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LANDSCAPE CHANGE AND SUSTAINABILITY OF INDIGENOUS

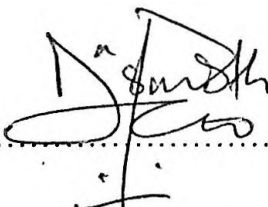CULTURE OF THE GA/DANGME IN GREATER ACCRA REGION,

GHANA

BY

ADAMS OSMAN

Thesis submitted to the Department of Geography and Regional Planning of

the Faculty of Social Sciences, College of Humanities and Legal Studies,

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award of Doctor of Philosophy Degree in Geography and Regional Planning

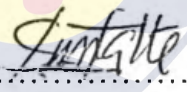FEBRUARY 2020

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature..Date... 17 /02/2020
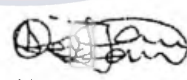
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Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

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ABSTRACT

Landscape is polysemous (including land cover and culture); but, it is often conceived as a unitary concept with less focus on culture. Such biased concept of landscape affects its comprehensive study; hence, affecting the sustainability of indigenous culture. This study sought to assess the effects of landscape change on the sustainability of the indigenous culture of the Ga/Dangme in Greater Accra Region using the dualistic concept of landscape. Ethnographically, the study interviewed Ga/Dangme chiefs and traditional priests; undertook series of focus group discussions with the aged and young Ga/Dangme people in four Ga/Dangme communities. In addition, using the cross-sectional survey research design, questionnaire was administered to 1,020 Ga/Dangmes while a spatial approach was employed to model land cover change in the region. Results indicated that land cover change in the Ga/Dangme communities was very high and had affected wetlands and groves considered by the Ga/Dangme as abodes for their gods/goddesses. Also, some rituals performed in these wetlands had ceased because of its degradation from land cover change. Attributing factors for these changes included urbanisation, Christianity, poor enforcement of formal government policies and chieftaincy disputes. The sustainability of the indigenous culture and land cover of the Ga/Dangme people will be possible if degraded wetlands and groves are rejuvenated and afforested by the efforts of Ga/Dangme people, Chiefs, traditional priest/Wolomei with the help of Environmental Protection Agency, Forestry Commission, Land Use and Spatial Planning Authority and National commission on Culture.

KEYWORDS

Culture

Ecosystem services

Landscape

Land cover

Sustainability

ACKNOWLEDGEMENTS

DEDICATION

To my mother, Mrs Fati Salam

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LIST OF ACRONYMS

AS	Artificial Surfaces and Associated Areas
AW	Artificial Waterbodies
BA	Bare Areas
CAFA	Cultivated Aquatic or Regularly Flooded Areas
CMTA	Cultivated and Managed Terrestrial Areas
CSI	Culture Sustainability Index
DAAD	Deutscher Akademischer Austauschadienst German Academic Exchange Service
EU	European Union
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
LPI	Landscape Patch Index
NSAV	Natural and Semi-Natural Aquatic or Regularly Flooded Vegetation
NSVA	Natural and Semi-Natural Vegetation
NSW	Natural and Semi-Natural Waterbodies
PAFRAC	Perimeter-Area Fractal Dimension
PLADJ	Percentage of Like Adjacencies
SDG	Sustainable Development Goals
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

Background to the study

The concept of "landscape" is polysemous (Fischer, Vance-Borland, Jasny, Grimm, & Charnley, 2016); its meaning ranges from a picture of a scenery or a portrait of natural environments to interactions between nature and humans. It has also been used to describe an act of shaping the land (Cosgrove, 2004; Lorch, 2000; Sauer, 1925). The adaptation or usage of a specific concept of landscape is largely dependent on the type of research and the background of the researcher. Arguably, the different concepts used to describe landscape converge at a point of nature and human interaction. Therefore, landscape is defined as the interaction between nature and human cultures which generates a physical (tangible) or perceptual (intangible) notion of our environment (Cosgrove, 2004; Sauer 1925; Schluter, 1906; Summerfield, 1991).

The first component of landscape, thus the natural component is the basic spatial element of the earth surface (Zhang, Peterson, Zhu, & Wright, 2008). It involves the physical and biological cover over the surface of land (Ellis & Pontius, 2006). It is often tangible and can be categorised into terrestrial and aquatic covers (Lambin, Geist, & Lepers, 2003). Terrestrial covers include natural vegetated areas (unmanaged), natural and semi-natural vegetated areas (managed forests, grasslands, shrubs) and artificial surfaces (roads, buildings) while aquatic covers involve water bodies naturally created (rivers, lakes, wetlands, etc.) or manmade (saltpans, fishing ponds, dams, etc.) (Di Gregorio, 2016).

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The second component of landscape is culture. Culture as a word is riddled with diverse meanings, from conceptualisation as an adaptive system (socially transmitted behaviour patterns that serve to relate human communities to their ecological settings – way of life) to an idea (viewed in three perspectives: cognitive system, structures and symbols) and recently as a marketable commodity (Boon, 1972; Fazio & Purpura, 2016; Goodenough, 1957; Heine, 2015; Keesing, 1974; Yudice, 2003). The adaptive ecological notion of culture is used in this thesis where culture is defined as a way of life, encompassing family system (size and inheritance), religion, occupation, festivals, medicine, diet and governance.

The interaction between land cover and human cultures which produces landscape has highly been debated regarding which one influences the other and the level of the influence. Such debates are highly evident in theories such as environmental determinism, possibilism and cultural determinism (de la Blache, 1965; Diamond, 2005; Harden, 2012; Koszegi, Bottlik, Telbisz, & Laszlo, 2015; Montesquieu, 1977). However, relying solely on one of these theories to explain culture and land cover interaction presents difficulties because of high levels of reciprocity between them. This reciprocity is evident in the benefits/services each provides for the other.

Landscape benefits derived from land cover and culture interactions are often termed ecosystem services or landscape services (Grêt-Regamey, Weibel, Kienast, Rabe, & Zulian, 2015). These services are of two kinds; service to land cover and service to cultures or human beings. Services to human beings are regulatory (flood control, disease, pollination, water regulation and climate control), supporting (nutrients cycle, soil formation), provisioning (food, clean

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water, fiber, firewood) and cultural (spirituality, religious, recreational, educational, sense of place, heritage) (Grêt-Regamey et al., 2015; Wu, 2013). Food and Agriculture Organisation (2010) claims that an area of 15million hectares of land cover is used for agricultural purposes in order to provide for humankind. In addition, about 80% of the world's population relies on natural and semi-natural land cover for medicinal products (Ecological Society of America, 2017). Global soil contribution to world economy, ranges from $1.5 to $13 trillion (Van der Putten et al., 2004). Natural and semi-natural terrestrial covers store about 2,477 billion tons of carbon, which helps to regulate climate and global warming. In addition, billions of people in the world with faith in Buddhism, Hinduism, Jainism, Bon and indigenous traditional religions gain spiritual enlightenment and social bonding from most land covers (Verschuuren, Subramanian, & Hiemstra, 2014).

On the other hand, services to the land cover provided by cultures are protecting (habitat protection, weeding, cultural prohibitions), enhancing (cultivation, domestication, pruning, translocation), restoring (improving soil quality, nutrients release, planting) and supporting (symbiotic, cultural beliefs) (Comberti, Thornton, Wyllie de Echeverriaa, & Patterson, 2015). Specific activities of farmers like cutting hay as forage reduce the dominance of grasses and increases biodiversity (Questad et al., 2011). The growth and sustenance of plants such as manioc, papaya, cashew, peanut, cacao, pineapple, arrow cane, tobacco, annatto, guava, rope plant, cocoyam and chili pepper are attributed to human activities of prunning and weeding (Comberti et al., 2015). Translocation is one way societies have spread growth of plants consciously and unconsciously (Diamond, 2005). Rituals, taboos and customs in most African,

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Asian and Latin American traditional societies have helped conserve millions of hectres of natural covers (Anane. 2015; Sharapan, 2016; Zimmerman, 2013; Wanza & Njuguna, 2012; Weir. Crew, & Crew, 2013).

When landscape services are functioning optimally with benefits to each component of landscape (nature-land cover and culture-humans), then the landscape can be described as being sustainable. The sustainability of landscape is very crucial for the life of both the present and future generations (United Nations Educational, Scientific and Cultural Organisation [UNESCO], 2015) and to the achievement of all the Sustainable Development Goals outlined by the United Nations. Despite the immense benefits of landscape to the sustainability of the world, it is witnessing tremendous changes in all parts of the world. It is estimated that over 40% of global land cover has been exploited (Foley et al., 2005) with most cultures threatened by complete change, acculturation, hybridity and extinction/assimilation. Factors contributing to landscape change range from natural forces (flooding, wild fires, climate change, etc.) to urbanisation (population growth), agriculture, technology, globalisation and westernisation as well as religious and government/institutional policies (Chayanov, 1927; Diamond, 2005; Lubis & Langston, 2015; Malthus, 1798; Rosenberg, 2017; Turner & Fischer-Kowalski, 2010).

Pressures from drivers of land cover and cultural change have led to unsustainable landscapes and diverse ecosystem disservices (Turner & Fischer-Kowalski, 2010). However, ecosystem disservices with physical outcomes tend to make the news and are granted the greatest attention by governments and interventionists. This is mainly because these outcomes are from physical

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changes in land cover which are easily quantifiable with remote sensed images and software. Thus, their effects such as disasters, erosion, destruction of flora and fauna are more visible (Foley et al., 2005). These have several negative effects on the achievement of the United Nations' Sustainable Development Goals (SDGs) as they impede the attainment of target 2 of SDG (12) (conservation of natural and semi-natural land covers) and target 1 of SDG (11) (Strengthening resilience and adaptive capacity to hazards/climate change).

Besides, landscape change also negates the attainment of target four (4) of sustainable goal eleven (11), which is concerned with traditional culture preservation but it is mostly unaccounted for (Palang, Soini, Printsmann, & Birkeland, 2017). This is because it is difficult to quantify and assess disservices coming from culture in landscape change (Axelsson et al., 2013; Nussbaum, 2011; Throsby, 2008). These cultural disservices are destruction/degradation of experiences that shape identities, traditions, beliefs, values, norms and cultural meanings to a place (Axelsson et al., 2013).

Other aspects of culture affected are the spiritual, emotional, aesthetic, moral and educational abilities of indigenous people (Chang, 2015; Palang et al, 2017; Wu, 2013). As natural and semi-natural coastal land cover changes into concrete surfaces, cultural occupations such as foraging, hunting, fishing and farming are diminished, pushing indigenes into white-collar jobs. Plants and trees, which hold cultural importance during festivals, are equally vanishing. Consequently, the transmission of intangible heritages has become quite a challenge since specific land covers and activities, which stimulate and enhance their teaching dwindle (Wu, 2013).

More specifically, it has been observed that the changes in the physical landscape affect some indigenous cultural practices of most societies of the world (UNESCO, 2015). An example is the inability of the Amis people of Taiwan to practise cultural activities like *Mifoting* (communal shallow water fishing) and *Badaosi* (gathering and sharing of food) along river bodies as most riverine vegetation have been converted to concrete surfaces used for recreational activities like biking, jogging and picnics (Chang, 2015). The construction of the Three Gorges Dam in China, has also marginalized and displaced villagers in Kaixian County with ancestral and spiritual grounds inundated (Hvistendahl, 2008).

In addition, some Aborigines in Australia have been forcibly removed from their land by mining and lumbering activities (Weir, Crew, & Crew, 2013) while most native Americans have witnessed large destruction of most cultural lands and identity by federal and state government policies which are geared towards "civilizing" Native Americans and thus, stripping them of their identity (Butler, 2017). Statistics indicate that from 1970 to 2016, about 768,935 km^2 (20%) of Amazonian has been degraded thus affecting cultural practices of Amazonian tribes including their food and rituals (Butler, 2017). Also, some Kayapos of the Amazon have to engage in prostitution and begging because high rates of land cover change has pushed them away from traditional livelihood strategies (Taylor, 1988; Zimmerman, 2013).

In Africa, the Baka (pygmies) people's culture of foraging and rituals are threatened as they are now pushed from nomadic lifestyle to sedentary by lumbering and mining activities in southern Cameroon (Chimtom, 2012). In Kenya, the Kaya forest which served as spiritual and sacred lands have been

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under intense pressure since the emergence of colonialization, christianization and urbanization (Githitho, 2003). Most Kenyans do not even see the cultural significance of the Kaya forest, describing it as fetish (Nyamweru, 2012). Egypt, a country with rich historical and cultural heritage, is also witnessing physical developments around pyramids because of rapid urbanization (Abdel-Rahman, 2016).

In Ghana, some indigenous cultural practices are also being threatened with the emergence of land cover change, urbanization and globalisation (Anane, 2015). The Aboakyire festival, at times, experiences no catch of a deer, which is the backbone of the festival because the Muni wetland is undergoing rapid degradation (Attuquayefio & Wuver, 2003). Similarly, industrial and residential activities along the Fosu Lagoon in Cape Coast have increased pollution levels, which has affected communal fishing activities (a very significant cultural event) during the Fetu Festival.

Though the effects of landscape on culture is enormous, interventions to preserve landscape are biased towards land cover (Chang, 2015). Current interventions have considered culture as unscientific, and hence unacceptable for conservation, while cultural policies have become more concentrated on the commercialization of cultural activities rather than their preservation, which, in most cases, is tied to the land cover (Pyykkonen, 2012). Moreover, planners also seem to lack adequate understanding of culture of the residents, and thus fail to incorporate it into their physical plans (Magis & Shinn, 2009). However, before the inception of formal systems of land cover management, custodians of culture held in stewardship the land cover as they built cultures around it,

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preserved and maintained it (Barre. Grant. & Draper, 2009; Bernbaum, 2006; Sharapan, 2016).

Cultural practices, though with little or no scientific basis, treat culture and land cover as a single unit with respect to the spiritual significance attached to land covers as places of abode for numinous and man (Bernbaum, 2006; Dudley et al., 2010). Any change in land cover has impacts on the culture of specific people while any change in culture can also be reflective in its land cover (Coombes & Barber, 2005). Hence, there is the need for a holistic approach which is not overly in tune to only preserving the land cover but also with similar focus for cultural sustainability.

Cultural sustainability deals with the preservation of the culture of a given group of people for intergenerational equity (ability of unborn generations to access cultural resources and meet their cultural needs) and intra-generational equity (access to cultural production, participation and enjoyment to all members of the community without discriminatory) (Throsby, 2008). The concept (cultural sustainability) has met strong opposition as it has been termed utopian and unachievable because culture itself is dynamic and subject to changes (Antrop, 2006). Dynamic nature of culture makes it adaptive to its environment or situations to prevent the culture from stagnating, failing or going extinct and in order to survive the test of time (Banse, Nelson, & Parodi, 2011). But when the change is too abrupt or high and it affects the very identity of the people then such change needs to be checked. Others criticise culture sustainability on the argument that, there are less clear foundations for the study of cultural sustainability (Auclair & Fairclough, 2015). This argument is debunked by Palang et al. (2017), Soini and Birkeland (2014) , Nussbaum

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(2011), Throsby (2008), Hawkes (2001), who have been propagating and developing well structured guidelines for studying and achieving cultural sustainability. Soini and Birkeland (2014) outlines one of the comprehensive indicators (heritage, vitality, economic viability, diversity, locality, eco-cultural resilience, and eco-cultural civilization) for the study of culture sustainability, making it less utopian as earlier argued by Antrop (2006).

Furthermore, proponents of social sustainability claim culture sustainability is an integral part of social issues and so need not to be accorded the separate attention. This argument does not also hold because culture as defined by Soini and Birkeland (2014) is a broad concept encompassing economic (economic viability), social (diversity and locality), conservation (heritage and vitality) and environmental (eco-cultural civilization and eco-cultural resilience) hence confirming Hawkes (2001) assertion that culture sustainability is the key to achieving social, economic and environmental sustainability. The growing discourse of cultural sustainability is in the divide as to whether culture should be seen as the fourth pillar of sustainable development, moderator of the other complements of sustainability or the enabler of sustainability. This argument can easily be solved depending on the definition of culture by the researcher. Lastly, what all culture sustainability students are faced with is what aspects of culture should be sustained, what is to be sustained is in its authentic or accessible form, who determines these aspects and whether the future generation that sustainability is purposed for will even admire and accept such a culture.

Therefore, there is a need to examine cultural sustainability as a concept in order to improve knowledge in this field of study. It is also important that we

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identify cultures which are changing in the face of rapid landscape change in the world, especially in Africa because most African societies have their culture highly integrated with the land cover. This can help to understand the nexus between culture change and land cover change and how they both influences each other.

Statement of the problem

Greater Accra Region is the traditional home for the Ga and Dangme people in Ghana (Ghana Statistical Service, 2010). The area is dotted with several land covers which have cultural significance to the Ga/Dangme. The Ga/Dangme have built a rich harmonious culture around the natural and semi-natural land cover within the region, which has influenced their religion, occupation, social structure/participation and inheritance. This harmonious relationship between the Ga/Dangme and nature was achieved through *Kpele* teachings/doctrine (topographical features such as the ocean, lagoons, forests rivers and mountains among others are envisaged as an abode for *dzemànwɔdzi*-sky-dwelling spirits/ numinous (Kilson, 1973; Yeboah, 2008). The *kpele* doctrine has prescribed laws, taboos and punishments for persons who mistreat and disregard the natural and semi-natural cover. Hence this is used to ensure a rich biodiversity within lagoons (blackchin tilapia, redchin tilapia, shrimps, etc), wetlands (mangrove, crabs, snails, pelicans, etc.) and vegetated areas in the region (Odotei, 1991).

Beyond envisaging natural and semi-natural cover as abodes of gods, the Ga/Dangme accord the land cover with respect as they derived all their basic needs such as food through the cultivation of millet, maize, fish, etc. Moreover,

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the famous Ga/Dangme festival, *Homowo* (hooting at hunger), symbolises how the Ga/Dangme survived hunger by cultivating the land together with the catching of fish in lagoons and sea after migration from present-day Nigeria and Benin (Ollenu, 2016; Songsore, 2008). Also, regarding the benefits of land cover to the Ga/Dangme's, land cover is viewed as a communal heritage with stewardship vested in the hands of *wekutse* (family heads) for the future generation. This makes the Ga/Dangme one ethnic group which had the notion of sustainable development long before the Brundtland Report.

Undoubtedly, colonialism and presently, Abrahamic religious influence (Christianity and Islam), urbanisation and formal governance have had a great toll on the harmonious relationship between the Ga/Dangme and their natural and semi-natural land cover (Asumadu-Sarkodie, Owusu, & Rufangura, 2015; Appeaning-Addo & Adeyemi, 2013; Okyere, Yacouba, & Gilgenbach, 2012; Karley, 2009; Kilson, 1973; Quarcoopome, 1992; Odotei, 1991). For instance, colonialization and formal governance/Land Use and Spatial Planning Authority (Ghana) ushered in an era where lands, even though communally owned by the Ga/Dangme families, were taken by government for physical developmental projects (Kilson, 1973; Odotei, 1991) with little regards for both the natural and semi-natural cover and the cultural significance attached to them. More so, the onset of Abrahamic religions, which had a different notion of God/gods, as beings transcending the physical realm and cannot reside in natural and semi-natural land cover, has turned most Ga/Dangme from the respect they gave to natural and semi-natural land cover (Ofosu-Appiah, 1997). This affects the continuous preservation of Ga/Dangme natural and semi-natural land cover. Largely, the greatest blame has been noted to be urbanisation which

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brought forth and still brings huge migrants from diverse regions and nations (Ghana Statistical Service, 2014) and who have little regards for the cultural significance of land cover.

Subsequently, urbanisation, Abrahamic religions and formal governance have resulted in social, cultural and physical deterioration of the Ga/Dangme's landscape. On the physical front, natural and semi-natural land cover has been converted to the construction of residential areas for the urban population. With the rapid physical and cultural landscape change in Greater Accra, only the physical effects seem to attract attention from government, academia and non-governmental organisation because of its human and material damage, yet no lasting solutions exist (Asumadu-Sarkodie et al., 2015; Appeaning-Addo et al., 2013; Okyere et al., 2012; Karley, 2009). Little attention and research have been given to the effect of land cover change on indigenous cultural practices of the Ga/Dangme's and also how acculturation of Ga/Dangme's culture has impacted natural and semi-natural land cover in Greater Accra Region. The situation is made even worse as planners in the area are more inclined to physical development which has less inputs from culture/traditional systems because planners tends to assume that cultural practices are unscientific and fetish (Magis & Shinn, 2009). It is therefore important to understand the nexus between land cover change and indigenous cultural practices to enhance proper landscape management in the region. Beddoe, Constanza, Farley, Garza, Kent, Kubiszewski and Ogden (2009), stipulate that culture determines sustainability because it is societal values and practices which will either accept or dispose sustainable goals (either in

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overexploiting land cover for its benefit now or conservation for all humanity and generations unborn).

On the theoretical front, this research tries to fill gaps in the discourse of culture sustainability. One, the research try to reduce the notion of utopianism associated with cultural sustaianbility by developing a measure for the indicators explained by Soini and Birkeland (2014). The contribution of this is to further reduce the utopianism of culture sustainability by generating a scale for the study of cultural sustainability using the Ga/Dangme culture as a case. In addition, a gap this research tries to fill is the conceptualisation of ecosystem services as one directional entity with services rendered by land cover to cultures. But it is important to refocus ecosystem as dual entity which involves the services rendered by land cover to cultures and services rendered by cultures to land cover. It is in this dual notion that any culture can survive and for that matter the Ga/Dangme culture in Greater Accra. This notion of duality can help improve the burden of responsibility on cultures especially the Ga/Dangme culture in the face of rapid changing of the land cover, by doing more in protecting the land cover which the forefathers of Ga/Dangme built their rich culture around.

Research objectives

The main objective of this research was to assess the effects of landscape change (land cover and culture change) on sustainability of the indigenous culture of the Ga/Dangme. The specific objectives were to:

1. Model land cover change for Greater Accra Region from 1987 to 2017.

2. Explore changes within the indigenous culture of Ga/Dangme's which have relationship with land cover.

3. Assess the drivers of landscape change (land cover and culture) of the Ga/Dangme's in Greater Accra Region.

4. Assess landscape ecosystem services from the interaction between land cover (natural and semi-natural) and Ga/Dangme in Greater Accra Region.

5. Assess the sustainability of indigenous culture of the Ga/Dangme in the face of rapid landscape change.

6. Explore how existing policies are helping to sustain the landscape of the Ga/Dangme in Greater Accra Region.

Research questions

The research objectives this research sought to address were informed by the following questions:

1. What have been the changes in land cover in Greater Accra Region from 1987 to 2017?

2. What are the changes in the indigenous culture of the Ga/Dangme and their relationship with land cover?

3. What are the drivers of landscape (land cover and culture) change of the Ga/Dangme?

4. What are the ecosystem services from the interaction between land cover and the Ga/Dangme?

5. How is the indigenous culture of the Ga/Dangme sustaining in the face of rapid landscape change?

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6. What is the role of existing policies in sustaining the landscape of the Ga/Dangme?

Significance of the study

Tangible outcomes expected from this research are land cover maps and cultural landscape maps. Land cover change maps from 1987 to 2017 can be useful to the Land Use and Spatial Planning Authority of Ghana in understanding the dynamics of land cover growth, which are essential to the development of spatial plans. The cultural landscape map can help in the fusion of culture into physical planning and give a voice to practitioners of traditions and customs who are often ignored in economic and physical developments. Information from the cultural landscape map can help in shaping current environmental laws and coastal zone management laws under review in parliament for subsequent implementation. Also traditional authorities and priests can use the maps to explain to government areas which need protection and have cultural significance to the Ga/Dangme culture. They can use the document and information from the thesis to make suggestions to government on the need to preserve the culture of the Ga/Dangme as it can help boost the countries standing and scores in sustainable development goals achievement ranking.

Information on the effects of rapid land cover change, from the thesis can improve on advocacy towards ensuring conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems. This can help in achieving Target 2 of SDG 12 (sustainable management and efficient use of natural resources) while strengthening resilience and adaptive capacity to

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climate-related hazards in Greater Accra Region to achieve Target 1 of SDG13 (Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries). Besides, the findings would help protect and safeguard the world's cultural and natural and semi-natural heritages (Target 4 of SDG 11). A possible project that can be undertaken, using this research as a model, is how landscape change affects the physiological and emotional wellbeing of people as the region is noted for its high rate of physiological or mental health related problems (Ghana Statistical Service, 2014).

Culture sustainability index from this thesis will be a milestone for easy understanding cultures vulnerability to degradation in modern times. This is because indicators proposed for the measure of culture sustainability has not been empirically tested concurrently as different researchers only focus on just one or few aspect of the indicators. It will help reduce the notion of indigenous culture studies as a typical qualitative arena which makes it difficult to infuse with other areas which are of quantitative base.

Lastly findings from this thesis are to help harmonious integration of government agencies which are all working in protection of various dimensions of landscape. Currently there is less integration between environmental agencies, traditional governance and cultural agencies. This is largely because these institutions see themselves as distinct, but to attain sustainable development these agencies must collaborate strongly together as what each is mandated to preserve is linked with or have close relationship with the other. The thesis can also serve as an inputs into future update on Ghana National Cultural Policy which is less focus on culture as a way of life but on the commodification thus festivals of indigenous culture.

Delimitations

The variables of study were landscape change, ecosystem services. culture sustainability and formal policies. Landscape change was skewed towards change in culture among the Ga/Dangme and land cover change. Change of Ga/Dangme culture was focused on change in their occupation, diet, herbal medicine, religion, festival, traditional governance and passage rites which has connection with land cover. Also these cultural practices were arrived at based on responses from focus group and interviews. With land cover, the study focused on change in natural and semi-natural land covers spearheaded by anthropogenic factors from 1987 to 2017. Also the change was interested in how increasing artificial services and cultivated and managed land covers affect the culture of the Ga/Dangme in Greater Accra. The thesis also concentrated on how these changes in both culture of the Ga/Dangme and land cover in Greater Accra affected ecosystem services from 1987 to 2017. Lastly, the study looked at how best to sustain the culture of the Ga/Dangme with the knowledge that culture is the binding force of ensuring economic, social and environmental sustainability hence a sustained culture will ultimately lead to a sustained land cover. In addition, the thesis acknowledged and discussed how formal policies of the Government of Ghana can positively or negatively affect the sustainability of Ga/Dangme culture in Greater Accra Region.

Limitations

Studies on culture are highly of ethnographic research and takes a longer time to undertake. Although the thesis acknowledged the time dimension needed to study a culture, the research was more emic which gave respondents

to evaluate changes in their culture. This approach has challenges when the people themselves have been highly acculturated or hybridised to recognise changes hence their perception of change is likely to be less. It is based on this that more time is needed to complement emic with etic studies. However, the study tried to rely on literature from other research on the Ga/Dangme to compare and contrast results. Also the researcher participated in some of the cultural activities to understand the changes. The study adopted a quantitative dimension to enable indexing of culture change. Indexing culture has its disadvantage as culture measurability is a big challenge but the strength is that it gives the opportunity to link cultural change with land cover change, ecosystem change and culture sustainability index.

Definitions of terms

1. Landscape is conceptualised as the outcome of the interaction between land cover and culture. Landscape change is defined as a change in either land cover or culture which affects itself or the other.

2. Land cover is defined as the physical and biological cover on the surface of the earth.

3. Culture is envisaged as indigenous social behaviour patterns of a group of people which is connected with the land cover. One main term in this thesis is ecosystem services which was defined as services provided by land cover to culture and also services provided by culture to land cover.

4. Culture change is a change in the way of life of a people, mode of practice, time, performers, place, and any other which moves it from already known and accepted practices.

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5. Cultural sustainability is defined in this research as protection and preservation of indigenous culture. Culture sustainability is studied through the following components heritage protection, diversity of a culture, vitality, locality, economic viability, eco-cultural resilience and eco-cultural education.

Organisation of the study

The study is organised into ten chapters. Chapter One presents the introduction of this study already discussed in headings above. The main headers for chapter one are background to the study, statement of the problem which informed the study, research questions, research objectives and significance of the study as well as this section. Chapter Two discussed the theoretical underpinning of this study. Topics treated are the concept of landscape (land cover and culture); theories in land cover and culture change as well as models explaining the changes. Also, the importance of landscape is discussed from the point of view of benefits to humans and service from cultures to nature. The concept of culture sustainability, as well, is discussed with regards to land cover sustainability in Chapter Two.

Empirical works on landscape change are analysed and discussed in Chapter Three. Chapter Four looks at the methodology employed in the study and considered the following headers: study area, study design, data sources, data processing and analysis. Chapter Five discusses the results of objectives one (land cover change from 1987 to 2017) and factors driving the rates of land cover change. Chapter Six deals with culture change and its drivers. Furthermore, results on ecosystems services to the Ga/Dangme is discussed in

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Chapter Seven. Chapter Eight focuses on assessment of sustainability of the Ga/Dangme culture. Chapter Nine, presents results and discussions on government policies and how they positively or negatively affects cultural sustainability among the Ga/Dangme. Lastly, summary, conclusion and recommendations about the study and key findings are presented in Chapter Ten.

CHAPTER TWO

THEORITICAL LITERATURE REVIEW

Introduction

This chapter reviews the theoretical underpinnings of this thesis and conceptualisation of the themes employed for analysis. The theories centred on interactionism with branches in landscape biography, mutualism, and path dependency. The themes discussed were landscape, landscape change culture, land cover, ecosystem services and culture sustainability. The chapter discusses the relationship between the components of landscape thus culture and land cover with the services each gives the other. Factors affecting landscape (land cover and culture) change are reviewed and attention is given to its sustainability through culture sustainability approach. Lastly, a conceptual framework combining landscape, ecosystem services, landscape change and culture sustainability is presented and discussed.

Landscape

Landscape, as a concept, has been used in diverse settings and ways. Its usage connotes different meaning to the user of the word depending on his/her background. But, a conceptualization of the word, "landscape", is important in understanding and appreciating its usage throughout this thesis. Landscape concepts can be categorised into four perspectives: first, as a picture, sketch, etching, photograph, map or other representation of inland scenery (Lorch, 2000). Second, it can be viewed as a prospect or vista of scenery or natural environment (natural landscape) (Nassauer, 2012). Third, landscape is

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conceived as a land with distinguishing characteristics created by the interaction of nature and humans (cultural landscape) (Cosgrove, 2004; Sauer, 1925). Lastly, it can be used as a verb, defined as the act of shaping land to make it more attractive or useful (Lorch, 2000).

The use of the word landscape takes its root from Dutch painters in the 17th century as they tried to depict the Dutch land and different sections of the land; hence, the word landscape (region). Landscape, as used by Dutch painters, was of the notion of both nature and human culture because portraits had these entities (Janson, 2001). The "Hunter in Snow" portrait by Jan Steen (1626-1679) shows hunters returning home with their dogs walking in snow cover with trees and rivers (Spencer, 2016). Lucas van Leyden's (1494-1533) painting "The Garden", which connotes strictly, vegetation and ponds, has a fusion of humans and mythical creatures. Others were of cultural inclination as they were centred on only drawings of humans, their households and habitats. The "Merry Family" portrait by Hieronymus Bosch (1450-1516) also shows a family having a feast during the black sabbath. Cartwright (2007) also describes how landscapes by Dutch painters depict change in culture; that is, from a traditional guise of the learned gentleman in paintings to men smoking, drank, and chasing women.

Geographers later adopted the word to express the shape of the land and modifications by natural processes (Summerfield, 1991). Thus, landscape is the land as created by evolutionary processes transformed by the natural forces of climate, geomorphology, vegetation and animals (excluding humans). This idea of landscape was termed by Schluter (1906) as original landscape or natural landscape. The notion of natural landscape has been highly adopted by

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ecologists and biologists as they tend to, largely, focus on natural things devoid of human interference (Weir, Crew & Crew, 2013). Weir et al., (2013) assert that this concept of landscape has influenced most environmental conservation practices where humans are evicted from the presupposed natural landscapes such as watersheds and forest. Schluter (1906), later, advanced his argument that the present landscape, as envisaged, cannot be original or natural as they have been acted on and shaped by human activities through culture, termed cultural landscape (Schluter, 1906). Consequently, original landscapes do not exist as human beings have had their footprints and influence on all original landscape in every corner of the earth.

