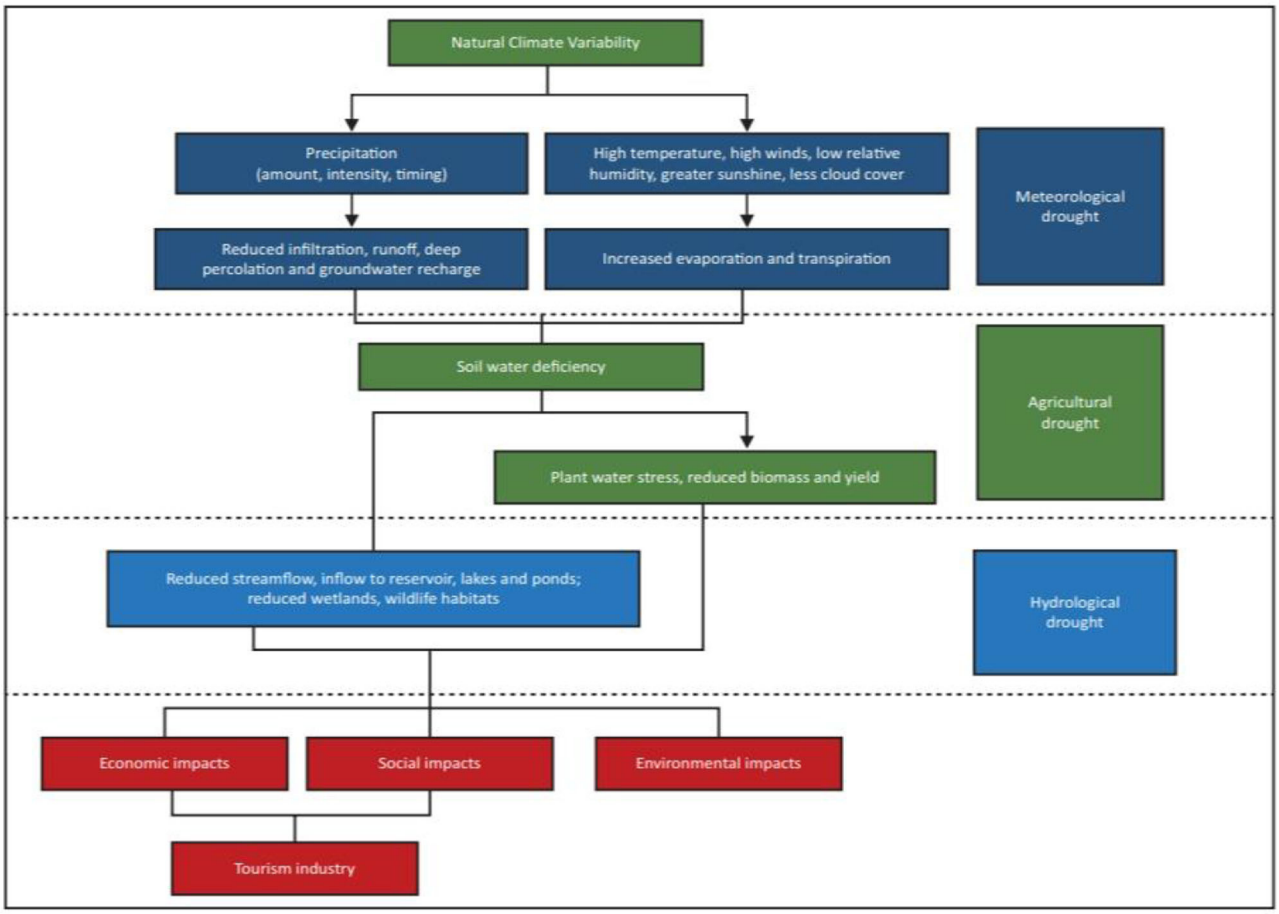

FIGURE 5
Effects of drought on the tourism industry.

the Sankoyo Tshwaragano Management Trust in Maun in 1995 (Mbaiwa, 2014). While the initial aim was on wildlife conservation, the government of Botswana, realized the potential benefits of CBNRM beyond just wildlife management and expanded the initiative to include other natural resources including forests, water, mountains, and pasturelands, among others.

