Cultural pathways to climate action in the Anglophone Caribbean

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CHAPTER SIX

ETHNOGRAPHIES OF TRADITIONAL KNOWLEDGE AND CLIMATE CHANGE IN THE CARIBBEAN

This chapter presents ethnohistorical and ethnographical data, in addition to other contemporary studies relevant to the research discussion. This data illustrates the inherent value of understanding how past Caribbean populations or communities responded to severe environmental changes and its applicability to current and future climate action in relation to the ongoing and accelerated effects of climate warming. It follows on from a presentation of data in relation to research at archaeological sites, establishing continuity with the adaptation strategies identified through the archaeological record and present in Indigenous and local communities today as their traditional knowledge systems.

In this way, it focuses on data in relation to the continuity of traditional knowledge systems of island people from the past to the present. It highlights ethnographic field research based on participant observations and interviews discussing knowledge and practices in relation to the changing climate. It also highlights strategies utilised to manage this change and is discussed within the context of what this change and resulting response mean for individuals and communities. This activity was undertaken as knowledge sharing sessions in collaboration with specified Caribbean Indigenous communities, with the express purpose being to inform a discussion on better understanding how these communities in the Caribbean responded to climate challenges in the past, continuity in these actions through intergenerational knowledge, and how these reinforce present climate action.

Through ethnography, we are presented with the opportunity to better understand how transformation and innovation occurs in response to the changing climate and how climate action is formulated. This response is examined through the lens of traditional (Indigenous or local) knowledge, practices, and experiences transmitted over generations.

The Caribbean, like much of the world, has experienced severe environmental change over several millennia. The implications of this are that the peoples of the Caribbean have a climate action

record that matches the effects of climate warming experienced. This exists within the archaeological record, social memory, contemporary actions, and the landscape that bears witness through its biographical layers.

In addition to examining these knowledge and practices and identifying what might have been viewed as successful or unsuccessful climate action in relation to severe environmental change, this Chapter's data presentation will conclude with a discussion of considerations for possible ways of applying this data at a broader scale in studying how the islands of the Caribbean pursue climate action (Bynoe, 2016).

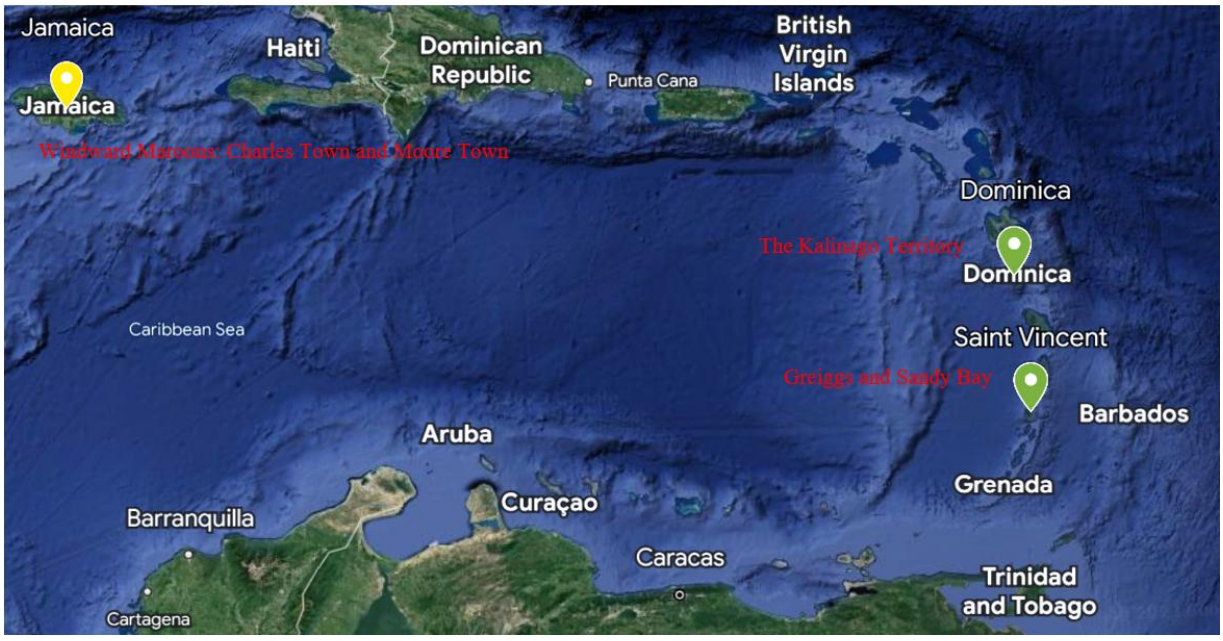
The most vital role of traditional knowledge systems in climate action is to address the scope for societal adaptation to climate change at all temporal scales, from rapid to slow onset emergencies and deep histories of adaptation. This knowledge is engaged at every phase of the emergency cycle, from preparedness through response to recovery. Delpuech (2004) suggests that while places and lives may be destroyed, they will eventually resume, making it difficult to fully gauge how these climatic occurrences have affected the cultural development of societies and in some ways, the transfer of inter-generational knowledge within this setting. There are, however, adjustments applied over time and building on each other in response to recurrent impacts. These are considered in this research as adaptation strategies. These effects leave lasting impressions on the social memory of people and communities, and the landscape is imprinted with these activities and memories, bearing testimony to environmental, historical and cosmological or mythical events concerning and processed within the world views of these communities.

The interplay between traditional knowledge and climate action occurs at different scales. The archaeologist's understanding of features, changes and other material evidence that point to adaptation in the archaeological record can be better understood or defined through traditional knowledge, which provides a contemporary context for understanding past actions. Through this inter-generational knowledge, communities adapt through time while building on and adjusting this knowledge. This knowledge will in turn inform future action that is transmitted also as inter-generational knowledge and practice, also becoming part of the future archaeological record.

Combined, archaeological data (presented in Chapters 4 and 5) and traditional knowledge offer culturally relevant solutions, pathways and insights to develop climate action for contemporary societies.

Detailed information on the methodology applied to the ethnographic data presented in this Chapter was discussed earlier in Chapter Three. To understand and highlight contemporary local community responses, this research utilised participatory research methods for ethnographical knowledge sharing in collaboration with Indigenous communities in Dominica, Jamaica, and Saint Vincent (see Figure 27). This participatory approach benefited from collaborative research design, and the identification of relevant knowledge and practices, and possible climate heritage actions based on this knowledge. This knowledge-sharing component benefited from group and individual interviews and permitted observations of practices. This ethnographic research was also pursued in tandem with ethnohistorical research and a review of contemporary studies to further contextualise data.

Figure 27. Caribbean Indigenous Communities Case Studies



Source: Author generated from Googlemaps.com

The outcome was the documentation of Indigenous knowledge and practices identified by individuals and communities with their free, prior and informed consent. When combined with the archaeological and ethnohistorical record and contemporary studies, this data provides rich opportunities to better identify and articulate adaptation strategies evidenced through landscape modifications, established social networks, Indigenous knowledge, and practices, artefacts, and other evidence. Further, it sought to identify how Indigenous knowledge can boost social and ecological resilience for Indigenous communities and wider Caribbean society and be mobilised for more robust climate action, even within the context of accelerated climate warming and its attending effects. Because traditional knowledge and practices are dynamic, this research takes the position that they are also suited to work with other knowledge systems, combining with them on an equal footing to address climate challenges, and adapt to same.

The value of studying and integrating traditional knowledge and practices into the development of climate action is an area requiring more in-depth research and application in the Caribbean. Globally, the value of integrating this data into a more comprehensive strategy relating to disaster risk management and responding to the effects of the changing climate has gained traction, as elaborated by Petzold et al. (2020) and Nakashima et al. (2012, 2018; see also Agarwal, 1995; Brace & Geoghegan, 2011; Maldonado, 2014, 2016) and is widely acknowledged and used in regions such as Africa and the Pacific (see Guto, 2020; Iloka, 2016; Nunn et al., 2024; Van Oosterzee & Hunter, 2023).

Although this traction has increased and is perhaps more evident at the programming level, the transition into policy has only been successfully attempted in some countries. This area, from programming to policy, remains extremely limited in the Caribbean, in the sense that while some areas and sectors of Caribbean society have referenced these same knowledge and practices (i.e., agriculture, see also discussion in Chapter 2), the data remains predominantly abstract and in a format that is not easily applied, nor has it been integrated into wider strategies and actions beyond perhaps the local level.

The fact that the research and application of Indigenous knowledge and practices remain restricted in the Caribbean is also strongly linked to commonly held views that the Indigenous populations of the region were completely exterminated as a consequence of European contact and subsequent colonialism (e.g., Hofman & Duijvenbode, 2011; Strecker, 2016; Wilson, 1997), and that there is little remaining of their traditional knowledge and practices as put forward by various encounter reports from the seventeenth century to the present time, and the heavy toll of colonialism and the socio-ecological fragmentation left in its wake (Bonilla, 2020; Stancioff, 2018).

There are, of course, varying levels of truth to these points. The Indigenous peoples of the region experienced an almost complete genocide during colonialism, and experienced forced relocation from their lands due to the expanding plantation economy and other opportunities for land grab. These processes and actions deeply affected the transmission of said knowledge and practices. Cultural practices and traditions were also subjected to acculturation or transculturation in their interaction with peoples from Europe, Africa, Asia, and the Middle East for centuries. As such, the commonly held view persists that there are no Indigenous knowledge and practices to be passed on. However, as Wilson (1997, p. 7) puts it, "Indigenous communities today are products of and originators of change…and the extent to which Indigenous peoples interacted with others allowed for a substantial transfer of knowledge and practices in the human-land interactions system" that would form part of the local knowledge of contemporary Caribbean communities.

To undertake this study of the role Indigenous knowledge systems played in past adaptation to severe climate variability and to inform contemporary and future climate action, an intimate understanding is required of how past Caribbean communities interacted with their natural environment (Bynoe, 2016; Honychurch, 1997). The Indigenous peoples of the Caribbean utilised elements of their island's physical environment to make observations, benefit from it, and adjust to its challenges. This awareness is considered within the context of climate change perhaps presenting as a much more severe challenge today than in the past due to a myriad of anthropogenic causes, more significant environmental degradation, and varying issues contributing to the vulnerability of Indigenous and other local communities.

This brings in to focus discourse on how vulnerability should be approached in relation to traditional communities within island systems. Fosberg (1963) Fitzpatrick and Keegan (2007) and Stancioff (2018) suggest that islands can be fragile and vulnerable environments. Island ecosystems are indeed fragile, particularly when considered within the setting of present rates of unprecedented climate warming and variability, ecosystem degradation at alarming levels, historical processes such as colonialism, and the earliest transformations of the region's cultural landscape from the initial peopling of its islands would also be a factor (Castilla-Beltrán et al., 2018, 2020; Keegan & Hofman, 2017).

Added to these are varied external and internal factors that demonstrate points of weakness to natural hazards. Existing within such a system or environment contributes to the vulnerability of its people, but this is not simply a cause-and-effect relationship. Portraying island communities, particularly the communities of the Caribbean as vulnerable, dismisses the agency of Indigenous and local communities and the place for cultural knowledge, practices, and traditions in shaping resilience and in transforming challenges. Salick and Ross (2009, p. 137) suggest that the assumption of "helpless victims of change beyond their control" in the face of climate change must be challenged. Indigenous peoples have lived in extreme environments for generations, which means that there is a long record of knowledge creation to manage this risk and uncertainty. These people have interpreted, filtered, and processed this change using their own traditional representations of the world and designed adaptations using their own knowledge (Berkes, 2012*b*).

Due to the continued perpetuation of systems originating from colonialism, disruptions have occurred in the region's socio-ecological systems and relationships, which have increased the level of exposure to climate-induced hazards by local populations, as well as disrupted the transmission of critical ecological knowledge and data concerning the treatment and management of the natural environment and in responding to severe environmental change or instability. As put forward by MacDonald and Ferdinand (2023, p. 232), "the Caribbean is of critical importance in considering historical events that shaped local culture [and its transmission and use] and examining how individuals and groups perceive and act to solve environmental problems."

Because these disruptions persist and are reinforced, vulnerability contexts persists, and it is within this system and processes that inter-generational adaptation strategies to the changing climate have been and continue to be shaped, transmitted and applied.

It is important to highlight that this research does not seek to assume singularity or exactness in adaptation knowledge practices used by Indigenous communities in the Caribbean to respond to the changing climate and its hazards. Instead, it recognizes that while response and adaptation practices may seem similar across groups and borders, the landscape plays a critical role in its use and application and is the cocoon that births these practices. Traditional ecological knowledge has been the basis of survival for many peoples and local resource management systems in diverse environments and contexts for generations. John (2007) suggests that although it is often not quantitative, amoral, or specialised, it can nevertheless yield crucial community-held knowledge or good practices for the Caribbean region. Emerging actions by international organizations and climate agendas are also now increasingly being called on to support the development of indicators that support the application of Indigenous knowledge in climate action.

Bynoe (2019, p. 76) cites Owuor (2007) in highlighting that "Indigenous knowledge is a process of learning and sharing social life, histories, identities, economic, and political practices unique to each cultural group." Bynoe (2019) goes further by highlighting that it is also "indicative of the unique ways in which specific societies construct their realities and use such forms of knowledge to resolve local problems," such as experiencing increasing environmental challenges and change.

Through a presentation of ethnohistoric, ethnographic, and other studies, this chapter highlights patterns that have emerged in the formulation and use of this knowledge, as well as identified knowledge and practices that focus on *agriculture, water management, and housing construction* where it exists. Indigenous environmental practices emerge as the nexus from specific situated histories of interaction between people, landscape, and their dynamic environment. So, although methods may be similar, the knowledge and strategies created can be further molded by cultural conditions, the natural environment or landscape, available resources, geophysical features, exposure, and sensitivity to a particular hazard, among many other indicators, similar to the

adaptive capacity of an archaeological site as discussed in Chapter Four. This approach further highlights the importance of the concept of human-ecodynamics.