Some ecologists, designers, planners, and architects have also conceived landscape as the art of designing gardens and greening land (McHarg, 1969; Lorch, 2000; Steinitz, 2012; Steiner, 2008). These scholars tend to treat the environmnet as spatially homogeneous. Such views of nature and the theory about dynamics led to the concept of equilibrium that dominated ecological thinking from the 1920s through the 1980s (Clark, 2010), influencing landscape architects and ecologists in maintaining equilibrium in the environment by limiting human imprints. Zimmerman (2013) claims that the ecological concept of naturalness of landscape is flawed as by a critical look at a forest vegetation, one is likely to see cultural imprints through human provisional services and conservation methods. Also, if one is to consider landscaping where lands are demarcated into grasses and hedges to improve the scenery, the design of such environemnts are still human centred as the tools and materials used in such scaping are all culturally created.

In terms of definitions, the distinction of cultural landscape and landscape does not hold as words used to describe them are same. European Landscape Convection (2000) defines landscape as an area as perceived by people, whose character is the result of the action and interaction of natural and human facts. Munarriz (2011) also defines landscape as the visible part of the environment or as an individual's perception of the environment through his senses. UNESCO (2015) definition of cultural landscape is similar to that of European Landscape Conversion (2000) and Munarriz (2011). UNESCO (2015) defines cultural landscape as a long and intimate relationship between people and the natural environment. Myga-Piątek (2011) conceived cultural landscape as the evolutionary subsequence of primary landscapes (natural landscapes – in different ecological zones and altitudinal zonation) and human interaction that exist. Lonzy (2008) considers cultural landscape as places filled symbolically with diverse meanings and encompassing all details of human past activities within an ecosystem (Lonzy, 2008). The usage of landscape or cultural landscape expresses the same thing since landscapes, even if strictly natural, has to be defined by cultures. It is cultures that determine the names given to natural entities (rivers, tree, lake or mountain) and processes (Hawkes, 2001). Landscape is a cultural expression that does not happen by chance but is created informally or by design (Leader-Elliott, Maltby, & Burke, 2004).

The division of landscape into original, natural and cultural landscapes demands a critical re-categorization into just one term, that is, landscape. Weir et al. (2013) explain that humans are resituated within nature; thus, they are a part of nature. Therefore, landscape in the context of this study, is defined as the interaction of land cover and culture. These entities have great influence on

each other as culture currently outplays the natural processes in the determination of land cover (possibilism). In that same regard, land cover has/had great influence on the type of culture that could and was developed (environmental determinism).

Culture

Words are easy to pronounce and used in a statement. Culture, in its Latin form "cultura", refers to cultivating fields, tilling, mental care and education of intellectual capabilities (Banse, Nelson, & Parodi, 2011). In current times, there are about three concepts in defining culture, culture as an adaptive system, a cognitive system and a symbolic system (Fiske & Shelley, 2013; Von Heland & Folke, 2014).

Culture as a symbolic system treats culture as shared symbols and meanings ascribed to things (Boon, 1972; Eller, 2016). Meanings, interpretations, emotions, value, significance, relevance, spirituality and history are all culturally coded. The totality of ideation of culture helps in the explanation of possibilism where the environment is the clay moulded by cultural ideas.

Culture can also be envisaged as a commodity which has commercial value and can be traded. Commodification takes place when economic value is assigned to something not previously considered in economic terms; the exchange value compensates for the use value of a product (Marx, 1867). Culture is currently treated as a resource for both socio-political and economic amelioration (Yudice, 2003). In this study culture is defined in terms of an adaptive system. As an adaptive system, culture is defined as a set of socially

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transmitted behaviour patterns that serve to relate human communities to their ecological settings (Keesing, 1974). These socially transmitted behaviour patterns affects all aspects of life thus from birth to death, occupation, religion, governance, rituals/festivals, etc. This notion of culture fits well with the interaction of culture and land cover because culture is a part of the ecological cycle of the world. Culture is inherently ecological as it is self-learning, iterative, subject to change and adaptive.

Land cover

Land cover is the basic spatial elements of the earth surface (Zhang, Peterson, Zhu, & Wright, 2008). It is defined as the physical and biological cover over the surface of land (Ellis & Pontius, 2006). Per its definition, several land cover schemes exist for specific areas of Africa and parts of the world (Amenyo, Mariwah & Osei, 2017; Brink & Eva, 2009; Mertens & Lambin, 2000). Most of these land cover schemes are diverse that it makes it difficult to compare analysis from one research and the other. However, the Food and Agriculture Organisation land cover scheme created by Di Gregorio (2016) creates more harmony, in land cover schemes for comparison. Also, the scheme is broad enough to encompass all the various land covers on the continent. The scheme groups land covers into Cultivated and Managed Terrestrial Areas (CMTA) (areas where the natural and semi-natural vegetation has been removed or modified and replaced by other types of vegetative cover of anthropogenic origin), Natural and Semi-Natural Vegetation (NSVA) (areas where the vegetative cover is in balance with the abiotic and biotic forces of its biotope with semi-natural vegetation, defined as vegetation not planted by humans but

influenced by human actions). Cultivated Aquatic or Regularly Flooded Areas (CAFA) (areas where an aquatic crop is purposely planted, cultivated and harvested, and which is standing in water over extensive periods during its cultivation period). It also have the group. Natural and Semi-Natural Aquatic or Regularly Flooded Vegetation (NSAV) (predominant vegetation, at least periodically, comprises hydrophytes-marshes, swamps, bogs or flats where drastic fluctuations in water level), Artificial Surfaces and Associated Areas (AS) (areas that have an artificial cover as a result of human activities such as construction), Bare Areas (BA) (bare rock areas, sands and deserts), Artificial Waterbodies (AW) (reservoirs, canals, artificial lakes) and Natural and Semi-Natural Waterbodies (NSW) (areas that are naturally covered by water, such as lakes, rivers) (Di Gregorio, 2016).

The group of natural and semi-natural vegetation provides a broader umbrella to fit several land covers in Africa, hence this study further breaks it down into two thus natural and semi-natural vegetation- Open forest and natural and semi-natural vegetation shrubs, and grass based on the terrain of Greater Accra Region under study.

Landscape change

Landscape, as an entity, is not constant but dynamic (Wiens, 2012). The present landscape we have is the result of constant interactions between culture and land cover over centuries with each being changed by the other. Landscape change is the change or modification of landscape (land cover and culture or one) to new land cover types and cultural practices. The study of landscape change is more concerned with where change is occurring, what land cover

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types and cultural practices are changing. driving causes of the changes and the effects of these changes (Loveland & Acevedo, 2016). The main factors which influence culture change are natural factors (Diamond, 2005; Goucher, LeGuin, & Walton, 2004), contact/ urbanisation (Sharapan, 2016), formal education (Taras, Rowney, & Steel, 2013), technology (Steward, 1972; Vicente, 2010), attitudes (Lehane, 2016; Dewey, 1963), economic growth (George & Reid, 2005) and formal government policies (Fellows & Liu, 2013; Hancock, 1999; Kabachnik, 2009).

Like land cover, cultural change is also caused by natural factors (Beniston, 2016; Lambin & Geist, 2008; Lubis & Langston, 2015; Naiman, Bilby, & Bisson, 2000), population growth (Gopal, et al., 2016; Malthus, 1798; Turner & Fischer-Kowalski, 2010), urbanisation (Rosenberg, 2017; VanWey, Ostrom, & Meretsky, 2005) and formal government policies. Similarity between factors which affect culture and land cover makes them highly prone to changes with a change in one likely to affect the other.

Ecosystem services

A proper functioning landscape will provide basic services such as regulatory, supportive, provisional and cultural services for the well-being of humans (Millennium Ecosystem Assessment, 2005). Regulating functions are services that maintain essential ecological processes and life support, e.g., flood control, soil transportation and climate control. Supporting functions are the provision of habitat (suitable living space) for wild plant, animal species and humans at local and regional scales (Grêt-Regamey et al., 2015). Food, fibre and materials derived from ecosystems are placed under provisional functions

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(Wu, 2013). Lastly, cultural services include the provision of life fulfilment opportunities, spirituality and cognitive development through exposure to life processes and natural systems (Pickard et al., 2015). Cultural services also include non-utilitarian and non-consumptive benefits provided by ecosystems, such as sources of creative inspiration or aesthetics, existence or recreational values (Comberti et al., 2015).

Ecosystem services have always been seen as a one-way movement for man, but ecosystem components provide services for each other. Comberti et al. (2015) espouse that humans and their culture have been providing benefits to the ecosystem. Services to ecosystem systems are domestication of species, trans-relocation, planting, sowing and conservation (taboos, rituals and regulating use).

Although humans derive services from ecosystem services, there can be disservices from ecosystems. An overstretched/exploited/degraded landscape, as a result of internal or external pressures, can lead to ecosystem disservices which can lead to harm to wellbeing (Cardinale et al., 2012). Dis-functioning landscape will produce effects which will hamper the wellbeing of humans and generate disequilibrium in the landscape (Zhang, Ricketts, Camey, & Swinton, 2007). A typical dis-functioning landscape is more likely to witness a great number of flooding, limited water supply, poor quality of air and a reduction in food productivity and unsustainability of cultural practices (Dallimer et al., 2015).

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Landscape sustainability through culture sustainability

Selman's (2008) defines landscape sustainability as the preservation and maintenance of ecological integrity and cultural legibility of an area. Pillars/dimensions of sustainability, is directed to economic, social and environmental sustainability (Kates, Parris, & Leiserowitz, 2005). Understanding these dimensions and their interrelations, adverse effects as well as synergy and trade-offs is the key to decision-making on landscape sustainability (Termorshuizen, Opdam, & van den Brink, 2007). There have been arguments on a fourth dimension of sustainability, termed culture (Hawkes, 2001). Proponents of this dimension believe less attention has been granted culture because it is embedded into social dimensions of sustainability. It is important that culture be given the same level of importance in sustainability courses because it is through culture that man embark on the journey to provide for his needs (UNESCO, 2015).

The reason for a fourth dimension of sustainable development is that, development is highly diverse and cannot be copied from one place or nation to another without regards to cultural aspects within the specific location (UNESCO, 2015). Culture needs much attention and focus in development agenda of any country far away from generic models which are more economic output centred. As Hawkes (2001) puts it, a sustaining society and environment depends upon a sustainable culture because if culture disintegrates, so will everything else.

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Measurement of cultural sustainability

Identifying indicators to measure cultural sustainability is faced with challenges. Throsby (2008) proposed a set of indicators to measure cultural sustainability. These indicators are intergenerational equity (ability of unborn generations to access cultural resources and meet their cultural needs), intra-generational equity (access to cultural production, participation and enjoyment to all members of the community without discriminatory), importance of diversity (cultural diversity to the processes of economic, social and cultural development), precautionary principle (taking risk adverse position to destruction of cultural heritage or the extinction of valued cultural practices) and interconnectedness (a holistic approach integrating economic, social, cultural and environment as a single unit). Throsby (2008) indicators are very general and measurability, more difficult. Simpler indicators developed and widely used in culture sustainability researches was proposed by Holden (2015).

Holden (2015) classifies cultural sustainability indicators into intrinsic aspects (e.g. aesthetic value, historical value, and spiritual value) and instrumental aspects (e.g. the impact of cultural capital and cultural engagement on well-being, employment or learning). UNESCO (2015) argues that these indicators are in close relationship with Throsby (2008) interconnectedness outlook of culture sustainability. Holden (2015) indicators have a qualitative outlook which makes it easy to assess because the very nature of culture is experiences. However the indicators are limiting as it does not factor the various crucial aspects of culture such as food, governance and social interactions and practices.

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However, Soini and Birkeland (2014) establishes a more comprehensive eight indicators which was further entrenched by Palang et al. (2017). The indicators were heritage, vitality, economic viability, diversity, locality, eco-cultural resilience and eco-cultural civilization. They can be grouped into economic (economic viability), social (vitality, locality), culture conservation (heritage, eco-cultural resilience) and environmental (eco-cultural civilization). The downside of these indicators are that they are still at the theoretical stage as there exist no measurement scale to claim at what point a culture is sustainable. It is the interest of this research to measure these indicators using an index based assessment, hence move it into an empirical stage.

Policies for landscape sustainability

Ensuring sustainability requires policies for management of the landscape. Landscape policies can be of four folds: cultural policies, environmental, land and physical planning policies (Kangas, Duxbury, & De Beukelaer, 2017; Selin & VanDeveer, 2015; Oduwaye, 2009; Githitho, 2003). Modern governments have taken control of land cover management through numerous state institutions by introducing scientific and law binding policies which traditional policies find difficult to enforce. Cultural policies are policies geared towards sustainability and protection of cultures within a given country (European Commission, 2017). They are important in the face of the fast pace of cultural change in the world and the high level of homogeneity in cultures. Globalization is diminishing cultural diversity as more cultures are being absorbed into westernised ideology (Friedman, 1999). The issue of state government protecting cultures has also been questioned because the custodians

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of cultures are the societies. One needs a high level of integration and cooperation to ensure culture protection. Also, approaches of state governments in culture sustainability is questioned on the level of commodification of cultures (Pyykkonen, 2012). Governments are more interested in economic aspect of culture through sale of cultural artefacts, festivals and promoting tourism.

Another governmental policy to protect landscapes is land and environmental policies. They are entrenched to protect the environment, that is, land cover and ecosystem services. Implementation of land and environmental policies are done through various government institutions, examples: institutions managing land, sea and specific land cover (Selin et al., 2015). The idea behind formulating environmental policies is that most environments are free goods which, if not managed for a common good, would be lost to an expected degradation.

Physical planning policies are also used by governments to ensure sustainability. Physical plans tend to arrange how land should be apportioned for various functionalities (Oduwaye, 2009). In such processes, certain land covers such as forest cover and wetlands are given priority. Physical plans can come in different kinds of plans (strategic plans, master plans, regulatory plans, etc.) on different scale levels (national, regional, local) (Termorshuizen et al., 2007). Having these plans might not be enough; the enforcement of these plans are equally crucial for ensuring sustainability. Any attempt to think about the sustainability of landscapes or the services or resources they provide must, therefore, focus on the appropriate scale(s) for what it is that is to be sustained (Wiens, 2012). Mismatches between the scales of ecosystem services or

resources in the natural world and the scales at which management or policy is applied to those services or resources are commonplace and can easily lead to ineffective management or policy.

Per all these policies, successful landscape sustainability cannot be carried out without integrating a cooperation among institutions with mandate over the policies (Lynch, Fell, & McIntyre-Tamwoy, 2010). Therefore, policies that promote landscape sustainability require a collaboration between natural and social scientists, governmental agencies and cultures (local knowledge) at the territorial regional level, which means facilitating an integration or synthesis of different knowledge (Soini & Birkeland, 2014). Dyer, Aberdeen and Schuler (2003) noted that sustainability is dependent upon the locals' control over their intellectual property and cultural events.

Conceptual framework on landscape change and culture sustainability

The conceptual framework (Figure 1) for this thesis (Landscape change and culture sustainability) was generated from the various concepts reviewed: landscape concept, causes of land cover and culture change, ecosystem services, culture sustainability and policies. The first part of the framework is landscape which is originating from the interaction of land cover and culture. The framework assumes that the interaction of land cover and culture is in harmony, generating mutual benefits for each other, thus, ecosystem services.

In such harmonious state culture will be at a sustainable point. However, these mutual benefits are likely to change when land cover and culture are subjected to change by anthropogenic and natural factors which are mediated by governmental policies. The framework further assumes that once land cover

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and culture are influenced by factors of change, their original state changes as covers change from one type to another or undergo fragmentation while culture acculturates, go extinct or new cultures are formed.
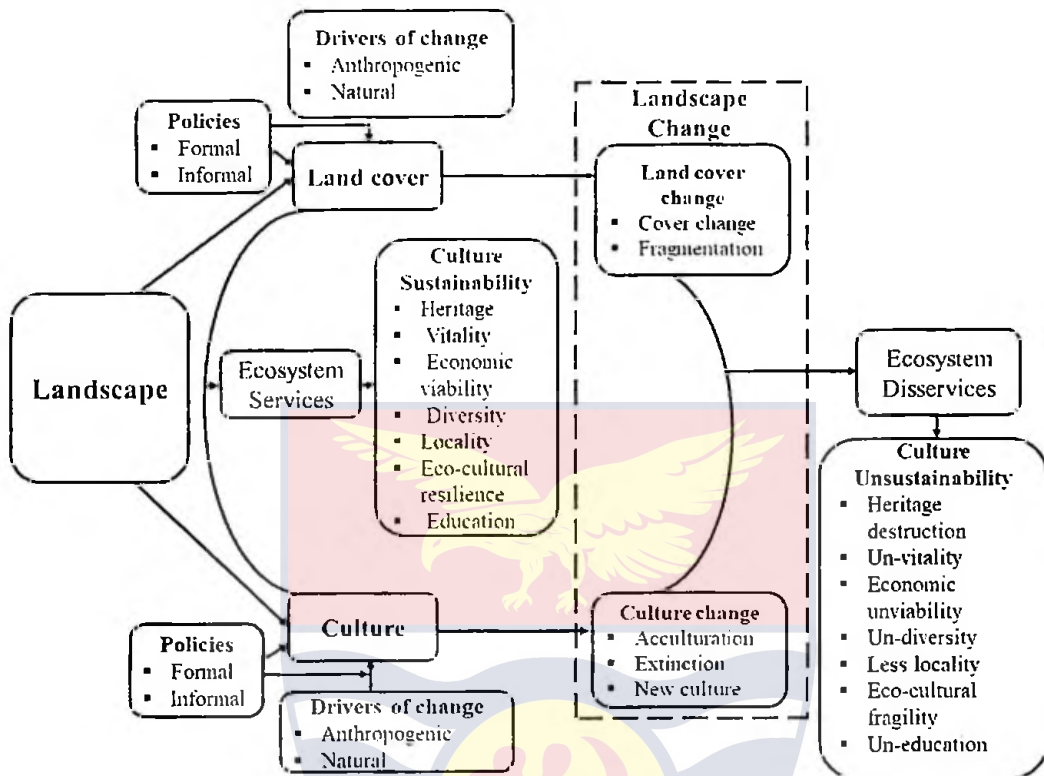
Figure 1: Landscape change and culture sustainability framework

Source: Osman (Authors Construct), 2018

Changes in either one entity of landscape leads to landscape change. Consequently, in a scenario of landscape change, ecosystem services are more likely to decrease with disservices originating from the interaction of culture and land cover (Figure 1). When ecosystem disservices emanate from changes in land cover and culture, the latter will be unsustainable.

Limitations of the landscape and culture sustainability framework developed

The developed conceptual framework on landscape change and culture sustainability is not a perfect framework which can explain all the happenings within a given place, but it helps place the research problem under study into

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context. Geographically it is helpful in explaining the changes which are ongoing within the study area. In addition, the assumption that landscape change is not static means its change can only be measured from a known base point/time. This can be a problem as the base point itself might be a changed landscape from a previous point in time. Also, the assumption that the interaction of culture and land cover at the initial stages is functioning with ecosystem services without disservices is not always the case. In addition, the idea that change will lead to ecosystem disservices is not always true as some changes can have positive impacts on culture and land cover.

Theories on landscape change and culture sustainability

Interactionism

Interactionist perspective maintains that human beings engage in social action on the basis of meanings acquired from social sources, including their own experience (Dong, 2008). Interactionism takes its roots from the Department of Sociology of the University of Chicago during and after the Second World War (Atkinson & Housley, 2011). Thomas and Herbert Mead were instrumental in the development of interactionism. However, they helped in the development of two different strands of the theory (Atkinson & Housley, 2011). The two perspectives can be organised at the macro (social interactionism) and micro levels (symbolic interactionism). The two modes of perspectives fit well within the objectives of the thesis on culture change which look at how individuals interact with cultural heritages, meanings they assign to them and how social structures serve as trajectories and constraints (institutions shape individuals and vice versa).

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Social interactionism espouses that society shapes self and social interaction. Stryker (2008) believed society emerges from social process and existed long before the appearance of all new members. One core aspect of social interactionism is that society creates identities by specifying roles for various groups within the society. Stryker (2008) further explains that a society is composed of organised systems of interactions and roles by different groups, communities, and institutions, with a variety of demarcations based on class, age, gender, ethnicity, religion, etc. These diversities within society are interdependent, cooperating, sometimes, conflicts for or against achievement of a goal. It, also, believes society with its structures can serve as a limiting factor on individuals' changing beliefs with a level of control. Blumer (1986) espouses that it is through social interactions that laws, customs, sanctions, and cultural prescriptions are determined. The idea of a society having control over individuals makes room for the symbolic interactionist where people can be free agents of societies' control.

Symbolic interactionism is based on three premises: humans act towards things on the basis of its meaning to them, meanings of things are derived from social interaction and meanings are handled in and modified with encountering things. This theory believes that meanings assigned to things result from interactions among people (Blumer, 1986). Symbolic interactionism also has six core roots: human society, social interaction, objects, human beings as actors, human action and interconnectedness of lines of actions. Blumer (1986) explains that human societies/groups are human beings engaged in actions, with individuals performing multiple activities. Individuals can act individually, as a group and on behalf of others or organisations. This aspect of the theory is

essential to this work as people can act individually as actors of change in land cover and culture though their actions are interconnected with the actions of others in similar or different activities. Social interactionism provides the frames of groups or subgroups with mandatory roles to protect the entire culture from or for change. The groups, in their duties, may work with other individuals (conservationists, researchers, etc.) and organisations (culture agencies, environmental protection agency, planning authority, disaster managers, etc.) that have similar interest but different meanings to the phenomena to be protected.

In addition, interactionism believes that the world, as it exists, is composed of objects to which people are oriented. These objects are in three fold: physical (trees, mountains, rivers, animals), social (actors and their actions) and abstract (gestures, words and ideas). However, they have different meanings to different sets of persons per their individual and social interactions. A tree is viewed as life for most societies; however, its meaning can transcend to be a raw material for a saw miller/carpenter, a god for a traditional priest/society and a carbon stock to the government. This situation is typical of landscape as diverse persons have different opinions about landscape elements (rivers, forests, wetlands and structures built-up). Social actors such as mothers, children, priests, chiefs, heads of organisations etc. help in defining and propagating meanings among one another. Blumer (1986) claims the actions of social objects are influenced by their motives, attitudes, role requirements or situational demands. Abstracts are the doctrines or concepts which help in managing meanings about a phenomena.

The concept of change is also explained by interactionism as it can occur at the individual or at societal level. Becker (1953), explains that at the individual level, one must learn appropriate responses to the possible physiological effects of the drug to find it pleasurable and learn any practical issues about how to actually use it. At the social level, one must navigate his/her way through the organizational constraints in space and time. This example is claimed by Atkinson et al. (2011) as socially managed processes of transition from one social position to another changes social identity over time at a collective and individual level. Interactionism, as a grand theory, is complemented by other middle range theories such landscape biographies, path dependancy and mutualism.

Landscape biographies

Interactionism helps in explaining individual and societal interactions. In the interaction, meanings are assigned to elements termed objects (physical, social and abstract). Landscape biography is also a theory which looks at meanings assigned to objects in the world with these meanings becoming memories formed and imprinted on the surface of the earth which is always changing in meaning and shape (Kolen & Renes, 2015). Landscape biography can trace its roots from cultural geography developed by Cosgrove (2004) and influenced by interactionism in the 1970's (Kolen & Renes, 2015). Kopytoff (1989) entrenched landscape biographies as life histories of goods, including landed property and monuments, which are transmitted frequently within society and, thereby, undergo shifts in their values, meanings, functions and physical appearance.

Landscape biographies focus predominantly on the changing use, ordering and experience of unique monuments through time, such as the biographical reconstructions (Kolen & Renes, 2015). The landscape biographies written by archaeologists show how successive generations have appropriated places and monuments of the past for their own purposes, and how they have incorporated these places and monuments into their social memories and their contemporary life worlds. Gomez (1998) explains that landscape biography centres on the role of individuals or societies as authors of landscape who shape landscape impression (objects and ideas) and expressions (manifestation of shaped objects and ideas). Landscapes have been transmitted and reshaped from prehistory to the present, viewing with a complex interplay between agency, structure and process (Kolen & Renes, 2015). Kolen and Renes (2015) further explain that human beings grow up in environments furnished by the work of previous generations, and as they do so, they come literally to carry the forms of their dwelling in their bodies but not in their genes.

Landscape biography also takes a look at laws, policies and institutions tasked with the responsibility of protecting antiquities, historic buildings and landscapes because they view these heritages as a necessary counterweight to modernisation and industrialisation (Kolen & Renes, 2015). Landscape biography was adopted to help in explain meanings Ga/Dangme ascribe to land cover thus wetlands and forested areas as abodes for gods and goddess. Also it helps explains how these beings are also changing with time as Ga/Dangme become more urbanised/westernised and christened.

Path dependency theory

Interacting, creating memories and shaping landscapes can lead to a well-defined culture of things in an environment. These social and individual interactions carried in culture can be subject to change with time. Path-dependency theory helps in explaining the importance of preserving, protecting and sustaining socially defined interactions passed on from generations to the present in simple terms as history matters (Pierson, 2000). Path dependence is for scientists interested in studying processes of change and dynamic phenomena in nature whose evolution is governed by history (David, 2007). It was developed by Brian Arthur and Paul A. David (Rixen & Viola, 2009). Path dependency is used in this thesis to explain the need to preserve culture and protect the land covers as they carry with them meanings worth preserving and ecological importance.

Path dependency can also help explain the haphazard nature and sprawl development of urbanisation in unmanaged or less controlled land as everyone just follows previous bad examples of building without structured land use. As Liebowitz and Margolis (1999) claim, path dependency suggests that where we go next depends not only on where we are now, but also upon where we have been. Pierson (2000) explains that path dependency can be grouped under increasing returns and positive feedback or self-reinforcing. Increasing returns explain the cost of switching to other alternative increases over time with importance to timing, sequence and formative events (Pierson, 2000). Thus, early events matter more than later ones. Self-reinforcement (positive feedback), on the other hand, is influenced by fixed cost, learning effects, coordination effects and adaptive expectations. Positive feedback is the

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existence of increasing returns in a situation where the increased production or activity indulged in leads to increased utility (Rixen & Viola. 2009). Increasing returns and self-reinforcing can lead to lock-in syndrome. Lock-in in path dependency expresses how persons, societies or institutions are literally stuck with a way of doing something either good or bad (Liebowitz & Margolis, 1999). When society or culture is locked in a good entity through its usage and management, leading to flourishing land cover and ecosystem, it is desirable. Contrarily, when cultural activities promote destruction, such lock-ins need to be changed to sustain nature.

A criticism of path dependency is that is provides little information about how paths 'de-lock', break up and dissolve (Sydow, Schreyögg, & Koch, 2009). However, David (2007) explains that break-up and dissolution can be attributed to changes in technological, industrial or institutional trajectories as a result of external shocks leading to a new path. External shocks on culture and land cover have been instrumental in landscape change through generations as massive changes in the land cover can be traced to the agrarian civilisation and industrialisation (Brown & Polsky, 2017; Lambin et al., 2003; Steward, 1972; Malthus, 1798). Another downside which can, however, be a strength is its resilience to change. Because the past matters, cultures adhere to specific activities even though there are better options. As strength, if a cultural activity, which might be the least option, still generates greater output, not to people, but to nature, such activity is cherished.

Mutualism

Mutualism is concerned with mutual benefits and interactions, regardless of their specificity, intimacy or evolutionary history (Bronstein, 2015). Mutualist interactions involve the exchange of goods or services (variable) between two species called mutualist partners (Landry, 2010). It was developed by Pierre-Joseph van Beneden in 1873. The theory was later advanced by Bernhard Frank and Heinrich Anton de Bary by grouping the physiologically intimate interactions based on parasitic, commensal, or mutualistic outcome. Mutualisms between species that benefit species involved have long captured the public imagination widely used in expressing the dependency and benefits between bees and flowers, ants and plants, etc. (Bronstein, 2015). Bronstein (2015) explains that occurrence of mutualisms is evident in every aquatic and terrestrial habitat as ecologists believe that every species on earth is involved directly or indirectly in one or more of these interactions.

The tenet of mutualisms is that the reproduction and survival of plants and animals in an ecosystem must be based on interaction. In addition, each species involved in mutualism must receive a benefit from the interaction; that benefit usually comes at a cost (Landry, 2010). Landry (2010) further asserts that mutualist partners do not necessarily receive equal benefits or incur equal costs because though one partner benefits, the other does not behaves altruistically. Mutualism is adopted to explain the benefit from the interaction between land cover and Ga/Dangme culture in the Greater Accra Region.

Janzen (1985) grouped mutualism benefits into transportation, protection and nutrition. In human and nature mutualism, however, recent

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ecosystem studies by Comberti et al. (2015) show benefits grouped into eight categories (services to cultures by nature: provision, regulating, cultural and supporting and services to nature by cultures: protecting, enchanincing, restoring and supporitng). However, benefits only arise in interactions when gains outweigh losses.

In other cases, losses ensue when benefits are less than cost. Measurements of cost and benefits are usually incomplete as it is rarely possible to measure costs and benefits in the same currency (Bronstein, 2015). Cost can involve time, distance, opportunity cost and financial resources for humans. In mutualism, there are instances where one partner exhibits behaviours that do not benefit the other. Such behaviours can lead to scenarios of exploitation of the partner, which can be detrimental to the partner and, in some cases, have long lasting effects on the exploiter/cheater/thief/parasite (Bronstein, 2015). The exploiter menace is often evident in culture and nature interaction. There are natural elements which depend on humans for their very existence. They are often parasites ranging from insects (mosquitoes, leach, etc.) to mammals. Similarly, cultures and human societies virtually extract all their essential resources for survival from nature; thus, culture is enabled by nature, making culture obligate. On the other hand, nature is facultative as it can survive with the help of cultures/human society.

Bronstein (2015) claims that mutualisms are not immune to the effects humans inflict upon their environment because anthropogenic change can alter their own success, but even if it does not, they may fail anyway because it alters their partner's success. Furthermore, Tylianakis, Raphael, Bascompte and Wardle (2008) assert that global change induced by anthropogenic factors is,

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also, a problem affecting mutualism. Notwithstanding, antropogenic effects on

mutualism in nature and cultures/humans can be resolved through restoration

and preservation of habitats (Schwartz, Hoeksema, & Gehring, 2006).

CHAPTER THREE

EMPIRICAL LITERATURE REVIEW

Introduction

This chapter reviews literature on empirical evidence of landscape change in the world. Issues discussed are land cover change trends around the globe and causes and effects of land cover change. Factors promoting culture change are discussed together with the associated problems they pose for societies and the attainment of sustainable development. The methods adopted in protecting land cover and culture are, also, reviewed in this chapter. Finally, the merits and demerits of these methods as well as their ability to enhance landscape sustainability are discussed.

Landscape

Landscape is the interaction between nature and human cultures (Munarriz, 2011; Sauer, 1925). However, most researchers use the term landscape to explain only the biophysical characteristics of an area; that is, land cover. These studies often tend to explain the land cover of an area in patch size, patch connectivity and diversity matrices. Gokyer's (2013) study on landscape used only land cover as proxy to measure landscape while it treated humans as separate entities. Dale's (2000) landscape study was highly on spatial patterns of land cover with less recognition given societies and cultures as part of the landscape. Landscape ecologist treat cultures as separete entity to landscape and rather the sole purpose of degrading the landscape. Braun's (2002) study of temperate rainforests in British Columbia (Canada) showed that foresters and

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academics described landscape as an entity or commodity to be protected or saved from human interaction. Significantly, in that same research, indigenes (Nuu-chah-nulth) who stay around the British Columbia forest used maps to show their level of interaction with the forest; that the forest was not only timber trees but a combination of their daily cultural activities and nature (Braun, 2002).

On the other hand, persons interested in cultural studies tend to shy away from the word landscape and adopt the term cultural landscape to illustrate landscape. McIntyre-Tamwoy, Fuary and Buhrich (2013), in their study, used the term cultural landscape in the study of Cardwell region but all their descriptions were the natural or biophysical environment (Wet Tropics rainforests, the extending from the mountains almost to the coast, and the Great Barrier Reef) of Aboriginal regions. Also, in the International Union for Conservation of Nature and Natural Resources (2010) report on sacred natural sites, the term cultural landscape was used throughout. However, all examples cited to refer to cultural landscape were water bodies, forest covers or snow caps which had cultural associations. This shows that even though cultural researchers use the term cultural landscape they mean the same thing as ecologists, foresters and planners.

Ecosystem services of landscape

Provisional services

Natural and semi-natural land covers provide critical provisional services for survival of life. They provide food and fibre to growing populations and are an important source of employment in many countries (Food and

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Agriculture Organisation [FAO], 2010). A total surface of 15million hectares of land is used for agriculture purposes in order to provide food for mankind (FAO. 2010). Worldwide, about, 25% of faunal biodiversity occurs in inland freshwater systems covering an area of less than 1% of the earth surface and providing protein for millions of people (FAO, 2002). In the Gulf of Thailand, shrimps, crabs, cattle, fish and squid are highly depended on by households from wetland ecosystem (Barbier, 2003). In the Chiuta community of Malawi, wetland vegetation provide an estimated 6,594 tons of fish, 50,436m^3 of water and 102,251 bundles of firewood annually (Zuze, 2013).