By the turn of the 21st century, the CBNRM program had made significant strides, with many communities beginning to reap benefits, especially from hunting concessions. More CBOs and CBNRM projects were introduced in Botswana and there was increased financial support from international organizations such as SNV-Netherlands (Mbaiwa, 2014). In 2007, the CBNRM policy was adopted, whose purpose was to guide the development

TABLE 3 Draft and tourism statistics.

Year	Drought (Y/N)	Tourist arrivals	Tourist receipts (in US$)
2020	N	358,000	$217.00 m
2018	N	1.83 m	$584.20 m
2017	N	1.62 m	$542.01 m
2016	Y	1.57 m	$505.00 m
2015	Y	1.53 m	$534.30 m
2014	Y	1.97 m	$529.30 m
2013	Y	1.54 m	$484.20 m
2012	Y	1.61 m	$515.60 m
2010	Y	1.97 m	$440.10 m
2009	Y	1.72 m	$663.60 m
2008	Y	2.10 m	$510.70 m
2007	N	1.74 m	$548.30 m
2006	N	1.43 m	$540.00 m
2005	N	1.47 m	$563.00 m
2004	Y	1.52 m	$582.00 m
2003	Y	1.41 m	$459.00 m
2002	Y	1.27 m	$324.00 m
2001	Y	1.19 m	$235.00 m
2000	Y	1.10 m	$227.00 m
1999	N	843,000	$239.00 m
1998	Y	750,000	$179.00 m
1997	Y	607,000	$141.00 m
1996	Y	512,000	$105.00 m
1995	Y	521,000	$176.00 m
1994	Y	–	–
1993	Y	–	–
1992	N	–	–

Source: UNWTO (2022) and Botswana Tourism Organisation (2016, 2021).

of CMNRM projects for the sustainable management of natural resources (Ministry of Environment, Wildlife and Tourism , 2007).

3.4 Mainstreaming climate change in CBNRM-related policies: the case of Botswana

Climate change poses significant challenges to Botswana's ecosystems, water resources, agriculture, and human settlements. The country experiences increased temperatures, changing rainfall patterns, and an increased frequency of extreme weather events such as droughts and floods (World Bank Group, 2020). These climatic changes can have adverse effects on agriculture, biodiversity, and human health and exacerbate existing socioeconomic disparities. Thus, the strategic national planning document for the country, Vision 2036—Achieving Prosperity for All, has a section wholly dedicated to promoting climate resilience and disaster risk reduction (see Box 1). The strategic document highlights the need to take a strong stance and include climate vulnerability assessments, adaptation, and mitigation in development planning (Government of Botswana, 2016).

Botswana is among the southern African countries that successfully adopted CBNRM policies as a means of empowering local communities to sustainably manage and benefit from natural resources (Keitumetse, 2011). The CBNRM approach involves devolving resource management rights and responsibilities to communities residing in or near natural resource–rich areas. By giving communities ownership and control over their natural resources, the government aims to enhance conservation efforts, promote livelihood opportunities, and foster community resilience (Keitumetse, 2011). Although currently under review, key aspects of CBNRM policy in Botswana include the following:

(1) Collaborative governance that promotes collaboration between government agencies, local communities, and other stakeholders to jointly manage natural resources and make informed decisions.
(2) A policy that emphasizes equitable benefit sharing from sustainable resource use, ensuring that local communities directly benefit from the revenue generated through eco-tourism, wildlife management, and other sustainable practices.
(3) CBNRM policy that currently focuses on striking a balance between conservation goals and improving the livelihoods of local communities dependent on natural resources for their income and subsistence.