While climate change is a global phenomenon, the experiences of each island and community are different, and their actions are localised, resulting in knowledge practices being developed, honed, and implemented differently across islands. Traditional knowledge systems are grounded in a specific sense of place or place-based identity relating to locations, environments, communities, and the changing climate. This is then processed through the landscape, so the erasure of heritage in this area due to climate-related hazards such as flooding, drought, coastal erosion for example, will impact this history and social memory, or as posited by Favini (2018, p. 24), "erasure of an ecologically materialized archive."

The grounding of these knowledge and practices in a particular place is key. Ford et al. (2020, p. 533) define *place* as "spaces that have acquired meaning for those that are associated with them, and it captures the nature of the environment to which individuals or cultural groups have attachment and contexts that give meaning and value to people's lives." It is a vital component, source, and sustainer of their knowledge, cultural practices and belief systems. However, while Indigenous peoples experience loss of their social memories when their cultural heritage is destroyed because of climatic hazards, disruptions in their connections with their natural environment also result in susceptibility to the effects of ongoing climate change, as "this closeness and intimacy to place promotes resilience to environmental change" (Ford et al., 2020, p. 533). Indigenous communities are therefore caught up in a circular relationship where the degradation of their environment promotes disruption in the transmission of practices and diminished resilience. The increased pace at which these communities experience climate change, again due to their degraded environment, has served to erode these knowledge and practices further.

Indigenous and other traditional communities often occupy some of the Caribbean's most economically and environmentally marginalized or fragile areas, making them more vulnerable to severe environmental changes (Barclay et al., 2019; Bynoe, 2016, 2019; Palmer & Fraser, 2021). It is also important to reiterate that this vulnerability context does not automatically suggest that they

are also victims, as they have historically leveraged and applied traditional knowledge innovation to find solutions which are identified as coping strategies in the short term or social adaptation over more extended periods (Douglass & Cooper, 2020; Hofman et al., 2021; Nakashima et al., 2012).

As presented in Chapter Five, there is information on the knowledge practices of the Indigenous peoples of the Caribbean in relation to the changing climate from archaeological research (see Florès Blancaneaux, 2009; Cooper, 2012; Douglass & Cooper, 2020; Hofman & Hoogland, 2015; Hofman et al., 2021; Samson et al., 2015). As this chapter focuses on ethnohistorical and ethnographic data, the early accounts of Europeans such as by missionaries such as Father Breton, based on their interactions with Indigenous peoples will also be reviewed (see Alegria, 1997; Bright, 2011; Delpuech, 2004), in addition to re-interpretations of these accounts and contemporary studies by ethnohistorians, anthropologists, and others to include Bright (2011); Cummins (1997); Delpuech and Hofman (2004); Lalubie (2014); and Wilson (1997).

The colonial impact and interaction period was severe, resulting in biological, cultural, and political upheavals and genocide against the Indigenous peoples (Hofman & Duijvenbode, 2011; Hulme & Whitehead, 1992). These accounts written on the lives of Caribbean Indigenous populations emanate from the earliest contact period during European colonisation. Since then, Indigenous communities have experienced being written about from a position of the world view or gaze of others, ignorance, romanticized, or misunderstood, molded to fit the description of a savage, and sometimes seeking to perpetuate longstanding cliches.

These are a people who have endured interruptions to the transmission of their knowledge and practices attributable to various historical factors, faced genocide, experienced relocation from ancestral land for varying reasons such as land grab or the impact of natural hazards, restricted to small parts of the islands they inhabited, and in some instances, experienced a denial of their claim as Indigenous by the broader society and the governments in these territories. Later, they were viewed as extinct and not retaining much of their cultural traditions as written by those representing colonial administrations or religious institutions (see Hulme & Whitehead, 1992). These views persist in the wider contemporary societies of the Anglophone Caribbean.

Alegria (1997) writes that European accounts offer differing perspectives concerning Indigenous peoples, and always from the worldview of Europeans observing others through their own cultural lens. The chroniclers during this age of European colonisation were primarily explorers, missionaries, and colonisers, and certainly could not be classified as trained ethnographic observers. They were also bound by the biases of their time and in how 'others' were looked upon. In his journeys to the Caribbean, Columbus brought would be colonists whose views were hardened by war and saw conquered persons as inferior and fit for servitude and their resources to be plundered (see Burbank & Cooper, 2011; Delpuech & Hofman, 2004; Lalubie, 2014).

Researchers such as Alegria (1997), Bright (2011), Hulme and Whitehead (1992), and Peterson et al. (2004), among others, have compiled the documentation of various and largely seventeenth-century missionary accounts such as Anonymous from Carpentras, Breton, de Rochefort, du Tertre, and Labat. These proved to be accounts of missionaries living with and observing Indigenous peoples in the Caribbean from the 1600s. These accounts involved details on lifeways, belief systems, practices and languages and are valued today as a record of the Indigenous peoples of the Caribbean "after nearly two centuries of cultural contact" (Hulme, 2005, p. 22) (see Hulme & Whitehead, 1992).

Although many Indigenous peoples did not survive the initial period of conquest, as Wilson (1997) argued, the archaeological record and ethnohistorical sources based on others' encounter descriptions do give insightful information on these persons, their communities, customs, history, and rituals. The physical and symbolic landscapes that the Indigenous peoples of the region and their forebears had created to regulate their living environment would have been disrupted along with their virtual eradication (Saunders, 2005). Many accounts are noted as flawed, containing many biases through the mode of acquisition, transcription, and background of the chronicler (Lalubie, 2014), and sometimes confined to myths processed by Europeans who might not have understood what they saw or heard, such as how stories were often told as myths. As indicated however, these accounts nevertheless provide helpful data for further research and reinterpretation.

The ethnohistorical accounts referenced earlier at times detailed information in relation to the cosmology and sometimes creation myth of the Caribbean's earliest inhabitants. This has also been passed from generation to generation in the oral history, sometimes the oral traditions of

these persons, and even their governance structures, such as the example of the *Warao* people who live in the Orinoco Delta and whose oral history speaks to a time when the "serpent's mouth was dry (Caribbean Sea level lower), and Trinidad was connected to the mainland" (Wilbert, 1993, p. 7). The fact that this would have happened thousands of years ago speaks to endurance of resilience through stories and the capacity to identify this resilience, and counters the accounts of those who wrote about the Indigenous people of the Caribbean as essentially losing their culture with very few traditions remaining (Hulme & Whitehead, 1992; Wilson, 1997).

Caribbean Indigenous peoples generally believed that good and bad spirits were central to their understanding of the physical environment and its changes. As such, images, petroglyphs, and zemis communicated relationships with nature and environmental change. Their response to these natural phenomena was also anchored in myth as suggested by Honychurch (2018). Mythical stories functioned as ways of explaining and marking beliefs and experiences. Natural phenomena were grounded in the cosmology of the region's Indigenous peoples and would have influenced their perceptions regarding these events and the actions that would be put in place to define how they managed them. Writings by Pane (1999) and Stevens-Arroyo (1988) highlight the seasonal behaviour of the frog as being linked to rainfall and agriculture for the Taínos, where it served as a zoomorphic representation of these things in addition to feminine fertility. Roth (1901, pp. 267, 370) also highlighted Indigenous knowledge that indicated that "the frog's behaviour during its rutting was the cause of increased rainfall."

Petitjean-Roget (1997, cited in Hauser, 2021, p. 58) suggests that the fruit-eating bat and the tree frog (*coquí)* were recurrent themes in Indigenous myths, with the tree frog being "linked to the destructive hurricane season and the fruit-eating bat to the equally destructive dry season." Petitjean-Roget further put forward "that these two motifs reject attempts by ritual specialists to influence the regularity and intensity of dry and wet seasons" (Petitjean-Roget 1997 cited in Hauser, 2021, p. 58). Zemis were also seen to have a vital role in the sterility or abundance of the land and the various elements of nature or the natural environment. Duin (2018) has written on the possibility of a rock outcrop (L'Eperon) on the coast of Guadeloupe linked to the Anse a la Gourde site being used by Indigenous peoples as an astronomical system concerned with predicting the

start of the rainy and hurricane seasons (see also Hofman & Hoogland, 2011). In this astronomical system, the relationship between the positioning of the stars with the sun and other stars was highlighted for the arrival and ending of seasons.

The Taínos of Hispaniola used the word *ouragan* to describe storms, which the Spanish and French adopted and became hurricane in English. In the Taíno myth recorded by Father Pané in the Greater Antilles, the *ouragan* was guided by a powerful female spirit, *Guabancex,* the Lady of the Winds, who had two assistants in *Gua-taubá*, who produced the hurricane-force winds, and *Coatrisquie*, who caused the floodwaters. For the Kalinago in the Lesser Antilles, the hurricane was *Ioüállou*. They realised that the seasonal cycle was changing from May, sending stormy waves towards them until October, and they called this time *Ioüállouoúyourou* (Honychurch, 2018). Caribbean Indigenous populations linked hurricanes to supernatural forces, and in some cultures, *huracán* signified a powerful god and threatened native peoples and lands with destruction (tempestuous spirit). In Mayan culture, *Huracán* was one of the three most powerful forces in the pantheon of deities, along with *cabrakan* (earthquakes) and *chirakan* (volcanoes). Other observers suggested that Indigenous peoples did not view the storms themselves as deities but instead saw them as under the control of some supernatural spirit or god.

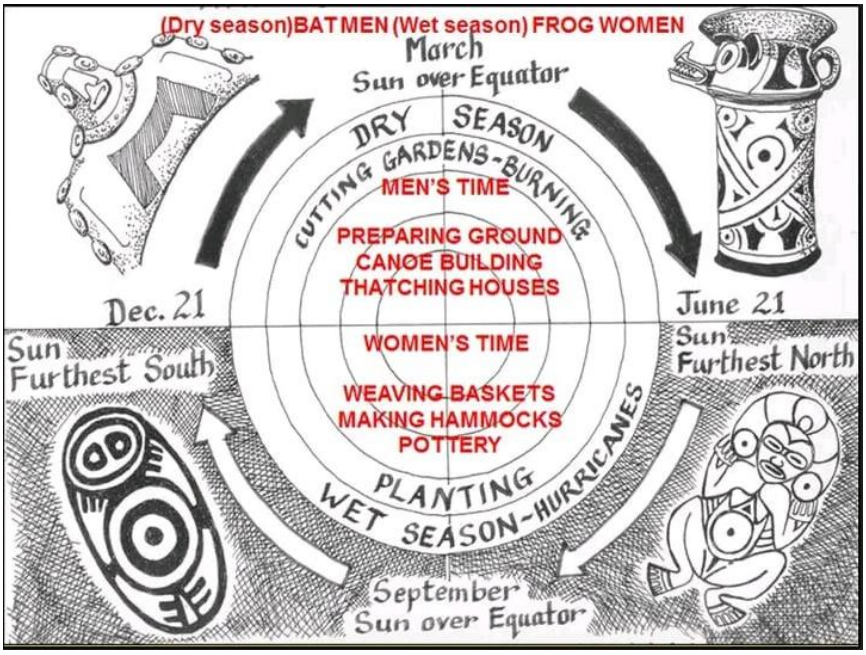
Another crucial area in studying Indigenous knowledge regarding responses to climatic changes was the place for social and trading networks between islands. These networks would also have provided ample opportunity for the development of strategies and the transmission and sharing of cultural practices and knowledge regarding response to drought, rainstorms, hurricanes, and other natural hazards and events, as well as possibly to mitigate seasonal changes such as the coming of the annual cyclone season and resource management within this setting (see Crock, 2000; Curet & Hauser, 2011; Hofman & Duijvenbode, 2011; Hofman & Hoogland, 2011; Hofman et al., 2021; Keegan & Hofman, 2017).

With each subsequent generation that migrated to the Caribbean and made the region their home, the inhabitants adapted to becoming islanders, having been brought into new environments, landscapes, and resources, centering the formation of human ecodynamics within the context of the region. Past populations would have observed the differences with natural hazards as present

populations do today, using local knowledge emanating from the past. They would, therefore, amass knowledge of environmental observations that informed them of approaching hurricanes or other climatic events. They developed a life cycle in tune with the seasons, and knowledge and practices evolved relevant to the nature of the islands and their exposure and sensitivity to climatic challenges. Over time, this knowledge became integrated with other knowledge systems, evolved or was lost or experienced disruptions in transmission due to the various historical processes and contexts discussed earlier.

In discussion sessions as part of this research programme, Kalinago community members spoke of the importance of doing things according to the correct moon phase. Lennox Honychurch (personal communication, July 17, 2023), in his research (see Figure 28) on the Kalinago Solstice, notes that June 21, when the Earth tilts furthest north, signified the end of the dry season and the beginning of the rainy season (and hurricanes) for the Indigenous Kalinago people of the Lesser Antilles. They realized that the seasonal cycle was changing, sending stormy waves towards them until October, and they called this time *Ioüállouoúyourou*. The dry season was considered the 'men's time,' signified by bats (which live out of the water and are dry animals), and the wet season was 'women's time,' signified by frogs (which come from beneath the surface of the water). Honychurch notes that this information on natural change and human actions was being passed on by Kalinago elders as late as the 1920s.