The Kaya forest in Kenya is known to provide medicinal plants for its surrounding communities (Walwyn, 2014). Similarly, the Bidayuh community of Jagoi area has about 117 plant species with medicinal properties which are largely used by households (Ripen & Noweg, 2016). Ecological Society of America (2017) estimates that about eighty percent of the world's population relies upon natural medicinal products.

Regulating services

Landscape processes regulate and absorb greenhouse gasses (McCarthy, Best, & Betts, 2010). This helps in regulating water-flow as densely vegetated areas can stimulate cloud formation, rainfall and the prevention of floods. The Barotse flood plain in Zambia has protected the local community from flooding while enriching soil for local use of wetland resources (Madzudzo Mulanda, Nagoli, Lunda & Ratner, 2013). Mangrove forests have the ability to help reduce damages caused by tsunamis and tropical storms (Danielsen et al., 2005). Das and Vincent (2009) espoused that mangrove forests saved a high

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number of lives and property in the Asian tsunami of 1999. Small patches of mangrove forests have the potential to reduce the death toll by one-third while reducing economic damage by $67 million (total of 44,000 acres).

Supporting services

Landscape's supporting services help in sediment and nutrient formation and retentions (Dominati, Patterson, & Mackay, 2010). Areas with vegetated covers tend to have high microbial populations including earth worms which facilitate plant growth (Callaham & Blair 1999). This biota plays a large role in the regulation of many of the processes occurring in soils and the services for agriculture and plant growth. Current estimates of the contribution of soil biota to ecosystem services provided by soils globally range from 1.5 to 13 trillion US Dollars annually (Van der Putten et al., 2004). Natural and semi-natural landscapes serve as sinks for carbon dioxide by storing carbon in trees and soils through maintaining the water cycle and precipitation levels. Globally, the terrestrial ecosystem stores about 2,477 billion tons of carbon while 1,150 billion tons are stored in the forest vegetation (19%) and soil (81%) (Deng, Shi, Jin & Wang, 2011).

Cultural services

Landscapes are noted to provide cultural services from occupation, sense of place, spirituality, education, well being, social/communal intergration etc. Hewlett, Harding, Munro, Terradillos and Wilkinson's (2017) studies revealed that more than 80% of respondants attribute natural and semi-natural land cover to tranquillity. They viewed natural and semi-natural land cover as

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areas which give a sense of peace, calmness and solitude. Respondents of Fuary (2009) study remarked: *"when you go out on the water or go bush, you feel light, happy thus like a big heaviness has been lifted off".* Most people in Malaysia visit the Taiping Lake Garden as escapism from stress; thus, for the purpose of relaxing (Thani, Ibrahim, Mohamad, & Rodzi, 2015). Ward, Parker and Shackleton (2010) identified that natural and semi-natural land cover and green spaces in South Africa helped in building social bonds as families and friends spend quality time which improves physical and mental relaxation.

Ritual ceremonies performed beside rivers and at open spaces in Palembang help in bringing together extended families of the Almunawar (Fitri & Triyadi, 2015). Mount Kailas in western Tibet is the most sacred mountain in the world for nearly a billion people in Asia who are followers of, at least, four religions including: Buddhism, Hinduism, Jainism and Bon. To them, the mountain serves as a place for spiritual enlightenment. The Upper Ganga Ramsar Site in India, as well, is a wetland dedicated for spiritual purposes (Soni, Garg, Singh, & Maurya, 2015). Similarly, Wetland Anillo de Cenotes is seen as a gateway for the afterlife with special rituals (Verschuuren et al., 2014).

Traditional knowledge is also transferred to the next generation through and within natural and semi-natural landscapes. Would-be priests or traditional leaders are made to spend days in traditional forests or sacred groves to learn about customs and traditions as these places serve as escape abodes for concentration. Van der Auwera (2014) asserts that cultural tourism accounts for an estimated 40% of the total amount of tourism revenues and 47% of international tourism arrivals. Of these, 36% of the world tourism proceeds went to emerging and developing states in 2009.

Services to nature

Protective services

Habitat protection is a service provided by societies to nature. Ritual regulations are, known measures societies use to protect nature. Formal laws on environment conservation, on the other hand, have also taken root in protecting natural and semi-natural landscape. Taiping Lake Garden is a natural and semi-natural landscape in the heart of urban Malaysia which has been preserved from degradation by both British colonial and current environmental policies (Thani et al., 2015). Defined spaces are demarcated as restricted zones and encroachment is prevented. In instances where tourism is protected, visitors are allowed by only for viewing and educational purposes. Guides and rangers man these conserved areas; hence, limiting their degradation and boosting diversity. In Ghana, forest reserves are protected under environmental and wildlife policies. Protected areas in Ghana have a high diversity of plant species and animal life.

Restoring services

Grazing and fire helps support biodiversity (Middleton, 2013). They help prevent loss of endangered species by curtailing the growth of proliferation of taller species which impedes the growth of short plant species (Scanga & Leopold, 2012). In Australia, high diversity of native plant species are maintained in grassy woodlands through the activities of low levels of cattle grazing (Dorrough, Moxham, Turner, & Sutter, 2006). Rickert, Fichtner, van Klink and Bakker (2012) identified high insect biodiversity in areas with cattle grazing activities. Cattle hoof-prints can sometimes create openings for growth

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of graminoid vegetation (Middleton. 2013). Pakeman, Hulme. Torvell and Fisher (2003) identified that sheep rearing has helped to restore dwarf shrubs on moorland in Europe. The activities of farmers in cutting hay as forage also reduce the dominance of grasses and increase biodiversity (Questad et al., 2011).

Enhancing services

Enhancing services by cultures to nature are cultivation, domestication, trait selections, translocation, pruning and fertilizer application. Cultivation is the oldest activity by man to sustain life. In agriculture, traits with higher productivity are chosen and protected for their benefits (Diamond, 2005). Translocation is one way societies have spread growth of plants either through conscious or unconscious planting or seed dispersal. Aheto et al. (2015) describe how people of Anyanui in the Volta Region propagated and stimulated growth of mangrove along the Volta Lake. Pruning is a major activity untaken by men in promoting the growth of plant species and land cover. Zimmerman (2013) espouses that Amazonian tribes have rejuvinated and stimulated the growth of plants in the Amazon by pruning plants which had medicinal properties. Farm and household organic waste has an influence on improving soil quality and soil fertility. Quansah, Drechsel, Yirenkyi and Asante-Mensah (2001) explain how farmers use animal waste and other organic waste to improve soil fertility on their farms in West Africa. Comberti et al. (2015) identified several plants (manioc, papaya, cashew, peanut, cacao, pineapple, arrow cane, tobacco, annatto (a dye tree), guava, rope plant, cocoyam, chili peppers) in the Amazon

rainforest area which have been domesticated. Erickson (2006) identified weeding as human intervention in the growth of most Brazilian fruits.

Supporting services

Cultural activities add a lot to improving soil fertility, nutrients circulation and animal production. Parrotta and Trosper (2012) discovered that charcoal, fish and animal bones and manure are added to amazonian soils by Indians to improve soil fertility. Emmons and de Laguna (1991) also observed that Alaskan Tlingits and Haidas put hemlock boughs into lower sea waters to help improve the spawning of herrings. Sacred groves are common examples as, in most cases, they help prevent the exploitation of reserved areas. The beliefs of the Bisieni and Osiama of Niger Delta about crocodiles have led to the conservation of wetlands which home the predator (Anwana et al., 2010). Sacred forest patches showed high species diversity and abundance in comparison with non-sacred forests in the same region, as they contain species endemic to Ethiopia, globally threatened species (Desalegn, 2012; International Union for Conservation of Nature and Natural Resources, 2010). Another restoring service offered by cultures is planting. Rackham (2012) claims that Chinese tree-of-heaven (Ailanthus Altissima) introduced by Sir Arthur Evans in the Mediterranean helped support the island ecological life.

Landscape change

Every landscape changes over time and each generation of humans creates its own landscapes (Antrop, 2006). Changes in landscape is resultive from changes in culture which reflect in land cover changes that later affect

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culture (Coombes & Barber, 2005). The changes in culture are numerous but not all have direct effects on the land cover of a place. Likewise, changes in land cover may not necessary lead to change in cultures. However, there are aspects of land cover and culture which impose direct effects on each other. FAO (2015) asserts that the global forest cover decreased by around 1.8 billion hectares in the past 5,000 years (a decline equivalent to nearly 50 percent of the total forest area today) as cultures moved away from hunting and gathering to being agrarian societies. As Germanic populations increased in the Alp, inheritance changed; and this resulted in de facto splitting of inherited farms. For this reason, forests were significantly reduced (Bender & Haller, 2017).

Factors which promote change in culture are contact and proximity, urbanisation/population growth, colonialism, technology change, religion change, climate change, promotion of tourism, government and institutional policies (Andrade, 2013; Acquah, 2011; George & Mair, 2009; Kandemir, 2016; Kormann, 2009; Oonk, 2004; Prost, 2006, Wu, 2013). The other dimension of landscape change is where culture is affected by land cover. A classical case is the disappearance of the Maya civilization which is widely attributed to climate change which transformed the land cover, making it unfit and unsuitable for habitation. The main cause of land cover change is similar to factors stimulating culture change; natural force, population growth/urbanisation, agriculture, deforestation, institutions and government policies (FAO, 2015; Giambelluca, Chen, & Ziegler, 2017; Lambin et al., 2003; Pelling & Blackburn, 2014; Taylor et al., 2017; World Bank, 2016).

Causes of culture change

Contact

Contact and proximity plays an important role in culture change. Cultures leaving in close proximity absorb part of each other's cultural practices (Liebmann, 2008). Newson (2015) revealed how Roman culture became close to other cultures through conquest. In effect, the Romans, for example, adopted gods from the colonised while the colonised also adopted the Roman way of life – love for entertainment and military lifestyle. Christianity, born out of Judaism, spread largely in the Roman Empire and even after the fall of the empire, it kept shaping western cultures (Park, 2004). Mexicans living on the border are seen as obliged to speak English, use dollars, listen to North American radio programs, watch U.S. television, support the spread of Anglo-Saxon religious institutions than those living in mainland (Mexico) (Zuniga, 1999). Oonk (2004) also revealed that the Hindu Lohana community in East Africa changed as the result of cultural contact with the Swahili's and white colonial elites. Changes ranged from food habits and marriage policies, as strict vegetarian lifestyle gave way to meat and alcohol consumption while inter-marrying, as well, spread among the Lohana (Oonk, 2004). Evangelical Protestantism on Andean lifeways is a relatively recent encounter but since their mixing, local rites and festivals, in many cases, continued, but without alcohol (Knapp, 2010).

Colonialism

Earliest forms of colonialism and imperialism can be traced to early civilization like the Babylonian's, Egyptian's, Greek's and the Roman's. Colonies they conquered learned, or at times, were forcibly made to accept and

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adopt their cultural practices. Andrade (2013) explains that Romans facilitated the production of cultural performances and symbols through recruitment and enticement of urban elites of their colonies. Archaeological findings of tombs with inscriptions show the adoption of Roman names and cultural systems in Homs, Syria (Newson, 2015). Robbins' (2004) studies of New Papua Guinea societies found that by independence, most people had abandoned their indigenous religions with the belief that they were worthless and adopted Christianity as most were indoctrinated by British Colonizers. In Kenya, most sacred trees were cut down by European colonizers seeking lands for agriculture (Nyamweru, 2012). In Africa, the story is largely known, most persons where assimilated in the France colonies while English colonies were acculturated to adopt European way of life.

Urbanisation/Population growth

Increasing populations demand new cultural practices to rule and manage a society. Diamond (2005) asserts that small societies tend to have religious leaders or priests serving dual purposes of spirituality and administration. As the population grows, such responsibilities are limited to one with a formal political structure instituted. Acquah (2011), also, confirms this by stating that the Fante's of Mankessim, after migration to their present location Mankessim, had to adopt a political structure by making Oson, one of the three spiritual leaders and warlords, their first chief when their population began to grow.

The onslaught of urbanisation, coupled with stark of economic growth, has opened culture to fragmentation and a gap between rural roots and urban

future. Traditions are losing their appeal and are fast vanishing as society is modernising (Hoffstaedter, 2008). One dimension of culture which vanishes easily is language. This is largely because urban folks have to adopt a common communication mode/language. Consequently, they tend to adopt the dominant culture (the culture with the most population) in the urban area, and in effect, the language of the majority. Eighty percent of Mapuche residents in urban centres like Chile do not understand or can speak their local language Mapudungun (Lehane, 2016). Urbanisation leads to effects on rural settings as migrants, on brief home visits, often increase awareness among rural villages by encouraging them to adopt urban ways of doing things against traditional methods (United Nations Human Settlements Programme, 1994). Communal living is common among rural settlers as they live in extended families and grandparents tend to live close to their children and grandchildren. In the urban areas, however, living arrangements tend to be nuclear and individualistic (Carlson, Lassey, & Lassey, 1981).

Technology change

Technology affects our habits, causing changes on ways societies define themselves and live (Kandemir, 2016). The greatest technological revolution was the industrial age (Benijer, 2009). The revolution brought, with it, tremendous changes in culture from the notion of family size, religious beliefs, social interaction, means of production, transportation to even warfare (Veblen, 1990). Large family sizes were abandoned for smaller ones across most European countries to cope with the cost of living in an industrialized economy. The roles of women as farm hands and care givers shifted to being cooperate

and industrial workers to support their families (Pinchbeck, 2013). Traditional means of production by using horse/donkeys/cows for ploughing fields gave way to mechanized ploughing systems as production was no longer meant for family consumption but for the entire economy and beyond. Communal living was highly substituted for individualism and personal gains against collective good. Remnants of the industrial revolution are still evident in climate change which is threatening all cultures of the world.

With the advent of automobiles, bombs and guns, there was a great change in military training and warfare. When the army was mechanized and horses were replaced with motor vehicles, the culture of training Swedish officers and military members in ridding and caring also vanished (Thorell & Hedenborg, 2015). Diamond (2005) explains how most Indians abandoned bow and arrow as a hunting and war tool with the advent of guns. Guns became the prefered tool for their efficency and, as such, provided a fair compitition for food as people resettled. The age of information has introduced new cultural outlook in cultural activities. Hansen, Postmes, van der Vinne and van Thiel (2012) confirmed that after a year of laptop usage by children in Ethiopia, the traditional communal concept had been replaced with individualist values. Kandemir's (2016) research also showed that the cultural notion of privacy is changing with the advent of social media and telecommunication. Friedman (1999), also, revealed how the use of phones had changed even the prayers of some Jews in his book. Family members who are not able to make a pilgrim to the Wailing Wall in Jerusalem prayed through a relative's phone beside the wall in Jerusalem.

Religion

Religion influences cultural practices and beliefs in so many ways. In instances where religion is the main embodiment of culture, a shift or change in religious beliefs spurs a general shift in culture. Prost's (2006) study of Tibetans showed that Tibetans who adopted other forms of religion such as Islam and Christianty where more likely to disassociate themseleves from the Hindu Tibetan way of life. In Kenya, Nyamweru (2012), also, identified that younger people especially members of revivalist Christian churches tend to be ignorant of and openly hostile to the belief systems of the Kayas' cultural systems. Kokaisl (2013) throws more light on changes in cultural practices and language systems of the Kyrgy's in China, Afganishtan and Russia. Kokaisl (2013), also, identified wide variations in eating habits, marrigae rites and language between Kyrgy's who were Muslims, Christains and Buddhist.

Just after independence in Papua New Guinea, people who had been converted or ascribed to christianity had abandoned indigenous practices and considered them as sinful (Robbins, 2004). Knapp's (2010) research in the Andeas confirmed influence of religion on culture. As persons who ascribed to charismatic chritian teachings when practising traditional ceremonies ignored the use of alcoholic drinks. Christian missionaries from the West saw most of what Africans treasured and valued in their culture as devilish and demons to be cast out. Hence, rituals were either modified or abolished. Most tradtional festivials in Africa are climaxed with either Christian or Islamic religious activities (Nwafor, 2016). Also, marriage ceremonies have taken a different turn in most cultural societies as marriages are finalised at churches (Acquah, 2011).

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Tourism/commodification of culture

Commodification of culture for tourism can result in, fundamentally, changing a community's structure (McKercher & Du Cros, 2002). Packaging of local cultures as a commodity has the potential of reducing vulnerable livelihoods and helps preserve cultures (George & Mair, 2009). Unfortunately, commodification of culture means commercializing cultural practices/images which are more likely to ruin original culture systems as they are reduced and sanitized to conform to tourist expectations (McIntosh, Hinch, & Ingram, 2002). Tourism can incite the pillage of artwork and other historical artefacts; this leads to the degeneration of classical and popular dancing, the profanation and vulgarization of places of worship and the perversion of religious ceremonies. These tend to create a sense of inferiority and cultural demoralization which fan the flames of anti-development through the acquisition of undesirable culture (Wood, 1980). Tourism growth in Lunenburg (Canada), for example, led to a cultural heritage changed totally into a new entity. George and Reid (2005) asserts that the strong sense of community in Lunenburg has decreased significantly with tourist economic mind-set.

Nature and Climate change

Research in climate change on tangible and intangible culture is gaining roots as calls for culture sustianability increase. Climate change is affecting most tangible cultures such as natural and semi-natural vegetations, heritage buildings, melting of glacier landscapes, bleaching of coral reefs, etc. (McIntyre-Tamwoy et al., 2013). In Australia, studies show that 30-50% of coral reefs had been bleached, affecting local food systems (Hoegh-Guldberg,

Eakin, Hodgson, Sale, & Veron, 2015). The melting of glacier is, also, influencing Andeas and Himalayans cultures. Traditional farming systems in Andeas region is hardly sustaining with less constant supply of water from glacier mountains (Kormann, 2009). The vanishing glacier is, also, affecting ritual performances conducted within snow caps. With the high rate of melting snows, cultural practices tradtionally held on snows are conducted on bare ground.

Baka's in Cameroon are experincing high rates of vanishing food systems (Chimtom, 2012). Community memebrs have to travel deep into the forest to seek tradtional foods and medicine. If herbal plants used for tradtional practices vanish with the changing temperature and rainfall partterns in Cameroon forests, centuries of tradtional healing services will also vanish (Chimtom, 2012). Archaeological sites are threatened by increasing soil temperature, changes in wetting and drying cycles and changes in sediment moisture. In Norway, increasing frosting is accelerating the degradation rate of most historical buildings (Krogli, Dramstad, & Skar, 2015). Indigenous people, for instance, in the Artic on low-lying island states are threatened by climate change as most of their culture landscapes are gradually being toppled by sea level rises (Thomas, 2011).

Government policies

Government policies and legislations have been one way of changing cultures of societies (Lucassen, Willems, & Cottaar, 1998). It is evident that modern states, by means of legislation and planning, have dealt harshly with indigenous cultures (Hancock, 1999). Governments have used measures such

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as punishments, displacement, techniques of assimilation and sedentarization (providing housing and restricting movements) to control cultures (Kabachnik, 2009). Kabachnik (2009) attributed the decrease in Gypsies nomadic lifestyles in Britain and Ireland to laws (The 1968 Caravan Sites Act and the 1994 Criminal Justice and Public Order Act) making it easy to evict people from occupied lands. In Canada, the government has forced the Innu to live in permanent communities restricting their daily livelihood and rituals (Alagia, 2014).

Maoist Cultural Revolution, in Tibet tried to restrict Tibetan in traditional clothes and religious practice (Sharapan, 2016). The Soviet Union, as well, was known to suppress religious and spiritual values of minority cultures (Tishkov, 1997). Soviet Jews under the Soviet Union were expected to conform to Russian norms and culture, give up their religious practices and cease speaking Yiddish (Garbuzov, 2005). In 2002, the government of Botswana, in an attempt to promote tourist and diamond exploration, evicted the San (Bushmen) people from their ancestral land, impeding ritual performances (Alagia, 2014).

Causes of land cover change

Natural forces

Natural forces were the dominant force in land cover change before the anthropocene (Zhang et al., 2016). Land covers in South America, the Philippines and Japan have all been subjected the action of typhoons and hurricane (Takemi et al., 2016). Hurricane Katrine, in the United Sates, transformed both the natural and artificial land cover with destruction of houses

and coastal wetlands (Morton, 2008). Fire is a natural event which has greatly affected and modified natural and semi-natural landscape. The Oregon natural and semi-natural landscape is believed to have to have been modified by historical and recent forest fires as they influence undergrowth and much more fire resilient trees (Fischer et al., 2016). After fires, the landscape is more likely to be bare areas with ash accumulations. Grimm et al. (2013) assert that climates affect the distribution of cover types, composition and conditions.

Population growth/Urbanisation and economic growth

Population growth constitutes one of the main forces of change in land cover change in the world (Lambin, Geist & Lepers, 2003). Population growth, with its associated urbanisation, is dependent on natural growth rate, immigration and emigration. There are enough studies supporting the claim of urbanisation/population growth on land cover change in the world (McGranahan & Satterthwaite, 2014; Lambin & Geist, 2008). In 1910, only 46% of the U.S. population lived in urban areas but by 2010, that figure had doubled to more than 81%. The effect has been the huge tracts of lands developed into residential and commercial facilities (Brown & Polsky, 2017). In Indiana, there was a 60% increase in built up surfaces as forest cover decreased (Jiang, Fu & Weng, 2015). Also, in Georgia Piedmont, United States of America, the annual population growth rate of 0.6% led to the 4.1% annual growth in built up area from 1990 to 2000 (Polyakov & Zhang, 2008). Similar records of land cover change were observed in Pune city, India, where an increase in population by 43.43% from 1973 to 2011 saw an increase in artificial surfaces from 28.50 km² to 155.99 km² (Mundhe & Jaybhaye, 2014).
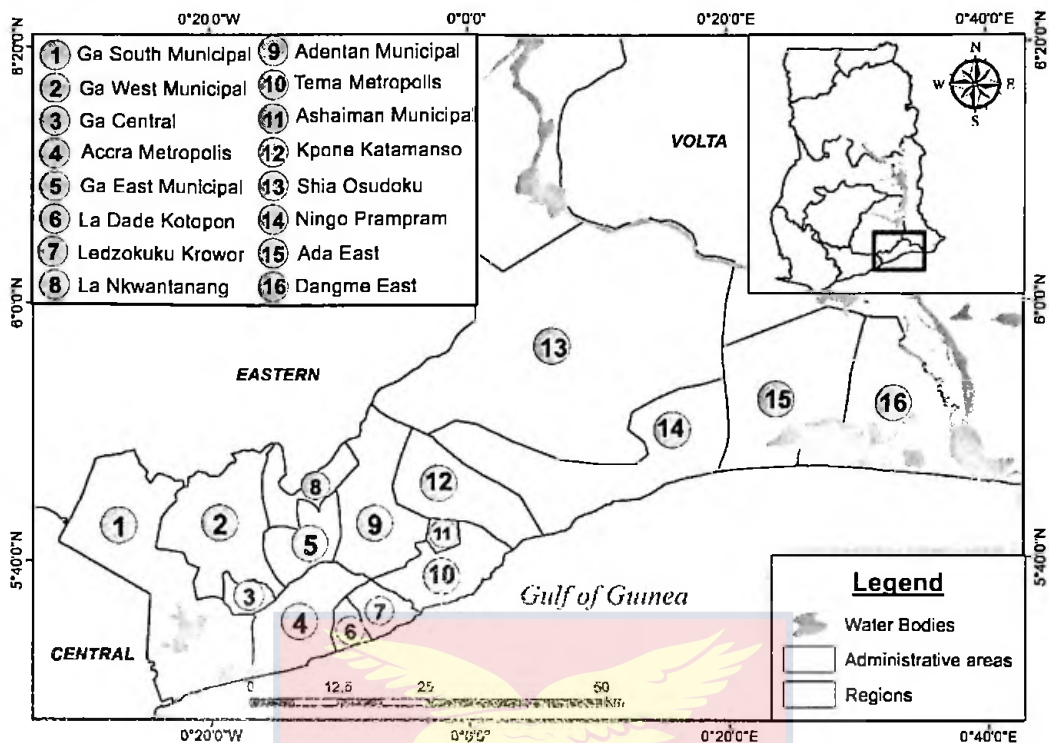
Figure 3: Map of Greater Accra Region

Source: Department of Geography and Regional Planning, University of Cape

Coast, 2017

The region has housed the administrative capital town of Ghana since

1877 when the capital was moved from Cape Coast to Accra. The region is

demarcated into Metropolitan, Municipality and District Administrative units

(MMDA's) (Figure 3). There are two metropolitan areas: Accra Metropolis and

Tema Metropolis; eight municipalities: Adentan Municipality, Ashaiman

Municipality, Ga East Municipality, Ga South Municipality, Ga West

Municipality, Ga Central, La Dade Kotopon Municipality and Ledzorkuku

Krowor Municipality. The districts consist of Ada East, Ada West, Kpone

Katamanso, La Nkwantanang, Ningo Prampram and Shai Osudoku (Ghana

Statistical Service, 2010).

Between 1960 and 1990, the double increase in population in Thailand also led a 50% decrease in forested areas (Jolly & Torrey, 1993). In Wadi Ziqlab catchment, Jordan, as population density increased from 87 person/km2 in 1952 to 943 person/km2 in 2008, land cover also changed by 4,414 hectares (42%) within the period (Mhawish & Saba, 2016). In the growth of urban centers, newly built structures serve as new homes for immigrants (Seto, 2005). Ouedraogo et al. (2009) found a high correlation between forest degradation and migrant populations in Southern Burkina Faso. On the other hand, emigration can have a positive effect on land cover change in the rural areas. Krogli et al. (2015) studies in Norway indicated that as more people leave rural areas to urban centres, afforested areas increased.

Within an urban area Von Thunen used the concept of space, rent and transportation cost in explaining change by conceptualizing five cycles of different land uses which influences the land cover of an area (Figure 2).
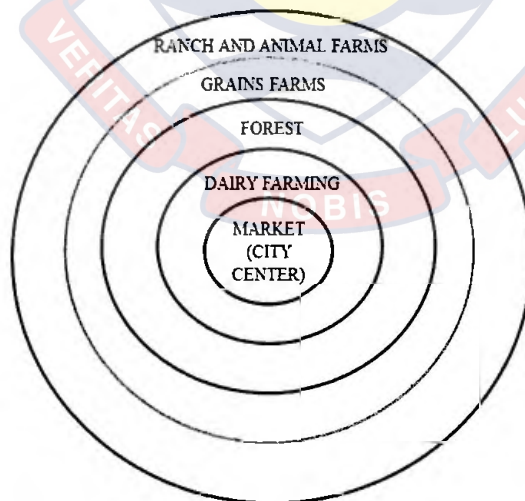
Figure 2: Von Thunen model

Source: Rosenberg, 2017

In the first ring or the urban core, natural and semi-natural land cover is completely changed as the land use is for residential and commercial. The

second ring is for dairy farming. Cost of land is very high but vegetable farmers have to endure the cost of land to compensate for travel cost, perishability of goods and good market at the core (Rosenberg, 2017). The third ring entails the productivity of forest related products, mostly, wood which is essential for building, cooking and heating. This places an extreme pressure on the immediate land cover as it will be greatly exploited to meet the demand for the centre or first ring.

The fourth ring tries explaining the cultivation of crops, both cash and non-cash crops, which will be needed by all the rings (VanWey et al., 2005). Cost of land in the fourth ring will fall drastically to enable farmers make profit but transportation to the core will reduce gains from the low cost of land in the fourth ring. The fifth ring was more likely to be used for ranching and livestock farming. This, also, has implications for land cover change as animals reared will have to forage on the plants and grass. Beyond the fifth ring is total wilderness and rich or untouched land cover (Rosenberg, 2017).

The core-periphery model is an extended version of the central place theory. It is based on the assumption that the market or state is isolated or independent, which is not realistic. Also, that the main market is one which receives all the flows but in reality, a state or area can have two or more markets with different flows and movements. Besides, he assumed that flow to the market was only based on foot and horses but automobiles have enabled persons to leave off the core and still work in the core by commuting daily.

Agriculture

Kasper et al. (2006) claim that human activities actively transformed the world's land cover around 6,000 BC when agrarian societies developed. Archaeological accounts explain how early forms of civilisations such as Babylonian of Mesopotamia, Harappanian of the Indus Valley and Mayan of the Yucatán Peninsula cleared extensive tracts of lands (forest cover and floodplains) (Redman, 1999). The era of industrial revolution, as well, witnessed enormous increases in world population and demand for agricultural products than the time of agrarian societies. Exploration and colonisation enabled western and highly industrialised economies to demand more agricultural products and mineral resources from their colonies. This led to large destructions of most forest covers in Africa, Asia, South America and Australia (Kasper et al., 2006).

World Bank (2016) estimates that the current agriculture land cover is approximately more than one-third (37%) of the total world land area. From 1975 to 2000, agricultural lands expanded from 13% to 28% of Ghana's total area. Just between 2000 and 2013, agriculture continued to expand rapidly, reaching 32 percent of Ghana's land area (United States Geological Survey, 2017). However, agricultural activities are not limited to farming on plots of lands only but also rearing of animals. Yet, it is estimated that animal husbandry is a major cause of deforestation, especially in humid tropical lowlands. Lambin and Geist (2008) report that only 6 % in Asia, 16 % in Africa and 82 % of all studies examined show that animal husbandry is responsible for land cover change.

Deforestation

Forests are a part of a collective patrimony serving the common good by providing, historically, meat, nuts, berries, medicinal plants, forage, fuelwood, building poles and so forth (FAO, 2015). Their advantages present a huge demand from man leading to lumbering/logging in many areas of the world. About 129 million hectares of forests, an area almost equivalent in size to South Africa, have been lost since 1990 (FAO, 2015). The stripping of the forest cover for agriculture, lumber, housing and road constructions are the leading causes of deforestation. The world's forests and woodlands have diminished by 120,000 million km2 or 19% while croplands cultivation showed a net increase of 120,000 million km2 which is a 466% increase in less than three centuries (Turner & Fajans-Turner, 2006). Wijaya, Budiharto, Tosiani, Murdiyarso and Verchot (2015), report that from 1990-2000, about 48% (5.8 mha) of forests were converted to shrub lands whereas 15.6% (1.8 mha) and 14.5% (1.7 mha) of the forests were deforested due to subsistence agriculture activities and for the expansion of estate crops (mainly oil palm, sometimes, mixed with rubber plantations). Sambou et al. (2015), also, indicate that 55% of the humid vegetation changed to wooded savannah from 1992 to 2015 in Central-West of Senegal.

Human road constructions open up forest vegetation, thus, making them prone to settlement developments. In Brazilian Amazonia, studies show that about 95% all deforestation occurs within 50km of highways or roads (Laurance, 2012). Salami (2008) estimated the rate of deforestation in Nigeria to be 1.36% per annum, mainly because of commercial and small scale lumbering activities. Lumbering has lasting effects with greatest impact on

forest unlike agriculture which will try to manage the land. Annual rate of forest change from 2000–2010 was 0.23% in the Congo Basin, about 0.43% in the Amazon Basin and about 0.41% in the Southeast Asia (FAO, 2015). Africa and South America had the highest net annual loss of forests in 2010-2015, with 2.8 and 2 million hectares respectively.

Non-anthropogenic causes of land cover change are landslides, drought, volcanism, flood, fires, etc, but most often, it is difficult to assess whether the cause is of a natural or human induced influence (Zhang et al., 2016). In 1997 and 1998, extreme drought season in Indonesia led to huge forest fires and forest loss of about 8.9million hectares (Wijaya et al., 2015). Volcanism can, also, cause forest fires as they have the potential to degrade large tracts of forest from their ashes. Less matured forest trees, usually less than 2years, are prone to destruction when ash deposits are thicker than 100 mm. Heavy ash fall >500 mm, on the other hand, can destroy mature trees (Craig et al., 2016).

Government policies

Another factor which connects demography and economy on the one hand and on the other, changes land-use decisions, is institutions (political, legal, economic and traditional). Government institutions regulate, amongst others, the property rights to the soil and play an omnipresent role in land cover changes. The access to land, work, capital, technology and information is structured by local and national guidelines and institutions (Batterbury & Bebbington, 1999). Thus, for instance, governments encourage economic sector, control prices, subventions, access to credit, infrastructure maintenance and exports. It is said, especially concerning economic guidelines, that they are

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closely interrelated to the dynamics driving land dynamics. Factors. such as market liberalisation and the privatisation or fall in currencies are often cited in connection with land-use changes (Mertens & Lambin, 2000).