The inaugural CBNRM policy for Botswana was established in 2007, almost 15 years and 7 years after the 1992 international UNFCCC climate policy and draft Africa Climate Strategy, respectively. At the national level, the policy was established 4 years prior to the Botswana National Action Plan of 2011–2016. Findings from the advanced word search indicated that this first policy does not make any explicit mention of any climate change–related terms. Despite this, a historical correlation between climate change policy and CBNRM policy initiatives, programs, strategies, and projects indicated that the country has been making efforts to incorporate the climate change agenda.

According to the Center for Applied Research's (Kelebang et al., 2018) report on CBNRM, Botswana's early adoption of CBNRM policies has significantly empowered local communities in sustainable natural resource management. These policies align with the objectives outlined by the World Bank in their publication on Climate risk country profile (2020), further emphasizing the importance of collaborative governance and benefit sharing to address environmental challenges (World Bank Group, 2020). The 1999 CBNRM policy in Botswana, which is currently under review, complements climate change efforts by promoting community-driven conservation and sustainable resource use (Keitumetse, 2011). Engaging local communities in conservation efforts can contribute to climate change adaptation and mitigation by ensuring the long-term health of ecosystems and biodiversity. Additionally, empowering communities with knowledge and skills to cope with climate-related challenges can enhance their resilience and adaptive capacity (Keitumetse, 2011).

BOX 1 Climate resilience and disaster risk reduction.

Global warming and climate change are unequivocal and could dampen a country's desired economic growth and development. As a nation, we recognise the possibility that disasters such as fire, floods and drought could worsen with increased incidents of climatic variability. We therefore take a strong stance to include climate change vulnerability assessment, adaptation and mitigation into our development planning.

Botswana will have a low carbon footprint, with a society that is aware of and resilient to the consequences of climate change. Our planning and decision making will take cognisance of vulnerabilities and provide for implementation of appropriate mitigation and adaptation measures. We will also strengthen efforts towards disaster risk management and early warning, as well as public education and awareness, and be a global player committed to global climate change efforts.

Source: Government of Botswana (2016).

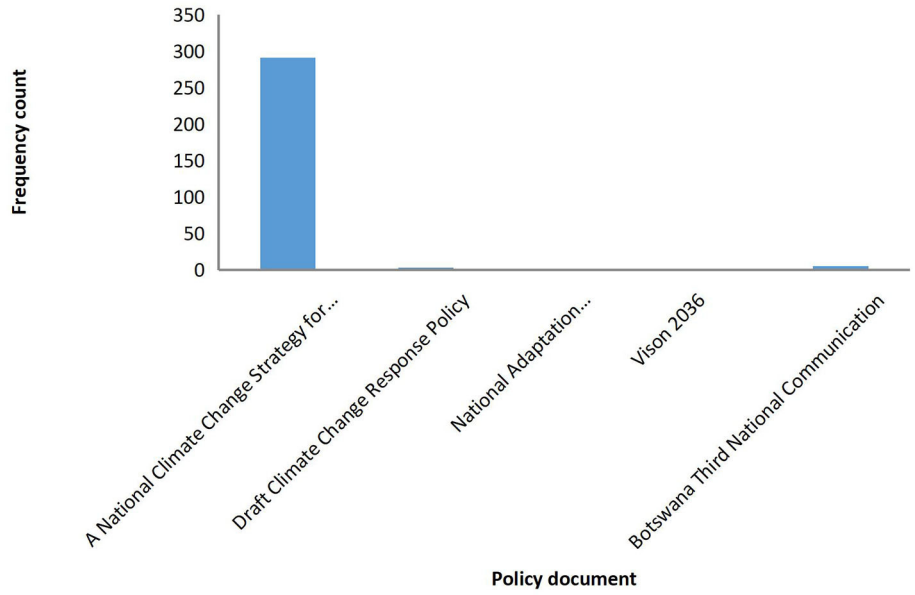

FIGURE 6
Frequency of mention of "natural resources" in policy documents.