Figure 28. Solstice and Moon-phase Calendar Utilised by the Kalinago



Source: L. Honychurch (personal communication, July 17, 2023; used with permission)

These observations by the Indigenous peoples would sometimes be utilized or transferred to Europeans. An example is the word *huracán,* which was the Taíno word for a storm of wind and rain under the control of a supernatural force. By the end of the 1650s, colonists had learned the seasonal boundaries of hurricanes from July to September from the Kalinago. Attempted English improvements, however, exacerbated rather than diminished the devastation from hurricanes (Mulcahy, 2008). Colonists began by describing hurricanes as wondrous events, divine judgments for human sins, or others linked the storms to various natural processes such as shifting wind patterns, the explosion of various chemicals in the atmosphere, and the celestial movement of planets and stars (Mulcahy, 2008).

Barclay et al. (2019) also put forward that the knowledge and practices shared by Indigenous peoples in relation to severe environmental change did not go unnoticed by Europeans, although they seemed hesitant. In most instances, colonists had to begin anew and learn from the Indigenous peoples, particularly how to build like them. Captain Langford's observations reported in Mulcahy (2008, p. 54) highlighted the Indigenous peoples as "the ignorant country people and barbarous, are better observers of times and seasons, and draw better rules from them, than more civilised and reasoning people, for they rely more on experience than theories." Views such as these led to both short- and long-term forecasting influenced by the Indigenous people, which were incorporated into trading and military patterns and behaviours.

Honychurch, in 2018, wrote about historical perspectives on disaster readiness of buildings in the Caribbean and highlighted that Indigenous construction methods depended on a knowledge of wood *maho* cord bindings, which tied together all components (such as posts and rafters) of the Indigenous house. Transfer of knowledge of woods and building techniques from the dwindling number of Amerindians to the European and African arrivals after 1492 was an important aspect of contact and culture exchange, which influenced the design and materials used in the Creole house. In some cases, Indigenous houses were adapted to become homes for Europeans. Other important applications of this Indigenous knowledge included crop times not coinciding with the hurricane season, where windmill sails and frames could be taken down and stowed, and drainage and defences for fortifications set up along the coastline. Traditional methods of Caribbean architecture, such as steep, heavily braced roofs and thick wooden shutters and doors aimed at hurricane resistance (see Chapter Five), have now declined in use.

Caribbean Indigenous Communities and Climate Change Perceptions

The communities that collaborated in this ethnographic research component are among those who have lived in the region the longest and are able to share valuable observations in relation to their experiences in how the climate has changed over time and their response to this change. This is not to say that responses to climate change were always positive for these communities. It,

however, recognises that adjustment is often about trial, error and maladaptation, as well as finding what works to address challenges. This would be in contrast to a Western framework which viewed people as being separate from nature.

Results presented in Table 20 highlight general perceptions of severe environmental change, specifically climate change, and are based on ethnographic research pursued for this dissertation.

Indigenous communities throughout the Caribbean also adapted to climate stressors by depending on social capital as a form of resilience. Within the context of this research, social capital refers to "norms and networks that enable people to act collectively," as defined by Woolcock and Narayan (2000, p. 226), and can be bonding (norms, values, and trust relationships that exist among families and communities) or networking (more formal but weaker bonds of trust outside of kinship networks) capital. In the Caribbean, this was evident through the sharing of work to manage issues in the community or the *koudmein* system (see Stancioff et al., 2017; also, Heron and Honychurch, 2023. Heron (2018) discusses this social resilience in writing about surviving Hurricane Maria's impacts on Dominica but notes that these practices are rarely transmitted today. This type of social capital was also evident in the region's earliest settlement, where Indigenous populations utilised mobility and resource networks across settlements, communities, and islands to respond to impacts such as those presented by severe environmental challenges (Hofman & Hoogland, 2011).

Overall, for communities collaborating with this research, interviewees presented a good understanding of how they were presently being impacted and how they felt they would be impacted by climate challenges in the future. They however felt that there was little to be done in response. This paradigm was confirmed by Smith and Rhiney (2016, p. 29) in their research on the Indigenous Caribs in northeastern St. Vincent who highlighted that "they were conscious of their local context and a change in the climate, of which increased temperature was a strong predictor."

Table 20. Perceptions on the Changing Climate Reported by Indigenous Communities

Climate Change Phenomenon	Perceptions
General perceptions in relation to the changing climate	All part of the cycle of life and nothing can be done about it except adjust where possible. In Sandy Bay (Saint Vincent), we are in a cycle of life with the volcano and the storms. The volcano builds up our coastal areas, and the storms wipe it away. In Greiggs we live in mountainous areas far from the coastline and sheltered from hurricane and so will not be impacted by climate change. Storms are a cleansing of the earth, and nothing can be done about that. Animals return night after night and know where to hide. Although climatic changes have increased, the eruption of La Soufrière remains our biggest concern. Many impacts now are unprecedented. Informal systems of managing resources have broken down. Ecological systems need a longer time to recover. Ancestors left information we should consider as important. Kalinago relationship with the environment has been interrupted. Forested areas and the environment were respected as they were key to survival from the past to the present time. Land cleared and destroyed for monoculture which contributes to how communities being impacted by climate change. Younger persons not interested in how we dealt with environmental issues in the past. If we do the research to combat climate change, we have to study why and how historic spaces were used. Target persons and document this information about how they coped with climatic issues. Persons today depend on equipment [and technology] instead of the knowledge which has been honed over time and tested. Always history versus modern knowledge. Solutions rest in raising awareness plus practical initiatives. Changes in nature are largely going unnoticed (earthquakes, heat). Man doing a lot to destroy the environment. Kalinago utilized environment well in the past. Repackaging of this knowledge is happening now as permaculture.

Table 20 (continued). Perceptions on the Changing Climate Reported by Indigenous Communities

Climate Stressor	Perceptions
Increased Drought	The river has changed drastically for the worse in recent years in terms of its hydrology, morphology, and biology and becomes drier in the dry season. More sedimentation in channels caused swimming holes to disappear. Sedimentation also impacted fish and crayfish availability. Drier periods are happening more often now. There are lobster and fish. The Sea is always rough, so less fishing on rocks and the water is always dirty, plus seaweed. Try to grow food naturally/organically such as composting. Communities used traditional initiatives to protect water and water sources during and after Hurricane Maria.
Increased Rainfall and Flooding	Wet and dry seasons are no longer evident, and there is a noticeable increase in flooding. Cannot always run from destruction, Sandy Bay is a disaster zone and has accepted its disaster context. Our ancestors lived in these places and managed, so we should be able to also. People now build in dry canals/ravines. Community moved from Old to New Sandy Bay due to 1945 flooding of the Cayo river. Climate change looks like more rain and flooding, more storms for the future.
Increased heat/hotter temperatures	Knew when to plant, how to rotate crops, and which crops could manage heat. Understanding nature is a process of trial and error. Paid attention to the moon, horizon bands, stars, colours, the atmosphere, and the sky. Knew when and how to manage the forest. Did not need to collect rainwater as the river was there, however, this is now changing, and river flow has decreased. Temperatures getting hotter. Modern imported materials do not keep the house cool.

Table 20 (continued). Perceptions on the Changing Climate Reported by Indigenous Communities

Climate Stressor	Perceptions
Stronger hurricanes	Traditional construction methods better manage hurricanes, but people feel these are old and useless solutions and indicate poverty. Aid houses do not consider local cultural context as houses cannot accommodate natural air or additional buildings for children. Every hurricane season brings pressure to the coastline.
Coastal erosion	The coastline must disappear, and then it will reappear. Less and fewer fish. More frequent sea swells, and coastal erosion in Saint Vincent. Sea will continue to come in more inland, and coastal ecosystems must go back. Screw pine can be used to protect coastlines. Should not only depend on sea defences. Told government that sea defences are being done incorrectly but they don't listen.

Note: Ethnographic field research by Author

Case Studies

Charles Town and Moore Town Maroon Communities, Portland, Jamaica

The Community (ies)

Maroons are described as "New World Indigenous groups found from Texas in the United States of America to Brazil in South America" (John, 2007, p. 9). Similar to Maroon communities in the Americas, the Maroons of Jamaica are descendants of Africans who founded free Black settlements in the island's mountainous interior after escaping enslavement on the island.

Africans were enslaved and brought to Jamaica under Spanish rule in 1509. Following the capturing of the island by the English and general colonial instability caused by this transition from Spanish to English rule, the large-scale flight of enslaved persons commenced, creating Maroon strongholds known as the Leeward and Windward Maroons (Bilby, 1996; White, 2014). Agorsah and other Maroon researchers have also suggested that there is a continuous link between the original Taíno inhabitants and the Maroon communities of Jamaica. One component of this link

being the use of the natural environment as hideaways or as a refuge, where runaway enslaved persons could hide from colonial pursuers and flourish in relative isolation.

Figure 29 identifies the four contemporary Maroon communities in Jamaica: the Trelawny Town Maroons of the Sovereign State of Accompong (western Jamaica known as Leeward Maroons) and Moore Town, Charles Town, and Scotts Hall in eastern Jamaica (Windward Maroons). This research focuses on the Windward Maroon communities of Charles Town and Moore Town.

Charles Town is found in the upper reaches of the Buff Bay River Valley. There are three villages in the Charles Town Development Area comprising Charles Town, Cotton Tree, and Plum Valley. Charles Town is the largest, with a population of approximately 2,400 persons, of which about forty percent of the residents are of Indigenous Maroon descent. The main economic activities in the community include agriculture, commerce, and tourism. Charles Town is distinctive as one of the communities of the Windward Maroons, established by enslaved Africans who escaped and established settlements in the mountainous regions of the island. Charles Town Maroons have retained strong African traditions and cultural beliefs, with their intangible cultural heritage contributing significantly to the livelihood of the various communities. Charles Town is one of the contiguous communities of the area designated as the Blue and John Crow Mountains National Park and World Heritage property, presently the Caribbean's only mixed cultural and natural heritage inscribed property.

Jamaican National Heroine Nanny, known as Nanny of the Maroons, established Moore Town (also known as New Nanny Town) and was the Maroon leader in 1781. The town is situated in the highlands of eastern Jamaica in the Blue and John Crow Mountains of Portland in the Rio Grande River Valley. It is the easternmost of all Maroon settlements in Jamaica, with approximately 1000 inhabitants. First named Nanny Town, then changed to New Nanny Town in 1782; the Maroons later changed its name to Moretown (*more land*). The three key districts of Moore Town are Cornwall Barracks, Ginger House, and Comfort Castle. Moore Town is 515 hectares in size and situated in the upper reaches of the Wild Cane River, a major tributary of the Rio Grande River. The settlement is bowl-shaped, with one access road and the river flowing right through the centre. The

dwellings are located along the valley walls and are accessible by footpaths leading up from the road and river (Bedasse et al., 1996; John, 2007).

Figure 29. Map of Jamaica of Historic and Present Maroon Settlements

Note: Case Study Communities are highlighted in red. *Source*: Author generated from Googlemaps.com

The rivers and their tributaries around these communities bring reflections on the water management traditions and practices of the Maroons into focus. Agorsah (1995, p. 407) writes that "hunting and fishing are the normal occupations people encounter in these remote areas of the Blue Mountains, and according to Maroon traditions, these were their occupations from ancient times."

Much of the Rio Grande Valley is located within the Blue and John Crow Mountains National Park World Heritage property, where the Windward Maroons have been identified as frontline actors for conservation activities (John, 2007). The Valley is noted for maintaining a traditional rural lifestyle with vernacular houses. The production of Blue Mountain coffee has, however, spread in the Rio Grande Valley at the expense of conservation programmes tackling soil and land degradation. Coffee farming has resulted in significant erosion in mountainous areas and significant flood risk when rain comes. Park managers of the Blue and John Crow Mountains National Park (BJMNP)

highlight that as the area is known as a protected area with sacred natural sites, “incorporating these sites into protected area management will help to preserve their knowledge and transmission within the Windward Maroon community and, in turn, reinforce the culture of Jamaica’s only remaining Indigenous group” (John et al., 2010, p. 146).

The Maroons have a long socio-ecological relationship with their natural environment. John (2007, p. 2) points to “a more than 300-year legacy of intimacy with forest and aquatic ecosystems and communal ownership of resources,” where the “Maroon’s history of autonomy, semi-isolation, and dependence on local natural resources would have fostered home-grown natural resource management knowledge, systems, and traditions” (John 2007, p. iii) John et al. (2010, p. 146) also highlight “widespread ecological degradation and erosion of Maroon culture” as important considerations for the protection of natural sites and *vis a vis* the natural environment.

Climate Hazard Scenario

The parish of Portland, the location of these two Jamaican case studies, is known as one of the more disaster-prone areas of Jamaica and a particularly vulnerable stretch of coastline (CCCCC - Jamaica, 2012). Under the smallest SLR scenario of 0.5m, up to forty-seven percent of the beach area will be lost (Jamaica National Communication NC3, 2019, p. 39). The communities in Portland are both coastal and rural communities with a significant dependency on ecotourism. The CARIBSAVE perceptions study in the parish revealed that communities were experiencing significant changes such as sea level rise, “coastal erosion and beach loss, and new weather phenomena such as hail and mini tornadoes, and changes in agricultural yield and output” (CCCCC - Jamaica, 2012, p. 94) and increasing incidences and severity of flooding events and land slippage due to hurricanes. The Portland coastline has already experienced significant land loss in the bays of the parish. In communities, farmers have observed declines in agricultural production due to “seasonal weather patterns, hotter temperatures, longer dry periods, and more intense rain and wind events” (CCCCC - Jamaica, 2012, p. xxv). See Chapter Four for detailed information on Jamaica’s climate hazard scenario.

The Buff Bay Valley in the Blue Mountains is one of the most scenic corridors in Jamaica. There is a montane mist forest from 4000 feet above sea level to the traditional fishing village of Buff Bay. Along the route can be found the meandering Buff Bay River, waterfalls, and springs.