Government participation in industries such agriculture, mineral extraction and manufacturing has local consequences for land cover (Lambin & Geist, 2008). Government policies in Thailand, Cambodia, Lao PDR and southern China have led to a homogenous landscape dominated by rubber trees. This is mainly because governments in Thailand and China provide tree seedlings, secured land tenure, loans and technical expertise to help local farmers take up rubber production and move out of poverty (Giambelluca et al., 2017). Giambelluca et al. (2017) believe these government policies are the main drivers of land cover change in rural settlements of southern China, Thailand and Cambodia.

Effects of landscape change

Loss of biodiversity

The first evident effect of land cover change is loss of biodiversity. Biodiversity explains the variety and variability of organisms and the relationship that exist among them (Freitas, 2009). As tree cover or natural and semi-natural covers are destroyed, the surface of the earth is exposed to the direct influence of the sun, rainfall and sound which tend to drive out animal species to areas with more conducive environment (Goudie & Viles, 2013). It is estimated that up to 25% of animal species could become extinct or reduced to tiny fragments by the middle of the next century. Fragmentation has immense effects on habitats as forest patches are reduced to singular units with less

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connectivity, thus, impeding species flow, water and nutrients (Ellis & Pontius, 2006). Fragmented covers increase vulnerability of landscape as in Girriggun-Australia. With fragmentation of mangrove and tree covers, pollution and turbidity increase, fishes develop sores (a result of agricultural runoffs), there is an increase in feral animals and animals (foxes, cassowary & wallabies) tend to move closer to houses (McIntyre-Tamwoy et al., 2013).

Soil fertility and erosion

Clearance of the immediate vegetation exposes the soil to the elements of the weather and anthropogenic activities. Adugna and Abegaz (2016), in their study of Northeast-Wellega (Ethiopia), indicated that forested areas had soil calcium content of 12.81ma/100g while grazed land and cultivated areas had 5.98 ma/100g and 4.08 ma/100g respectively. A study of Sangong River Basin showed that surface soil organic carbon content of vegetated and wetlands was 4.01 g/kg in 1982. However, as a result of degradation, the soil organic carbon content reduced to 3.79 g/kg in 2005 (Li et al., 2013). In Jatropha curcas, India, replanting of plants helped increase micro aggregates by 6.3% while soil bulk density reduced by 20% and bacterial populations increased two folds (Ayele, 2011).

As soil fertility reduces, most soils become loosely jointed and prone to erosion. Results from Sharma, Tiwari and Bhadoria (2011) showed that the mean soil erosion potential of the Maithon watershed (India) increased slightly from 12.11 t ha − 1 year − 1 in 1989 to 13.21 t ha − 1 year − 1 in the year 2004 while that of the forestland decreased by 15% within the same period. Also, a study by Tezera, Chanie, Feyisa and Jemal (2015) revealed that expansion of

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cultivated land by 11.33% (44.55ha) reduced shrub lands by 7.3% (35.73ha); hence, soil loss reached 3,655 tons per annum in Andit Tid Watershed (Ethiopia).

Climate change

Land-cover change is accountable for about one-third of all carbon released into the atmosphere by people globally since 1850 (Brown & Polsky, 2017). Of this, about an estimated 16% of the CO2 going into the atmosphere is due to land-related activities globally (Brown & Polsky, 2017). Cumulative emissions from historical land-cover conversions for the period 1920–1992 have been estimated to be between 206 and 333 Pg CO2 (Sivakumar et al., 2013). In south west Australia, the clearing of evergreen broadleaf forests to grasslands resulted in an increase in surface albedo of 0.06 (Lawrence, 2004).

Also, Ngwana, Demory, Vidale, Plant and Mbezi (2010), by studying the South African climate, indicated that a changing land cover has resulted in a change in the net radiation of a net of broadleaf surface by one kelvin. Similarly, the persistent land modification in Southeast Asia led to a decline in evapotranspiration and precipitation and a significant warming as temperature increased by 2^0 C from 1990-2004 (Tolle, Engler, & Panitz, 2016). Tolle et al., (2016) further explain that changing deforestation is contributing to high frequent formation of hurricanes and El Nino. Jiang, Fu & Weng (2015), also, asserts that increases in number of buildings, extensive road networks and other paved surfaces are contributors to climate change as solar radiation and thermal heat is stored during the day and released by night. The North China Plain which was characterized by regional urbanization had experienced significant changes

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in the near-surface temperature, thereby, increasing the regional near-surface temperature by 0.03°C/year on average (Qu et al., 2013).

Flooding

Flooding is consuming cities all over the world with devastating effects ranging from ecological and social to economic losses. Its frequent occurrences are linked to changing land cover and climate stimulated by anthropogenic activities (Mao & Cherkauer, 2009). Land cover change is believed to influence the infiltration and soil water distribution process. Also, transforming wetlands which absorb and soak excess water or rainfall into residential areas reduces the retention ability of soil, consequently, stimulating flooding. Low level vegetative cover could also affect infiltration and lead to reduced groundwater levels and, therefore, the base flow of streams (Dewan & Yamaguchi, 2008).

As wetlands (12715hac) and vegetated areas (5793hac) in 1988 decreased to 7128.8 (wetlands) and 3773hac (vegetated areas) in 2005, flooded areas also increased within Greater Dhaka from 47.1% to 53% (Dewan & Yamaguchi, 2008). Similarly, as rangeland decreased by -8.39% in Madarsu Basin (Iran) from 1960 to 2002, peak runoff discharge increased from 0.369 m3/s to 3.76 m3/s (Panahi, Alijani, & Mohammadi, 2010). Apollonio, Balacco, Novelli, Tarantino and Piccinni (2016), in studying the Cervaro Basin (Italy), concluded that there was a good correlation between flooding areas and land cover change.

Change in livelihoods system

Rudel, Bates and Machinguiashi's (2002) study of the Shuar hunting society in Ecuador revealed that by contact with other cultures they ventured into land clearing, plant pastures and raising of cattle. Luz et al. (2015) estimated a probability of a decrease in hunting activities by 22% by the Tsimane indigenous people for an additional year of formal school attended. In the Amazon, because of mining activities affecting land cover, the Yanomami tribe which is semi-nomadic had to resort to selling crafts such as baskets, bows and arrows, broadcasting their culture and gaining some income to survive (Caballero-Arias, 2003).

In Lao PDR, Nepal and Bangladesh, government's strict land policies on shifting cultivation has affected the overall living conditions of locals to worsened points of food security as farmers seek work as labourers (Erni, 2015). In West Kalimantan Province, a large number of people have abandoned farming altogether and are working for oil palm and mining companies while a few, which have some education, have been able to secure low-paid jobs in government and private works (Erni, 2015). In the Venezuelan tribe of Carib, as well, women in focus group discussions complained about poverty and hunger levels as their husband's abandon gathering food crops and farming to earn cash incomes on ranches (Seale, Seale, Alvarado, Vogel, & Terry, 2002).

Change in dietary systems

Food systems and choices are dependent on the natural and semi-natural environment and times moderated by technology; as such, a change in culture or the environment will impact dietary systems (Kuhnlein & Receveur, 1996).

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Surveys of indigenous Venezuelan tribe of Carib showed that traditional corn fermented alcohol was consumed, mainly, during festivals but currently. rum (distilled sugar alcohol) is more preferred as there is a 58% likelihood for indigenes to choose rum over any traditional beverage on daily basis (Seale et al., 2002). Yupik, an indigenous people of western Alaska, have had to change their protein intake from walruses (sea mammals) to moose or caribou (terrestrial animal) as walruses catch has decreased from over 2000 in 1999 to just around 500 in 2014 due to climate change (Milman, 2016). The diet of the Kung (Bushmen) of Botswana was mainly made of 35% hunted meat and over 655 vegetables mostly foraged in the 1960s (Kuhnlein & Receveur, 1996).

However, landscape changes from the 1980s had led to a shift in diet with maize being the dominant food with little portion of meat and vegetables bought in the open market (Kuhnlein & Receveur, 1996). Degradation of Kitimat rivers and wetlands has, also, affected foods such as oulachens (ooligans, a favourite fish of the north coast), shrimps and clams, thereby, decreasing their consumption in the area (Turner, Plotkin, & Kuhnlein, 2013). Magni (2016) indicates that among the Xhosa people of South Africa, traditional vegetables are associated with poverty and primitiveness. Therefore, younger generations have stopped learning about these vegetables and using them in their diet as they do not want to be associated with a lower social status or backwardness, more generally.

Loss of identity

Changing landscape can lead to loss of identity (Comberti et al., 2015). With the decrease in agricultural lands in Norway, the sense of place was largely

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decreased as reforestation hid most cultural buildings and also reduced visual perception of rural landscape. This is because an estimated 80% of the culturally protected buildings can be found on farms which are visually covered by growth of new trees on abandoned agricultural lands (Krogli et al., 2015). Wahlquist (2017) reports that the loss of cultural identity has contributed to over 25.5 deaths per 100,000 people for Aboriginal and Torres Strait Islanders compared with 12.5 deaths per 100,000 non-Indigenous people. Yet, in Canada indigenous people's suicide rates are almost twice as high as non-indigenous Canadians. This is largely because once a person is ousted from his native land and begins to wander around, he will put on a new identity which might lead to physiological issues.

Shepherd, Delgado, Sherwood and Paradies (2017) revealed that deposed and restricted cultures had a mean time to re-offence as 15months for persons with low levels of cultural engagement while those with high levels of cultural engagement had 18months to re-offence. With a loss of identity, traditional dress codes are shunned. As Koirala (2016) asserts, traditional girls and women used to wear cholia, nahaa uporona while the boys and men used to wear mardani (dhoti) and phad (kachad) in Tharu's (Nepal). However, this has changed with older generations still preferring traditional clothes while girls now wear kurta and boys, t-shirt and pants (Koirala, 2016).

Decrease in aesthetic value and tourism

Land cover change and culture is a key socio-economic footprint of human activity and potentially affects aesthetic and ecological functions of landscapes (Zhao, Luo, Wang, & Cai, 2013). Aesthetic value determines what

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we see as positive or negative, beautiful or ugly (Gemada, 2012). Yang, Luo, Lin, Qiu & Luo (2014) study in Houguanhu Region, China, showed that on a scale 0-5, respondents scored a composite of 4 and above for natural and semi-natural land cover while non-natural was in the range of 3 and below. Ecotourism has been crucial in the protection of natural and cultural scapes. It has been a source of income to governments and people who sell cultural artefacts; but, at the same time, it has led to eviction of cultures from traditional lands, overuse of natural and semi-natural habitats and destruction of habitats to create tourism infrastructure (Kipuri, 2009). Irrational tourism and land development have destroyed Sanya's tourism resources and dissipated its initial advantage (Wang & Liu, 2013). This affects the number of tourists who visit the ecosystem as it is destroyed, hence, affecting income of tourist entrepreneurs (Van der Duim & Caalders, 2002).

Decreased transfer of traditional knowledge

Traditional knowledge tends to be collectively owned either in stories, songs, beliefs, customary laws and artwork or in scientific, agricultural, technical and ecological knowledge as well as the skills used in implementing these technologies and knowledge (Kipuri, 2009). It is transmitted to members of the society (Parents, siblings, elderly, chiefs, priests, etc.) through spoken words (stories) and experiential learning. However, modernization has unleashed an era where indigenous knowledge is eclipsed by western knowledge, formal education, urbanisation etc., making it difficult to transfer age-long knowledge (Magni, 2016).

Among the Omushkego Cree Group in Canada, sedentarization, formal education and access to television have limited knowledge transfer between the older and younger generations; hence, affecting the value system of the younger generations (Ohmagari & Berkes, 1997). In 1963, the abolishment of native authorities and chiefs in Tanzania had a huge impact on respect and transfer of knowledge as accumulated chieftaincy knowledge was neglected for formal systems. The removal of the San from their ancestral home affected even basic transfer of local dialect as the people become scattered (Alagia, 2014). Also, with land cover change, specific tree species are destroyed as their importance and usage are lost.

Change in religion

Religion a product of culture is intimately linked to the environment in which the people live as the land is the core of all spirituality. A change in culture affects religion. In Cape Coast, Ghana, the church of Methodist's rule on one man one wife led to a breakdown of social ties and responsibility and even hereditary. Acquah (2011) explains how libation offering on Sundays has been abandoned during festivals in Mankessim to appeal to the growing number of Christians. The Balokole Movement made of Anglicans in Rwanda, during the 1930s, forced most of its members not to accept bride-prices during marriage (Höschele, 2007). In addition, Western education has led to the loss of traditional knowledge which was the basis for the protection of sacred sites in Mijikenda, Kenya (Githitho, 2003). In Bhutan, as well, people had the tendency to perform rituals before logging and collecting medicinal plants, such rituals are abhorred currently due to modernisation (Ohsawa, 2005).

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Conflict and tension

Conflict can result from culture change when not all persons of the culture or society like the new culture being adopted. In Ghana, early Basel Missions segregated and built tension among their converts and traditional worshipers by building separate communities for them, especially, in Kibi, Ghana. They were not allowed to mix with non-converts who were mostly their relatives as they were made to believe their salvation depended on the separation (Ekem, 2008). Likewise, there have changes in how communities function in Kenya, with children going to state-run schools, elders no longer being the respected, cohesion within the society and the respect for values and traditional social norms being degraded (Wanza & Njuguna, 2012). Furthermore, an analysis of the 1994 tragedy in Rwanda highlights the contribution of land scarcity and environmental degradation as a major driving factor in the process (Percival & Homer-Dixon, 1995).

Cultural policy and cultural sustainability

Agenda setting and formulation of cultural policies

UNESCO's efforts in the 1960s led to the development of cultural policies to guide the development, protection, support and promotion of diverse cultures. The policy document has been a blueprint for country specific development of cultural policies. Cultural policies tend to be developed at different levels of administration, that is, at the national, sub-national/regional or district/county levels. However, not every country has a cultural policy. Out of 213 countries and regions listed in the International Federation Arts Councils and Culture Agencies [IFACCA] database, only 41 had a cultural policy

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document with 11 countries developing their cultural policy (International Federation Arts Councils and Culture Agencies [IFACCA], 2014). Notably, most of the countries without culture policy documents were developing countries.

The European Commission's has elaborated laws on cultural policies. Its Article 3.3 of the Lisbon Treaty states that the union shall respect its rich cultural and linguistic diversity, and ensure that Europe's cultural heritage is safeguarded and enhanced (European Commission, 2017). Also, the National Historic Preservation Act (NHPA) was formulated in 1966 with the oversight responsibility of preserving historic and cultural properties of America. Specific responsibilities are to, under Section 106 of the act, identify and evaluate properties for inclusion in the National Register. Likewise, projects and physical developments must be checked to consider the effects of their undertaking on historic properties and on natives' culture prior to the start of the project (Smythe, 2009). The act proposes a consultation with cultures and people expected to be affected by projects before their commencement. If the effects on the people will be diverse and great, then the project is to be cancelled.

Furthermore, specific cultural policies can be made to protect indigenous and disadvantaged cultures within national contexts. The Indian Arts & Crafts Act (IACA) was enacted in 1990 to protect tribal cultural resources by preventing the sale of goods that are falsely presented to have been made by Indians (National Congress of American Indians, 2017). Culture policies is Kenya places culture at the heart of all forms of development (Ministry of State for National Heritage and Culture, 2009). Ethiopia has a well-documented cultural policy to safeguard indigenous culture from globalisation and so does

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Ghana and Nigeria as well. However, there has been a challenge of frequent updates of these policies to meet the pressures of the rapid changing modern societies.

In some countries, cultural policies move beyond the national to sub-national levels. In Argentina, because of their highly diverse culture, the Buenos Aires Municipal has a special Secretariat for Culture responsible for the administration, direction and management of a vast socio-cultural complex composed of various services which are provided in the municipal area (Harvey, 1979). The Province of Caserta in Italy, renowned for its national and international cultural resource named the famous Reggia di Caserta (Royal Palace), has a special cultural policy to govern and manage its cultural heritages for survival against continuous internal and external demands (Mollica, 2014). Such functions are to be complementary of the national policies and also specific as national policies tend to be a bit generic.

Implementation and evaluation of cultural policies

One dominating attribute of all countries with cultural policies is their quest to preserve, promote and conserve heritage and memory (International Federation Arts Councils and Culture Agencies, 2014). But, achieving this aim has been difficult for most countries. Despite the institution of laws, often times, projects and developments undermine cultural heritage and natives, and this is because minority cultures are largely under represented. Van der Auwera (2014) claims that the ratification of UNESCO cultural policies were unequally represented as developing countries in Africa, Asia and South America were largely unrepresented. In United States of America, the 1978 Congress passed

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American Indian Religious Freedom Act, but it has been difficult for Native Americans to protect cultural scapes as most courts ruled that the new law was a policy statement with no enforcement provisions (McLeod, 2005). Recently, there has been a demonstration by the Sanding Rock Sioux tribe about the construction of the Dakota Access Pipeline crossing upstream from their reservation. Even though such constructions had implications for culture preservation, politicians were still willing to undertake the project for the economic benefits it brings (Volcovici, 2017).

Another weakness of most cultural policies at national levels or even that of UNESCO is the broad definition of concepts and targets to be achieved within the policies. Argentine music, books, radio, television and folklore festivals and the relevant regulations are scattered among various provisions which are of more general scope or which have their origin in local tradition (Harvey, 1979). Another challenge with cultural policies is that some countries lack organisations to manage and implement outlines of cultural policies. Only one-fourth of over 213 countries had a cultural ministry to promote and advance the course of culture. The rest added or attached issues of culture to other ministries such as youth, sports, tourism etc. (International Federation Arts Councils and Culture Agencies, 2014).

Funding of cultural policies

The administration and management of culture has also been faced with financial difficulties while others are well endowed. European countries tend to have enough and are well-resourced for protecting culture. From the year 2007 to 2013, €4.4 billion was invested in cultural heritage from the European

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Regional Development Fund and European Agricultural Fund for Rural Development with about €100 million invested in only cultural research (European Commission, 2017). However, Greece is a European country struggling with budget on culture protection. The Ministries of Culture budget has been cut by 50% after the financial meltdown of 2009 (Mavromatis, 2013). Germany, on the other hand, has the highest budget for cultural protection as the government's allocated funds for cultural affairs on the national level rose continuously from 1.00 billion EUR in 2006 to 1.53 billion in 2014, indicating an increase of 53 % (Blumenreich, 2016). In the United States, Federal funding to the National Endowment for the Arts (NEA) projects remains static at $146.2 million a year with a measly annual budget of $158 million while National Science Foundation's annual budget sits around $7 billion (Gummow, 2014). Even though funding looks substantial, it is inadequate in managing the cultural dimensions of the entire United States of America. In protecting cultures, the United Kingdom allocated over £30million from 2016 to 2020 as Cultural Protection Fund which is now open to arts, culture and heritage organisations (British Council, 2016).

Nonetheless, some countries are faced with financial constraints on implementing cultural policies. Signing onto UNESCO policies and ramification can generate financial benefits; but, developing countries are unable to secure funds because of limited knowledge and because the procedural approach application cost can be high (Van der Auwera, 2014). Funding for protection of cultural heritage can be multi sourced. In Tyre, restoration and protection of the cities historical buildings got international funding of the World Bank and governments of other countries such as Italy (Italian

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Cooperation) and France (Agence Francaise de Development) (Zeayter & Mansour, 2017).

Another major problem is the clarity of funding for culture protection which hinders the ability of cultural agencies to secure funds. The Ethiopian cultural policies state that the expenses necessary to run the activities of the cultural sector shall be raised by the state, international organisations, non-governmental organisations and from aid assistance and contributions made by individuals and the public. It is, however, difficult to secure funds from all these institutions as there no fixed amounts to be rolled out. In Africa, limited government budgets, largely, contribute to the low financial support for culture.

Environmental policy and cultural sustainability

Agenda setting and formulation of environmental policies

Environmental problems are a common phenomenon faced by every nation globally. Internationally, since the beginning of the century, more than 170 multilateral environmental treaties and instruments have been established, covering subjects ranging from the atmosphere and the marine environment to nature conservation and transboundary watercourses (European Environmental Agency, 2016). The National Environmental Policy Act (NEPA) 42 U.S.C. of 1969 of the United States is one of the oldest environmental policy developed in the world to give a national framework for protecting the environment. The main aim of the policy was to ensure that all branches of government give proper consideration to the environment prior to undertaking any major federal action that significantly affects the environment (United States Environmental Protection Agency, 2017). In Europe, environmental policies are formulated by

the European Council rather than by national and sub-national governments. legislative avenues and regulatory agencies. Environmental policies and laws in Europe from 1970s to 1980s were often arbitrary. But, the 1986 Single European Act (SEA), though based on Articles 11 and 191 to 193 of the Treaty, defines clearly environmental policies (Weale, 1996). In 2001, the EU introduced its Sustainable Development Strategy (SDS), thus complementing the earlier environmental policies for promoting growth and jobs with an environmental dimension.

This is renewed in 2006 to combine the internal and international dimensions of sustainable development to strive for the improvement of quality of life through fostering prosperity, environmental protection and social cohesion. In line with these goals, the Europe 2020 strategy for growth aims at shaping smart, inclusive and sustainable growth (Ohliger, 2017). In 1979, China passed the Environmental Protection Law for Trial Implementation with the 1982 Constitution Article 26 which requires state protection and improvements in the environment (Chow, 2013). The Nigerian 1999 Constitution of the Federal Republic section 20, also, empowers the state to protect and improve the environment and safeguard the water, air and land, forest and wildlife of Nigeria. Besides, a separate section (section 2) of the Environmental Impact Assessment Act of 1992 (EIA Act) provides that the public or private sector of the economy shall not undertake or embark on or authorise projects or activities without prior consideration of their effects on the environment (Eneh & Agbazue, 2011).

Implementation and evaluation of environmental policies

Implementation of environmental policies everywhere has been faced with challenges. Internationally, environmental policies lie in their implementation and enforcement. Parties to international agreements generally find external monitoring and enforcement systems unacceptable and wish to control monitoring themselves as information gathered in this manner may be incomplete or inaccurate due to differing monitoring methods and standards (European Environmental Agency, 2016). VanNijnattan and Boardman (2002) assert that Canada, which is considered well-grounded in environmental policies, is faced with uncertainties and disagreements between the various levels of government. Environmental matters have shared jurisdiction but the actual boundaries between the federal government and provinces are not always clear (VanNijnattan & Boardman, 2002).

The EU, in 2011, received 3,115 new complaints regarding insufficient domestic implementation of EU policies (Selin & VanDeveer, 2015). Selin and VanDeveer (2015) continue to claim that financial penalties had been issued in only five environmental cases to Greece in 1997, Spain (2001), and France (2007) regarding the nonconformity and non-implementation of the EU's environmental policies. Also, EU is faced with the implementation gap between the initial stated policy intentions and the results delivered. This gap exists for a range of reasons including procedural time-lags, knowledge gaps, and difficulties in working across different governance levels (European Environmental Agency, 2016). In China, implementing environmental policies is limited by local government interests. Local government officials benefit from higher levels of economic outputs in their region. Hence, they place much

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emphasis on economic developments and, sometimes. use bribes to override environmental protection policies (Chow, 2013).

Nigeria is faced with issues of corruption as resources and the paternalistic attitude of some judges towards matters relating to environmental hazards created by companies have rendered the enforcement of environmental laws ineffective (Offiong, 2011). Anago (2001) also claims that most infrastructural projects lack environmental impact assessment because officials approve the projects before assessments are undertaken. Similarly, Olarinoye and Orecho (2015), using Nigeria and Uganda as a case study, asserted that despite comprehensive policies and legal frameworks adopted by developing countries, environmental degradation and resources depletion continue. This, Olarinoye and Orecho (2015) attributed to weaknesses in policy implementation and the enforcement of environmental legislations and a lack of monitoring and evaluation systems as well as a communication strategy which are notable concerns.

Funding for environmental policies

Funding the establishment of environmental policies are mostly generic. In most countries, the government is the main source of funding and implementing policies though there are helps from other non-governmental agencies and world organisations. However, the money required to fund these policies are faced with two major deficits: knowing the right amount and mobilising the amount needed. Because the objectives of environmental policies are, often, too broad, budgeting for the right amount per objective becomes difficult (European Environmental Agency, 2016). The Cohesion Fund was

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created in order to help the poorest members of the EU meet the costs of environmental and infrastructural developments (Ansari, 2000).

Ansari (2000) further explains that due to the dual nature of the Cohesion Fund which funds both environmental and infrastructural developments, there has been a conflict regarding how the money is used. In the United States, funding provided by government for environmental policies protection was about $8billion in 2016; but, the amount was inadequate as there are many environmental agencies resulting in a huge cost of operation (European Environmental Agency, 2016). In Africa, Kenya is one of the few countries to have secured over US$ 10 million to US$ 255 million with local and international organizations to deal with environmental protection and mitigation (National Environment Management Authority of Kenya, 2016). Unlike Kenya, most African countries are still struggling to raise necessary funds for agencies as their budgets cannot adequately accommodate their activities.

Physical planning policy and cultural sustainability

Agenda setting and formulation of physical planning policies

Physical planning policies provide a plan-document to be used for physical and infrastructural growth of the human habitat on the surface of the earth (Oduwaye, 2009). Physical planning policies usher into being the development of documents for managing the land surfaces. A good physical planning policy will make room for achieving sustainable development which is not limited to the society, economy and environment but culture as well. Plans

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developed are diagrams/maps backed with many legislative guidelines and administrative reports.

In Greece, the Law 2508/1997 on the Sustainable Development of Towns is the key law for the organization of built-up areas. providing for public participation and promotion of the reuse of the built space to prevent urban sprawl. In the Philippines, the Presidential Proclamation No. 65 sets the frame for physical planning between 1993 and 2022. The aim is to formulate an integrated national land use policy agenda that would guide the allocation, utilization, development and management of the country's physical resources. This physical plan is geared towards protecting cultures by adding a section for the "recognition of the rights of Indigenous people" to ensure that indigenous people's right to develop, control and use lands within their ancestral domain are guaranteed. Sri Lanka, in 2011, formulated its National Physical Planning Policy and Plan subjected to the approval of Cabinet Ministers (Sri Lanka National Physical Planning Department, 2011). The Sri-Lanka physical planning policy outlines diverse physical developments which meet environmental stability. There is little recognition of culture protection, but rather, an emphasis on tourism. Consequently, there has been a call for the upgrading of the tourism industry to cater for the protection of environmental, traditional social, religious and cultural values.

In Dominica Republic, Physical Planning Act 5 of 2002 implores the National Physical Development Plan to properly manage land development. The prime focus is to address conflicts and changes in land use and challenges faced because of the negative impacts of climate change. Dominica, being an island state, is more concerned about sustaining itself from climate change and

disaster in its physical planning agenda. In Uganda, physical planning is the responsibility of Ministry of Lands, Housing and Urban Development. In their duties and functions, attention is drawn to how to attain orderly, progressive and sustainable urban and rural development as a framework for industrialization; provision of social and physical infrastructure, agriculture modernization and, therefore, poverty eradication (Ugandan Minsitry of Lands, Housing and Urban Development, 2015). This agenda falls short in the integration of culture sustainability as the physical planning policy tends to be of the old notion of achieving social and economic stability with less emphasis on the environment and culture. Land Use Decree in 1978, as a policy, sets the field for the most significant and concrete contributions to urban and regional planning by the Federal Government; these, subsequently, trickled down to states and local government areas.

Implementation and evaluation of physical planning policies

Cooperation is one way some countries have adopted to be effective in managing their physical environments. This cooperation is in technical support and equipment for developing physical plans which are sustainable. The Dominican Republic, for instance, hired the services of Canadian Dillion Consulting Ltd (Government of the Commonwealth of Dominica, 2013). Another hindrance to implementing physical planning policies is conflicts and war. Civil war that lasted almost three years (1967-1970) was a huge distraction to eastern states in relation to any meaningful physical planning in Nigeria as its 1946 physical planning Act was put on hold (Mobolaji, 2015). Mobolaji (2015) futher asserts that land and land use planning is weak and retrogressive

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as people with vested land interest develop lands without following physical planning schemes. In most villages or countrysides, there exist no physical planning schemes to even adhere to. Also, physical planning policies in Nigeria has been belittled by legislative bottlenecks, technical inadequacies and lack of manpower, lack of public participation and corruption (Oduwaye, 2009). Also, there are loopholes in the Land Use Decree of 1978 which are yet to be revised close to three decades later due to selective implementation of the Urban and Regional Planning Decree 88 of 1992, paucity of qualified officers on the field and the inability of government to remunerate workers adequately (Mobolaji, 2015).

Funding of physical planning policies

Funding is a challenge for implementing physical planning policies as internal funding is the first call of funding for physical planning. The physical planning agenda of Dominican Republic, for example, is funded by the Caribbean Development Bank in collaboration with the Government of the Commonwealth of Dominica (Government of the Commonwealth of Dominica, 2013). However, most countries have to depend on inflows of external help. Greece, always, is able to secure funds from EU in implementing physical planning policies. She has benefited, in particular, from Cohesion and Structure Funds, Rural Development Aid and the LIFE programme. In 2007-2013, EU funds for about EURO 2.8 billion were allocated to environmental infrastructure and nature protection (EURO 3.6 billion including national co-funding), representing about 10% of the total EU support available for Greece at an

average of 0.23% of GDP (or 0.30% of GDP in national co-financing is included) (UNESCO, 2015).

Greece, again, has adopted self-financing instruments by charging entrance fees to reserves and merchandising shirts, wares, etc. to help cover part of their operational cost. Uganda, also, has operational costs charged by physical planning departments across the country to support activities (Ugandan Minsitry of Lands, Housing and Urban Development, 2015). However, such funds are still inadequate as the departments and ministry still have to depend on limited government funds.

CHAPTER FOUR

RESEARCH METHODS

Introduction

This chapter presents the methodology employed in achieving the objectives of this study. The chapter is organised under the following themes: study area, research design, target population, sampling, data collection instruments, data collection procedures, analyses and ethical issues. Per the headings, research design looked at the philosophical underpinning the methodology employed while study area expanded on the attributes of the study area. The choice of target population and methods used to sample respondents are explained together with the instruments used to solicit information. Analyses elaborate on steps, procedures, software and functions used to generate results from collected data. Lastly, ethical issues considered before and after data collection were explained together with the weaknesses of the methodology adopted.

Study area

Location

Greater Accra Region is the smallest region in Ghana with a total size of about 3537.52km^2 (Ghana Statistical Service, 2010). The region lies within 6^{0}6'34.07"N and 0^{0}30'28.76"W to the North-East and 5^{0}28'25.76"N and 0^{0}37'28.21"W to the South-West. Relatively, the region is bound to the west by Central Region (Fante and Denkyira), to the north by Eastern Region (Akyem/Akwapim), to the east by Volta Region (Ewe) and to the south, the Gulf of Guinea (Figure 3).

Population

The region has the second highest population in Ghana with about 4.01 million people (Ghana Statistical Service, 2010). In terms of age, 31.2% of the inhabitants are within the ages of less than 1 to 14 years, 65% between 15 to 64years and 3.5%, 65years and over (Ghana Statistical Service, 2010). The population is a very youthful one, a representative of the general trend for the entire country (Ghana). Population growth rate in the region from the year 2000 to 2010 was 38% with intercensal growth rate of 3.1% (Ghana Statistical Service, 2010). Per the intercensal growth rate, current projected population (2017) for the region should be 4.88 million people.

Original natives of the region are the Ga and Dangme but currently, it is an ethnic melting point in the country. About 72.57% of the population in the region are migrants. The highest of them (migrants) are the Akans with a percentage of 39.7% followed by the Ewe (20.1%) and the Mole Dagbanis (5.2%) (Ghana Statistical Service, 2010). This signifies a high rate of inter cultural activities a possible indicator for culture change. The natives (Ga/Dangme) of the region are the second major ethnic group with a percentage of 27.43 (Ghana Statistical Service, 2010).

Ga/Dangme indigenous culture

Culture influences all aspects of life and gives meaning to the physical body and minds of persons. The Ga people are subcategorised into six different groups: those from Ga Mashie, Osu, La, Teshie, Nungua and Tema while the Dangme are the people of Ada, Kpong, Krobo, Ningo, Osuduku, Prampram and Shai. Despite these divisions they share a common language with little

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variations, similar social structures, religion and festivals (Odotei, 1991). Their culture embodies their food, family systems, occupation, rites of passage (birth, adulthood, and death), religion, festival celebrations and governance institutions (Regula, 2008). Food and occupation are intertwined culturally as occupations are primarily subsistence. The Ga/Dangme, traditionally, are known as an artisanal fishing ethnic group (Ollenu, 2016; Songsore, 2008). This occupation is mainly for the Ga/Dangme settlements along the coast (Tema, Usher Town, Osu, Prampram etc.) while the inland inhabitants (Shai, Afienya, Dodowa, etc.) are mostly into crop farming.