BOX 2 Climate change and tourism.

4.41 Climate change has a significant impact on physical resources supporting tourism and can therefore influence seasonal variations in tourist flows and behaviour. Climate change also influences types of tourism activities necessitating the need for national and regional assessment of the effects of climate change and the potential for adaptation. This will be achieved through the following:

i. Implement concrete measures in order to mitigate climate change throughout the tourism value chain and reduce risk to travelers, operators and infrastructure;

ii. Promote and undertake investment in energy efficient tourism programmes and use of renewable energy resources; Conserve biodiversity, natural ecosystems and landscapes in ways which strengthen resilience to climate change and ensure a long term sustainable use of the environmental resource base of tourism;

v. Implement climate focused product diversification to reposition local destinations;

vi. Raise awareness among public and private sector institutions, tourists and communities on climate change impacts and adaptation measures and

vii. Access funding from different sources to mitigate the effects of climate change.

Source: Ministry of Environment, Natural Resources, Conservation and Tourism (2020).

The revised Tourism Policy of 2021 incorporates the climate change agenda under section 4.41. Box 2 shows the key tenets of the policy regarding climate change. One may argue that the provisions apply to CBNRM initiatives because most of them are key components of nature-based tourism.

3.5 Mainstreaming CBNRM and tourism in international, regional, and national climate policy: the case of Botswana

Findings from the word count of the term *natural resources* in international climate policies (Figure 6) indicate that they do not include this term in their text. However, regional policies (Figure 6), particularly the African Union Climate Change and Resilient Development Strategy and Action Plan (2022–2032) and the draft Africa Climate Strategy (2020–2030) (Table 4), include this term several times. For instance, the Africa Union Climate Change and Resilient Development Strategy and Action Plan (2022–2032) (Table 4) mentions the term natural resources 17 times. This recent policy document indicates that Africa is endowed with rich and diverse culture and natural resources such that it has great potential

TABLE 4 International, regional, and national policy documents related to climate change.