The environment is generally fragmented because of the mountainous nature and the deep gullies of the Rio Grande, Buff Bay, Negro, and Dry Rivers, which cut through the region of both communities and the forested regions proved to be particularly suitable for runaway settlements. The landscape has significantly changed from forest to shrubs, bamboo, and coffee plantations, and there is a loss of forest cover, particularly from the upper sections of the Valley. The rivers of Portland, which have their source in the Blue Mountains, flow swiftly and can be very destructive when there is torrential rain. The Rio Grande Valley (RGV) in Portland also has a history of flooding, and communities along the course of the Rio Grande River are repeatedly flooded.

Campbell et al. (2021, p. 4) describe the RGV as being situated within over 41,000 hectares of forested land in the BJCMNP. Its river system is one of the largest on the island of Jamaica, and over 20,000 inhabitants occupy the Valley. The watersheds of the upper sections of the Rio Grande comprise one of the last remaining undisturbed stretches of tropical broad-leafed montane rainforest in Jamaica. The river separates the contrasting geologies of the two sides of the river, and steep slopes dominate the mountainous, deeply dissected topography of the upper Rio Grande.

The local environment is prone to multiple hazards, including erosion, mass wasting, flooding, and landslides from torrential rainfall. The upper watershed region serves as home to forty percent of the population, with the highest concentration in the Moore Town community, which is considered to be the capital of the Windward Maroons. The Upper RGV is also exposed to hazards such as landslides and flooding that are accentuated by storm events. Livelihoods depend predominantly on agriculture. The natural and social history of the Blue and John Crow Mountains positions the region as an important area for the examination of how global changes are manifested in rural agrarian societies and mediated by traditional knowledge systems.

The upper slopes of Jamaica's Blue Mountains are an important protected area, while the lower slopes are key coffee-growing locations. Climate change impacts, such as stronger hurricanes and more intense drought, threaten to increase erosion and landslide risks. These hazards place

communities in danger, threaten livelihoods, and impact a crucial watershed serving the city of Kingston, the capital of Jamaica, and its key urban areas. As such, actions are needed to reduce climate-driven erosion and landslide risks through reforestation and agroforestry while working with local farmers to manage ongoing climate change pressures.

In recent years, some communities have experienced increased soil erosion and landslides from climate change associated with longer drought periods, higher temperatures, and high-intensity rains that force local farmers to seek new farmland further up the mountainsides. This has resulted in a continual cycle of land degradation. Farmers clear forest land for agriculture when landslides and soil erosion render previous fields unusable, only to put the new fields at increased risk for future erosion by clearing the protective ground cover. This is a case where communities previously utilised sustainable traditional knowledge and practices but are now mixed with those who don't use these practices. Do these traditions persist or do new unsustainable practices take root? Today, these communities are now caught up in a dangerous cycle of unsustainable landscape practices, further contributing to their vulnerability and loss of livelihoods and living heritage.

The Jamaica Conservation and Development Trust (JDCT), the managers of the BJCMNP world heritage property implements initiatives that seek to break the cycle of degradation and land encroachment on the nearby BJCMNP. These initiatives are implemented through promoting sustainable traditional agricultural techniques such as soil conservation, organic farming, and greenhouse farming. Here, farmers are successfully increasing the quality and quantity of their crops, which has served to increase economic opportunities for local farmers and has reduced their susceptibility to the impacts of climate change.

Exploring Maroon Socio-ecological relationships through Ethnohistorical, Ethnographic, and Other Studies

John (2007) writes that it is unclear how much of the Maroon's traditional ecological knowledge remains today. Although the Jamaican Maroons as a group have been heavily researched, few accounts offer insights into practices relevant to the natural environment and its resources and within the context of the changing climate. Maroon ecological knowledge is most known in relation to the plants and herbs used for their traditional medicinal value. The Maroons of Jamaica's socio-

ecological relationship is borne out of its need for the environment as a source of nurturing, protection, and resistance against those who were seeking to re-enslave them. Moulton (2022) suggests that the Maroon occupation of these areas in Jamaica contributed to forest management in an era when the colonial administration sought to take up more and more land for the plantation economy.

Researchers of Maroon heritage have highlighted that the development of Maroon societies emphasised cultural links with Indigenous societies (Agorsah, 1994; Bilby, 2005; Carey, 1970; Price, 1976, 1973). This provided opportunities for the sharing and integration of knowledge and practices in relation to cultural responses to severe environmental change. Agorsah (1994) suggests that Maroons heavily invested in environmental adaptation and continuity of traditions in hunting, fishing, and farming, which were essentially a composite of Amerindian and African traditions. Campbell et al. (2021, p. 13) have written that:

> "Maroon practices of food harvesting persist into the present and serve two functions, that of wild food harvesting which enacts a claim to the forest as a common space, and preserving the cultural traditions of Maroon ancestors, and wild food harvesting which serves to ameliorate food insecurity among residents. In both ways, the forest is broadly imagined by residents as a space akin to tropical home gardens."

The relationship Maroons in the Caribbean had with their natural environment was sometimes played out in the utilisation of their spaces as both refuge sites as part of resistance activities and long-term settlements (Singleton, 2020), and they believed that the placement of settlements was determined by the *apuku (*forest spirits). More importantly, the matrilineal and matrilocal descent order ensures that the clans within a tribe ascribe to a permanent geographic area, utilising the resources therein and thereby establishing fixed ancestral territories while also ensuring sustainability in resource management. Here, centuries of traditional knowledge connect people with places and the environmental changes experienced by these places over time. This socio-cultural development was suggested as the reason why Maroon tribes do not just leave flooded areas or areas experiencing severe environmental change (Jabini, 2020, pp. 4-5, cited in Richards et al., 2023; see also Scholtens, 1994, p. 148).

The Maroons' relationship with their natural environment was one based on resilience and survival, as highlighted by Singleton (2020, p. 3). They "fled to places where they could elude capture for as long as possible in thick forests, swamplands, mountains, caves…and other places that offered seclusion" (Singleton, 2020). The impacts from climate change experienced by these spaces of resistance and forested areas would, therefore, serve to interrupt the people and place narrative of these communities, resulting in disruptions to the transmission of vital knowledge and practices. The Maroons in Jamaica occupied hilly, remote terrain, and have remained in these areas, unlike some Maroon groups in Suriname that first utilised the forested interiors and later moved to coastal areas following the signing of peace treaties. Today, personal observation suggests that these coastal Maroon settlements and by extension communities are experiencing varying levels of river erosion, such as where the Saarmaka Maroons established their settlements along major rivers.

Favini (2018, p. 20), in his research on the Jamaican Maroons' relationship with their environment, highlights that Maroons emphasised immersion within ecology and meaningful relationships with the non-human elements of life. Such an environmental philosophy would be vital to their resilience and would undoubtedly extend to their responses in relation to severe environmental change. Bedasse and Stewart (1996) have detailed Maroon practices in relation to forest usage and streams when agriculture cannot be practiced and could provide useful strategies in the event of impacts from climate stressors.

Maroons speak of using the landscape to pursue surveillance of their enemies, identify plants that contain water reserves or offer cure and food, and use vines to cover their body as part of their ritual 'ambush' (Bilby, 2005; Favini, 2018) which represented a merging of people and place, human and plant, or a socio-ecological relationship. Connell (2019, p. 2), in further explaining Maroon relations with their landscape, writes that the Maroons have had a long history of tension with the state "over the boundaries of their land and the extent of sovereignty." This issue continues today with attempts to extract bauxite and redraw boundaries in their traditional territories. The continued erosion of their sovereignty also serve to disrupt traditional practices connected to the land.

In Jamaica, traditional cropping systems based on local knowledge are recorded as being practiced from the days of slavery; however, within the region, the archaeological record suggests a much

longer timeframe. Small-scale cultivators utilised various traditional knowledge and practices such as symbiotic crop combinations such as cassava and gungo peas to provide shade, ground cover, and nutrients, planted sweet potato alone, as well as practised pre-Columbian mixed cropping (Sauer, 1966). For food production on plantations and during the post-emancipation period, Mintz (1985) and Satchell (1990), suggest that these practices were also utilised in kitchen gardens and food forests.

Farmers in the Rio Grande Valley differentiated and classified soils on the basis of crop yield, soil texture, and colour (Davis-Morrison & Barker, 1997), and the absence of earthworms and smell were used to indicate infertile, possibly acidic soils. Soil observations were also used as indicators for soil erosion, land degradation, and quality. They prepared and planted fields under a mulch of dried guinea grass cover to reduce soil moisture loss while keeping down weeds and reducing soil erosion, all traditional strategies used to combat the challenge of moisture deficiency and low rainfall (Campbell et al., 2021).

The Maroons describe the forest as more than providing food. It is also a spiritual ecosystem rooted in their ancestrality and embedded in their memories, emotions, and overall well-being. Therefore, the forest is more than an ecosystem providing food production services to the communities; it is a metaphysical space that can be described as a place-based relationship where farmers are in unity with the land.

In prior studies undertaken in rural farming communities in Jamaica, including Maroon communities, Campbell et al. (2021) highlight that these communities employed various adaptation strategies built on local and Indigenous knowledge applied over the long term. These included switching between livestock and farming as needed, cultivating shade trees to protect other plants from extreme heat, increasing pruning activity and removal of excess leaves from plants, focusing on maximising production from a section of the entire farm under cultivation, harvesting rainwater, cultivating crops that are more drought resistant, contour ploughing especially along very steep slopes, constructing trenches to control the flow of water on farms or using contour grassing techniques to minimize the loss of topsoil. Another example in Jamaica comes from the planting of yams and the unavailability of yam sticks due to scarcity, poor quality,

and high prices. In this case, Indigenous technical knowledge was applied by yam farmers who adapted their cultivation methods and innovated new ways of staking yams to solve the yam stick problem. Here, they relied on their Indigenous knowledge as the basis for innovation (Campbell et al., 2021; Davis-Morrison & Barker, 1997).

A study on Maroon water resource management traditions and practices in the Blue Mountains (John, 2007) also indicated that the Maroons had retained a river culture, which ensured the use of sustainable practices for its protection. Other traditional practices noted were the zonation of streams and springs for drinking and washing, the regulation of settlement and fishing, and the use of sustainable inland fishing techniques such as trapping and biodegradable poisoning (John, 2007). More recent innovative practices that have developed perhaps in response to changes in the water supply or disruption due to heavy rains, include the construction of entombments at springs and water delivery infrastructure. Because of this close relationship with nature, Maroons also developed an intuitive way of *reading* the environment for instability and change, such as forecasting rainstorms, hurricanes, or drought by analysing the behavior of plants and animals (Bedasse & Stewart, 1996).

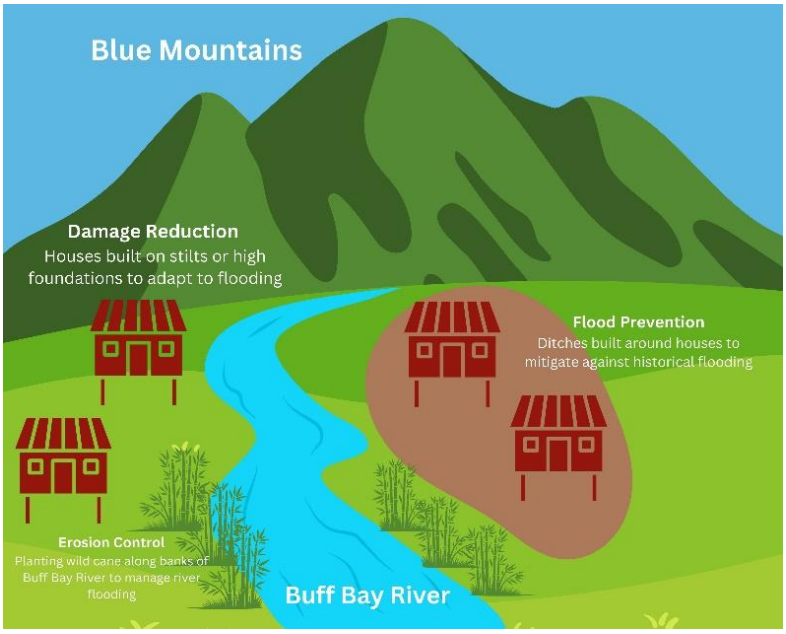
For ethnographic research with Maroon communities, the leadership (Colonel) provided community members with the option to determine whether they wanted to participate in individual interviews or group interviews. A group interview was overwhelmingly selected, ranging from 10 to 15 persons in each community at both Charles Town and Moore Town. Climate change stressors, hazard impact, and adaptation strategies are presented in Table 21. Figure 30 presents an example of an adaptation strategy identified by the Charles Town Maroons to manage river flooding.

Table 21. Climate Impacts and Action identified by the Charles Town and Moore Town Maroon communities

Focus Area	Climate Impact	Climate Action
General	The incursion of the sea in coastal areas such as Orange Bay, generally in Portland and Saint Mary parishes	None indicated
Agriculture	Loss of agricultural produce	Use of the trumpet tree to keep crops cool. Adjustment of planting seasons. Wild cane used to minimize river flooding and stabilise riverbanks.
Housing construction	None given	Built ditches around houses to control flooding. Elevated houses or build on stilts to manage flooding.
Water Management	Less water in sacred spaces that utilise water. This impacts communities and agriculture	Water always available with spring water and it is always clean as water is collected using rolled leaves to funnel water off rocks. Use of non-edible fish or the *wedhu* beetle to gauge the suitability of springs for drinking water.

Source: Compiled by Author from Ethnographic Research

Figure 30. Cultural Practices in Relation to Flooding Identified by the Charles Town Maroons



Source: Author

Long (1774, pp. 514 – 5 cited in Green (1988)[111] in writing about housing construction in Jamaica, described the dwellings of colonists as "fixed on an airy, dry and elevated spot, raised some feet above the surface of the earth, floored and constructed either of timber and *plaister* (plaster), or bricks but never of stone, which is a very improper material for the climate for dwelling houses on account of the damp chill which strikes in rainy weather." Green (1988, p. 10) also writes that "as settlements increased and people became more familiar with the land and the climate, they began to rearrange their settlement patterns and modify their building designs in accordance with environmental factors." The architectural adaptation over the years was a response to addressing climatic issues and utilising the practices they would have observed from the pre-Columbian and Maroon communities.