Socially, *We* (ancestral house) is the basic cell of the Ga/Dangme society, where children are received at birth as gifts of God and are welcome with a grand birth ceremony (Odotei, 1991). Every person belongs to a family (*We*) and a name of a Ga/Dangme person can be used to trace his lineage or *We*. Death is viewed as a passage climaxed with rites for departed family members as they join the ancestral world. Traditionally, the Ga/Dangme are ruled by family heads who are in charge of family properties, control and settling of family issues within and with others (Regula, 2008). The cultural life of the Ga/Dangme has been under several influence since the coming of the Dutch, English, Swedes, Danes, French and a host of interlopers of all nationalities (Odotei, 1991) and intermarriage with other ethnic groups such as the Akyems, Ashantis, Fantes and Ewes.

Religion is a major backbone of the Ga/Dangme society. To the Ga/Dangme, natural and semi-natural features such as water bodies, mountains and forest groves are abodes for ancestors and gods (Quarcoopome, 1992). These places are worshiped with each having a priest to perform rites to

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intercede between them (Ga/Dangme) and the spirit world. Religion has, also, influenced the festivals celebrated by the Ga/Dangme. *Homowo* is the famous festival of the Ga/Dangme which is celebrated annually. A legend has it that the Ga/Dangme were faced with hunger when they first settled in Greater Accra Region but due to persistent and gradual nurturing of farmlands and prayers to their gods, they managed to get a bounteous harvest which led to the institution of the *Homowo* festival. *Homowo* means "hooting at hunger" and is celebrated to signify that the Ga/Dangme are well sustained and will never be subjected to hunger (Ollenu, 2016). However there are other specific festivals celebrated by specific groups. For instance the Dangme of Prampram celebrate the *Kpledum*.

Economy

Greater Accra Region is the most economically vibrant region in the country. This can be attributed to the presence of government offices and several companies. Traditionally, fishing is predominantly the main occupation of most of the indigenes (Ga/Dangme) in communities like Ga Mashie, Osu, La, Nungua, Tema New-town, Ningo, Prampram and Ada. Farming is more inland, in peri-urban and rural districts such as Shai Osudoku, Ga South, Ada East and West.

The region's importance, economically, has been transformed from a simple agrarian (farming and fishing) one to a commercial and service economy. Service is the most vibrant sector of Greater Accra as seen in the provision of banking, education, transportation, communication and tourism (Ghana Statistical Service, 2010). Greater Accra is the financial hub of the country; but, the spatial distribution of financial institutions is skewed towards

the metropolis and municipalities. The metropolis and most of the urban areas are dotted with commercial and rural banks. The opposite pertains to the rural districts as they have less commercial bank facilities but, mostly, rural banks and savings and loan institutions.

Education and tourism services provision is very viable and vibrant in the region. In terms of tourism, the region can boast of the Shai Hills Reserve, national monuments, series of hotels and restaurants. The region is also noted for several senior high schools and tertiary institutions all crowed within the municipalities and metropolis. The region provides all kinds of transport services as it houses the country's international, sea port and numerous lorry stations. Manufacturing is of two kinds in the region, small scale and large scale. Small scale manufacturers are often dairy and beverages companies and paint firms. Large scale are into petroleum, shipping, iron fabrication, etc.

Climate

Greater Accra Region lies within the Dry Equatorial Climatic Zone of Ghana. It has a bi-modal rainfall (April to July and September to November) and a dry season from December to February within the year. The average annual rainfall for the region is between 787mm and 1,200mm (Ghana Meteorological Agency, 2015). June is the month with the most rains having an average precipitation of 193mm. It also has the highest number of rainfall days spanning more than 10 days and stimulating floods in the months of June and July (Ghana Meteorological Agency, 2015). January has less rainfall of 16mm with an average of one day of rainfall and no reported cases of floods (Ghana Meteorological Agency, 2015). Rainfall occurrence is also influenced

by the Akuapim-Togo mountain ranges. The region lies at the lee-ward side hence receive a minimal amount of rainfall.

The hamattan (dry) months of January to mid-April have the maximum temperature of 32^0C. June. July and August have a temperature of 22^0C while the mean temperature in the year is 26.5^0C (Ghana Meteorological Agency, 2015). Relative humidity in the area is very high, averaging 75% to 85% (Ghana Meteorological Agency, 2015). High relative humidity in an area means more water vapour in the air that can form into clouds to give rain (Umoh, Akpan, & Jacob, 2013). This accounts for a greater part of the convectional rainfall in the region.

Geology and soils

There are over seventeen different geological under bed in the region (Minerals Commission of Ghana, 2011). The most extensive geological formation is quartz schist often grained and equigranular. It stretches from the eastern part of the region to parts of La Dade Kotopon (Minerals Commission of Ghana, 2011). It is inter-sparse with marine, fluvial or lacustrine sediments, orthognesis and amphibodite (Minerals Commission of Ghana, 2011). On the immediate west of it is the phyllite and phyilonite (Minerals Commission of Ghana, 2011).

The geology type has influenced the type of soil on top of the geology. The Food and Agriculture Organisation (FAO) (2015) of the United Nations' report, the classification of soils are over 44 soil sub groups in the study area. The major ones are vertisols, solonetz, luvisols and acrisols (Soil Research Institute- Ghana, 1998). Vertisols covers all parts of the Shai Osudoku district

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thus, covering about 20% of the district. Vertisols are rich is clay content with grey to red colour containing varying degree of organic content (FAO, 2015). They easily crack under dry conditions but swell in wet seasons making it highly prone to flooding and drought. They are good for the cultivation of shallots, maize and water melon. Luvisols form the second dominant soil type within an area of about 14.6%, they cover Tema Metropolis, Ledzokuku Krowor, Kpone Katamanso, Ashaiman and the eastern parts of Shai Osudoku. This type of soil is a mixed mineralogy, high in nutrient contents and well drained. They have no or less clay content with high iron bearing minerals good for crop cultivation.

Acrisols dominate the Accra Metropolis, Adentan Municipality, Ga East and Ga Central. Livisols cover the Moist-Semi Deciduous vegetation within the upper parts of Ga South (Soil Research Institute- Ghana, 1998). Solonetz soils are salty soils with high contents of sodium and clay. They cover about 8.6% of the region and are confined to parts of the Songor wetland in Shai Osudoku, Ningo Prampram, Ada East and West. Their salinity is influenced by the Songor Lagoon and the high level of infiltration from the sea. They have low nutrients and are highly erodible when exposed to the elements of the weather. Other smaller soil sub groups in the region are the lixisols, cambisols, luxisols, gleysols (Soil Research Institute- Ghana, 1998).

Water systems

The region is situated within two major water sheds, the Volta Lake Basin and Densu River Basin. Over 81.6% of the region is directly under the influence of the Volta Lake Basin (Water Research Institute, 1998). There are a number of smaller catchments such as Korle-Chemu, Kpeshie and Songor and

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the Gyankai catchment. The region has been well drained until the surge in urbanisation. Some of the major rivers in the area are Sege (Sege town), Akonyador (Kpantsendor), Oludor (Dawhenya), Gyrokorgyor (Kpone), Kyekudor (Odumase), Gblekpo (Afienya), Kyekubor (Odumase), Ado (Oyarifa), Nasakyir (Pokuase), Densu, Odaw, Gbagbla-Ankonu (Ashaiman) and many more (Ghana Survey Department, 1996). Some of these rivers have been dammed to serve agriculture and household purposes, especially, in the rural parts of the region. These include: Dawhe (Dawheya), Densu, Norboyita (Tsinakorpe) and Mamahuma (Ashale Botwe to Nungua). Beyond dams, some of the rivers drain directly into the sea with a few creating lagoons and wetlands.

The major lagoons and wetlands in the region are the Densu wetland, Sakumo (Grefi) Kyemu, Korle (Ga Mashie), Kpeshie (La), Songo (Teshie), Mokwe (Nungua), Chemu (Tema), Gao (Kpone), Laloi (Prampram), Gyankai (Old Ningo), Moyo (Ahwiam), Sorgor lagoons, etc (Ghana Survey Department, 1996). The general pattern of rivers system in the region can be described as being dendritic in nature due to the low elevation of the area. However, urbanisation has created a major problem for most of the rivers, lagoons and wetlands (Okyere et al., 2012).

Vegetation

Greater Accra Region lies within four vegetative belts of Ghana. The first is the Strand/Mangrove Vegetative cover. This is confined to the very extreme southern part of the region's border but moves inland to about 2.5 km. It is only at Songor wetland that mangrove growth can reach over 6kms inland. This vegetation covers about 19.05% of the region. Most of the wetlands

(Songor, Korle, Densu, Odaw, Laloi) housing the mangroves are considered as gods in the Ga-Dangme culture; yet, they are, heavily, under threat from urbanization and pollution. Areas where extensive sheets of mangrove vegetation can easily be identified are Songor wetland, Densu and Sakumo.

The immediate vegetation cover after the mangrove cover is the coastal shrubs and grassland. They cover a greater part of the region and virtually engulf most MMDAs. Most of this cover has given way to building of surfaces as urbanization increases in the region. The nature of shrubs and grass makes them easily cleared with little effort; hence, the increasing rate of conversion. This cover moves inland to about the very edge of the region with a few exceptions at Ga South and Shai Osudoku districts. Ga South enjoys a third vegetation cover at its upper boundaries, the Moist Semi- Deciduous Forest. It has a few dense forest covers and emerging tree plants as it is the boundary of the forest of the country.

Research design

Reality is a complex, dynamic, unique and obscure entity; as such, different schools of thought exist concerning it (Jaccard & Jacoby, 2010). Two major themes of philosophy of knowledge about reality exist: ontology and epistemology. Ontology is concerned with what is real while epistemology is concerned with how to obtain information about reality or how we know reality. A combination of ontology and epistemology has produced diverse philosophical divides in academia between the positivist and interpretivist paradigms. The positivist philosophy postulates that reality is stable; it can be observed and can be described from a single point of view (Creswell, 2002).

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That is, reality is objective, definite and can be known through empiricism. Positivist philosophers also believe that reality can be explained in rational terms as people are rational beings (Denzin, 2012).

The thesis adopted a method philosophical approach using both the positivist and interpretivist philosophies. Two objectives of this research adhere to the positive philosophy. Objective one, which is based on land cover change for this thesis postulates that land cover, as a phenomenon, can be measured logically and objectively through remote sensing techniques. In this regard, any person using the same process will arrive at the same results without any subjectivity in the outcome. Secondly, the research also depends on the rationality argument of positivist philosophers that people are rational. Per this argument, this thesis depends on people's objective notion about effects of landscape change: change in land cover and culture. However, Babbie (2010) states that people do not always act rationally and that, reality, cannot be singular but plural. This leads the study to adopt the interpretivist school of thought to make up for the weaknesses in positivism.

Interpretivists are of the view that reality is subjective depending on the lens (person) looking at it (Gratton & Jones, 2010). This philosophy was adopted by this thesis because not all the objectives of this study can be explained from the positivist orientation. In terms of what constitute culture change, it can be envisaged differently by different people like government officials, traditional rulers, indigenes (per age, sex, formal education and status in society). Of this, Schwandt (2014) claims that interpretivists believe reality should rather be interpreted through the meanings that people give to their world.

It can be concluded that each of the philosophies (positivist and interpretivist) complements each other's weakness. Based on this, this study can be said to fall in the pragmatist domain. Saunders, Lewis and Thornhill (2012) suggest that pragmatism may adopt multiple philosophies because they are more concerned with finding philosophies which allow them to undertake effective research. To the pragmatist, positivism or interpretism is either an end or a continuum (Saunders, Lewis, & Thornhill, 2012).

Per the mixed adoption of philosophies, the study further mixed the research designs. The study adopted the survey and ethnographic research strategy as a follow up of the two research philosophies (positivist and interpretist) adopted. By using a survey design, the research takes two approaches in survey studies into consideration; that is, cross-sectional and longitudinal survey, specifically, the trend analysis. Longitudinal (trend analysis) design follows the same sample over time and makes repeated observations (Creswell, 2002). This makes it possible to study a phenomenon at regular intervals, identify changes over time and explain them in relation to other variables (Frankfort-Nachmias & Nachmias, 2007). In the study of land cover change the study adopted the longitudinal survey as it allowed the study of land cover change in Greater Accra from 1987 to 2017.

In addition, the cross-sectional survey was also chosen as a in this research because of objectives two, three and four. They try to describe causes of changes in land cover, sacred lands and cultural practices from respondents' perspective. Cuthill (2002) asserted that cross-sectional study design is employed when the researcher is concerned with understanding and gaining insight into the concept under study. In a cross-sectional survey, information is

collected at just one point in time and it can last for days to several months (Fraenkel, Wallen & Hyun, 2012). It is employed when the population is known and sample frame, easily drawn. This design, also, fitted the theme of the thesis as indigenes were sampled from Ga/Dangme traditional communities using Ghana Statistical Service 2010 population figures.

The ethnographic part of the research looked at studying culture change of the Ga/Dangme through observation, interviews and participation. Also the thesis gave more credence to the ethnographic work as results from the interviews and observation which served as the foundation for the development of questionnaires. Ethnography offers one of the best exploratory research approach (Creswell, 2002) in the study of indigenous cultures hence its adoption in the study of the Ga/Dangme culture.

The type of mixed method employed was the sequential exploratory method. This approach was adopted to first understand qualitatively the issue of land cover and culture change through in-depth and focus group discussions with selected indigenes, traditional priests, traditional rulers and heads of government institutions. The results from the qualitative analysis provided the foundation for the development of questionnaires for the quantitative data collection and analysis. Quantitatively, the research used the method of maximum likelihood classification scheme to empirically measure the land cover change. Also, the themes from the qualitative data analysed helped developed questionnaires used in the survey for regression models and descriptive statistics.

Target population

The population for this study were indigenes (Ga/Dangme) of Greater Accra Region who stay in traditional communities. The reason for the choice of indigenes residing in traditional communities was the likelihood that they had their daily cultural activities built around the immediate land cover. It was more probable that Ga/Dangme staying outside traditional communities lose touch with their ancestral and cultural roots which make it difficult for them to be the stewards of the Ga/Dangme's culture as compared with indigenes staying in traditional communities. The targeted population was further limited to household heads who were indigenes and resided in traditional communities because of the nature of the questions posed. Also the study targeted, Ga/Dangme traditional chiefs and priests. In addition, physical planners in Greater Accra Region were targeted for this study.

Sample size estimation

In estimating the sample of respondents to interview for the study, the research adopted the sample estimation formula by Dusick (2014) for a finite population.

$$SSf = SS / (1 + \frac{(SS - 1)}{N})$$

SSf= Adjusted sample size   N = Accessible population

SS = Sample size

$$SS = \frac{Z^2 * (p) * (1 - p)}{C^2}$$

Z = Z value (margin of error is set at 1.96 for 95% confidence level)

p = percentage picking a choice, expressed as decimal (0.5 used for sample size needed)   C = confidence interval, expressed as decimal (e.g., .03 = ±3)

$$SS = \frac{1.96^2 * (0.5) * (1 - 0.5)}{0.03^2}$$

$$SS = 1067.11$$

Substituting the finite population of 22,887 household heads in the four sampled communities (Ga Mashie 12,905; Prampram, 3,602; Teshie Maame, 3,297 and Dodowa, 3,083 household heads) (Ghana Statistical Service, 2010).

$$SSf = 1067.11 / (1 + \frac{(1067.11 - 1)}{22887})$$

$$SSf = 1020$$

The total sample for this study based on the functions was 1020 household heads.

Sampling procedure

Sampling of respondents for quantitative data collection and analysis was based on multi stage approach. In order to get to respondents to be sampled, the first approach was cluster sampling to select two persons in Ga's and Dangme's groups. Two traditional council areas were selected from each of the Ga and Dangme groups randomly. Traditional councils within the cluster Ga's were the Ga Traditional Council, Osu Traditional Council, La Traditional Council, Teshie-Nungua (Ledzokuku Krowor) Traditional Council and Tema Traditional Council. At the Dangme side the councils were Ningo-Prampram Traditional Council, Shai Traditional Council and Ada Traditional Council. The simple random technique helped in the selection of Ga Traditional council and Teshie-Nungua (Ledzokuku Krowor) from the Ga group while Ningo-

Prampram Traditional Council and Shai Traditional Council were selected from the Dangme group.

Furthermore, purposive sampling was employed to select the seat of the traditional community to be visited within the selected traditional councils. In Ga and Shai Traditional councils, Ga Mashie and Dodowa were selected respectively. However, Teshie-Nungua (Ledzokuku Krowor) and Ningo-Prampram Traditional Councils each had two indigenous traditional communities as the names suggest. Simple random sampling was used to select Teshie Maame and Prampram. As traditional seats in the traditional areas, these communities have most of the cultural heritages which served as a reference to measure landscape change. In addition, the selected communities house the custodians of the Ga-Dangme culture. Lastly, the selected communities were areas where most Ga/Dangme traditional activities are held.

Proportional allocation was used to allocate respondents (household heads) to be visited within each selected community. Using, Ghana Statistical Service (2010) records, the number of household heads in these selected communities were 22, 887, Ga Mashie having 12,905; Prampram, 3,602; Teshie Maame, 3,297 and Dodowa, 3,083 household heads. The sample size (1020) was initially proportionally allocated to the four selected communities; Ga Mashie was allocated 575, Prampram (161), Teshie Maame (147) and Dodowa (137).

The proportional allocation, however meant that the possible data to be collected was going to be highly skewed towards Ga Mashie which would hinder effective comparison with other traditional communities. The skewness of the expected data also meant analysis would be bias to one community. This

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necessitated for a more appropriate method of equal allocation. Hence each community was allocated 255 household heads to be interviewed. Lastly, systemic sampling was used within the community with the community centre as a reference. Every thirteenth house for Ga Mashie and Dodowa, sixth for Prampram and twelfth for Teshie Maame was sampled in a serpent like order from which a household head was sampled. The nth figures for systematic sampling was arrived by using the number of houses in the community divided by the allocated sample size (255).

For the qualitative study, purposive sampling technique was adopted for sampling persons with in-depth knowledge for the qualitative data collection. The study purposively selected one traditional priests from each of the four selected communities (thus 4 traditional priests) but on the field five priests were interviewed. In Ga Mashie, the Naa Wolomo who was the chief priest was selected and also the Korle Wolomo was selected because he was directed in charge of the Korle Lagoon and wetland. In Teshie, the chief Wolomo who also doubles as the Adjei Kwanko of Teshie was selected. In Dodowa, the Asafoatse Djaney Odonkon who was in charge of protection and rituals in the Dodowa forest was selected. Four groups of people (Males aged 48+, Females aged 48+, male youth-below 32 and female youth-below 32), and each group consisting of 6 people were used for focus group discussions to understand how each generation appreciates the landscape, its changes and sustainability. Heads of traditional councils or representatives in the four selected traditional councils were also selected. Lastly heads of government Land Use and Spatial Planning Authority at the selected administrative areas were interviewed.

Data collection instruments

Focus group discussions (FGDs)

Fifteen separate focus group discussions were conducted within the four selected communities (Ga Mashie, Teshie Maame, Dodowa and Prampram) with the help of FGD guide. One group had people who were 48years and over and who had lived within the community around the year 1987. This group consists of people who would have been in their teens or thirties in 1987 which was the data point for land cover change analysis. Also, persons in this group were more likely to have some historical knowledge of the changes in culture and scared lands. The 48years and over age cohort was further divided into male and female groups.

The other groups were the youth (18 to 32 years), male and female. The youth group was chosen to compare and contrast how the younger generation envisage their land cover and culture with their changes. A maximum number of 6 people were engaged for each focus group discussion. Questions in the FGD (Appendix A, B and C) were on their (groups) knowledge about the land cover in their areas, what benefits they derived from the land cover, changes in the land, changes in the culture they have witnessed and how to help sustain both the culture and land cover.

In-depth interview guide

In-depth interviews were conducted to complement the results from focus group discussions. In-depth interviews were conducted with three traditional council representative, six traditional priests and two metro/municipal/district Spatial Planning and Land Use Authority Officers.

Interview guides were used to inform the questioning of these key informants. Questions ranged from causes of land cover change and culture to impacts of land cover change on culture as well as ecosystem services provision by landscape in the past and present. Measures adopted to protect land cover and culture were discussed in terms of success, failures and lessons learnt. The use of focus group discussions and in-depth interview is in line with the interpretivist philosophers' view of ascribing meanings to social phenomenon adopted by the study.

Interview schedule (Cross-sectional)

Interview schedule was developed from literature reviewed and also complemented the data from focus group discussions and in-depth interviews. Data for objectives two, three, and four were obtained from the interview schedule. The use of interview schedule was in line with cross sectional survey which solicit data from respondents at a specific time. Interviews involved orally administering questions while the research assistants ticks or writes the responses. This method was adopted over the use of self-administered interview schedules as not all respondents within the sample population were literate. This was also to ensure that the meaning of each question was communicated same across all respondents.

The first theme was about socio-demographic information of the respondents and their households (Appendix D). The second theme concentrated on land cover types, causes of land cover and culture change in the study area. Theme three was on effects of land cover and culture change while theme four asked questions on people's involvement and participation in

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cultural activities. The last theme sought respondents' opinions on how to protect the culture of the Ga/Dangme from change.

The interview schedule was designed electronically on the Kobotoolbox platform of the Harvard Humanitarian Initiative and Brigham Women's Hospital but deployed using smart devices (Tablets and smartphones). The advantage of this platform over paper deployment is the built-in check systems which automatically cleans the data. Furthermore, once data was collected, data entry issues did not exist as one's responses were entered onto smart phones/tablets and an excel sheet of all responses, generated on the platform.

Navigation System device (Global Positioning System-GPS)

Field mapping was done by the use of a global positioning system device. Tremble Juno SD. The GPS device was to map the location of land cover types as training samples for land cover classification. These training samples helped to improve the accuracy level of image classification. In addition, training samples were generated from the 2017 classified image and loaded on the GPS device to be verified on the field (a post classification technique to ascertain how accurately the classes created conform to the reality on the ground).

Remote sensed images

Objective one of this research required the use of satellite images. Landsat satellite images of Greater Accra Region, thus, downloaded from the United States Geological Surveys (USGS) depository through Earthexplorer website (www. Earthexplorer.usgs.gov). Images downloaded were 1987, 1993,

2005 and 2017 using a simple query of date of interest and location (path 193, row 56). The research settled on these years because of excessive clouds and line dropouts within other images for most of the years. The image for 1987 was from Landsat 4 bands all having four bands; Band 1 (visible, green-0.5-0.6um) to Band 4 (Near Infrared, 0.8-1.1um). Both images had less than 10% clouds cover to limit image classification. Images for 1993 and 2005 were from Landsat 5 multispectral and thematic mapper while 2017 image was captured by Landsat 8 in January. Having 11 bands from Band 1 (Coastal, 0.43-0.45um) to Band 11 (Thermal Infrared, 11.5-12.51), the resolution for all the images were 30meters.

The resolution was high for urban areas as the urban landscape can have different covers with smaller resolutions than 30. However, such differences have a little effect on the outcome as the classification scheme of FAO (2015) is more generalised, hence allows the scheme to filter such problems on its own. Besides, in areas where sharp changes can occur at 30m, the study acknowledges the defect but relies on the accuracy assessment of classified images.

Policy documents sourced

Objective six of the research (review of policy documents on landscape sustainability through cultural sustainability) required the review of various policies. Policy documents of certain agencies in Ghana were, therefore, collected. They include: policy document of Spatial Planning and Land Use Authority, Land policy (Lands Commission) Environmental Act

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(Environmental Protection Agency) and Cultural Policy (National Commission for Culture).

Data collection methods

Discussions (In-depth interview and Focus group discussions)

Focus group discussions were conducted in each of the four communities. In Ga Mashie, the open space used was close to the Community Research Centre while in Teshie Maame, Dodowa and Prampram, the Municipal and district offices were used. These locations were within the community; hence, not too far from respondents house and not so close to attract persons not selected for the discussion. Each focus group discussion lasted for a minimum of 40 minutes and maximum of 80 minutes under the stewardship of a research assistant with the researcher supervising. Though present, the researcher did not steer the discussions because of a language gap but recorded all conversations. Discussions with officials from NADMO and Environmental Protection Agency as well as Traditional Council Representatives and Planners in the three communities were facilitated by the researcher.

Key Informant Interview (Interview schedule)

Data collection procedures varied according to the data collection instrument and techniques employed. Personal interview was used to administer the interview schedule to help answer objective 2, 3, 4 and 5. Data collection started from 15th March, 2018 to 24th May 2018. The researcher employed the service of 16 research assistants who were very fluent in Ga and Dangme dialects. They were trained for two days. Day one was used to go through the

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interview schedule, to understand and familiarise with the contents while day two was for pretesting the interview schedule. For the pretesting, research assistants were made to interview five people in the communities.

Remote sensed data and policy documents

Satellite images of the study area were downloaded from the USGS Earthexplorer website (http://earthexplorer.usgs.gov/). The site allowed download after a user subscribes by creating a user account and password and by also indicating what the data was to be used for. Downloaded image was the Landsat Level One images as they have been processed for noise and geometrical position accuracy. Also, a digital terrain model of the study areas was downloaded to help in the regression analysis of factors affecting land cover change. The images were downloaded on 10th November 2017. The average file size of the images was between 600MB to 1GB, all in Tagged Image File Format (Tiff). The projection for the images was the World Geodetic System (WGS) 1984 Universal Transverse Mercator (UTM) Zone 30 North.

In addition, policy documents of agencies whose heads were interviewed were sourced through internet download and collection from agencies resource persons this was to help answer objective 6. Land policy on land use and management was collected from the Spatial Planning and Land Use Authority in the Greater Accra regional office. All documents were catalogued and saved onto the researcher's cloud storage to help safeguard it from being corrupted and deleted.

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Data processing and analysis

Land cover change analysis

Analysis of objective one was spatial and non-spatial basis. Landsat satellite images were processed for geometric and atmospheric corrections. Geometric corrections dealt with checking the data fit to the study area. The image was overlaid on other vector layers to check how they will overlay without shifts. Using metadata accompanying the downloaded images, haze and correction were performed to clean the data for analysis. Later, the images were subsetted (clipped) to the regional boundary of Greater Accra to enable effective classification as the images covered areas spanning Akosombo to Winneba.

Classification looked at assigning classes to digital numbers of images as different features emit different reflectance (digital values). The classification method used for this analysis was based on a maximum likelihood method using Erdas 12. The rationale behind maximum likelihood classification is that pixel values are normally distributed by calculating the probability of a given pixel belonging to a specific class. The function of maximum likelihood was,

$$Gi(x) = \ln p(w_i) - \frac{1}{2}\ln|\sum i| - \frac{1}{2}(x - m_i)^T \sum i^{-1}(x - m_i)$$

where:

i = the ith class, x = n-dimensional data (where n is the number of bands).

p(ωi) = probability that a class occurs in the image and is assumed the same for all classes.

|Σi| = determinant of the covariance matrix of the data in a class

Σi-1 = the inverse of the covariance matrix of a class, mi = mean vector of a class

The maximum likelihood classifier produces more accurate results than any other method of classification; however, it takes a longer time to generate results due to extra computations (Jensen, Christensen, Ellis, & Jensen 2009). It is more accurate because it assumes that classes in the input data have a Gaussian distribution and that signatures were well selected; but, this is not always the case (Jensen, Christensen, Ellis & Jensen 2009).

The process involved unsupervised classification of the images into 200 classes using the ERDAS 2013 software. This was to allow the computer to partition the digital numbers of the surface reflectance into many groups or clusters. The groupings were further merged into eight land cover classes per FAO (2000) classification scheme. Responses of interviewees were also described to know how people's notions of their surrounding land cover differed from remote sensed image. It was also done to either confirm or dispute classed results from the images. The overlay analysis was based on "combinatorial or" extracted difference in land cover classified for the various years. This process was repeated for the different images by pairing one land cover year against the other. Change (area of old land cover – area of new land cover) results were displayed in maps and tables.

In addition to the change in cover analysis, land cover fragmentation was undertaken with the help of FRAGSTAT (Spatial Pattern Analysis Program for Categorical Maps) softwate. In fragstat, a landscape metrics generated were landscape patch index (LPI), shape; perimeter-area fractal dimension (PAFRAC) and configuration; percentage of like adjacencies (PLADJ) indices. Largest patch index (LPI), equals the area (m^2) of the largest patch of the corresponding patch type divided by total landscape area (m^2), multiplied by

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100 (to convert to a percentage) (McGarigal. Cushman, Neel, & Ene, 2015). It measures the dominance of a land cover type. PAFRAC equals 2 divided by the slope of regression line obtained by regressing the logarithm of patch area (m2) against the logarithm of patch perimeter (m). That is, 2 divided by the coefficient b1 derived from a least squares regression fit to the following equation: ln(area) = b0 + b1·ln(perim) (McGarigal et al., 2015).

A fractal dimension greater than 1 for a 2-dimensional landscape mosaic indicates a departure from a Euclidean geometry (i.e., an increase in patch shape complexity). Percentage of Like Adjacencies (PLADJ) measures the degree of aggregation of patch types with values close to zero (0) meaning disaggregation in land cover type and values closer to 100 shows aggregation. It is calculated by sum of the number of like adjacencies for each patch type, divided by the total number of cell adjacencies in the landscape; multiplied by 100 (McGarigal et al., 2015)

Exploring changes in cultural practices of the Ga/Dangme

Qualitative and quantitative approaches were used in analysing data for this objective. Descriptive analysis such as frequency and mean was performed for responses on cultural practices (family systems, occupation, dietary, medicine, and traditional governance and passage rites) which are changing. Responses on cultural practices under threat were grouped under frequencies and mean displayed in table. In addition, ordered logistic regression analysis was undertaken to understand what determines the people's knowledge of culture change in their community. Culture change was measured as the summation of responses (No change-0, very low-0.2, low 0.4, moderate-0.6,

high-0.8 and extreme-1) of changes in specific culture practices divided by total number of specific culture practices. The function for the ordered regression was given as;

$$CC_{or} = \beta_0 + \beta_1 A + \beta_2 Sex + \beta_3 Age + \beta_4 MS + \beta_5 RL + \beta_6 FEDU + \beta_7 EMS + \varepsilon_i$$

Where CC_{or} = Culture change

β_0 = constant, $\beta_1 A$ = Area, $\beta_2 Sex$ = Sex, $\beta_3 Age$ = Age $\beta_4 MS$ = Marital status,

$\beta_5 RL$ = Religion $\beta_6 FEDU$ = Formal education $\beta_7 EMS$ = Employment status

and ε_i = standard error.

Data from focus group discussions and in-depth interviews were analysed on themes to complement or debunk descriptive results. Responses were themed using Qualitative Data Miner (QDA). Word frequency was generated from the themed areas. In addition, specific citations from respondents were extracted to give backing to the analysis.

Drivers of landscape (land cover and culture) change

Various analyses were performed for drivers of land cover change and culture change separately. Descriptive analysis of responses on the causes of land cover was generated. Themes from focus group discussions and in-depth interview results created with QDA software were employed to give a qualitative support to the descriptive results. Quotations from these interviews were used to give a voice to the causes.

Ecosystem services from land cover and culture interaction

Ecosystem service and disservice analysis was undertaken using responses on services/disservices they receive from the landscape. The responses were analysed at first, on the individual levels to understand how individual responses differ and what factors influence the responses. All responses of individuals from various ecosystem services were merged to generate a composite individual ecosystem service coefficient with a scale of 0-1 (Values close to 0 means disservices while values close to 1 shows services). Individual coefficients for households in each community were further merged to generate ecosystem coefficient for the entire community. Also the measure of ecosystem services and disservices was done for 30 years ago and now (2018). Respondents who were 48 and above gave responses for 30 years ago while all respondents gave responses for ecosystem services/disservices now.

Culture sustainability of Ga/Dangme

Analysis of culture sustainability of Ga/Dangme culture was performed through indexing. Indexing took the form of creating categories, inputting variables for each category, standardizing the inputs, and re-categorising. Palang et al. (2017) indicators for culture sustainability: heritage, vitality, economic viability, diversity, locality, eco-cultural resilience and eco-cultural education served as the categories. Within the heritage group the study measured the number of heritages in communities, significance and accessibility of these heritages.