Region	Policy	Provisions related to CBNRM
Global Area	UNFCCC	No direct mention of CBNRM or related terms
	Kyoto Protocol	No direct mention of CBNRM or related terms
Continental (Africa)	Draft African Climate Change Strategy (2020–2030)	Promoting climate resilience, environmental protection and sustainable management of natural resources (p. 36) Activity 5.7: Monetizing Africa's Natural Capital and Mitigation Potential The African continent is endowed with much human and natural resources which have been obtained from the continent for centuries by other nations with the practice continuing to this day (p. 71)
	AFRICAN UNION CLIMATE CHANGE AND RESILIENT DEVELOPMENT STRATEGY AND ACTION PLAN (2022–2032)	In the face of uncertainty and variability, many approaches to natural resource management, infrastructure development and investment may need to be strengthened to deal with the level of uncertainty associated with climate change (p. 39) National and regional organizations and governments will need to work hard to benefit populations equally and equitably, and to account for and address the negative impacts of food systems on the environment and natural resources (p. 46) ... Africa has enormous potential for industrialization, given its rich natural resources as well as prospects for developing intra-African value chains and integration into global value chains (page 53) *Priority interventions and suggested actions for enhancing resilient water systems.* 3a: Take actions to ensure that the natural resource base (water, land other natural resources) is maintained to support development in a changing climate (p. 60).
SADC	SADC Secretariat (2015)	**Section 4.1.3 Biodiversity** The Southern African region is endowed with a rich natural heritage of biological diversity–or biodiversity. The SADC Secretariat (2007) indicates that more than 40% of the region's species are endemic. Biodiversity is of fundamental importance to the functioning of all natural and human-engineered ecosystems, and by extension to the ecosystem services that nature provides to human society. Biological resources such as plant and animal products, timber, and wildlife
		tourism account for a significant proportion of the SADC region's Gross Domestic Product (GDP) and are a source of livelihood for the majority of its citizens. **Strategies** 1. Promote scientific and indigenous knowledge on the vulnerability of biodiversity to climate change. 2. Promote Sustainable Forest Management practices in order to reduce deforestation and forest degradation. 3. Promote Society recognition of forest and marine eco-systems adaptation to climate change **Actions** Capacity building initiatives on sustainable utilization and management of biodiversity at different levels particularly on communities Provide incentives for communal forest management, including reforestation and afforestation.
	SADC Protocol on Environmental Management for Sustainable Development	Objectives highlight the need to (i) Enhance the protection of the environment in order to contribute to human health, wellbeing and poverty alleviation; (ii) Promote equitable and sustainable utilization of natural resources and the protection of the environment for the benefit of the present and future generations; (iii) Promote the shared management of transboundary environment and natural resources; and
	SADC Climate Change Policy	
	Regional Climate Resilience Program for Eastern and Southern Africa- Stakeholder Engagement Plan (SEP) 2023	Will be monitoring the activities on the ground and coordinating capacity building on natural resources management (p. 16)
Botswana	Constitution of Botswana	**8. Protection from deprivation of property** Item 5a (vii) for so long only as may be necessary for the purposes of any examination, investigation, trial or inquiry or, in the case of land, for the purposes of the carrying out thereon of work of soil conservation or the conservation of other natural resources or work relating to agricultural development or improvement (being work relating to such development or improvement that the owner or occupier of the land has been required, and has without reasonable excuse refused or failed, to carry out), and except so far as that provision or, as the case may be, the thing done under the authority thereof is shown not to be reasonably justifiable in a democratic society (Government of Botswana, 1966);
	Vision 2036 Achieving Prosperity For All	PILLAR 3: SUSTAINABLE ENVIRONMENT By 2036, sustainable and optimal use of our natural resources will have transformed our economy and uplifted our people's livelihoods
	Botswana National Climate Change Response Strategy	The National Climate Change Strategy (NCCS) emphasizes building climate resilience in sectors like agriculture, water resources, and infrastructure to reduce vulnerability to climate-related risks. Botswana in this way aims to increase the share of renewable energy in its energy mix, including solar and wind power, to reduce greenhouse gas emissions and promote sustainable energy alternatives in the future. Other initiatives such as reforestation and conservation efforts are crucial for preserving natural habitats, increasing carbon sequestration, and enhancing biodiversity. Under the NDP's core priority area of "Sustainable Use of Natural Resources," the NDP highlighted the role that climate change mitigation and adaptation can play in employment creation and economic growth and emphasized the need to mainstream climate change into development planning.

(Continued)

TABLE 4 (Continued)

Region	Policy	Provisions related to CBNRM
		Primary NDP Goal Implicated NDP 11 – Sustainable use of natural resources. Policy Goal to Be Realized: "Food security and sustainability must be achieved in the context of integrated development planning and land use reforms that can reduce natural resources degradation, human-wildlife conflicts, and significantly contribute to job creation and poverty eradication." (Government of Botswana, 2018)
	Nationally-Determined Contribution to the UNFCCC in 2016	Foreword: Our high dependence on climate sensitive natural resources for our livelihoods and economic sustenance will inherently increase our vulnerability. **Dryland/grassland ecosystems** Dryland forests provide essential resources critical to the survival of human and animal populations. Community livelihoods are often directly dependent upon the use of natural resources in these habitats. **Climate change effects on biodiversity** "[S]hift in composition of natural resources in their habitat. The inflow in Okavango Delta is likely to be reduced due to decline in rainfall in its catchment area"
	National Adaptation Plan Framework for Botswana (Ministry of Environment, Natural Resources, Conservation and Tourism, 2020)	Foreword: The country's frequent exposure to these climate extremes, the fragile ecosystem and reliance on natural resources as well as inadequate capacity makes it vulnerable to climate change (p4) **3.2 Promoting an EbA approach** Subsequently, promoting an EbA approach would align the NAP process with Vision 2036. It also aligns the NAP process to NDP 11, which requests the prudent and sustainable use of natural resources.
	Government of Botswana (2017)	Introduction: "The effects are being experienced in various economic sectors such as water, agriculture, energy, natural resources and infrastructure development with devastating socio-economic repercussions" **8.1.1. Agriculture and Food Security** Food security and sustainability must be achieved in the context of integrated development planning and land use reforms that can reduce natural resources degradation, human wildlife conflicts and significantly contribute to job creation and poverty eradication. **8.1.8. Biodiversity and Ecosystems** The integrity of our biodiversity and ecosystems continue to contribute significantly to the country's GDP particularly from wildlife and tourism activities. Any increased pressure on the adaptive capacity of our ecosystems is likely to have significant negative impact on our economy and human livelihoods. The government therefore commits to promoting conservation and sustainable use of biodiversity and effective management of ecosystems, as well as promotion of equitable sharing of benefits from natural resources.