[111] Extract from Long, The History of Jamaica, 2:3,6 pp. 514-5, cited in Green. 1988. The Evolution of Jamaican Architecture 1494 to 1838

Disruptions in Maroon Socio-ecological Relationship

The Maroons' insistence on their rights within the Jamaican state has been a central tenet of long-standing issues related to Maroon sovereignty and their non-recognition as an Indigenous community by the Jamaican Government (Lewis, 2022). In recent years, Maroon communities have experienced threats to their sovereign lands, particularly from resource extractive activities. The Maroons of Jamaica are however recognised as Indigenous peoples and possess rights under the United Nations Declaration of the Rights of Indigenous Peoples. These ongoing issues, however, threaten landscape degradation, compounded by coffee farming, and contribute to the vulnerability of these communities, which depend primarily on agriculture and ecotourism activities, and serve to disrupt their cultural knowledge and practices concerning the land and their socio-ecological relationships.

These activities contribute to communities being more susceptible to the effects of the changing climate and erode and disrupt historical relationships with landscapes and cultural practices. Reflecting on the potential impact of mining on Maroon culture, Maroons have referenced the importance of the Cockpit Country to both Maroon history and spirituality, stating that the land is the protector, and that mining would contaminate the water and the environment and impact wild food harvesting. Connell (2020, p. 11), in documenting the concerns of Maroon farmers, noted them saying, "farmers will not have any soil to do farming, so, hunger will take over, and we would become as though this place turned into the Sahara Desert." Approaches such as these mentioned earlier ignore the Maroon element of the local land-use history and often will result in injustices that undermine food and livelihood security, as well as cultural heritage, and also perpetuate environmental injustices.

The Kalinago, Kalinago Territory of Dominica

The Community

The Kalinago present in the islands of the Caribbean are the descendants of the previously known Island Carib, who inhabited the Caribbean as early as 5000 BC (Allaire, 1997; Auguiste & Hofman,

2022; Honychurch, 2000, 2024). Encounter reports by Europeans most often make references to the Carib or Kalinago as a people and hostilities with the Taínos and the Spanish (see Allaire, 1997; Hulme & Whitehead, 1992). However, the Kalinago have had an enduring history of resistance and resilience within the context of social, environmental, and political upheavals, which have defined their past and present and will undoubtedly continue for their future (Honychurch, 2024).

Around two thousand years ago, Arawakan-speaking Amerindians arrived on the black sandy shores of Castle Bruce and built a settlement there called *Kouanari.* Today, the Kalinago people of Dominica are the descendants of the Island Carib who inhabited the island of Dominica and called it *Oüaitoucoubouli* or *Wai'tukubuli,* meaning tall is her body, in the language of the Kalinago prior to and at the time of the arrival of Europeans in the Caribbean (Auguiste & Hofman, 2022), and as recorded by French missionary Father Raymond Breton in the seventeenth century.

Due to treaties between the various European colonising powers at the time, the islands of Dominica and Saint Vincent and the Grenadines were left to the Carib people on the condition that they abandon claims to other lands (Strecker, 2016). Dominica became the last Caribbean island to be colonised, and it remained a home for pre-Columbian societies, such as the Kalinago, that had been virtually wiped out in other locations. Dominica was not apportioned to either the British or the French and the island was to be a neutral island for the sole benefit of the Carib people.[112] It was also decreed that no European nation should settle there, and a native chief should be recognized as the master of the island. This decree would not remain, and the ninth article of the Peace of Paris in 1763[113] set aside the previous arrangement, and Dominica was assigned to the British.

As British and French settlements increased in the 1700s, the Kalinagos had their homes torn from them, were forcibly relocated, and their hunting grounds disappeared under the cane fields and coffee plantations of the Europeans and their burgeoning plantation society and economy. Claims of the Kalinago to arable land were ignored as plantations spread from the coast inland. The Kalinago, who were located throughout Dominica, were forced to relocate to the areas around

[112] Treaty of Aix-la-Chapelle 1748.
[113] Treaty of Paris 1763. Accessed at: https://www.oas.org/sap/peacefund/belizeandguatemala/historicdocs/treaty%20of%20paris%201763.pdf

Salybia, the eastern coast of the island, which was viewed by the colonial administration as highly unsuitable due to severe topography and undulating landscape (Stancioff, 2018). Although the Kalinago were located throughout Dominica, the area around Salybia came to be known as the Carib Quarter. In 1903, the Territory was delimited and expanded from 300 acres beyond the Carib Quarter at Salybia to 3,782.93 acres. In 1930, a letter (Figure 31) by Douglas Taylor to Noel Teulon speaks about the Carib Reserve. Today, a community of approximately 3,000 Kalinago live in their self-named Territory in Dominica, and the Kalinago Territory was legislated under the Carib Reserve Act 1978[114].

Figure 31. Letter by Douglas Taylor about the Carib Reserve

"THE CARIBS NOW LIVE IN A LEGALLY DEFINED RESERVE OF AMPLE DIMENSIONS ON THE WINDWARD AND MOST SAVAGE PART OF THE ISLAND, UNDER THE NOMINAL RULE OF THEIR CHIEF. THERE IS NO VILLAGE AS WE UNDERSTAND IT, THE HOUSES WHICH ARE WELL BUILT OF HARDWOOD IN A STYLE OF THEIR OWN RAISED ON STAKES, AND SCRUPULOUSLY CLEAN, BEING SCATTERED OVER MILES, EACH ONE BEING SURROUNDED BY PLANTATIONS OF COFFEE, COCOA, VANILLA, NUTMEG, BREADFRUIT, TANIA, DACHINE, LIMES, ETC. AND THE WHOLE INTERVENING COUNTRYSIDE BEING COVERED WITH BAY TREES. ABOUT TEN MILES INLAND STARTS THE FOREST, FROM WHICH THEY GET THEIR HARDWOODS, SEMAN, BALATA, CEDAR, AND GOMMIERS, WHICH THEY SELL FOR 25/- THE CURRENT PRICE AT FORT DE FRANCE (MARTINIQUE) BEING 18 POUNDS (A GOOD BOAT TAKES SEVERAL MEN SEVERAL WEEKS TO COMPLETE)."

Source: Letter of Douglas Taylor to Noel Teulon Porter, 25 September 1930, Colonial Office – CO 152/418/2 in Hulme and Whitehead

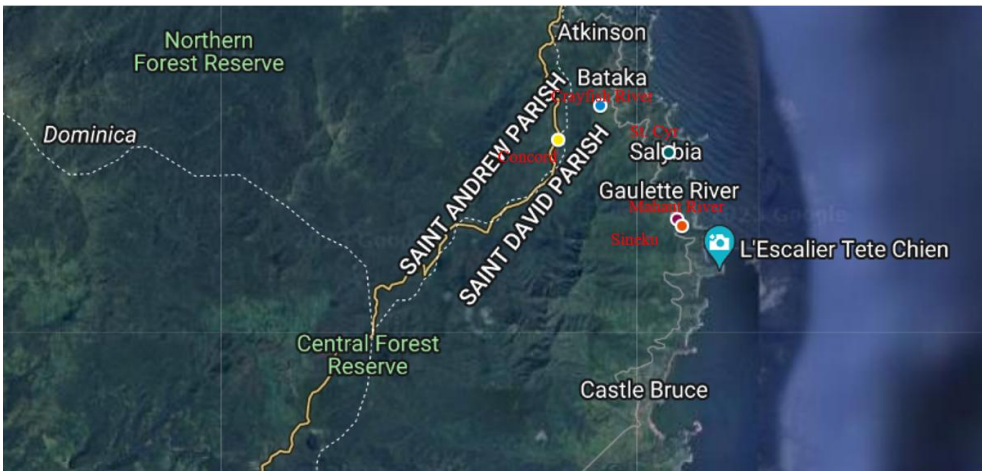
There is acknowledgement that much of what we know about the Kalinago from history stems from the accounts of priests and other chroniclers from the seventeenth century, and these accounts have been repeated, analysed, and re-interpreted by others since then.

[114] Carib Reserve Act 1978. Accessed at: https://www.dominica.gov.dm/laws/chapters/chap25-90.pdf

These records speak of a people who had lost much of their cultural knowledge and traditions. Phrases such as this would be dismissive of the fact that traditions were not frozen in time or static but constantly evolving. The seventeenth-century Kalinagos were a people whose culture had already been impacted for many years by disease, slave trading, and other colonial practices that Europeans introduced to the region precipitated by the earliest days of contact.

The Carib (Kalinago) Territory today is a forested area crossed by many streams and rivers running along approximately 13km of coastline. There are seven coastal communities (Figure 32), with Salybia being the administrative centre (Auguiste & Hofman, 2022; Boomert, 2011). A coastal road from Marigot to Castle Bruce connects the various communities. Houses are described as being of the Dominican creole type "raised about 0.5 - 1.5m from the ground on piles with flooring and walls of hardwood boards and galvanized iron sheeting for roofs" (Honychurch, 2000, p. 10; Taylor, 1938). The virtual isolation of the Carib Territory and the mountains of Dominica have played a vital role in safeguarding elements of the living heritage of the Kalinago people and assisted in maintaining some autonomy, as the terrain proved difficult for the expansion of the plantation economy spreading across the island and the region (Honychurch 1997; Stancioff, 2018).

Figure 32. Hamlets of the Kalinago Territory



Source: Author generated from Googlemaps.com. Note: N-E Dominica (Bataka, Concord, Crayfish River, St. Cyr, Salybia, Gaulette River,

Climate Hazard Scenario

Dominica is a volcanic island with rugged and steep terrain (Dominica, Third National Communication, 2020). The island does not offer the traditional white-sand beach tourism experience and has instead built its tourism product around eco-tourism, taking advantage of its rainforests, volcanic activity, and rugged landscape. The island is experiencing the effects of climate warming, tropical cyclones being of the greatest concern, and the island has been impacted by a string of such events, such as the devastating Hurricane Maria in 2017.

According to the Climate Change Risk Atlas for Dominica[115] (CCCCC, 2012), a 2m sea-level rise would put six percent of the major tourism properties and fifteen percent of roads at risk. Temperatures are projected to increase to 3.0˚C and SST up to 2.9˚C by the 2080s (CCCCC Dominica, 2012). Rainfall increases and decreases will range from -35 to +14 mm per month by 2080.

The majority of Dominica's infrastructure and settlements are located in coastal areas. This placement is also connected to the island's mountainous terrain. The effects of climate warming, particularly SLR, will exacerbate the effects of development in these coastal areas and contribute to coastal erosion. The eastern boundary of the Kalinago Territory is coastal, and the entire territory, specifically Salybia, has been exposed to land degradation, erosion and slippage.

The Caribbean Disaster Emergency Management Agency (CDEMA) highlights the Kalinago community as the most vulnerable in Dominica to climate-induced and other natural hazards. (United Nations Office for the Coordination of Human Affairs - UNOCHA, 2017). A post-disaster needs assessment (PDNA) undertaken by the Government of Dominica (2017) in collaboration with the international development agencies after Hurricane Maria advised that "special attention should be paid to the Kalinago Territory, given that the population there are primarily subsistence farmers that live off their production and the sale of crafts to tourists" (2017, p. 43). Following the passage of Hurricane Maria in 2017, the loss of materials and markets severely impacted these livelihoods. While the livelihoods of the Kalinago are indeed vulnerable to the effects of ongoing

[115] The Carib Save Climate Change Risk Atlas Project (CCCCC, 2012). Accessed at: https://www.caribbeanclimate.bz/blog/2010/02/11/2009-2011-the-caribsave-climate-change-risk-atlas-cccra/

and accelerated climate change, these entrenched vulnerabilities stem from a history that has forced the Kalinago to exist in vulnerable spaces and adopt practices that are in no way sustainable cultural practices in relation to the land.

A 2021 unpublished United Nations Development Programme (UNDP) study revealed that eighty-five percent of respondents in the Kalinago territory perceived changes in the climate over their lifetime. Of the respondents who reported observing changes in climate patterns, they highlighted that the most frequently noticed change was an increase in the number of hot days, followed by a shift in rainfall patterns and more frequent and severe droughts. Almost ninety-four percent of respondents in the study believed that the climate would continue to change over their lifetime.

The climate challenges that the Kalinago faced in centuries past would not have been framed by historical processes of land degradation and historical human-induced vulnerabilities caused by colonialism. As the oldest remaining Indigenous population in the Anglophone Caribbean, the Kalinago are now facing an existential threat to their traditions and cultural practices due to the accelerated effects of climate change affecting their centuries-old socio-ecological relationship with the landscape.

Exploring Kalinago Socio-ecological relationships through Ethnohistorical, Ethnographic, and Other Studies

The main sources of early Carib ethnology in the Caribbean, and specifically the Windward Islands, are the accounts of missionaries, the most prominent being Father Raymond Breton (Allaire, 1999; Con Aguilar, 2020; Honychurch, 1995; Hulme & Whitehead, 1992; Keegan & Hofman, 2017; Petersen et al., 2004). Breton, in his 1665 *Dictionnaire Carraïbe-Français* documented terminologies used by the Kalinago to describe perceptions concerning natural risk, the environment and its hazards (Lalubie, 2014).