On economic viability, indigenes' willingness to spend in their community and also the contribution of tourism on their household income was

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measured from the questionnaire responses. Vitality of culture looked at respondents' sense of belonging, education on indigenous cultural practices and respect for traditional institutions. Diversity measured how the younger generation is allowed to participate in decision making at the community level and the acceptance of other cultures by the Ga/Dangme. Locality, was more on the indigenous nature of indigenous Ga/Dangme culture, with culture change index generated in objective two as a proxy. Eco-cultural resilience looked at rate of change of natural and semi-natural heritages and involvement in management of natural and semi-natural heritages while eco-cultural education considers rank of respondents' education of Ga/Dangme culture by parents and also the teaching of household members.

All these indicators were standardised onto a scale of 0-1. Number closer to 1 means sustainable while closer to zero means less sustainability of culture. The summation of all the indexes from standard data was divided by the number of variables to generate a composite culture sustainability index.

Evaluation of policies for cultural sustainability

In evaluation of policies the study adopted content analysis. Contents within the adopted policies were evaluated based on Patton, Sawicki and Clark (2016) indicators: efficiency, equity, technical feasibility, political viability and administrative operability of the policies and acts in sustaining the Ga/Dangme culture. The researcher read through the policies to deduce the availability of these indicators. Evaluation was highly subjective based on the researchers understanding of the policies and the problem of landscape change derived from field data. Efficiency was evaluated as the direct cost employed by government

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of Ghana to execute the policies and the opportunity cost of policies. Evaluation per equity was based on horizontal equity (equal distribution to all persons), vertical (unequal distribution), transitional (unfair situation by the policy to a group) and lastly intergenerational (consideration of the unborn).

Technical feasibility was evaluated as ex-ante (objectives set) and ex-post (objectives achieved). Consideration of political viability was based on acceptability of the policy by actors or stakeholders, how appropriate the objectives of the policy mesh with values of the society and responsiveness (how targeted group believe the policy will achieve its objective). Administrative operability focused on logistics, staff capacity and cooperation between the agencies.

All these criteria were evaluated based on a likert scale of very low, low, moderate, high and very high in their roles in sustaining the Ga/Dangme culture based on the research understanding and field data. In all these processes, focus group and in-depth interview responses were, also, used to support the details in the documents reviewed.

Ethical issues

Professional codes and laws were introduced in the research to prevent scientific abuses of human lives. There were ethical considerations before and during data collection. These were informed consent, privacy of respondents and data collected and obligation to sponsors of this thesis. All respondents were informed about the purpose of the research, methods of the research and their ability to partake or withdraw from it. Persons in in-depth interviews were given prior notice of about one month to the data collection. The researcher also made

a follow up call to inform participants on the scheduled date of the interview. In relation to privacy in data storage, once the data collection process was completed, all the data was downloaded to the researcher's computer and the cloud data in Kobotoolbox platform was deleted. This was because of recent hacking of data and the use of people's data by computer algorithms for marketing and other purpose.

In addition to these, ethical considerations with respect to obligation to sponsors of this study were adhered to. Deutscher Akademischer Austauschdienst (DAAD) Performing Culture, Development and Sustainability had their focus on culture and sustainable development. As a benefactor (researcher) the topic of the research fitted well within the scope of the scholarship. Also, the researcher followed duration and timelines set by the sponsors in finishing the thesis within stipulated time.

Chapter summary

The entire chapter explained the methodology employed in achieving the objectives of this thesis. It explained the reason for adoption of pragmatist approach by combining positivist and interpretivist philosophy. The design used was the survey design (cross-sectional and longitudinal) and ethnography. The research design was influenced by the research objectives of the study. Culture is a dynamic phenomenon which demands a more qualitative approach since culture involves the meanings given to things which can only be explained subjectively. The researcher therefore conducted in-depth interviews and focus group discussions with 3 chiefs, 5 traditional priests, 2 physical planners, 8 aged groups and 7 youth groups. The responses helped in modifying the interview

schedule where 1020 Ga/Dangme were interviewed from Ga Mashie. Teshie Maame, Prampram and Dodowa after a multistage sampling.

The chapter elaborated on how responses from interview schedule were analysed descriptively and inferentially. Also, pixel classification method of Landsat remote sensed image was discussed and two change analysis techniques of overlay (combinatorial and) and fragmentation explained. Ethics (informed consent, privacy and obligation to sponsors) which informed the study was also explained.

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CHAPTER FIVE

LAND COVER CHANGES IN GREATER ACCRA REGION

Introduction

This chapter presents the results on land cover changes in Greater Accra Region from 1987 to 2017 and the causes of the changes. Results were based on the types of land cover generated from 1987 to 2017 using maximum likelihood classification. The study adopted 1987 as the base year, with 1993, 2005 and 2017 being time periods for the comparison of land cover changes. The results focused on changes that occurred in the land cover types and the fragmentations within the various cover types. Finally, findings from the survey, focus group discussions and interviews on the causes of land cover change in the Greater Accra Region were presented and discussed.

Land cover types within Greater Accra Region from 1987 to 2017

Land cover maps generated for the Greater Accra Region covered four main time periods: 1987, 1993, 2005 and 2017. The land cover types obtained from the reclassification of unsupervised classes using the maximum likelihood classification scheme were nine: Natural and Semi-Natural Terrestrial Vegetation-Open Forest (NSTV-OF), Natural and Semi-Natural Terrestrial Vegetation-Shrubs and Grass (NSTV-SG), Natural and Semi-Natural Aquatic Vegetation (NSAV), Natural and Semi-Natural Waterbodies (NSW), Artificial Waterbodies (AW), Artificial surfaces (AS), Cultivated and Managed Terrestrial Areas (CMTA), Cultivated Aquatic or Regularly Flooded Areas

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(CAFA) and, lastly, Bare Areas (BA). These classes of land cover were in accordance with FAO (2015) land cover classification scheme for Africa.

Table 1: Accuracy assessments of classified images

Land cover (Year)	User accuracy (%)	Producer Accuracy (%)	Overall Accuracy (%)	Kappa (K)
1987	72.1	68.0	66.4	0.7
1993	86.4	73.2	70.1	0.9
2005	84.0	70.1	83.4	0.6
2017	92.1	94.4	83.0	0.9

Source: Osman, 2018

Accuracy assessment generated for the classifications were generally high (Table 1). User accuracy which was a measure for reliability showed high values above 70% with producer ability to sort land cover classes at 68% and above. The statistical test of accuracy (kappa coefficient of agreement), on the other hand, was 0.7. The overall accuracy for the images ranged from 66.4 to 83.4 with 1987 image having the least and 2005 and 2018 having the most. Overall accuracy assessment above 70% and Kappa 0.8 can be classified as good and acceptable (Jensen, 2005; Lillesand, Kiefer, & Chipman, 2015). Despite the low overall accuracy of 1987 classified image, its Kappa of 0.7 is above 0.4 which is considered by Jensen (2005) as moderately good for analysis. Kappa of the classified images closer to 1, signifies that the results were not a random outcome (Nusser & Klass, 2002).

The variation in the accuracy index for the various years was influenced by spectral range of the sensors which captured the images and resolution of the images. The image for 1987 covers a smaller spectral range of 0.5um to 0.9um

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with a spatial resolution of 30meters by 30meters, while that of 2017 covered a wide range of 0.433 um – 12.51um with a resolution of 15meters by 15 meters after layer stacking with panchromatic band (Band 8). The larger the spectral range and smaller spatial resolution, the better different features could be distinguished (Lillesand et al., 2015).

Per the results on land cover, natural and semi-natural terrestrial vegetation-shrubs and grass (NSTV-SG) was the predominant land cover in 1987 (Table 2).

Table 2: Area of land cover classes of Greater Accra Region from 1987 to 2017

	1987		1993		2005		2017	
Land Cover	Km^2	%	Km^2	%	Km^2	%	Km^2	%
AS	160.7	4.3	213.5	5.8	422.9	11.4	1226.4	33.1
AW	21.4	0.6	19.5	0.5	27.6	0.8	25.7	0.7
BA	130.2	3.5	126.5	3.4	126.8	3.4	170.3	4.6
CAFA	2.1	0.1	4.9	0.1	31.8	0.8	29.8	0.8
CMTA	728.8	19.7	741.9	20.0	1284.8	34.7	1103.5	29.8
NSAV	266.1	7.2	250.3	6.8	52.4	1.4	153.6	4.2
NSTV-SG	1616.3	43.6	1792.0	48.4	1647.1	44.8	901.7	24.3
NSTV-OF	673.4	18.2	423.4	11.4	75.2	2.0	23.1	0.6
NSW	104.7	2.8	131.8	3.6	35.2	0.9	69.6	1.8
Total	3703.9	100	3703.9	100	3703.9	100	3703.9	100

Source: Osman, 2018

It covered an area of 1616.25 km^2 (43.6%) in 1987 and 48.4% in 1993 (Table 2). Cultivated and managed terrestrial areas (CMTA) was the second largest cover for 1987 and 1993 while cultivated aquatic or regularly flooded

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areas (CAFA) had the least area of 0.1% in 1987 and 0.1% in 1993. Natural and semi-natural terrestrial vegetation-shrubs and grass (NSTV-SG) still remained the dominant land cover in 2005 but 2017 had artificial surfaces (AS) as the largest land cover with an area size of 1226.35 km^2 (33.1%) (Table 2). The high vegetation cover in 1987 and 1993 showed limited human effects on the land cover. McGranahan and Satterthwaite (2014) stated that where natural and semi-natural land cover is dominant, less anthropogenic effects is witnessed.

Also, in 1987, 1993 and 2005, the natural and semi-natural terrestrial vegetated areas-open forest (NSTV-OF) was located at the extreme north-west with few patches to the extreme south-east and extreme north-east parts of the region (Figure 4 and 5). The good distribution of natural and semi-natural terrestrial vegetation in 1987 and 1993 (Figure 4) reflects the coastal savannah nature of the region. Artificial surfaces were limited to the southwestern part of the region, mainly in Accra and the Tema metropolis as the urban core in 1987 and 1993 with a few patches of artificial surfaces scattered within the region. The eastern part of the region had extensive cultivated managed areas depicting the rural and agriculture orientation of the area and the indegenes (Ga/Dangme). The land cover pattern identified for 1987 and 1993 was consistent with the vegetation map of Ghana (Nabila, 2001).
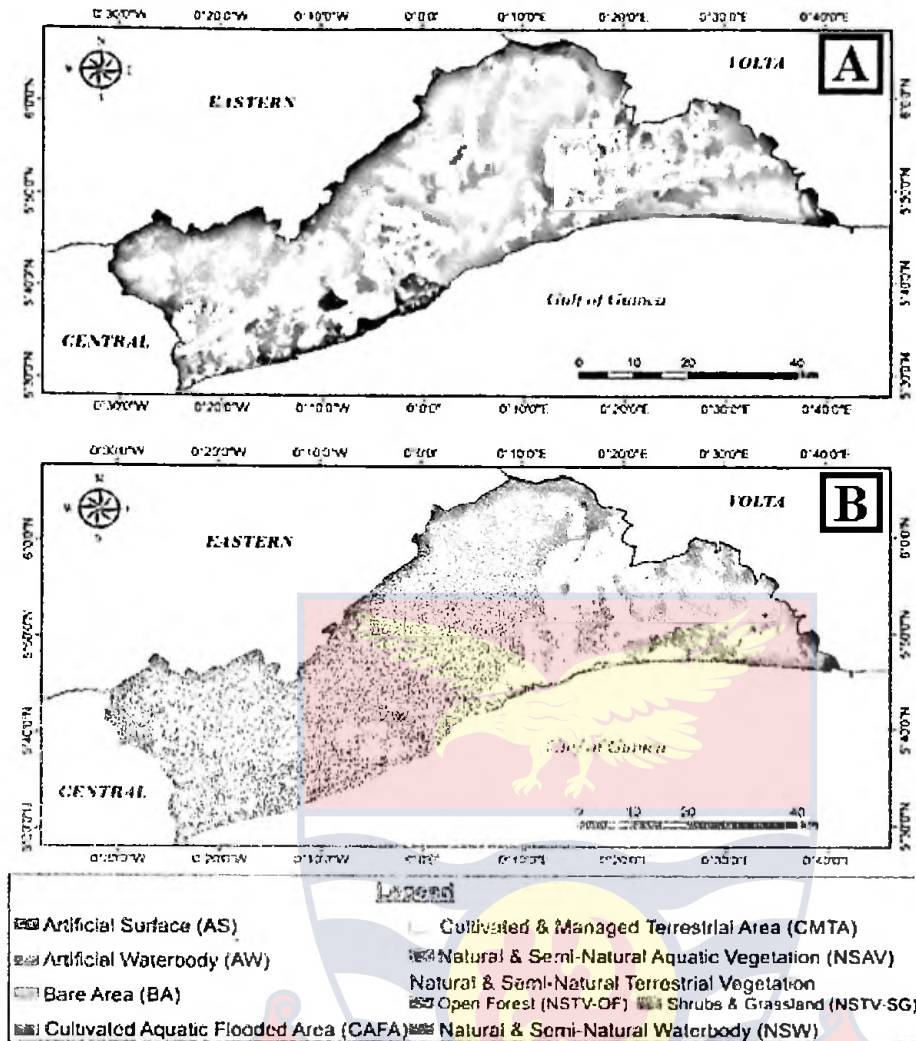
Figure 4: Land cover map of Greater Accra Region for 1987 (A) and 1993 (B)

Source: Osman, 2018

The increase in artificial land cover in 2017 (Figure 5) confirmed other studies by Adade, Nyarko, Aheto and Osei (2017), Amenyo, Mariwah & Osei (2015), Stow Lippitt and Weeks (2010), Tagoe and Mantey (2017) as well as Yeboah, Awotwi, Forkuo and Kumi (2017) that artificial cover was the fasters growing in the region. Comparing 2017 land cover map of this study with results of the United Nations Geological Survey (USGS) (2017) land cover map of Ghana, the study identified contradictions as USGS (2017) claimed that cultivated and managed terrestrial areas were the fastest growing land cover in Ghana.

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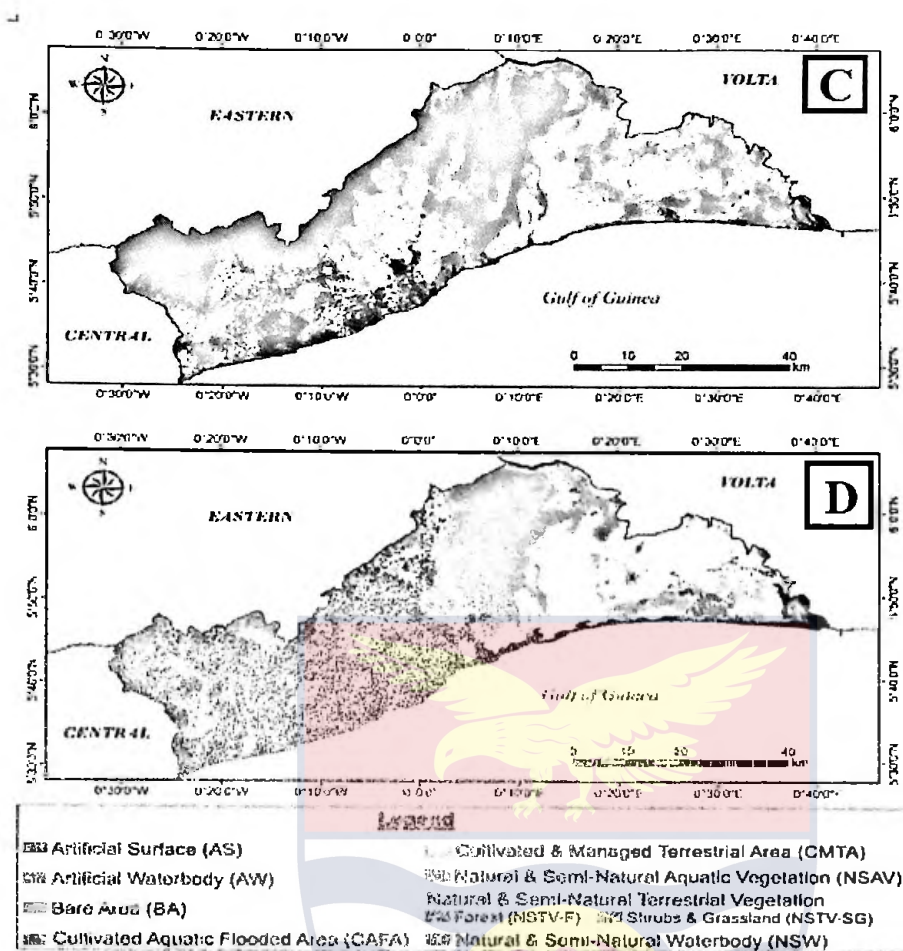
Figure 5: Land cover map of Greater Accra Region, C (2005) and D (2017)

Source: Osman, 2018

This contradiction, nonetheless, was expected and could be attributed to the higher rate of urbanisation of Greater Accra Region compared to other parts of the country. Per Ghana Statistical Service data in 2012 Greater Accra Region the region grew by 103% from 1984 to 2000, 38% from 2000 to 2010 and 20.4% from 2010 to 2018 .

Modelled land cover change in Greater Accra Region from 1987 to 2017

Wilson et al. (2013) espouse that a land cover change model looks at the change in cover types and fragmentation within the land cover. Change in cover types tells the story of how one cover metamorphoses into another cover

type while fragmentation identifies ecological disintegration of various land covers. All land cover types experienced changes in their area sizes either as a gain or loss from 1987 to 2018. The greatest losses in area size were the two natural and semi-natural terrestrial vegetation-shrubs and grass (NSTV-SG) and, natural and semi-natural-open forest (NSTV-OF) (Table 3).

Table 3: Percentage change of land cover in Greater Accra (1987-2017)

Land Cover	1987 (%)	1993 (%)	2005 (%)	2017 (%)	Δ 1987-2017	Annual Δ 1987-2017	Annual area Δ 1987-2017 km²
AS	4.3	5.7	11.4	33.1	28.8	1.0	35.5
AW	0.6	0.5	0.8	0.7	0.1	0.0	0.1
BA	3.5	3.4	3.4	4.6	1.1	0.0	1.3
CAFA	0.1	0.1	0.9	0.8	0.8	0.0	0.9
CMTA	19.7	20.0	34.7	29.8	10.1	0.3	12.5
NSAV	7.2	6.8	1.4	4.2	-3.0	-0.1	-3.8
NSTV-SG	43.6	48.4	44.5	24.3	-19.3	-0.6	-23.8
NSTV-OF	18.2	11.4	2.0	0.6	-17.6	-0.6	-21.7
NSW	2.8	3.6	0.9	1.8	-1.0	-0.1	-1.2
Total	100	100	100	100			

Source: Osman, 2018

Annually, natural and semi-natural terrestrial vegetation-shrubs and grass (NSTV-SG) reduced in size by 23.8km² while natural and semi-natural-open forest (NSTV-OF) shranked by 21.7km² (Table 3). The land cover with the least annual loss was natural and semi-natural waterbodies (NSW) which reduced by 0.1% with an annual decrease of 1.2km² in the area size. The rapid

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decrease in natural and semi-natural vegetation was likely due to the ease with which shrub lands were cleared. Tayyebi (2013) attests to the fact that coastal vegetation is mostly shrubs and mangrove, making them prone to change.

The low rate of change of natural and semi-natural waterbodies, on the other hand, could be attributed to the hedge created by the natural and semi-natural aquatic vegetation around it which tends to change first. The effects of the depletion of the natural and semi-natural aquatic vegetation around the Korle and Lalu lagoons were the sedimentation and easy flow of pollutants which made the lagoons ecologically unproductive. Abugri (2016), Andoh (2016) and Nixon et al. (2007) found high levels of ammonia, nitrite and dissolved phosphate that exceed the United Nations' acceptable limits in Korle and other natural and semi-natural waterbodies in the Greater Accra Region.

The sedimentation of natural and semi-natural waterbodies (NSW) also induced the rate of flooding in the region as it made the waterbodies shallow, thus, reducing their water carrying capacity. Culturally, natural and semi-natural aquatic vegetation (NSAV) and natural and semi-natural waterbodies (NSW) are envisaged as the abode of gods by the Ga/Dangme. Consequently, if their degradation is not checked, the Ga/Dangme culture will lose this cultural heritage and identity.

While natural and semi-natural land covers decreased in area size, artificial surfaces gained by about 14% of the area size of natural and semi-natural terrestrial vegetation-shrubs and grass (Figure 6). They also gained 7.8% of natural and semi-natural terrestrial vegetation areas-open forest (NSTV-OF) and 5.6% of cultivated and managed terrestrial areas. The annual growth rate of artificial surfaces (AS) was 1% with an annual growth of 35. 5km^2 in area.

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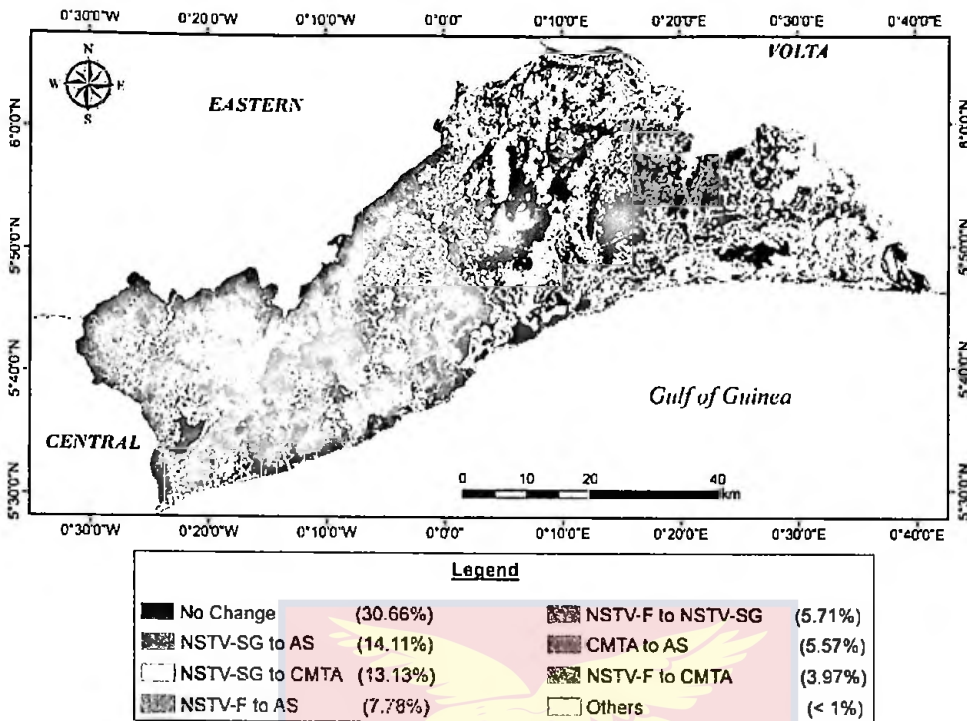
Figure 6: A spatial pattern of land cover change of Greater Accra from 1987 to 2017

Source: Osman, 2018

The increasing artificial surfaces made land cover change an important study because of the effects it has on the ecological integrity of the region and the repercussion of disasters. Asumadu-Sarkodie et al. (2015) and Appeaning-Addo et al. (2013) assert that increasing flood disasters is linked to the increase in artificial surfaces largely because artificial surfaces block rainwater from percolating into underground aquifers while speeding their flow. Another anthropogenic land cover which had gained in area size was cultivated and managed terrestrial areas. It gained in area size by absorbing 13.1% of NSVT-SG and 3.9% of NSVT-OF (Figure 6 and Table 3). Cultivated and managed terrestrial areas had an annual growth rate of 0.3% with an annual areal increase of 12.5km². The growth of cultivated and managed terrestrial areas was spatially inclined to the eastern part of the region, mostly the rural areas. Lastly, 30.7% of the area did not change in their initial land cover type between 1987 and 2017

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as they maintained their original land cover type of 1987 (Figure 6). At the administrative areas of Ga Mashie, Teshie Maame, Prampram and Dodowa; that is, Shai Osudoku, Ningo/Prampram, Ledzekuku Krowor Municipality and Accra Metropolis. Artificial surfaces were still the rapid growing land cover. Ledzekuku Krowor experienced the greatest increase in artificial surfaces (AS) with a 58.8% increase followed by Accra Metropolis 28.9% (Table 4).

Table 4: Land cover change at selected administrative areas from 1987 to 2017

	Dangme						Ga	
	Shia Osudoku (970.57km²)		Ningo Prampram (623.64km²)		Ledzokuku Krowor Municipal (47.67km²)		Accra Metropolis (139.93km²)	
Land Cover	1987	2017	1987	2017	1987	2017	1987	2017
AS	3.1	9.9	2.2	20.1	30.4	89.2	52.0	80.93
AW	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
BA	13.4	2.6	0.0	8.9	0.0	0.0	0.0	0.0
CAFA	1.3	4.1	0.0	0.1	0.0	0.0	0.0	0.0
CMTA	6.8	33.1	42.5	43.4	38.9	1.5	3.4	4.6
NSAV	2.9	0.2	10.8	3.8	1.5	0.8	1.5	0.8
NSTV-SG	53.0	48.4	41.9	22.3	28.9	8.4	39.9	12.1
NSTV-OF	17.3	0.7	1.5	0.1	0.0	0.1	2.9	1.4
NSW	2.0	0.8	1.1	1.2	0.2	0.0	0.2	0.1
Total	100	100	100	100	100	100	100	100

Source: Osman, 2018

Respondents' perception of changes in land cover types also confirmed the remotely sensed image classification as respondents perceived artificial surfaces to have grown by about 71% from 1987 to 2017 in the administrative areas (Figure 7).
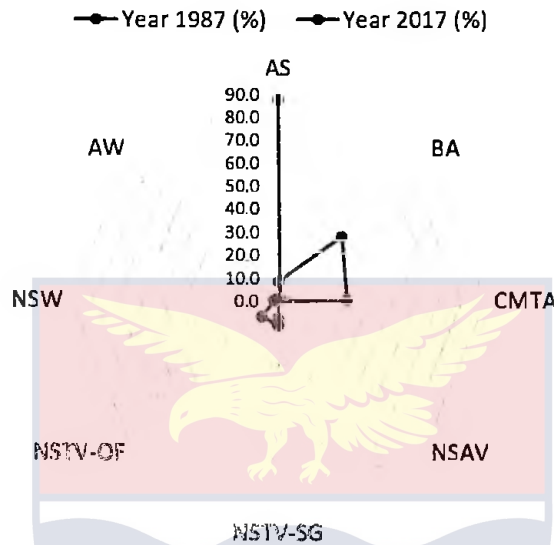
Figure 7: Respondents' perception of land cover change from 1987 to 2017
Source: Osman, 2018

Ledzekuku Krowor experienced the greatest increase of AS (58.8%) followed by the Accra Metropolis with 28.91% (Table 4). The Municipal Physical Planner of Ledzekuku Krowor Municipality (LEKMA) attested to the rapid AS growth in her municipality:

> *LEKMA is almost full, the rate of growth (AS) is faster than other areas because Accra is "choked", people are moving here. It is also because we are close to Accra and Tema. This administrative area* (Ledzekuku Krowor Municipality) *is now even choked; people are beginning to move towards Amasaman* [Interview: Physical Planner for LEKMA, 4th March, 2018].

LEKMA's growth could be attributed to its closeness to TMA and AMA which made it possible for urban folks to commute easily to work in the metropolis. Also, the cost of housing and land was more likely to be lower as compared to the central nodes (TMA and AMA) in the region. Currently, LEKMA's growth has even reached an optimal level as the Physical Planner claimed people were moving to other areas. However, the problem was not with the space reaching an optimal level but the issue of the unstructured nature of physical development.

Cultivated managed terrestrial areas (CMTA) was the fourth dominant land cover type for the Shai Osudoku District in 1987 but it became the most dominant land cover in 2017 as its area of 6.8% increased to 33.1% from 1987 to 2017. Meanwhile, natural and semi-natural waterbodies, decreased across AMA and Shai Osudoku District but gained a little of 0.1% at Ningo-Prampram District largely because of the districts rural nature and less human effect. Artificial water (AW) and bare area (BA) were largely absent within the Ledzokuku Krowor Municipality and Accra Metropolis.

The second part of land cover change analysed was the fragmentation within the various land cover types mapped. Fragmentation helps in understanding the ecological functionality and health of natural and semi-natural land cover (McGarigal et al., 2015). The fragmentation indices generated were the landscape patch index (LPI), shape, perimeter-area fractal dimension (PAFRAC), configuration and percentage of like adjacencies (PLADJ) indices. Landscape patch index (LPI) looked at the dominance of a land cover type; PAFRAC, the aggregation of land cover types and PLADJ, assessing patch shape complexity.

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The land cover which was lost in terms of LPI from 1987 to 2017 included artificial water (AW), bare areas (BA), cultivated aquatic flooded areas (CAFA), natural and semi-natural aquatic vegetation (NSAV), natural and semi-natural terrestrial vegetation-shrubs and grass (NSTV-SG) and, natural and semi-natural terrestrial vegetation-open forest NSAV-OF. Covers such as artificial surfaces (AS), cultivated and managed terrestrial areas (CMTA) and natural and semi-natural waterbodies (NSW), however, gained. The largest patch index (LPI) for natural and semi-natural terrestrial vegetation-shrubs and grass (NSTV-SG) reduced significantly by 20.1% while artificial surfaces (AS) gained by 24.9% (Table 5).

Table 5: Fragmentation of land cover in Greater Accra from 1987 to 2017

Land Cover	$0 < LPI \leqq 100$			$1 \leqq PAFRAC \leqq 2$			$0 \leqq PLADJ \leqq 100$		
	1987	2017	Δ	1987	2017	Δ	1987	2017	Δ
AS	1.9	26.8	24.9	1.3	1.4	0.1	91.6	92.1	0.5
AW	0.4	0.1	-0.3	1.1	1.2	0.1	90.1	68.4	-21.7
BA	0.6	0.3	-0.3	1.3	1.4	0.1	94.6	77.6	-17.0
CAFA	0.1	0.1	0.0	1.3	1.4	0.1	89.2	76.1	-13.1
CMTA	10.3	15.6	5.3	1.3	1.5	0.2	92.9	88.3	-4.6
NSAV	1.6	0.6	-1.0	1.4	1.4	0.0	90.1	96.1	6.0
NSTV-SG	33.3	13.2	-20.1	1.3	1.4	0.1	92.3	88.5	-3.8
NSTV-OF	14.2	0.0	-14.2	1.4	1.4	0.0	93.6	77.5	-16.1
NSW	0.8	1.5	0.7	1.3	1.3	0.0	94.9	84.3	-10.6

Source: Osman, 2018

Cultivated aquatic flooded area (CAFA) (0.1) had the least LPI in 1987 but was overtaken by natural and semi-natural terrestrial vegetation-open forest (NSTV-OF) which reduced from 14.2 in 1987 to 0.0 in 2017.

The decreasing LPI of natural and semi-natural terrestrial vegetation clearly indicated that their ecological integrity was at risk. It suggested that the allowable space for the movement of animals in the region was decreasing. The rising LPI of anthropogenic covers gave the notion of agglomeration of artificial surfaces in the region. It also explained how peripheral settlements were being absorbed into the core of the region which gave a large area of mobility to people. Communities such as Kpone, Prampram, Afienya, Abokobi, Amasaman, Ofankor, etc. had all become part of the Greater Accra Metropolitan Area which previously were limited to AMA and TMA only.

In terms of the shape index changes, PAFRAC was positive for all the various land cover types from 1987 to 2017. The positive values of PAFRAC explained that land cover types were keeping their complex natural shape of being more fractal. Ripple, Bradshaw and Spies (1991) espouse that the shape of nature is fractal hence the results of PAFRAC for the natural and semi-natural areas is good. Unfortunately, artificial surfaces and cultivated and managed terrestrial areas also had high PAFRAC which gave an indication of complex natural shape. Complex natural shapes based on fractality were of natural features, not anthropogenic features (Couclelis, 1992). This statistically explained the unstructured nature of development in the region as human's physical developments tend to have straight and well defined geometric shapes measured as Euclidean geometry, not fractal.

The last index on fragmentation looked at the connectivity between patches of a specific land cover. Only artificial surfaces (AS) and, natural and semi-natural and semi-natural terrestrial vegetation-shrubs and grass (NSTV-SG) gained in terms of PLADJ. That artificial surfaces (AS) gained in terms of

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PLADJ could be attributed to the increasing LPI associated with rapid physical developments of various peripheral communities and also various road networks built to connect communities. Greater Accra Region had witnessed huge physical road infrastructural developments to link the region with its neighbouring regions. These roads included the Accra-Kasoa, Accra-Aflao, Accra-Nkawkaw, Accra-Madina-Aburi and Accra-Madina-Dodowa roads. These roads also help improve flow and connectivity within the region.