CBNRM, community-based national resource management; UNFCCC, United Nations Framwork Convension on Climate Change; SADC, Southern Africa Development Community; NDP, National Development Plan; EbA, Ecosystem-Based Adaptation; NAP, National Action Plan.

to emerge to be a global hub for climate change solutions (Africa Union, 2023). The policy further highlights *"the importance of the sustainable use and management of natural resources to maintain the livelihoods of people across the continent that are affected by climate change, while avoiding practices that contribute to environmental degradation" (Africa Union, 2023 p. 27)*. In terms of anticipatory governance and planning for climate change, the policy, mentions that, "*in the face of uncertainty and variability, many approaches to natural resource management... may need to be strengthened to deal with the level of uncertainty associated with climate change" (Africa Union, 2023 p. 39)*.

Botswana recognizes the importance of addressing climate change and has taken steps to adapt and mitigate its impacts in the CBNRM sector. This is reflected by the extent to which the climate change–related policies, strategies, and plans have incorporated elements related to natural resources. A word count of the term *natural resources* indicated a high count (291) of the term in the National Climate Change Strategy for Botswana and a low count of 2 in Vision 2036.

The government developed the UNDP (2018) to guide actions and policies that promote climate resilience and low-carbon development. Some key components of the strategy are as follows.

3.6 Climate change challenges, adaptation, and mitigation and opportunities in Botswana

Climate change is an imminent global concern with profound implications that necessitate immediate action. This section is dedicated to delving into the multifaceted challenges, threats, and opportunities posed by climate change, with a specific lens on adaptation and cooperation in the context of CBNRM. It seeks to elucidate not only the global dimension but also the specific context of Botswana. By examining the challenges, adaptation strategies, and opportunities within the context of Botswana, this section aims to contribute to the broader discourse on climate change response and underscore the importance of local and global cooperation in addressing this pressing issue.

According to the IPCC sixth assessment report, global warming will continue to seriously impact living conditions in most African regions (EU, 2022; IPCC, 2022). For instance, temperature rises will continue to lead to decreases in crop yields and fish harvests, increases in rainfall variability and unpredictability, and will put an additional strain on fresh water. Several animal and vegetal species