Literary sources, to also include Breton's text, are useful in establishing how Indigenous peoples, in this case, the Kalinago, understood their environment. These accounts, although often one-sided and mired in bias and misunderstandings in relation to the Indigenous peoples, are nevertheless vital information about the daily life of the Kalinago people (Allaire, 1997; Peterson et

al., 2004). At a broader scale, another interesting source of information on climate variability are ship logs, and writings from individuals from the 1700s such as Edward Long (1774) and Byam (1755) on Antigua, and Thomas Thistlewood who wrote on eighteenth century climate in Jamaica (Chenoweth, 2003). In the case of the former, local knowledge is recorded specifically in determining the arrival of cyclones (2003, p. 112).

Hauser (2021) points out that the Kalinago in Dominica would have experienced the land as providing them with all that was needed for life, in addition to being aware of natural phenomena that would have "reminded them of the earth's sentient nature" (Hauser, 2021, p. 51). Lalubie's (2014) research on perceptions of the Amerindians regarding the environment and natural hazards in the Lesser Antilles points out that based on the vocabulary used by the Kalinago, they had a good knowledge of the various natural hazards that abounded and applied grading or stages to their intensity such as:

> "simple, intense rain versus storms or hurricanes; the river is troubled, the overflowing flood, different from the exceptional flood; gale, storm or hurricane wind; beautiful sea, agitated sea, choppy sea, waterspouts, the impact of the swell in the shire: on the sand, up to the rock, the storm swell, up against the cliff and exceptional swell submerging the shore to the path" (Translated from French - Lalubie, 2014, p. 332 - 333).

Using the various accounts from the seventeenth century to further delve into how the Kalinago perceived their environment and experienced its challenges and change, Lalubie highlights that the people who occupied the Lesser Antilles when Europeans first arrived were a people who had detailed perceptions regarding their natural environment and knew how to utilize the resources of their environment, through various agricultural practices and technologies, and villages were located near the sea or not far from the river mouth. Villages were spaced several kilometres apart and connected by coastal paths in most cases (Breton, 1999, cited in Hofman et al., 2022).

The encroachments and relocation the Kalinago experienced in relation to their land, therefore, contributed to disruptions in their relationship with their natural environment. Noting that the land was seen as dangerous to travel across due to torrents from the mountains to the sea, the Kalinagos' maritime environment would have taken on even greater meaning as an adaptation

strategy in response to their environmental conditions. This, in addition to their superior maritime navigation skills, would have enabled them to relocate as an adaptation strategy in the event of severe environmental risk. The Kalinago also made significant adaptations to their canoes to deal with sea swells as they adjusted to traveling on the Orinoco to the wider sea and its swells, so they likely adjusted to the prevailing climatic phenomena when they settled in these spaces.

Honychurch (2000) writes that the Kalinagos' capacity to survive would have been dependent on detailed knowledge and awareness of the environment and their relationship with it. Communities along the east coast created specific linkages to other communities and the natural resources in the forested interior of the island and along its coastline as a form of adaptation to severe environmental change. Local knowledge of the land from which their resources are obtained and the ways in which these resources are used are contained in a perception of their island habitat, which emanated from earlier inter-generational Kalinago knowledge of the landscape, which has contributed to their worldview.

Kalinago housing construction presents another form of adaptation strategy that has benefited from documentation. Taylor (1938), in describing the Kalinago house, noted that, "the usual but now rare dwelling of the Dominica Caribs was known as the *muinan,* a simple structure consisting of a ridge pole supported by a main post at either end. The rafters, crossed by rods (gaulettes) to which the thatch is tied, reach to the ground. The whole is covered with cane straw [or vetiver] or more rarely, with the leaf of the *yattaghu* palm. The *Uanas*, called *mibi* and *calabouli*, are used to tie the thatch to the thatching rods, which are made of wood or bamboo. An interesting thing about these *muinans*, is that they were commonly built double, one within the other, after the style of a Carib pannier" to better withstand storms (see Figure 33). The *muinan* gave way to huts, which were raised on piles up to four feet from the ground. The construction of the roof remained consistent.

Figure 33. Sketch of the roof of a Kalinago Muinan

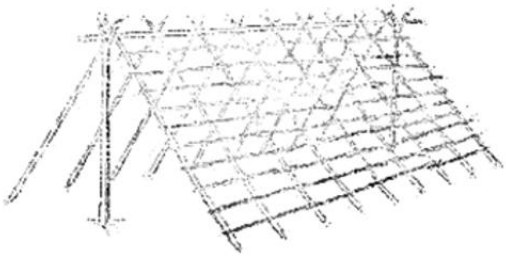
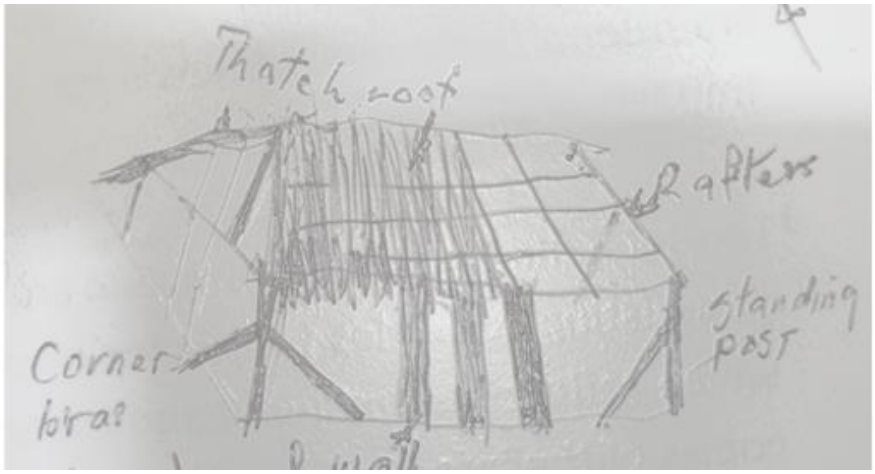


Figure 34. Sketch of a Kalinago Hut



Source: Sketch by Kent Auguiste for the Author (2022)

Burke & Lovell (2000) and other historians (see also Barclay et al., 2019; Honychurch, 1995; Schwartz, 2015) suggest that the Kalinago preferred "small, dispersed settlements, close to fertile land and relatively sheltered from hazards" such as hurricanes. Mulcahy (2008) suggests that this "dispersed pattern of settlements also distributed the collective impacts of any one storm and that land use in coastal areas particularly prone to storm surge was restricted." Schwartz (2015) and Honychurch (2017) have highlighted that these practices were also utilised by colonists. What can

be inferred from the above, is that the Kalinago had good knowledge of the intricacies of mitigating the effects of storm systems. Mulcahy (2008) and Schwartz (2015) also pointed out that the Indigenous peoples paid attention to the behaviour of the elements, animal behaviour and the look of the moon, such as it having an unusual aura around it. Early European encounters suggest that these Indigenous observations received the full attention of colonists.

Early colonists did not always utilise these Indigenous practices. Later, they introduced practices such as cutting down trees and building westernized housing, which increased susceptibility to natural hazards. Some however continued to recognize the value of Indigenous building practices which prioritised storm resilience and improved ventilation, which, according to Mulcahy (2008), had the added benefit of managing diseases.

The 2021 UNDP report pointed out that many farmers were seeking to revitalize Indigenous farming practices, although these practices are not detailed. This paradigm aligns with Stancioff's (2018) research, which highlighted that community members were noticing landscape changes related to declining agriculture, soil erosion, and landslides. This acknowledgement is also added to the significant coastal erosion taking place already, and the availability of rainwater no longer predictable.

Kalinago community members pointed out that the rainy season was unpredictable, and the land was dry more often. Community members still continued to depend on the water from rivers for many aspects of their livelihoods, with this water also being vital for cultural practices and traditions. The monoculture system introduced first through sugar cane and later through bananas also resulted in significant alterations to the landscape, further impacting socio-ecological relationships and systems and the transmission of intergenerational knowledge and practices in relation to the natural environment.

Persons contributing to this research from the Kalinago Territory acknowledge that the climate is changing and that there are some knowledge and practices that have been passed from one generation to the next that help them to manage this phenomenon better to continue with lives and livelihoods based on the implementation of cultural practices highlighted in the next section. A point made in relation to agriculture is that the Kalinago ensure their food security by participating

in whatever main crop there is in the country. There are smaller family plots and also provision grounds, which are at a distance from family homes. Participating in the country's main crop has had deleterious effects in many instances. It has made the Territory more vulnerable within the context of climate change, as banana farming continued to focus on monoculture, which resulted in issues with pests and diseases. Banana farming also cut down many of the windbreaks (K. Auguiste, personal communication, July 13, 2022), which increased exposure, and soil from banana farming was dumped into rivers, which impacted water supply and quality for both rivers and the sea, which further impacted fishing and the use of rivers and the sea.

Figure 35. Community Session in the Kalinago Territory to discuss Initial Research Findings

Source: Author

Figure 36. Climate Impacts and Climate Action Identified by the Kalinago of Dominica

Focus Area: General

Climate Stressors and Impacts: More frequent and stronger tropical cyclones. Drought or drier environment. More frequent heavy rain, landslides, coastal erosion, coastal inundation, and higher temperatures.

An influx of seaweed and Sahara Dust, in addition to new pests; damaged trails; physical infrastructure damaged; brain drain (youth and elderly who are knowledge bearers); increased health hazards; loss of archaeological sites before they can be studied and impacts to cultural spaces.

Climate Action: Relying on savings and other community members when crops fail; if everything is done according to its correct lunar phase, the community will be able to adjust better; *koudmein* helped everyone in times of distress; general observation of plants to see how they are behaving; type of fish marijuana (*nivuage/enivrage*) increases fish yield in low times; did not settle in areas with repeated vulnerabilities as the Kalinago saw hazards in coastal areas; good idea to document how spaces were used in the past and build awareness around this.

Focus Area: Agriculture

Climate Impacts: Reduction in crop production quality and quantity (food insecurity); soil erosion; no access to materials for making things such as craft; loss of trees.

Climate Action: Practice permaculture; use of intercropping for plants; generally, pests do not look for food during the full moon; planting should be done after a full moon as the crop bears a lot, and the last quarter of the moon is better for crops under the earth; use of yam sticks to conserve water to retain productivity during drought (mulching); change cultivation sites and practise soil conservation; earlier or later farming cycles; diversity in farming; plant crops that are drought/drier temperature resistant varieties; plant below ground instead of above; change fishing locations, techniques, and production processes; leave a portion of the yam in the ground and harvest one month before full harvest (for more food); utilised cutting and harvesting practices before and after the full moon; plant more manioc/cassava as it is a resistant crop; cover land to retain moisture

and control erosion; maintenance of agriculture plots or provision grounds a distance from family homes; vetiver grass used for slope and soil stabilization and erosion; crushing and placing neem plant at the root of your crops will get rid of pests or use sand to treat plants or stifle borers; digging drains around plants to reduce water damage in times of flooding; Materials can be changed, but techniques should remain.

Focus Area: Housing Construction

Climate Impacts: Severe weather events can cut off communities from each other and result in loss of homes; persons believe concrete solutions are better; anything else is seen as an indication of poverty.

Climate Action : Windbreaks previously used frequently around houses (agro-windbreaks would also provide additional food); using the 'A' frame type constructed house prevents roof uplift during strong winds from cyclones; the sharper hip roof withstands hurricanes better than the gable; building houses on stilts (also for houses used for food storage and drying process); pegs, joints, and braces better for construction than nails; harvesting of wood for construction should be during the dark phase of the moon; houses built based on wind direction and flow based on inter-generational knowledge; anchored wood trunks in the ground to stabilize the structures and used banana leaves as a sealing material.

Focus Area: Water Management

Climate Impacts: Impacts to agriculture; transformation of beach areas and fishing coves, and heavy sedimentation in rivers. Some people don't see it as there are subtle changes, but there is less available clean water, and no rainwater harvesting is being practiced as the island seen as blessed with abundant water resources through rivers

Climate Action: Placing banana stumps in fields to collect water for soil moisture and to slowly provide moisture in drier times.

The Kalinago speak about their use of traditional construction practices that can be utilised for contemporary society, with a focus on the process and technique instead of solely focusing on the materials. Traditional techniques also prioritised the use of local raw materials and construction according to lunar phases. There is no doubt, and this was repeated over and over by community members, that traditional Kalinago structures were well-adapted to their environment. There is, however, a concern that when houses are lost because of the passage of a hurricane, there is no consultation with the Kalinago community when international donors set about replacing houses as a form of aid. These houses very often did not reflect the cultural practices of the Kalinago people in how they were constructed to allow airflow or in allowing multi-generational families to live together (I. Auguiste, personal communication, July 17, 2022).

There are numerous opportunities to use these techniques to build hurricane-resilient homes and public structures. In fact, elements of this traditional construction were later integrated with the traditional skills of enslaved Africans to develop what became the traditional Dominican vernacular house or the *ti'kai,* which various reports have provided evidence of their durability against tropical cyclones (see Chapter 5 for this discussion). An example of this traditional technique is the utilisation of the A-frame roof construction (see Figure 37). Here, the building can withstand high winds, as the structural load generated by the high winds during a hurricane is transferred to the ground.

Figure 37. Construction within the Kalinago Territory using Indigenous Knowledge

Source: Author

A noted example of this type of Indigenous construction technique is the traditional long house of the Kalinago, known as the *karbet*. Heron (2021) and Honychurch et al. (2020) describe the *karbet* as having a "tall, steep roof section, combined with the long rectangular rounded layout [which] reduces wind turbulence and works in harmony with wind flow around and over the building and is a good example of simple design principles adapted well to extreme climate conditions." The present Community Resource Centre in St. Cyr, built in 2015, is presented by the Kalinago community as a way of blending traditional and modern design (also see Figure 37).