Losses in PLADJ by the natural and semi-natural terrestrial vegetation-open forest indicate strongly that the flow between its patches was minimal since the patches were dispersed. Henle et al. (2004) claim that a dispersed patch affects the integrity of population growth of species. This could explain the vast decrease in animal population in the region because animal species flourish when they have large patch sizes which are connected.

Causes of land cover change in the Greater Accra Region from 1987 to 2017

Responses on causes of land cover change in Greater Accra from 1987 to 2017 were obtained from in-depth interviews, focus group discussions and survey.

The main themes gathered from interviews and focus group discussions on causes of land cover change were population growth, formal government policies, traditional governance disputes, corruption, change in technology and natural factors (Figure 8).
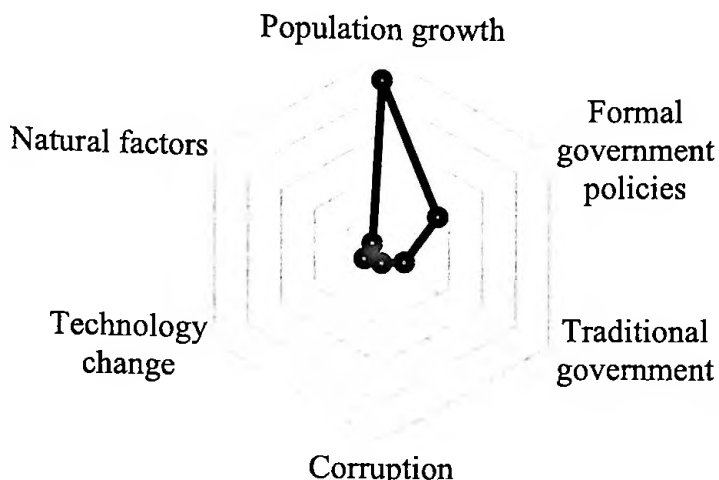
Figure 8: Causes of land cover change from interviews and focus group discussions

Source: Osman, 2018

Responses from household heads were also inclined towards population growth (55.3%) followed by formal government policies (21.3%), traditional government (8.4%), and corruption (4.7%) (Table 6).

Table 6: Level of influence of causes of land cover change from 1987 to 2017

Causes	Influence (%)				Total (%)
	Extreme	High	Somewhat	Slightly	
Population growth	19.5	29.4	4.4	2.0	55.3
Formal government	7.8	8.1	2.2	3.1	21.3
Traditional government	5.4	1.5	1.0	0.7	8.6
Corruption	2.5	1.0	0.9	0.3	4.7
Technology change	0.7	3.4	1.6	0.9	6.6
Natural factors	0.5	2.0	0.6	0.4	3.5
Total (%)	36.5	45.4	10.8	7.3	100

Source: Osman, 2018

The causes of land cover change in Greater Accra Region, as indicated by respondents, confirm studies by the USGS (2017), FAO (2015), Mhawish and

Saba (2016), McGranahan et al. (2014), Lambin and Geist (2008) and Redman (1999) who ascribe the main causes of land cover change to anthropogenic factors.

The predominant cause identified from the FGDs and interviews was population growth. A member of a male youth focus group in Dodowa explained the influence of population growth on land cover change as:

The rate at which the population is growing also demands that people build more houses to accommodate the populace; hence, the change in the land cover of the Dodowa traditional area [FGD: A Male Youth, Dodowa, 14th April, 2018].

Another male member of the aged focus group in Dodowa claimed:

For instance, right now people are building houses and this has enlarged the town in terms of its spatial extent. Now Dodowa is no longer a farming land but a developed area for building purposes [FGD: Male Aged, Dodowo-12th April, 2018].

Ghana Statistical Service (2010) attest to population increases in Greater Accra Region as population in the region increased from about 2.9million to 4.01million from 2000 to 2010. Results from studies conducted by Polyakov and Zhang (2008) in United States, Mhawish and Saba (2016) in Jordan, Mundhe and Jaybhaye (2014) in India, Ouedraogo et al. (2009) in Burkina Faso, etc. also attest to the fact that as population increases in their respective study areas, a greater part of natural and semi-natural areas (NSVA-SG, NSVA-OF, NSW, NSAV) also changed to artificial surfaces (AS). The population growth explanation of changes in land cover in Greater Accra fitted the Malthusian and Neo-Malthusian concepts shared by Malthus (1798), Lambin and Geist (2008),

Gopal et al. (2016) and FAO (2015). They hold that as population increases, stress on natural and semi-natural areas will increase because the populace will convert them into housing areas and farms to support themselves.

Carr (1997) explains that the population growth of the region is also influenced by the economic and infrastructure developments which attract migrants from all parts of the country. Greater Accra Region houses heads of almost all government institutions, commercial banks and industries which work as a pull factor for migration and population growth. The region has high-income levels and high demand which also serve as leverage for capital investment in real estates by companies like Regimanuel Estates, Manent, Paraku Limited, Appolonia Development Company Limited, Devtraco Limited etc. in areas such as Ga South District, Ningo-Prampram District, Ga West District, Kpone Katamanso District, etc.; thus, speeding the rate of land cover change to artificial surfaces.

Turner and Fischer-Kowalski's (2010) technological advancement influence in land cover change was also evident in Greater Accra Region. A young male focus group discussant in Dodowa explained:

We have adopted new methods of farming especially through the application of fertilizers and use of tractors because the fertility of the soil has reduced [FGD: A Male Youth, Dodowa, 14th April, 2018].

The *Asafoaste* (Leader of Community Warrior Group) in Dodowa also complained about the use of machinery in clearing the Dodowa forest. He said:

As I am now speaking. if you go there some people are using Bulldozers to clear parts of the forest [Interview: Asafoatse, Dodowa, 18th April, 2018].

The Physical Planner for LEKMA lamented against the possibilism mentality of physical developers who have heavy machinery and resources to drain wetlands:

Now people don't care but they tell you with proper engineering and machinery work they can put up even a building on the sea. Just here, there is a lagoon in which someone has gone to put up just three pillars, and he is building [Interview: Physical Planner for LEKMA, 4th March, 2018].

Extensification was evident in the study area as some farmers have adopted fertilizer and tractor use in farming at the eastern part of the region around Afienya, Prampram and Ada, thus, allowing them to clear large pieces of land than traditional cutlass and hoes would allow. Beyond the application of new technology within the agricultural sector, Rosenberg (2017) reports that technological advancement extends beyond one sector of the economy; that is, from agriculture to all other sectors of the economy.

In the region, the influence of technological advancement in the construction sector was speeding the rate of land cover change. Engineers now pride themselves with the ability to develop in wetlands by filling and reclamation, thereby reducing the area size of artificial water (AW), natural and semi-natural waterbodies (NSW) and, natural and semi-natural aquatic vegetation (NSAV) in the region. The results were evident in areas such as the Weija catchment, Songor, Densu wetland, Sakumono, Korle wetlands and

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Kphesie which had been under siege by engineers and building developers. This illustrated the shift from the environmental determinism idea to possibilism in the region as a result of technological advancements.

Carlson et al. (1981) and Kilson's (1973) concept of institutions spearheading land cover change was true in the region. A female participant of the aged focus group in Prampram also explained:

> *Each chief tries to prove that he is greater than the other and does anything without consulting another; they keep selling the land* [FGD: Female Aged, Prampram, 22nd April, 2018].

In Dodowa, the *Asafoaste* made a similar assertion:

> *Some of the chiefs went and sold part of the Dodowa Forest to these operators (woodcutters) and they went and felled some of the big trees* [Interview: Asafoatse, Dodowa, 18th April, 2018].

The physical planner at LEKMA also complained that:

> *Over the years, with landowners, majority were families and stools, government doesn't have control over it. As for the traditional people what they are interested in is the money from the sale of the land* [Interview: Physical Planner for LEKMA, 4th March, 2018].

The Physical Planner at Prampram outlined the effects of land ownership being in the hands of traditional leaders:

> *The families are causing or creating problems in our plans. Even the little area that we have planned, they don't want to follow the plans. Some feel like this is the only land (property) they have, so they want to try and do some sub-divisions so that they can sell*

more because land is their 'gold' here [Interview: Physical Planner for Prampram, 28th March, 2018].

Indiscriminate selling of lands including cultural lands which serve as an abode for Ga/Dangme gods/goddesses was very worrisome. The landscape biography theory explains that cultures or people ascribe historical and cultural/religious meanings to specific land covers and tend to protect them. In the scenario of Greater Accra Region, the cultural meanings had been shifted to economic meanings because of the high land prices linked with urbanisation.

Also, due to formal education and the influx of Abrahamic religions, some Ga/Dangme no longer or have less believe in the *Kpele* doctrine which holds that gods and goddesses reside in physical entities such as the Korle, Kphesie, Lalu and the Dodowa forest. That gave them the impetus to sell such cultural lands. All these conformed to the interactionism theory which holds that with time, people or cultures change their perception and interaction with their physical and social environment.

Lastly, the issue of chieftaincy disputes worsens the sale of land as different factions compete for the control of land. The result was the numerous cases of land guards and land litigation in the region. Aside chieftaincy, the influence of formal governments on land cover change in Greater Accra Region was elaborated by respondents. A female member of the aged focus group in Prampram said that:

The dam which was constructed by the government at the back end at Dawhenya has affected the size of lagoons in Prampram because the water is used for irrigational purposes upstream [FGD: Female Aged, Prampram, 22nd April, 2018].

Nai Wolomo in Ga Mashie also complained about government ministries giving out land without traditional leaders' consent:

> *Most often, when I visit the shore I witness new physical developments. The area would have been cleared and under construction by people claiming to build hotels and tourist attractions along the beach with permission from a ministry* [Interview: *Nia Wolomo (Numo Akwaa Mensah II)*, Ga Mashie, 1st April, 2018].

The physical planner of LEKMA, being a government official, also supported this assertion that governments, inadequate laws and ineffective collaboration played a part in the rapid land cover change. She explained that:

> *Under the Town and Country Planning Act (CAP) 84, we didn't have the mandate to control physical development. So the mandate to even make sure the plans you have prepared are adhered to is given to someone else who does not know the genesis of the plan you have prepared* [Interview: Physical Planner for LEKMA, 4th March, 2018].

An aged female discussant in Teshie Maame blamed the changing land cover on the corruption of government officials as she claimed that:

> *You see people developing within the Kphesie wetlands but the planners will not talk, some will take money to allow them* [FGD: Female Aged, Teshie, 12th April, 2018].

The physical planner of LEKMA, however, refuted this claim saying:

> *I have heard that the planners are to be blamed for writing "stop work" on buildings but later development still goes on. We are*

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*not the ones who write stop work, it's the Works Department.
With the new law (Land Use and Spatial Planning Policy), there
is going to be greater coordination between us (Physical
Planning and Works Department)* [Interview: Physical Planner
for LEKMA, 4th March, 2018].

The problems labelled at formal government institutions dates to the colonisation era where formal government institutions took over the stewardship of natural and semi-natural land covers in Greater Accra Region from traditional rulers. Eneh and Agbazue (2011) and Laryea-Adjei (2000) explained that formal government institutions such as Environmental Protection Agencies, Forestry Commission, National Culture Commission and Land Use and Spatial Planning Authority are all riddled with inadequate personnel and financial support as well as non-coordination of activities, making them inefficient in managing land cover changes.

The problem of ineffectiveness in formal government could also be attributed to the non-existence of spatial plans to control land cover (Quarcoopome, 1992). The previously existing spatial plan for the region was done during Kwame Nkrumah's administration; this was not modified until 2016. Therefore, there was a gap in determining how best to accommodate the rapid land cover change in the region. However, the new spatial policy document is not timely as physical development has already taken its course. Little can be achieved if the policy is not enforced to the letter. Interestingly, policy enforcement was a challenge for most formal governments in Ghana and other developing countries because of corruption and the fear of losing votes as asserted by Mobolaji (2015) and Volcovici (2017).

Also, Giambelluca, Chen and Ziegler (2017) and Quarcoopome's (1992) assertion that formal governments in developing countries tend to shed their responsibilities in housing could also explain the causes of rapid land cover change in Greater Accra Region. Most areas in the region, like Ridge, Tema (communities officially built by Nkrumah), Airport Residential area, etc. where government developed residential accommodation, still have artificial development conforming to spatial plans. Areas without spatial plans and government housing facilities like Ashaiman, Kpone, Madina and Ofankor have experienced highly unstructured development because individual household developers lack the financial ability to develop storey houses which can accommodate the rising population and reduce the rate of land cover change.

All the factors used to explain the causes of land cover change in the region are anthropogenic, but one cannot discount the influence of natural factors on land cover change in the study area. Natural factors explained by respondents included sea level rises and erosion which had swept the natural and semi-natural vegetation along the shoreline of the region. Besides, other natural factors such as elevation could influence land cover change. Elevation has an influence on land cover change because, despite the number of physical developments on the high areas around Dodowa, Weija, West hills etc. The rate of land cover change was far less than areas on relatively lower elevations. This supported Beniston's (2016) claim that uplands and mountains slow land cover change.

Natural and semi-natural water bodies have been a catalyst around which developments and civilisations have emerged. It can be argued that staying close to water bodies is no more a priority for societies compared with

the Babylonian, Indus, Maya and Egyptian societies because it is now possible to transport water miles away through pipes. In the Greater Accra Region, however, physical developments were close to natural and semi-natural water bodies because of competition for land (Appeaning-Addo et al., 2013). This also contributes to the yearly annual flooding of artificial surfaces in the region.

Chapter Summary

The chapter presented changes in land cover types in Greater Accra Region from 1987 to 2017, over four time steps (1987, 1993, 2005, and 2017). A major finding was the partitioning of the region into west and east. The west which was mostly metropolitan and municipal areas had high growth rates of artificial surfaces, while the east, mainly rural areas witnessed tremendous growth in cultivated and managed terrestrial areas. However, artificial surfaces were the fastest growing cover in the region as its growth was three times higher than that of cultivated and managed terrestrial areas. Artificial surfaces consumed a greater part of natural and semi-natural areas mainly because of increasing population in the region, limited capacity of government policies and chieftaincy disputes. The natural and semi-natural land cover in the region can be safeguard if physical planners are sourced and equipped to enforce their planning schemes. The safeguarding and protection of the natural and semi-natural land cover in the region is essential for the sustainability of the Ga/Dangme culture as their traditions are heavily built around them.

CHAPTER SIX

CULTURE CHANGE AMONG THE GA/DANGME OF THE GREATER ACCRA REGION, GHANA

Introduction

In this chapter, the results on the cultural change among the Ga/Dangme in the Greater Accra Region are presented and discussed. Per the definition of culture (socially transmitted behaviour patterns that serve to relate human communities to their ecological settings) adopted for this thesis, the chapter only focused on cultural practices of the Ga/Dangme which had a relationship with land cover (natural and semi-natural land covers). The cultural practices identified from focus group discussions, in-depth interviews and survey were the Ga/Dangme family system, occupation, food and medicine, religion, festivals, traditional governance and passage rites. Also, the chapter presented results on the causes spearheading the changes in the identified cultural practices of the Ga/Dangme.

Results on culture change of the Ga/Dangme in Greater Accra Region

Change is a concept well-argued when dealing with human activities and endeavours. Some respondents argued that the Ga/Dangme culture had changed while others thought otherwise. An aged male focus group discussant in Dodowa explained:

> *The culture (Ga/Dangme) doesn't change but it is rather static*
>
> *and no one can change the culture because it is something*

instituted by our forefathers [FGD: Male Aged, Dodowo, 12th April, 2018].

The opposite was, however, shared by an aged male focus group discussant at Ga Mashie, who stated that "there have been changes in all of the cultural practices".

This was supported by an aged female focus group discussant at Teshie Maame who also indicated that:

> *There has been a lot of changes. Those who have been doing the practices as in the olden days are there but the young ones coming are those who have been adding some things to it* [FGD: Female Aged, Teshie, 12th April, 2018].

The opposing notion of change and no change held by interviewees on the culture of the Ga/Dangme can be traced to the famous argument on the concept of change by Aristotle and Parmenidas. The argument by the aged male focus discussants in Dodowa that Ga/Dangme culture is static was more of the Parmenidas school of thought. But such a stance contradicts the major characteristics of culture as being adaptive and dynamic which of Aristotelian philosophy where change occurs when there is shift in time, location, and change performers are introduced, new quantity/amount is adopted etc. This Aristotelian view was what Banse et al. (2011) explained that culture is not static but undergoes a creative process of constant change and negotiation. Thus, the Ga/Dangme culture like any other culture cannot be static.

Change in the family system of the Ga/Dangme

The very basic unit of the Ga/Dangme society is the *We* (Family) which grows into the Quarters and later, the Ga/Dangme society. Population and systems of inheritance are crucial within the Ga/Dangme family system which have links with land cover but are currently under change. A respondent in Teshie Maame claimed:

> *If you have a daughter or a son and he has grown up to some extent and then you want to find a room you can't just tell your daughter to go and sleep under the trees, you have to cut the tree and then build a house* [FGD: Male Aged, Teshie, 10th April, 2018].

The growth in the population of the Ga/Dangme means new built-up spaces for accommodation have to be provided. This leads to clearing available vegetative covers. New child births also put pressure on family lands as children, when of age, need to be given a part of the family land for subsistence. Caldwell and Caldwell (1990) argue that an increase in births in Africa and other Eurasian families after the neolithic revolution led to the disfragmentation of land holdings and change in land cover.

Another change noticeable in the Ga/Dangme family system was inheritance. The emergence of urbanisation with other ethnic groups in Greater Accra, like the Akans, Ewe and Mole Dagbani allows for intermarriages among them and the Ga/Dangme. Intermarriages presented a challenge to Ga/Dangme inheritance and land cover change. A focus group discussant in Teshie Maame touched on the changes in inheritance by saying:

At first, they didn't give the women any of the property, especially land [FGD: Female Aged, Teshie,12th April, 2018].

Allowing women to inherit even lands can largely be attributed to the Interstate Succession Law 1985 (PNDC Law 111) which allows for the deceased spouse and children irrespective of their gender to inherit. Woodman (1985) argues that this law changed drastically inheritance in all parts of Ghana.

However, the change in inheritance by the PNDC Law 111 presents a great lot of land litigation between nuclear families and extended families as there is a clash between the state law on inheritance and cultural Ga/Dangme communal inheritance. Boamah and Walker (2017) assert that the pluralist land inheritance causes Accra many land conflicts and litigation. De Soto (2000) also argued that the problem was even compounded when the land under litigation was not formalised and titled legally, a common characteristic of most lands in Sub-Sahara Africa. The solution for conflicting parties was to try to outdo the other by selling the land in litigation or erecting structures on it first with the help of land guards (Barry & Danso, 2014; Obeng-Odoom, 2014). Trying to build first, consequently, speeds the process and rate of land cover change in the region.

Change in the occupation of the Ga/Dangme

Almost all available literature on the Ga/Dangme (Aryeetey & Udry, 1995; Akyeampong, 2002; Koranteng, Nmashie, & Baddoo, 1993; Kilson, 1973; Reindorf, 1895; Quarcoopome, 1992; Waston-Quartey, 2011) indicated that the Ga/Dangme are mainly into cultural occupations like fishing, fish processing, hunting and priesthood. Results from this study, however, do not

confirm this assertion as respondents in non-cultural occupations (Dodowa-77.65%, Ga Mashie-76.47%, Prampram-61.18% and Teshie Maame-51.76%) were three times more than those in culture-related work (Table 7). Prampram (33.33%) had the highest persons in cultural occupation followed by Teshie Maame (21.18%) with Ga Mashie having the least persons 10.59%.

Table 7: Occupation of Ga/Dangme in Greater Accra Region

Occupation	Dangme (n=510)		Ga (n=510)	
	Dodowa (n=255)	Prampram (n=255)	Ga Mashie (n=255)	Teshie Maame (n=255)
Cultural	19.61	33.33	10.59	21.18
Non cultural	77.65	61.18	76.47	51.76
Student & Retired & Unemployed	2.75	5.49	12.94	27.06
Total	100.0	100.0	100.0	100.0

Source: Osman, 2018

The non-cultural occupations, on the other hand, range from office works such as administrative works, legal (lawyers), financial (bankers, mobile money vendors etc.), sports (boxing, football), health (medical doctor, nurse), construction (architects, welders, building contractors, etc.), fashion (beauticians, dressmakers, hair) and security (police, private security) sector works.

The change from cultural occupations to non-cultural ones by the Ga/Dangme is a common phenomenon across all indigenous cultures of the world. The Bakas of Cameroon (Chimtom, 2012) and the Aborigines of Australia (Hoegh-Guldberg et al., 2015; McIntyre-Tamwoy et al., 2013) are all changing from cultural occupations to white collar and other non-cultural

works. This was because cultural occupations depend largely on the natural and semi-natural land cover which is changing rapidly; hence, impeding production. Aryeetey and Udry (1995) and Waston-Quartey (2011) linked the shift from fishing in Ga Mashie to the dwindling fish catch and the high cost of operation.

Fishing by the Ga/Dangme had witnessed some changes from traditional fishing methods and techniques. One change was the increase in the number of persons per canoe from 3-4 to 7-11 people which also means larger canoes were preferred (Figure 9). The preference for bigger canoes also was motivated by the high commercialisation of fishing from subsistence, which allowed space for refrigerators, fuel and food.
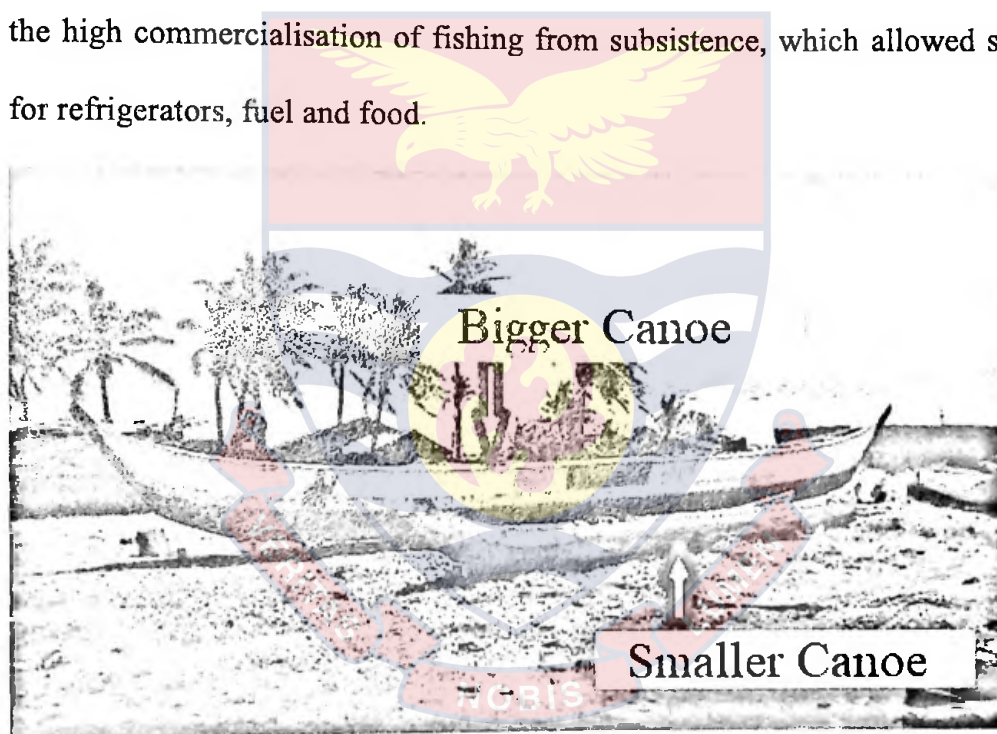
Figure 9: Different canoes for fishing

Source: Osman, 2018

Aryeetey et al. (1995) and Koranteng et al. (1993) largely blamed the commercialisation of fishing for the introduction of the technology of motors, and the migration from hook and line to fishnets. They also argued that the use of refrigerators, generators and bigger fishing were the cause of the low fish catch. However, another reason for the low fish catch, which was not discussed by Aryeetey et al. (1995) and Koranteng et al. (1993), was the diminishing

natural and semi-natural aquatic vegetation (NSAV) and natural and semi-natural waterbodies (NSW). Fishes breed in natural and semi-natural aquatic vegetation (NSAV) and natural and semi-natural waterbodies such as lagoons. when such habitats are destroyed, Hayes, Ferreri and Taylor (1996) claim fish population and catch are affected. Other illegal sea fishing methods such as *saiko* (light fishing) and fishing within the Ghanaian coast by illegal trawlers should also be blamed.

Fish processing (smoking) has witnessed some changes as well. The stove for processing fish has transcended from adobe to blocks or brick stoves. A fishmonger at Prampram explained:

At first, we used this one (pointing to a mud stove) but now we use the block stoves because now there is no land (as most areas are being converted to AS) for us to get the mud [FGD: Female Youth, Prampram, 8th April, 2018].

Switching to block stoves, as explained, is because clayey lands and available spaces are taken over by residential areas. Crop farming, as a cultural occupation, has also witnessed some changes as some farmers now hire or buy ploughs for preparing the land for farming. Some even go a step further to use weedicides and chemical fertilizers to help boost productivity. Also, farmlands or cultivated managed terrestrial areas are decreasing at the western part of the Greater Accra Region while they increase at the eastern side.

Hunting is the least occupation of respondents although founders of most of the Ga/Dangme communities were hunters (Figure 10). In Prampram, the *Wolomo* gave an account of how the *Lalu* lagoon became their goddess and how Kpledum drum was discovered through hunting expeditions. He recounted:

A man called Ayor in one of his hunting expeditions traced the blood of a wounded animal into the Lalu wetland where he discovered the god (Kpledum drum) and took it to a secret place [Interview: Wolomo, Prampram, 9th April, 2018].

Similar stories were shared for other Ga/Dangme communities such as Teshie Maame (Figure 10) where Nii Anteh, a brave hunter discovered Teshie Maame with his hunter pet, a tiger.

Figure 10: Nii Anteh the hunter who founded Teshie Maame community

Source: Osman, 2018

Reindorf (1895) claimed that hunting was a crucial part of the Ga/Dangme culture as it was one way a young man was deemed esteemed and worthy of his country. But, in recent times, this cultural occupation is dying out due to the effects of decreasing natural and semi-natural terrestrial vegetation (NSTV). The movement from cultural occupations by the Ga/Dangme was explained by Yeboah (2008) who asserted that urbanisation had hemmed the Ga/Dangme, and the only way to enjoy its fruits is to engage in non-cultural occupations.

Change in food and medicine of the Ga/Dangme

The cultural occupation of the Ga/Dangme, being dependent on natural and semi-natural land covers, influences the cultural foods and medicine of the Ga/Dangme. Kuhnlein and Receveur (1996) postulate that a change in the natural and semi-natural environment will affect the dietary systems of any culture. Data from the various focus group discussions revealed the shifting dietary types and traditional medicine usage as land cover changes. A young female discussant in Prampram explained:

Surely, our diet has changed because we no longer get the herbs and food crops we use to prepare our local diets. We are known for different varieties of water-yam but now we have lost all these food crops. We used to eat a lot of maize diet with soup or pepper but now it is more costly to buy corn than rice. Now indomie (a form of pasta) has been added; it is less expensive and easy to prepare [FGD: Female Youth, Prampram, 8th April, 2018].

Also, in Prampram, a male participant expressed how he has lost touch with bush meat. He said:

There was bush around so we sometimes went hunting for bushmeat. I hardly see people going to hunt for those animals now since the area is more built-up now [FGD: Male Youth, Prampram, 8th April, 2018].

Others expressed how they missed delicacies they used to enjoy during their childhood. An aged male focus group discussant in Ga Mashie claimed:

When we were children we go to the Korle lagoon and make traps

to catch fish and white crabs, they were nice to eat [FGD: Male

Aged, Ga Mashie, 22nd March, 2018].

That some traditional delicacies do not exist anymore in Ga/Dangme communities can be attributed to land cover change. Barbier (2003) used this same explanation (decreasing land cover) for dwindling foods such as crabs, shrimps and squid as food for inhabitants of the Gulf of Thailand. Also, research by Turner, Plotkin and Kuhnlein (2013) suggested that the degradation of Kitimat Rivers and wetlands affected shrimps and clams consumed by families along the wetland. Milman (2016) supported this explanation as he explained that the rapid land cover changes in the 1980s affected Kung's (Bushman) diet by a rapid shift from bush meat and vegetables to cereals and vegetables bought on the open market rather than foraged.

Some respondents also expressed difficulty in getting certain trees and herbs for medicines. In Teshie Maame, an aged female respondent lamented:

Oyefa, Ohwefa and Omenfa are trees we use for treating phlegm.

They were very effective. Sometimes, if you have a baby and can

hear sounds from the stomach, we administer these herbs. Now,

we are not getting it here (Teshie Maame) unless Pantang area

[FGD: Female Aged, Teshie, 12th April, 2018].

Chimtom (2012) claims that it is not only the medicinal plants which are affected by land cover change but also the knowledge of herbs and plants. It is important that the natural and semi-natural land cover are protected with their medicinal knowledge preserved. The Ecological Society of America (2017)

claims about 80% of the world population relies directly on natural medicinal products obtained from natural and semi-natural land covers.

Change in the religion of the Ga/Dangme

The link between religion and land cover was manifested in the *Kpele* traditions of the Ga/Dangme. It holds a strong belief in natural and semi-natural land covers as abodes for gods/goddess or numinous. But most residents of Ga/Dangme have now shifted from this *Kpele* doctrine to the Abrahamic doctrine especially the Christian faith. A youth female focus group discussant in Ga Mashie, expressed her notion about *Kpele* doctrine on the Korle being a goddess:

> *It's not that we don't believe whether the Korle goddess is there or not. It's been there before we were born and it will be there if we die so it doesn't concern us. Whether there is a spirit there or not we don't deal with spirits* (based on her new Christian faith) [FGD: Female Youth, Prampram, 8th April, 2018].

Others believed the gods are not strict. In Dodowa, a native who the research team chanced on close to the Dodowa forest remarked:

> *Do you want to go into the Dodowa forest, you can go through the back. Nothing will happen because the gods are now lenient.*

The decreasing faith in the *Kpele* doctrine is linked to the strong faith attached to Christain doctrines. Majority of the survey respondents were Pentecostals/Charismatics. Most Dangme's were Pentecostals/ Charismatics with Dodowa having over 66.4% of the respondents and Prampram 66.0% being Pentecostals/Charismatics (Table 8).

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Table 8: Religious affiliations of respondents

| Religion | Dangme (n=510) | | Ga (n=510) | |
	Dodowa (n=255)	Prampram (n=255)	Ga Mashie (n=255)	Teshie Maame (n=255)
TR	3.2	2.8	3.6	9.6
PC	66.4	66.0	38.0	48.0
O	30.0	31.2	55.6	37.2
I	0.8	0.0	0.8	1.2
No	0.0	0.0	2.0	4.4
Total	100.0	100.0	100.0	100.0

TR-Traditional Religion, PC-Pentecostal and Charismatic, O- Orthodox, I-Islam No- No religion.

Source: Osman, 2018

The Ga communities, rather, had more respondents as Orthodox Christians with Ga Mashie having over 53.6% and Teshie Maame, 35.6%. Teshie Maame had the most respondents still ascribing to their traditional religion (22) followed by Ga Mashie (9). Respondents who ascribe to the Islamic faith were just 7 (0.7%) (Table 8).

Christian doctrines label traditional belief systems as satanic and demonic, an assertion highly supported by Asamoah-Gyadu (2008) and Reinford (1895). Christianity takes away, from Christian Ga/Dangme, the respect and protection accorded natural and semi-natural vegetation. Nyamweru (2012), also, shares this assertion as he claims that Christians in Kenya were very hostile to the Kaya forests (spiritual groves) which have been preserved by their traditional religion. Knapp (2010) also asserts that the adoption of Christianity had transformed the religious practices of most Andean folks. Robbins (2004), as well, explains that the force of Christianity on indigenous religion is so strong that just after independence in Papu New Guinea, most

folks who had converted to Christianity abandoned indigenous practices and considered them sinful.

Only a few respondents still held on to Kpele teachings alongside the Christianity, a situation Nwafor (2016) claims to be common among Africans who tend to hold on to their native beliefs in addition to other Abrahamic religions. Contrastingly, most Ga/Dangme stewards of abodes for numinous still hold strongly to their beliefs; as in Prampram, the *Wolomo* asserted that:

> *The deity or spirit is a woman so she has sympathy for her children even when she is offended. But she can destroy properties of offenders if she wants to* [Interview: Wolomo, Prampram, 9th April, 2018].