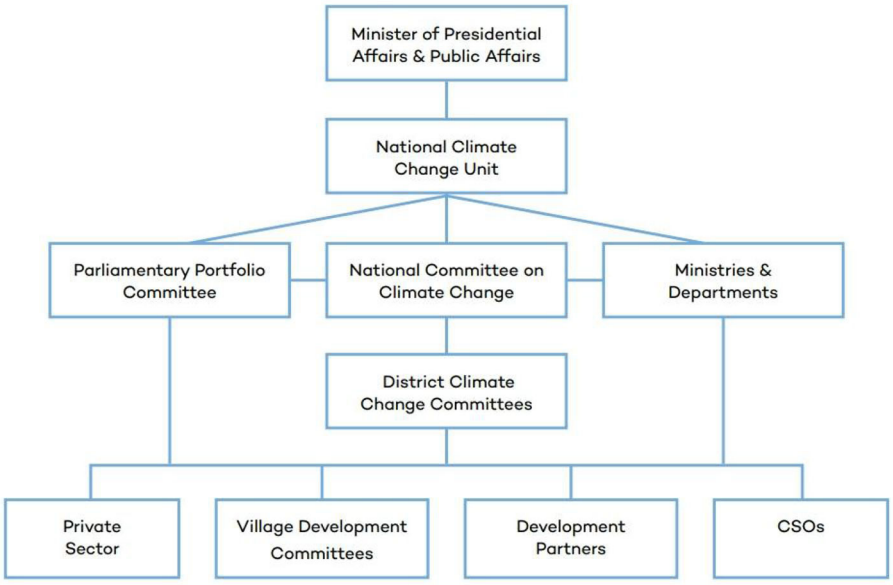

FIGURE 7
Institutional arrangement for the National Adaptation Program. CSO, Central Statistical Office. Source: Government of Botswana (2017).

are at risk of sharp population decreases or extinction (IPCC, 2022). The IPCC (2022) further projects that biodiversity loss will escalate with every 0.5°C increase and that more people will be exposed to climate hazard risks, such as floods and heat waves, and a longer-term rise in sea levels. Thus, climate change–related threats will further strain the livelihoods of natural resource–dependent societies.

3.6.1 Adaptation and mitigation strategies

Response to the dire climate change situation, the Government of Botswana, through the Ministry of Environment Wildlife Conservation Tourism (2020), came up with a National Adaptation Plan framework in 2020. The framework has several guidelines for ensuring inclusive climate change adaptation. According to the guidelines, climate change adaptation strategies should be inclusive of all stakeholders from national to subnational levels and youth-centered, pro-poor, and vulnerable groups, cross-cutting and ensuring effective mainstreaming into all sectors, and be infused with indigenous and traditional knowledge and science (Ministry of Environment Wildlife Conservation Tourism, 2020, p. 11–14). A close reading of these reading shows the indispensable row of local communities in ensuring climate change mitigation and adaptation. Figure 7 shows the institutional framework for the National Adaptation Program.

The figure shows that effective climate change adaptation will require the involvement of everyone from the office of the president to the village (where CBNRM projects are based).

Apart from the National Adaptation Program, the Government of Botswana drafted a Climate Change Response Policy in response to the climate change challenges highlighted earlier. The policy includes a range of adaptation strategies. These are categorized into agriculture and food security, biodiversity and ecosystems, human health, water, infrastructure, disaster risk reduction, forest management, land use and land allocation, and human settlement (Government of Botswana, 2018). Among the biodiversity- and ecosystem-related strategies are

a) Accelerating the prioritization of climate change related research on species richness changes, migration, pests and diseases.

b) Supporting the coordinated implementation and integration of climate change into existing biodiversity and ecosystem related policies and community based programs.

c) Promoting use of ecosystem based adaptation approaches in order to take into consideration the full range of possible climate outcomes.

d) Adopting climate change guidelines for designing and monitoring of development activities within and adjacent to sensitive ecosystems in order to enhance their resilience under changing climates.

e) Where possible avoid human settlements adjacent to sensitive ecosystems that may interfere with the natural rehabilitation cycles of such ecosystems especially large water bodies (Draft Climate Change Response Policy p. 17–18).

By highlighting these strategies, we can gain insights into Botswana's proactive stance on climate adaptation. Emphasizing adaptation strategies is crucial to build resilience and reduce vulnerabilities to climate change impacts.

The draft Climate Change Response policy also highlights the mitigation strategies, which are mainly in the areas that include creating carbon budgets and carbon markets, SD and using renewable energy, reducing transport emissions, sustainable waste management, and sustainable procurement, especially in government institutions (p. 19–21).