Disruptions in Kalinago Socio-ecological Relationship in Dominica

Since the period of European contact, the Kalinago of Dominica have experienced land encroachments and were eventually forced from their lands to less suitable environments due to the growing plantation economy on the island in the eighteenth century. This unsuitable land, which was recognised as the Kalinago Territory, was exposed to severe coastal erosion and land slippage. The Kalinago nevertheless made it their home and continued to practice many of their traditions, which would have previously experienced disruptions when they became internally and externally

displaced communities at the beginning of European colonisation. The plantation economy and the subsequent banana industry would also severely erode and disrupt Indigenous relationships with their natural environment and landscape through the introduction of monoculture.

Honychurch (2000) highlights additional restrictions that would have been imposed on the Kalinago, such as where and how they could fell trees, which he described as a "colonially constructed restriction on Indigenous concepts of their environment."

The Kalinago and Garifuna of Saint Vincent and the Grenadines

The Community(ies)

Saint Vincent is a small volcanic island in the Eastern Caribbean, specifically the Windward Island sub-group of islands. It is the largest island in the state of Saint Vincent and the Grenadines, which comprises 32 islets and cays. The Grenadines, of which only eight are inhabited, are also volcanic as well as have coral limestone formations (John, 2015)[116].

As is the case with Dominica, the present-day Indigenous Kalinago of Saint Vincent and the Grenadines are the descendants of the Island Carib, who occupied the Lesser Antilles of the Caribbean originating from the coastal areas of the Guianas. Father Breton recorded the Island Caribs calling the island *Youloumain* or *Ioloumain* (later *Yurumein* by the Garifuna). The Lesser Antilles archipelago, and specifically the Windward Islands sub-group of islands (southern portion of the Lesser Antilles and primary location of the Kalinago), have, however, been the focus of ongoing debates in relation to migration and habitation in relation to the Kalinago (Boomert, 1986; Bright, 2011; Hofman & Hoogland, 2011; Hofman et al., 2021b).

Some of the earliest eye-witness accounts of Amerindians on Saint Vincent appear in 1596 by British lieutenant captain Lawrence Kemys, who saw Indians on the leeward side of the island

[116] See the Second National Communication on Climate Change for St. Vincent and the Grenadines, prepared by N. John.

(Kemys, 1596), and Captain William Turner in 1605 of the ship Olive Branch who saw Indians also on the leeward side (see Hulme & Whitehead, 1992).

The year 1763 signalled a key point in the history of Saint Vincent. Prior to this, the island was free of European colonisation except for some French clerics and farmers who clandestinely settled there despite agreements among the European nations that the islands were to remain refugee sites for Caribs (Gonzalez, 1997, p. 202). The arrival of Africans resulted in intermingling with the Kalinago and the mixing of cultural practices from as early as the sixteenth century (Bright, 2011), giving rise to the Black Caribs, later known as the Garifuna, who see their origin narrative as emerging from the meeting of the Kalinago and a population of West Africans who were enslaved and brought to the Caribbean (Finneran & Welch, 2019).

When the British formally occupied Saint Vincent, this led to conflict between the British, French settlers, and the Kalinago and resulted in British incursions on Kalinago lands for the eventual establishment of plantations. In 1796, following years of warfare between the British and the Caribs, with support from the French and Kalinago from other islands, their resistance faltered, and many were captured by the British and deported to the Grenadines Island of Baliceaux and later to Roatan, Honduras (Bright, 2011; Finneran & Welch, 2019; Gonzalez, 1997; Scarlett, 2022). Those who were left on Saint Vincent experienced imprisonment or other forms of discrimination. Gonzalez (1997) notes from her research "that by the middle of the eighteenth century, the Black Caribs were culturally and biologically indistinguishable from the Yellow Carib" (1997, p. 202). From 1770, the planters described the eastern side of the island as being occupied by the Black Caribs, with a smaller group of Yellow Caribs occupying the western side (Hulme, 2003). From the 1790s, it was estimated that there were about twelve main Carib groups, mostly resident on the eastern side of the island (Hulme, 2003).

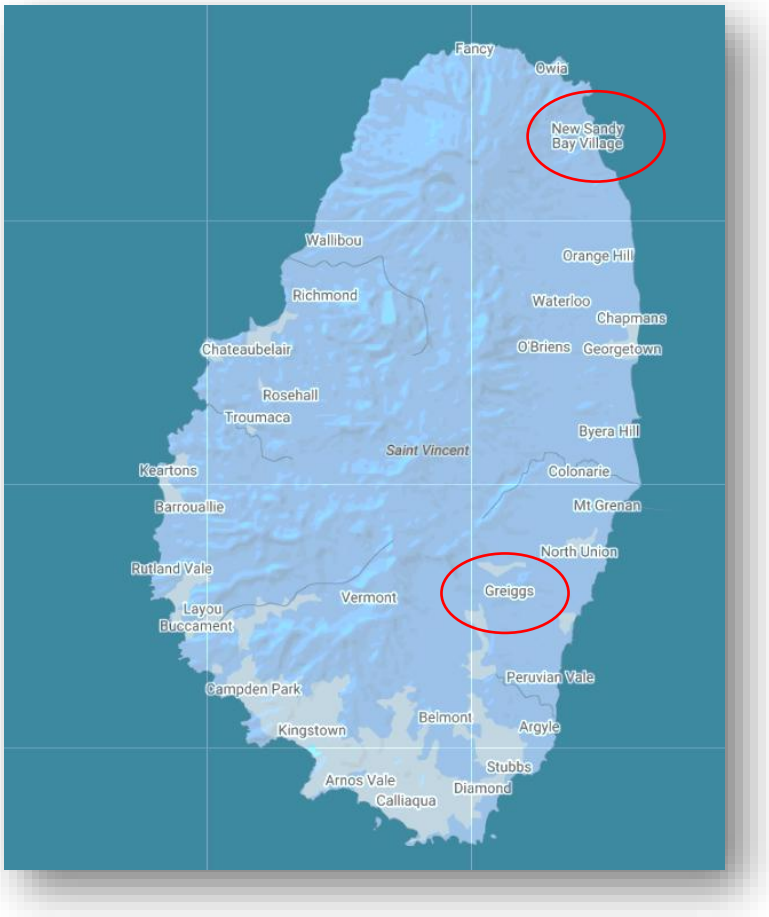
Scarlett (2022), in her research on Indigenous communities in Saint Vincent and the impacts of volcanic hazards, notes that the locations of plantations were later used as post-emancipation settlements, and "this forced land settlement led to greater risk from a variety of natural hazards, including volcanic eruptions, landslides, flooding, and tropical storms."

The Indigenous community in Saint Vincent has retained the categories of Red/Yellow or Black Caribs that were established during the colonisation of the island. Residents of [New] Sandy Bay refer to themselves as Caribs, while the community of Greiggs is referred to as Black Carib or Garifuna. Ober (1880, cited in Wild Majesty Hulme & Whitehead, 1992) identified Carib Country as that portion of Saint Vincent lying between the central ridge of mountains and the Atlantic Coast comprising fertile and level land, with La Soufriere (volcano) dominating the entire landscape. Today, the area known as Carib Country extends north on the windward side from the Dry Rabacca River through the remote coastal villages of Waterloo, Orange Hill, Overland, Magum, London, Sandy Bay, Point, Owia, and finally Fancy, where the coastal road ends (Smith & Barker, 2013; Twinn, 2008).

The historic community of Sandy Bay takes its name from a beach of grey sand guarded by volcanic rocks lined with tropical vegetation. It is a community exposed to coastal elements, and the main activity is farming on hillside plots. Ober, who visited Sandy Bay in 1877, considered it the most secluded community on the island and described the houses as made of reeds, wattled, and thatched. While the Sandy Bay community is coastal, the Greiggs community is located inland from the eastern coast of Saint Vincent. One of the earliest records of the settlement mentions the Greiggs settlement of Black Caribs in the mountains.

According to the 2012 Population and Housing Census Preliminary Report of Saint Vincent and the Grenadines, 3,280 persons identified as Indigenous, with the majority of 988 persons being in the Sandy Bay census division, followed by 866 in Georgetown.

Figure 38. Indigenous Community Study Areas in Saint Vincent



Note: Case Study Communities are highlighted in red. *Source*: Author generated from Googlemaps.com

Climate Hazard Scenario

Saint Vincent's Coastal Vulnerability Study (United States Aid Agency - USAID, 2007) identified the coastal zone as being particularly vulnerable to natural hazards. The island has experienced numerous impacts from volcanic eruptions, droughts, and hurricanes over the years. In the same 2007 study and cited in Saint Vincent and the Grenadines' Second National Communication, the coastline from Colonaire Bay to Sandy Bay (home of the Kalinago) is described as a "high energy area…includes the Georgetown and the Rabacca River floodplain…exposed to wind-generated

swells, waves, and storm-generated seas." The coastline is characterised by steep slopes and narrow coastal corridors, and major rivers contribute to significant coastal flooding (John, 2015).

Saint Vincent and the Grenadines has been highlighted by various regional climate change studies as already experiencing the effects of climate change (see CCCCC Saint Vincent and the Grenadines, 2012). Climate projections to the 2080s suggest an increase in average atmospheric temperature to 3.1 ˚C, reduced average annual rainfall, increased SST to 3.0˚C, and the potential for an increase in the intensity of tropical cyclones. SLR of 1m is expected to place 10 percent of major tourism properties at risk, and 100m of erosion from a 1m SLR will impact approximately seventy-six percent of the major tourism resorts. This projected change will undoubtedly impact the various Indigenous communities, as settlements are predominantly coastal.

For the coastal community of Sandy Bay, its closeness to the ocean has resulted in significant impacts to the community. In the past, these events resulted in some inhabitants relocating to other communities along the coast at London and Magum, and to a new village adjacent to Overland (Gullick, 1985). The Old Sandy Bay village is noted as being beyond Sion Hill a mile to the north of the present New Sandy Bay. Gullick (1985) notes from informants that historical records suggest that "shortly after the Second World War, there was a flood from one of the many rivers that destroyed the village of Old Sandy Bay…and it was abandoned save for a few inhabitants who remained, and the new settlement built at its present site." This new settlement of New Sandy Bay continues to have a high level of exposure.

Exploring Kalinago Socio-ecological relationships through Ethnohistorical, Ethnographic, and Other Studies

A study by Smith and Barker (2013) identified several coping strategies among farmers and fisher-folk in Sandy Bay, Owia, and Fancy in relation to drought and tropical storms. This study utilized a mixed methods ethnographic approach through surveys and focus groups and was undertaken in the aftermath of a severe drought followed by Hurricane Tomas in 2010. From this study, farmers in selected communities identified climatic hazards through droughts and storms as the main issue. Several coping strategies were also identified as being embedded in the cultural knowledge

and practices of the Garifuna and having the potential to help build adaptive capacity and strengthen resilience within the communities.

Farmers highlighted various strategies utilising their Indigenous knowledge in efforts to cope with specific hazards. Knowledge and practices included intercropping, lunar phase farming, and fallowing during dry season, were noted, although not unique to Saint Vincent. Farmers highlighted that it was important to utilise crop choices that were drought resistant, as these required less water to manage during drought conditions, such as sweet potatoes, cassava, peanuts, and peas. They also deployed other traditional strategies to manage temperature stresses in crops during prolonged drought. Other solutions utilised to manage climate stressors include tie-back plants, contour furrowing, building drains in land, planting in season, irrigation, drought-resistant crops, special vegetation for landslides, and rainwater harvesting using spouting and catchment containers (Smith & Barker, 2013, p. 7)

Gullick (1985) produced one of the most detailed studies on the Vincentian Carib. His research, published as *Myths of a Minority: The Changing Traditions of the Vincentian Caribs*, noted various myths, cosmology, and observations regarding how the Caribs perceived natural hazards and the changing weather, among other areas relevant to the changing climate or environmental variability and instability.

Through Gullick's research, a persistent theme in traditions collected in the 1970s about this entire period involves the relationship between humans and nature. References to disasters involving nature and probably their spiritual cause were common. During the period 1813 to 1945, he highlights that such interactions between culture, nature, and spirits were mainly found in folktales. This observation is not unknown, as Indigenous communities commonly practised the transmission of traditions through stories, and oral traditions were an important component.

Gullick (1985) writes that the moon was important to the Carib as it was believed to be the ultimate ancestor. The moon's status was high as the Vincentian Caribs measured the months by it, undertook tasks by moon phases, and used it to identify changes in nature. "Their actions toward the moon were noted as being ritualistic" (Gullick, 1985, p. 27). Eclipses were attributed to the *mapoia* (*also maboya)* or bad spirits. If the moon was totally eclipsed, it was ill, and the Caribs also

became ill (Borde, 1674; Tertre, 1654, pp. 410-411, cited in Gullick, 1985), and full and new moons were believed to bring tidal waves, tempests, and hurricanes. The August full moon is the chief time for such manifestations. A halo around the moon was also a sign of coming wind and rain, while a ghost moon or sun (translucent clouds of dust accompanying the celestial body) or the appearance of comets signified disasters or tempests. They considered the moon to be part of heaven and the controlling force of agriculture and fishing.

Carib relationships with nature and the spirit world are interconnected with their belief systems. The phrase natural disaster was noted as being alien to the Carib (Gullick, 1985, p. 155), though explanations of hurricanes and volcanic eruptions were common. We also know from the Dominica context, specific words existed for natural phenomena. The gods' wrath resulted in minor disasters and the Kalinago listened to sounds from the volcano and decided when and how to move. In recent times, it was reported that some Kalinago believed geologists stirred up the volcano and tried to make it erupt. Some of these tales about natural disasters (hazards) demonstrate some of the Caribs' response to nature and its backing myth. The symbolism of the moon in Carib beliefs in the 1970s was noted as "complex" by Gullick (1985).