3.6.2 Opportunities

Moreover, climate change presents opportunities for innovation and collaboration. From an innovation perspective, due to climate change, there is a growing emphasis on renewable energy sources, such as solar power in Botswana, which not only mitigates greenhouse gas emissions but also offers economic prospects (Botswana Climate Change Network, 2023). As the traditional sources of energy are dwindling in the region, the call for adopting greener and smarter energy has only become louder. This creates an opportunity for economic diversification into areas of renewable energy, eco-tourism, and green technologies. By doing so, Botswana will reduce its dependence on traditional sectors such as mining and agriculture (Botswana Climate Change Network, 2023) and create more opportunities for employment and economic resilience and growth.

By demanding mitigation measures such as recycling, reducing waste, and promoting sustainable consumption, climate change creates opportunities for Botswana to preserve its resources for future generations. At the same time, the country can benefit from resource efficiency, thereby reducing the cost of operations (Botswana Climate Change Network, 2023).

With the increased effects of climate change, an opportunity for collaborating with neighboring countries and international organizations can further enhance climate resilience and drive SD. Both at the international and local levels, there are opportunities to implement nature-based solutions and promote sustainable land and water management practices. International cooperation plays a vital role in addressing climate change on a global scale. The Paris Agreement serves as a critical framework for international collaboration, aiming to limit global temperature rise and enhance adaptation efforts (UNFCCC, 2015). Apart from this, the Global Biodiversity Framework targets, such as the need to protect and restore at least 30% of areas of degraded terrestrial, inland water, and marine and coastal ecosystems and minimize the impact of climate change on biodiversity and increasing its resilience, also serves another opportunity for African nations to deliver their ambitions on climate action.

International cooperation facilitates the sharing of resources, technology, and expertise, enabling collective action to address climate change challenges. In Botswana, regional and international partnerships, such as collaborations with neighboring countries and international organizations, provide opportunities for knowledge sharing, capacity building, and financial support for climate change adaptation projects (Government of Botswana, 2017).

The European Union (EU, 2022) noted that Africa needs to transform key sectors such as terrestrial and aquatic-based ecosystems to face climate challenges. This entails leveraging climate change mitigation while at the same time providing for sustainable and inclusive growth. Strategies for protecting and restoring forests, soils, and water systems also need to be upscaled so as to enhance their role as carbon sinks (EU, 2022). Thus, Africa can also leverage these natural assets to expand options for CBNRM apart from the traditional wildlife-based tourism ventures.

Stone and Stone (2020) identified challenges for CBT in Botswana, such as community definition problems, multistakeholder participation, diversity and heterogeneity, deficiencies in business acumen, a lack of income distribution plans and reinvestment priorities, and passive community participation. The country can address these challenges to promote climate-resilient CBNRM initiatives. At the local level, collaborative efforts between government agencies, local communities, and non-governmental organizations are vital for effective adaptation and SD in Botswana. The collective response to climate change will determine the ability of the nation to secure a sustainable future for generations to come.

4 Conclusion

Climate change and variability, particularly drought episodes, are directly affecting CBNRM through impacts on tourism products and services. Botswana has made efforts to mainstream climate change in tourism policies and strategies, on one hand, and incorporate CBNRM initiatives in climate change policies, on the other. One may conclude that Botswana's CBNRM policy and climate change strategies are interconnected and play critical roles in promoting SD and conservation of natural resources. By empowering local communities, enhancing their involvement in resource management, and addressing climate change challenges, Botswana is taking steps toward a more sustainable and climate-resilient future. Future studies should focus on the extent to which CBNRM programs have implemented the climate change agenda for climate resilience.

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OC: Conceptualization, Supervision, Writing—original draft. OK: Methodology, Writing—original draft, Writing—review & editing. ON: Investigation, Validation, Writing—review & editing.

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