Similar to others, Gullick also highlighted that a common element in Amerindian cosmology is the link between creation myths and natural phenomena and hazards, such as the tale of the flood which contributed to the formation of the Antilles and the continent of America. This also had similarities to Taíno creation myths and water produced transformations. The Caribs looked upon La Soufriere as the abode of a vengeful spirit hiding itself in the clouds. An eclipse of the moon meant that a *maboya* was eating it, and the *oumoko* were spirits that caused shipwrecks (Breton 1999, [1665]). "Thunder was thought to be caused by *Coualina*, the captain of the *chemeens,* chasing the lesser ones. Their falling in fear created noise and made the earth shake and tremble, and rainbows after rainy weather explained *Joulanca's* significance" (Gullick, 1985). In Carib weather lore, a great number of bats flying was a sign of coming good weather (dry versus wet weather, as mentioned earlier), as bats were good spirits. The combination of nature and spirits in one grouping was justified as both good and bad spirits were related to natural phenomena (Gullick, 1985).

As with the island of Dominica, the earliest accounts were largely produced by missionaries, and these accounts did not record how communities were impacted by or responded to natural hazards or how their cultural practices came into play. The references to natural hazards causing disasters were simple, such as the 1875 flooding did damage to Kingstown, Marriaqua Valley, and Mesopotamia, and likely Greiggs; or in 1876, a second storm caused Caribs living at the foot of La Soufriere and at Morne Ronde to flee Chateaubelair where they were lodged in the church's schoolroom as they experienced significant damage to their houses.

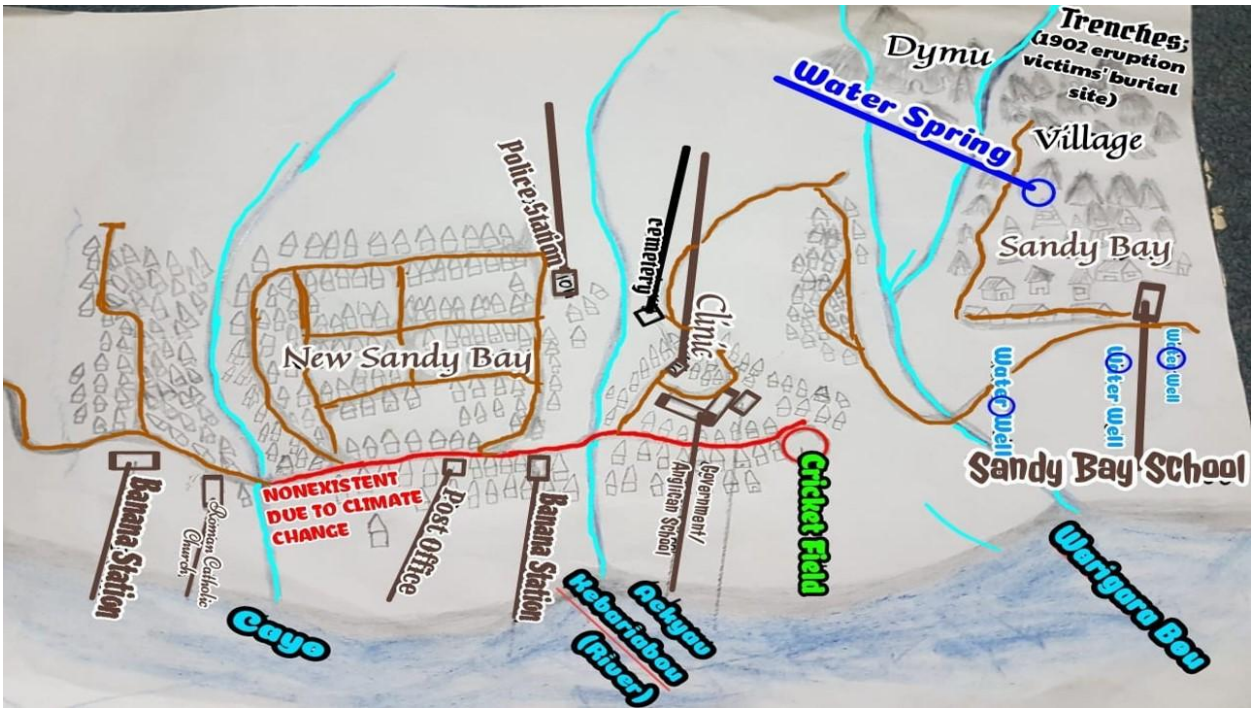
Ober, visiting the Caribs in 1877 (cited in Hulme and Whitehead, 1992), mentioned that they considered the period since 1805 to be peaceful, which could suggest that they disregarded the various natural disasters and riots of this period. Various annual reports in the 1800s noted that Carib communities were impacted by natural disasters such as the Hurricane of 16 August (1886), damaging Rabacca and Georgetown, and probably Owia and Sandy Bay, with ten thousand people homeless and almost two thousand homes destroyed.

Some of these storms and impacts would be in the social memory of Caribs in the 1970s, and it would be interesting to identify the oral histories that would have formed as well as any cultural practices used to respond. The storm of 1895 was key in social memory as it produced a crack in the hill overhanging Morne Ronde. Also, the floods of October 1896 caused a landslip at Old Sandy Bay, resulting in 11 deaths. Windsor Forest was reported as gone in the sea, and nine others died in the Carib Country (Colonial Office Annual Report for St. Vincent, 1896). The Caribs of Sandy Bay in the 1970s still recalled this storm, which they said flooded their village. The September 1898 hurricane destroyed Morne Ronde, but no one was reported as seriously injured. Some Caribs built huts from the debris, but others moved to Frasers, where relocation was pursued as an adaptation strategy. The configuration of the shoreline is noted as being altered by this hurricane, and land at Rose Bank was almost flat before the storm, but flood water had washed it away and created grooves to make it a valley now. These specific disasters and their place in the social memory of these communities today present an interesting entry point to examine linkages with adaptation strategies.

In the Annual Report of 1947, Old Sandy Bay was said to be a compact village located on the lower slopes of land that was ill-adapted for housebuilding and afforded limited number of areas for building. The water supply was one well on the beach. In times of heavy rain, destructive torrents of water rushed down the hillside, causing deep erosion channels, destroying crops and stock, and sometimes washing houses away. Flooding in October 1945 swept away three houses and nearly demolished the church and school. A Central Housing and Planning Authority was formed, and the government acquired 13 ¼ acres of land from the Orange Hill Estates in two areas on Big Sands known as Phyllis Level and Baptiste Level. These, together with the 24 ½ acres bought in 1942 at Delves Level, were handed over to this new authority to relocate Sandy Bay.

A survey was conducted of the old village from which the requirements of the new village were determined. The old village was threatened by erosion and flooding, but this was delayed by planting trees and ditching, although marine erosion continued unabated. Its residents described the present Sandy Bay community (New Sandy Bay) location as a failure due to it being sited on sandy soil and thus also susceptible to erosion. Figure 39 presents an illustration created by a community leader visualising land lost and being lost due to coastal erosion and flooding since the community's relocation in the 1940s.

Figure 39. (New) Sandy Bay Community Map Initiative



Note: The map highlights areas lost or impacted by climate-induced and other natural hazards created by A. Sutherland (personal communication, November 16, 2021) and used with permission.

Regarding descriptions of the houses of the Caribs, Moreau de Jonnès' 1795 account in *Adventures in Wars of the Republic and Consulate* in Hulme (2005, p. 40) described the houses of the Caribs as "being beside streams flowing from the mountains in the interior and with houses like beehives in the shape of their roofs, made of palm leaves but with their wattle sides admitting refreshing breezes and daylight."

In terms of agriculture, within the Carib communities, an important cultural link exists between past crops and food security, where small agro-processing cottage industry operations continue to utilise cassava, arrowroot, and sweet potatoes, all crops cultivated by the Caribs before the arrival of Europeans (Smith & Barker, 2013).

Participants from Sandy Bay and Greiggs contributing to this research acknowledged that their ancestors developed successful strategies that should not be dismissed or ignored. However,

community members highlighted that although they are more equipped, present communities are less prepared than their ancestors. This is a profound statement that brings into focus the applicability of past strategies in combination with current technology to present innovative strategies for addressing the climate crisis.

In the Greiggs group discussion, persons saw climate change as mostly a coastal thing and mentioned that as they were inland, their impacts would be minimal. This way of thinking, however, transitioned to a discussion regarding a 'climate change chain of impacts' and how they would experience these phenomena from the coast to the hills. They noted, however, that they practiced river and rainwater (Massar-aqua)/Marriaqua) harvesting and historically utilised multiple water sources in times of drought. It was felt that relocating Indigenous persons away from their traditional enclaves resulted in them losing their protection and impacted their lifestyles and livelihoods, leading to more consumption-oriented ones. The historical development of sugar plantations and, later, bananas involved the large-scale destruction of the island's forests, which the Caribs needed for hunting, planting, and sustaining livelihoods (Hulme, 2003).

Figure 40. Climate Impacts and Climate Action Identified by the Kalinago and Garifuna of Saint Vincent

Focus Area: General

Climate Impacts: Increased health hazards; loss of archaeological sites and heritage spaces; damaged trails and physical infrastructure; brain drain and loss of knowledge bearers and practitioners

Climate Action: In Greiggs, the community depended on the mountains as safe locations which have traditionally broken hurricanes.

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Focus Area: Agriculture

Climate Impacts: Reduction in crop production quality and quantity; soil erosion; loss of trees.

Climate Action: Trees and shrubs were used as windbreaks; plant crops that do better traditionally with higher temperatures (heat resistant); planting grass and trees by the Bay is useful; dug trenches around plants that were planted in areas prone to flooding; Old Man Beard, lavender and vetiver grass used to manage erosion; Ancestors utilized more trees and even if rain fell for two weeks there would be no flooding; screw pine used in the past to protect coastlines; utilise trenches in the field.

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Focus Area: Housing Construction

Climate Impacts: Cuts off communities; loss of housing stock, which is no longer very traditional.

Climate Action: Build higher and steeper roofs, such as those used in the traditional Cayo hut construction. These could respond to hurricane-force winds, and if not, the repair was simple and easy from locally sourced materials. Thatch houses allow air to pass through better in extreme heat.

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Focus Area: Water Management.

Climate Impacts: Transformation of beach areas and fishing coves; heavy sedimentation in rivers.

Climate Action: Rainwater river and rainwater harvesting (Massar-aqua)/Marriaqua); community has intergenerational knowledge about finding water from springs in drier times.

Persons contributing to discussions highlighted that the volcano La Soufriere built up the land, and climate change eroded it, and this was a part of the ongoing cycle of life for them.

Disruptions in Kalinago Socio-ecological Relationship in Saint Vincent

Smith and Barker (2013) have suggested that in Saint Vincent, the Garifuna (Black Caribs in original text) still struggle with the legacy of European colonisation, which decimated their population and access to land resources, with the connection to land being an integral part of this cultural identity.

Other natural hazards, such as volcanic eruptions, have in the past served to disrupt ancestral ties with land for the Indigenous people of Saint Vincent. It is important to highlight that in speaking to these communities, they did not see these hazards as necessarily disrupting their ties with the land, but frequent relocations would.

The Carib Country first attracted the attention of the English for the fertility of its lands and was called New Caledonia. In 1722, the best part of the Carib lands was seized, which resulted in hostilities, and the Caribs retreated to the mountains during the conflict. Carib lands were left desolate and declared forfeited, surveyed, and subsequently sold. In 1805, a few remaining Caribs were pardoned, and 250 acres near Morne Ronde were granted to them. However, this land was not considered fertile by the Carib population.

The history of the Anglophone Caribbean is one replete with Indigenous displacement and resettlement schemes. In the case of Saint Vincent, this was related to the various eruptions and hurricanes it experienced. Actions post-1902 eruption, for example, have significantly impacted Indigenous culture and its transmission in Saint Vincent (Gullick, 1985; Palmer & Fraser, 2021). Gullick (1985) records an example in 1902, where the Morne Ronde Caribs "petitioned the King of England, and complained about their resettlement at Rose Bank, drawing attention to the fact that the location was not one that they had chosen or preferred, as it was not suitable for the continuation of their ancestral farming and fishing practices."

The British felt that the Caribs had too much land for their numbers and misunderstood their agricultural practices. The Caribs practiced a form of agriculture that required vast amounts of land under secondary and primary forests compared with that under cultivation every 2 – 3 years when the Caribs would move to non-exhausted land and start all over again with their farming (slash and burn). Old lands would then be allowed to slowly return to secondary forest. Gullick (1985) also records that in contrast to the aforementioned, "lands they received from the British were issued as individual small plots, a form of land tenure entirely contrary to their traditional, collective land tenure arrangements." In the aftermath of the 2021 volcanic eruption of La Soufriere, it was stressed that persons should be allowed to return home once it was safe to do so, with the Government only offering relocation to those who wished it. This action was a marked change from

previous ones where communities were forced to relocate with no say as to where they would end up. One government senator of Garifuna descent stressed that Indigenous communities had deep ties to places that had experienced these disasters in the north of the island, and that this was a part of their cultural traditions, and not for them to be cut off from these ancestral lands.

Summary

The Indigenous communities in the study area highlight that the erosion of or disruption of socio-ecological relationships has profound implications for the transmission of cultural knowledge and practices regarding how severe climate variability from the past to the present was experienced. Indigenous communities also did not view the changing climate as something that was operating in a silo but as a part of complex relationships existing between various phenomena and the natural environment or landscape.

This chapter concludes by reinforcing that an analysis of ethnographic studies of heritage-based knowledge of climate change does offer crucial insights that demarcate opportunities and roadblocks in the application of practical solutions and how local and Indigenous knowledge may be mobilised for human-centred climate action and strengthen social and ecological resilience in the region. A more complete analysis of this data is developed and discussed in the following chapter as part of a wider discussion on the applicability of data and the creation of these pathways.