This claim of the goddess' ability to harm people was reiterated by the *Korle Wolomo* as he explains the cause of the 2015 flood and fire disaster in Accra:

> *The Korle became angry and destroyed so many things during the 2015 flood and fire disaster. Korle is merciful because she is a woman but her child, Agoblo, did most of the damage* [Interview: Korle Wolomo, Ga Mashie, 2nd April, 2018].

These priests are the last hope for the Ga/Dangme indigenous religion so its sustainability rests on their shoulders as they still hold fast the Kpele teachings. This is evident in Tibetan, Aborigines, Native American and most African societies where the native priests still hold to their indigenous beliefs (National Congress of American Indians, 2017; Nwafor, 2016; Prost, 2006).

The explanation given by the Korle priest that the Korle goddess and her child caused the 2015 flood can be said to be logical when explained from a scientific persceptive; the korle is the main drain in the Accra Metropolis and

its adjourning districts like Ga Central, Ga West and East. Once all the natural and semi-natural aquatic vegetation had been cleared/destroyed the korle lagoon was exposed to sedimentation, which reduced its depth. The result had been the frequent flooding of its banks with minimal rainfall. It was such flooded water that sipped down into a petrol tank underground, releasing tons of petrol which got lighted and caused the June 2015 fire-flood disaster.

Change in festivals of the Ga/Dangme

The celebration of Ga/Dangme festivals (*Homowo/ngmayem*, *Kpledum* and *Kpanshemo*) were linked to the natural and semi-natural land covers. Changes identified with Ga/Dangme festivals were non-performance of some of the rituals, reduction in the number of days for festivals/rituals, low level of participation and shifting significance of festivals. A Teshie Maame female aged focus group discussant linked some of the changes to changes in their agricultural practices:

> *For now, we are not cultivating (planting) maize but we are buying it at a cheaper cost* [FGD: Female Aged, Teshie, 12th April, 2018].

In Prampram, a sub-chief submitted that:

> *Do you think Homowo will cease because all the farmlands have been converted into buildings? We will continue to perform it once we can buy it* [Interview: Sub-Chief, Prampram, 23rd April, 2018].

In Ga Mashie, the researcher observed a female beauty pageant group which performed the *Soo Bii* in 2018, parading items bought from the market

(Figure 11). Agriculture and its produce play a great part in Ga/Dangme festivals; thus, the Homowo. The results clearly indicated that a decline in agriculture affected these festivals and their importance as most foodstuffs used for the festivals were bought from the open market. This defeated the notion of Homowo, which is geared towards the celebration of the victory over famine in the migration story of the Ga/Dangme.

Figure 11: Ga Mashie beauty pageants parading purchased items for Soo Bii

Source: Osman, 2018

Also, the number of days used to perform the rituals for the festivals have reduced. In Prampram, an aged male focus group discussant asserted that:

> *One week or sometimes two weeks are taken out of the Homowo*
>
> *festival here (Prampram). At first, they begin with the rituals*
>
> *during the first week in April and ban drumming and noise*
>
> *making at the end of April. Now they start in the middle of April*

and end in last week of May [FGD: Male Aged, Prampram. 14th April, 2018].

The Chief Fisherman of Ga Mashie, as well, talked about the change in the number of days for some rituals:

Ooh, what happens is that those who use hook and line in the olden days, go in the morning and then come in the evening. Those with fishnet go in the evening and then come in the morning. Now they can spend days, sometimes they go and spend 6 days [Interview: Chief Fisherman, Ga Mashie, 15th March, 2018].

This reduction in days was to make room for Christian activities which mostly depend on drumming and singing during services, which shows that the Ga/Dangme people are accommodative. But then, it also suggests that they have subdued their cultural practices to the demands of the Christian faith.

Aside from the reduction in the number of days for festivals, some rituals performed during festivals have also been abolished. An aged female Ga Mashie focus group discussant claimed:

With the degradation of the Korle wetland (Figure 12), *the Korle Priests don't perform the rites they used to in the olden days. Most rituals performed before the Homowo festival at the Korle lagoon have ceased* [FGD: Female Aged, Ga Mashie, 22nd March, 2018].

Figure 12: A-Degraded and polluted Korle Lagoon, B-Choked and polluted Odaw River which feeds Korle Lagoon

Source: Osman, 2018

In addition, the Odwura rituals performed by the people of Jamestown at the *Korle* after the Homowo festival have also ceased. As a young female discussant explained:

> *The Odwura is a Fante or Twi word, people travel with a stool from the Western region to James town so that it will be washed/cleansed. I watched one last time around mid-night at the Korle. It's the Korle water that they use to wash it but since it's polluted they just take the stool there and camp throughout the night (Figure 12). They don't wash it (stool) again* [FGD: Female Youth, Ga Mashie, 21st March, 2018].

The cultural significance of Odwura was the purification of the community of Jamestown of their sins and bad deeds by washing the ancestral stool using the Korle water. But, because the water was polluted (Figure 12), it would not be prudent to cleanse the stool with the Korle water as that will rather defeat the intended purpose.

Another significant change in festivals was low reverence and participation in the festivals. A youth in Prampram lamented:

The Homowo is celebrated by everyone without discrimination and everybody comes to celebrate. But it is the other one, the Kpledum festival, that is considered barbaric and hence those of us who attend church see it as evil so we try to avoid it [FGD: Male Youth, Prampram, 8th April, 2018].

The traditional priest in Prampram also lamented about the low participation. To him:

Our yearly festival (Kpledum) celebration does not prohibit Christianity; when we were children even the men of God, that is, the Rev. Fathers and the church members came to dance during the festivities. In fact, we performed all the rituals with them. They even presented drinks to us when it was time for the festival because they came to meet the deity here and were well accepted and offered a place of worship. But in recent times some individuals have opened up some churches that if they see you coming you are an idol worshipper. Some churchgoers fear their pastors are likely to sack them whenever they see them attending this festival (Kpledum) [Interview: Wolomo, Prampram, 9th April, 2018].

As a result of the low reverence for *Kpledum* in recent times, the natural and semi-natural areas housing the *Kpledum* drum now share a boundary with a toilet facility (Figure 13). Pentecostal and Charismatic churches have picked up from where European Missionaries left off. Their members shun from the *Kpledum* festival because they believe it is satanic and there is a likelihood of being punished by their pastors if they participate. Githitho (2003) and Höschele

(2007) also had similar results where charismatic and even some orthodox Christian priests forbid their church members from engaging in traditional festivals and rituals.
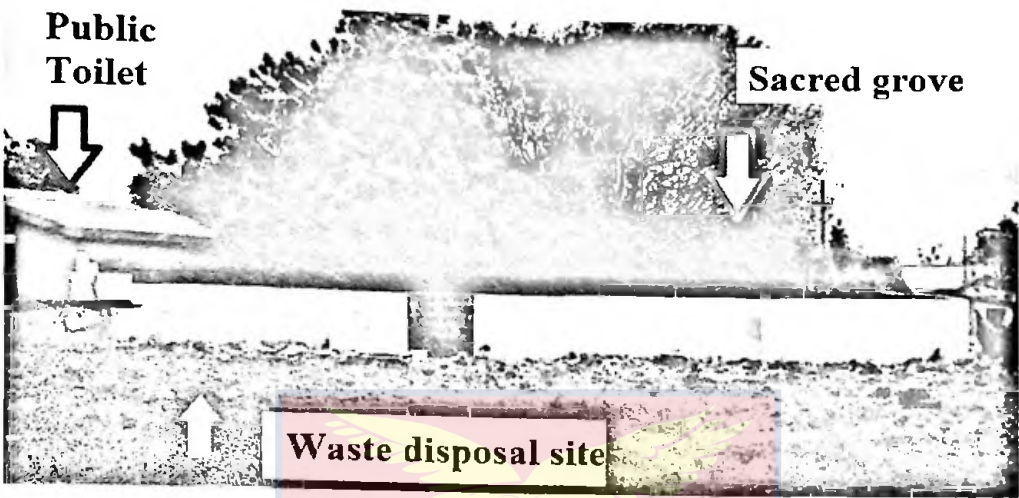
Figure 13: Scared grove in Prampram

Source: Osman, 2018

Per survey results, about 55.4% of the respondents claimed there have been changes in festivals as against 44.5% who think otherwise (Table 9).

Table 9: Change in festivals of the Ga/Dangme

Change	Dangme (n=510)		Ga (n=510)	
	Dodowa (n=255)	Prampram (n=255)	Ga Mashie (n=255)	Teshie Maame (n=255)
Extreme	2.0	0.4	3.6	33.2
High	18.0	30.0	26.4	9.2
Moderate	37.6	19.2	6.0	19.6
Less	5.6	1.2	0.4	10.0
No	36.8	49.2	64.0	28.0
Total	100.0	100.0	100.0	100.0

Source: Osman, 2018

Within the changes in festivals, level of change per community was skewed more towards Teshie Maame having an extreme change (33.2%); Prampram

recording a high change (30.0%) and Dodowa, a moderate change (37.6 %). Ga Mashie had the least for less change (0.4%) and more for no change (64.0%) in festivals (Table 9). Ga Mashie, which recorded a cessation of most rites at the Korle Lagoon during the Homowo festival, rather, had more respondents claiming there was no change. This can be explained from Von Heland and Folke (2014), Fiske and Shelley (2013) and Marx (1867) concept of culture where culture changes from ecological to ideation point. In the ideation concept, people are far removed from culture as ecological entities and are less likely to assume or recongnise changes from that dimension (Marx, 1867).

Change in the traditional governance of the Ga/Dangme

Traditional government was one cultural entity which had witnessed changes that have immense effects on the rate of land cover change. Some main changes in the Ga/Dangme traditional governance system included the shift from the fetistocracy with priests being the community leaders to chiefs and formal education becoming a criterion for the selection of chiefs (Reindorf, 1895). This change started with the arrival of the Portuguese and other Europeans in 1482 and interaction with other ethnic groups confirming contact theory of culture change.

Akamanje Manste of Jamestown further explained the change in traditional governance from *Wolomei* to *Mantse*:

> *In the olden days, the Wolomei were the community elders but*
>
> *the way the high priest dressed, they can't go to the government*
>
> *officials for a meeting as they are always barefooted; they had*

to select the leaders as chiefs to go and represent them

[Interview: Akamanje Manste, Ga Mashie, 31st March. 2018].

The shift from rulership by priests to chiefs removes from the chiefs and the community the direct connection to natural and semi-natural land covers which is often revered as abodes for gods. It can be argued that if priests still ruled, then the ultimate respect accorded to the priest will also extend to the deity and the natural and semi-natural land cover the deity inhabits. The shift from festitocracy to chieftaincy by the Ga/Dangme has also increased the problem of family disputes for political and economic supremacy; specifically, with regards to land ownership.

Another significant change in traditional governance was the use of formal education as criteria for the selection of chiefs. Native Affairs records on Prampram had a similar indication of a change in the installation of traditional chiefs. Sir Arnold Hodson-Governor of Gold Coast in 1940 wrote:

After the Chief, Waka had ruled in his house, the mantse fell on Doku house and Anerty ruled but after this chief passed to eternity, the Prampram people realised that if a nation must rise the leaders must be enlightened so they would no longer find glory in their chiefs being illiterate persons. As the first and third ruling houses were unable to produce literate rulers at this time, it was necessary for the second house to be approached. As Abbeiy Kojo of the house was able to fulfil the necessary educational qualification, he was accordingly elected. After his death, people of Prampram were still insistent for educated chiefs. Borrowing of chiefs was done with the people and other

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two family houses [Extract: Native Affairs of Prampram, 1904. Ghana Public Records and Archives].

Formal education is based on the premises of science and logic which has the potential to take away from educated Ga/Dangme shifts the respect to be accorded natural and semi-natural areas which are believed to be abodes for deities. This claim was supported by the *Asafoaste* of Dodowa who asserted that *"some of the chiefs went and sold part of the Dodowa Forest to operators (woodcutters) who went to cut some of the big trees"*.

Another change in traditional governance was the acceptance of persons from the matrilineal side to be enthroned which had effects on land conflicts and land cover change. Native Affairs records of 1944 about a court case made by Osekre Adjei Kwanli's lawyer from Yiadom Chambers gave an account of the genesis of the chieftaincy conflict in Teshie Maame:

> *Ama Npa's daughter was Asheley. Asheley married Narh after*
> *whom the present Abraham Narh Tetteh is named. Narh was not*
> *a member of the Teshi royal house, his ancestor had come from*
> *Shai, Dangme district. Asheley, wife of Narh was to have been*
> *Mantse but being a woman the post was given to her son, Adjei*
> *Okpon who became Mantse on the customary understanding that*
> *his descendants were not to ascend the stool* [Extract: Native
> Affairs of Teshie, 1944, Ghana Public Records and Archives].

A female focus group discussant in Ga Mashie explained further the change in inheritance concerning chieftaincy and its problems:

> *People are getting well educated (formal) and more enlightened*
> *to understand that if I am from this clan then it means that this*

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land is for my clan so I can sell it. With that everybody is so aggressive wanting to be chief bringing about the chieftaincy disputes. What I have found out is that with Ga we do inherit patrilineal inheritance but most of our chiefs are currently matrilineal [FGD: Female Youth, Ga Mashie, 21st March, 2018].

The prestige and economic benefits of being a chief or the family head had affected land cover as family heads, chiefs and family members try to outwit one another by being the first to sell family land. Akyeampong (2002) asserted that chieftaincy in Accra was embroiled in numerous land disputes and destoolment cases since the selection of Accra in 1877 as the colonial capital had put a premium on real estate and made the land a coveted and contested asset. This complication still persists in all the communities, especially Teshie Maame which has not had a paramount chief for over 30 years. It was, therefore, not surprising its district had the highest rate of land cover change. In Prampram, a court ruling on traditional governance and land was now having effects on land cover change. As the Prampram Physical Planner explained:

Formerly, this place was handled by the Traditional Council, let me say the Stools, until 2008 where there was a revolution. They said the stools can't own land from the court since the land is owned by families, so we realised that families began to contest against each other. Some feel like this is the only land they have and they have to sell it because land is their gold here. That is, land is the source of their wealth [Interview: Physical Planner for Prampram, 28th March, 2018].

The shift in the perception of land as communal and entrusted to chiefs and family heads to economic and source of wealth stimulates the rate of selling these lands. Economic logic stipulates that the more of anything that is sold, the higher the reward; thus, these chiefs and family heads had to sell more lands to make more. This had resulted in sales to individuals for residential built-up purposes.

Meanwhile, data from the survey showed that 88.4% of the respondents in Dodowa believed there has been no change in the traditional governance of the Ga/Dangme; 67.6%, for Prampram, 59.6% for Ga Mashie and 26.4% for Teshie Maame (Table 10). Most of the respondents in Dodowa, for instance, did not see any change in their traditional governance.

Table 10: Change in the traditional governance of the Ga/Dangme

Change	Dangme (n=510)		Ga (n=510)	
	Dodowa (n=255)	Prampram (n=255)	Ga Mashie (n=255)	Teshie Maame (n=255)
Extreme	1.2	3.6	9.2	44
High	6.8	22.4	24.8	15.6
Moderate	3.2	5.6	6	11.6
Less	0.8	1.2	0.8	2.4
No	88.4	67.6	59.6	26.4
Total	100.0	100.0	100.0	100.0

Source: Osman, 2018

In Teshie Maame, about 44.0% of the respondents in the community asserted that traditional governance has extremely changed. The results from Ga Mashie were close between those who believe there were changes (41.4%) and those who do not (59.6%). Non-recognition of change in chieftaincy and other cultural entities mostly be survey respondents can be explained from the concept of time

and cultural memory. The shift in governance occurred during the colonial era; hence, present generations cannot appreciate such change.

Changes in the rites of passage ceremonies

Rites of passage ceremonies of the Ga/Dangme such as outdooring, naming, puberty, marriage and death were all witnessing changes. These range from a change in the time for performing these ceremonies to the performers, the food served at the ceremony and the items used for performing these rites. An aged male focus group discussant in Prampram lamented:

If you name your child, the male's family/parent will perform the naming and dedication around 4:00am to 5:00am so that by the time the sun rises, everything will be done. But now it is 10'clock in the morning or later in the evening (Figure 14) that you see people saying they are going to name their child. This spoils everything as the dedication is to the early morning sun [FGD: Male Aged, Prampram, 14th April, 2018].

A young male in Teshie Maame also explained, saying:

We do it (dedication and outdooring) in the evening (Figure) and it can go as late as 11:00pm or even 1:00am. It is a way to raise money and create a bond between groups as these women have social groups which they join [FGD: Male Youth, Teshie, 10th April, 2018].

Figure 14: Preparation for outdooring and naming ceremony at Teshie Maame around 6:20 pm

Source: Osman, 2018

In Ga Mashie a male youth expressed how naming ceremonies now disconnect the new child and the land and only preaches goodness against the previous good and bad. In his words:

> *They say when you dip your finger in alcohol and give it to the child during naming, the child becomes a drunkard. So, now, only honey is given; they have done away with the alcohol. This time they don't even put the* child (him/her) *on the ground; they just hold him/her. And even the pastor now does it or they would take you to the church* [FGD: Male Youth, Ga Mashie, 21st March, 2018].

This, a respondent claimed, has reduced the spirituality of the event. He stated that:

There is no spirituality in what they do now (naming and outdooring). Formerly it was sacred and highly spiritual [FGD: Male Youth, Ga Mashie, 21st March, 2018].

On puberty, an aged female focus group discussant at Dodowa said:

People don't participate in the activity like my time (when I was young). Some families even allow small children to partake so they will not refuse when they grow up. I have even seen a four-year-old girl allowed to perform dipo [FGD: Female Aged, Dodowo, 12th April, 2018].

On funerals as well, a young woman in Ga Mashie said:

As for our "Yala" (funeral) here (James Town), I will invite you to one and you will marvel. They do the normal rituals alright but afterwards, it's something else with "Gbonwo" party. We have it on the Sunday after the burial [FGD: Female Youth, Ga Mashie, 21st March, 2018].

In Teshie Maame, a young male commented on marriage ceremonies saying:

Wedding, as I was told was strictly in a traditional way. Now what I have seen is everyone doing a white wedding and everything is done at the church. Even for the engagement which is supposed to be held at the family house, some people are even having it at churches [FGD: Male Youth, Teshie, 10th April, 2018].

The connection between these passage rites and land cover was reflected in the use of tree poles and palm branches as shades for participants during these

ceremonies in the olden days. Currently, metal and tarpaulin materials (Figure 14) were used. In Dodowa, a young male explained:

What I heard was that in the olden days they used branches and sticks to make shades during ceremonies [FGD: Male Youth, Teshie, 10th April, 2018].

Table 11: Changes in rites of passage ceremonies in Ga/Dangme culture

Change	Dedication and naming R	%	Puberty R	%	Marriage R	%	Death R	%
No	283	27.8	545	53.4	360	35.3	402	39.4
Less	51	5.0	64	6.3	45	4.4	47	4.6
Moderate	266	26.1	170	16.7	230	22.6	196	19.2
High	284	27.8	203	19.9	273	26.8	243	23.8
Extreme	136	13.3	38	3.7	112	10.9	132	12.9
Total	1020	100.0	1020	100.0	1020	100.0	1020	100.0

Source: Osman, 2018

From Table 11, most respondents from the survey mentioned changes in dedication and naming (72.2%), followed by marriage (64.7%) and funerals (60.6%).

Culture change index of the Ga/Dangme in the Greater Accra Region

A culture change index was generated from responses on the named cultural practices of the Ga/Dangme. This index was possible by converting survey respondents' notion of change in culture to a scale of 0-1. The reason for generating a cultural change index is based on the conceptual framework of this study that, where land cover changes, cultures change. The index can be categorised into four, thus from 0-0.20 meaning very less cultural change; 0.21 -0.4, less change; 0.41-0.6, moderate change; 0.61-0.8, high change and 0.81-1,

very high change. In Table 12, Prampram and Dodowa, which are the rural areas, had lower indexes of 0.42 and 0.46 respectively within the domain of moderate cultural change. Ga Mashie had an index of 0.55 still in the moderate culture change domain while Teshie Maame with an index of 0.61 signifies a high culture change.

Table 12: Culture change index for Ga/Dangme in Greater Accra

Communities	Culture change index
Dodowa	0.46
Ga Mashie	0.55
Prampram	0.42
Teshie Maame	0.61
Total	0.51

Source: Osman, 2018

The culture change index made it easy to determine if, indeed, there was a relationship between culture change and land cover. As can be seen in Table 12, LEKMA which had the highest AS (Artificial Surface) also houses Teshie Maame which had the highest culture change index of 0. 61 (High). Further analysis using ordered logistic regression showed that respondents were more likely to indicate that Ga/Dangme culture change was high and it was significant at 0.01 for p-value (Table 13) confirming the outcome reported in the descriptive statistics. With respect to place of residence, respondents in metropolitan areas and municipal were less likely to state that culture change was very high compared to those in districts. This can occur because urban folks would have absorbed other practices from other cultures at the metropolis and municipals and might not regard change as very high.

Table 13: Ordered logistic regression of cultural change (Ref: Very Low)

Variables	Very high		High		Moderate		Low	
	b	SE	b	SE	b	SE	b	SE
Constant	-30.8	3294.6	17.1	1.1	18.6	0.826	17.0	1.0
District	52.1	3574.2	20.1	1385.9	19.5	1385.9	19.2	1385.9
Metro	2.7	3822.2	0.8	0.5	2.7	0.6	2.2	0.5
Aged	-33.2	2853.3	-1.0	0.5	-0.4	0.5	-0.6	0.5
Mid age	-1.7	0.8	-0.9	0.4	-0.3	0.4	-0.3	0.4
Islam	35.6	5453.0	19.4	5213.8	18.8	5213.8	17.2	5213.8
No religion	-12.6	8899.4	1.5	1.4	2.3	1.2	1.6	1.3
Orthodox	0.7	1.6	1.8	0.6	1.1	0.5	1.2	0.6
Pentecostal	-0.2	1.5	0.5	0.6	0.3	0.5	0.7	0.5
JHS	-0.1	1.1	0.0	0.6	0.3	0.6	0.9	0.7
No Edu.	1.3	1.7	-0.1	0.8	-0.6	0.8	0.9	0.8
Primary	-0.1	1.2	-0.7	0.7	-0.8	0.7	-0.2	0.7
SHS	-0.2	1.0	-0.8	0.7	-0.8	0.6	0.2	0.7
University	-16.7	4346.1	0.3	1.2	0.8	1.2	1.3	1.2
Cultural Occ.	-2.4	0.7	-17.6	0.9	-18.8	0.6	-18.3	0.8
Non Cultural Occ.	-3.0	0.8	-17.3	0.8	-18.3	0.5	-18.2	0.7
Retired	13.7	0.5	-34.5	4344.0	-17.8	1.3	-17.1	1.4
Student	-20.1	5910.7	-18.0	0.7	-18.6	0.5	-17.9	0.5
Log Likelihood	1850.5							
McFadden R	0.1							
N	1020							

Source: Osman, 2018

Also, urban folks are more likely to lose knowledge of their indigenous culture as compared to rural folks an assertion supported by urban and contact theorist of culture change such as Lehane (2016). Hoffstaedter (2008), Oonk (2004), etc.

Interestingly, aged respondents were less likely to indicate that culture change was very high. Marked differences were also noted with respect to respondents' religious affiliations and rating of culture change with traditionalists, orthodox Christians and Pentecostal and charismatics less likely to state that culture change was very high. Education was also found to exert significant influence on the rating of culture change as high or not high. Specifically, respondents with primary and vocational/technical and commercial education were less likely to rate culture change as high compared to those with university education. This is true as people become trained in formal education (other cultures) they are less likely to ascribe to their indigenous culture (Newson, 2015; Robbins, 2004).

Causes of changes in the Ga/Dangme culture

The identified causes of the changes in the Ga/Dangme culture can be summed into Christianity, chieftaincy, formal education, urbanisation, formal government, among others. Chieftaincy was the most talked about cause of culture change among focus group discussants and interviewees, followed by Christianity (Figure 15).

Christianity
Urbanisation
Government
Monetory pursuit
Chieftaincy

Figure 15: Causes of culture change of Ga/Dangme in Greater Accra Region from focus group discussions and interviews

Source: Osman, 2018

In Dodowa, an aged female discussant remarked:

> *It depends much on the chiefs. When someone is enstooled as a chief, within 3 days' time the person will deviate from the normal ways of doing things or go wayward* [FGD: Female Aged, Dodowo, 12th April, 2018].

This claim was supported by a male youth in Dodowa who also believes that the *"lack of unity among the chiefs contributes to changes in their culture"*.

In Prampram, the *Wolomo* also spoke about the unavailability of a paramount chief and its effects:

> *The land guards are selling sacred lands to people. The absence of the paramount chief makes me (priest) unable to discuss important issues affecting the community and find solutions to problems affecting the gods of the land* [Interview: Wolomo, Prampram, 9th April, 2018].

In Teshie Maame, a male youth also blamed chieftaincy issues. He remarked:

So everything in this world that would change. People will change, the government would change, places would also change and fashion would change. But tradition is there for us to obey not to change anything. The elders are still there, and they need to enforce the law but they are fighting for kingship [FGD: Male Youth, Teshie, 10th April, 2018].

That focus group discussants and interviewees pointed accusing fingers at chieftaincy, because the chiefs are the custodians of culture, so once they are locked in disputes, the culture will suffer. It also leaves a broken window for people to do as they please by not following customary and traditional laws. Besides, the numerous disputes between chiefs result in a competition over who is fast enough to undertake a ritual so his opponent does not. Turner and Fajans-Turner (2006) and Xing (2017) explained that the Kayapo culture in Brazil is resisting change largely because Kayapo chiefs bonded. This, unfortunately, cannot be said of the Ga/Dangme culture.

Per survey responses, urbanisation (29.8%), Christianity (18.4%) and chieftaincy disputes (16.3%) were the main causes of the Ga/Dangme culture change (Figure 16). The least responses were impudence (9.9%), monetary pursuits (4.6%) formal government (0.5%) and colonisation (0.4%).
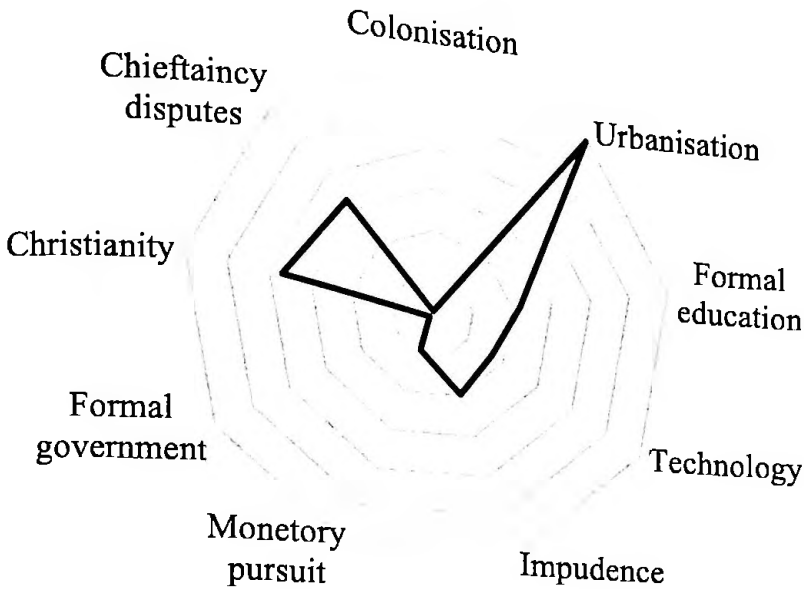
Figure 16: Causes of culture change of the Ga/Dangme in the Greater Accra

Region from survey responses

Source: Osman, 2018

Monetary pursuit by the Ga/Dangme to fit into urban lifestyles supports

Gray's (1988) economic theory of culture change. The desire for material

comfort has been a push for most indigenes to abandon their culture for western

cultures. In the pursuit of material comfort, the Ga/Dangme were abandoning

their cultural occupations and selling religious lands.

On formal government's effect on culture, the *Nai Wolomo* in Ga

Mashie explained:

With some of the policies that the tourism sector takes, they don't

consult the traditional authorities or the highest priest. This is

really affecting us because we know what is on the ground

(things planted along the beach) but they just go and build a

restaurant or a hotel affecting the things we are preserving along

the beach [Interview: Nii Tsuru Botomo *(Numo Akwaa Mensah),* Ga Mashie. 1st April, 2018].

The government's influence on culture change was well documented in findings of Alagia (2014), Hancock (1999), Quarcoopome (1993) and Lucassen et al., (1998). Quarcoopome (1993) stressed that the Ga/Dangme culture had suffered because formal government policies have marginalised them by taking most of their lands. Land is linked with culture so once it is taken, the culture suffers. Alagia (2014) supported this explanation in his study of the San ethnic group in Botswana. Alagia (2014) stipulated that formal governments allocated lands for tourism and diamond exploration without consulting the San and forcibly ejected them from ancestral lands, impeding cultural performances and sustainability. Kabachnik (2009) also claimed the Gypsey culture shrank in Britain because of formal government policies of The 1968 Caravan Sites Act and the 1994 Criminal Justice and Public Order Act which made it easy to evict Gypsies from their occupied lands.

Issues of urbanisation, formal education, colonialisation, Christianity and technology being the top causes of change in Ga/Dangme culture lies within the contact theory of culture change. Every culture, when exposed to another culture, is likely to adopt and adapt to parts of the other culture. This was reflected in the formal education orientation of the entire country, not only the Ga/Dangme culture, which had led to Christianity and the high dependence on foreign technology in all aspects of lives. With urbanisation, the Ga/Dangme culture also learns from other ethnic groups living in the Greater Accra Region, compounding the change in culture.

The chapter began with an introduction which clearly defined culture in its ecological settings. Results indicated that the Ga/Dangme family system, occupation, food and medicine, religion, festivals and traditional governance had a strong link with the natural and semi-natural land cover as changes in one affects the other. Drivers of Ga/Dangme cultural change have a high affiliation to Christianity, urbanisation and lack of respect for impudence to the indigenous Ga/Dangme culture. Disputes among families for chieftaincy and rulership worsened the culture change by sowing disunity among the Ga/Dangme. The disunity presents a challenge for the sustainability of the Ga/Dangme culture because the focus was outdoing one another rather than presenting themselves as a single force to outdo drivers of culture change. Ga/Dangme must strive for unity if they are to sustain their heritage and identity because disunity has wiped more cultures in history.

CHAPTER SEVEN
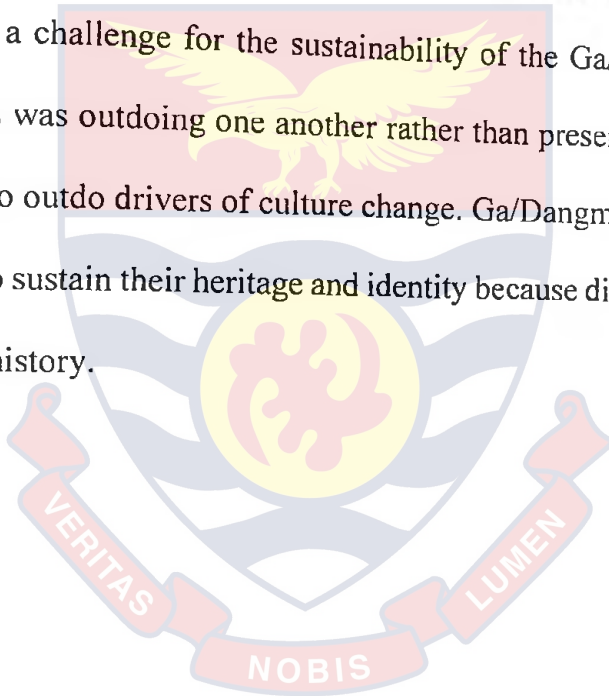
ECOSYSTEM SERVICES FROM THE INTERACTION BETWEEN LAND COVER (NATURAL AND SEMI-NATURAL) AND THE GA/DANGME CULTURE

Introduction

In the interaction between land cover and cultures, each provides services for the other. This chapter discussed the services the Ga/Dangme derived from natural and semi-natural land covers and the services they in turn rendered to natural and semi-natural land covers. Thus, the chapter analysed how these services provided by the Ga/Dangme and received from natural and semi-natural land covers have changed over time. Responses from interviewees and focus group discussants were presented per various ecosystem services to the Ga/Dangme (provisional, supporting, regulating and cultural) and services to natural and semi-natural land covers (protecting, enhancing, supporting and restoring). Lastly, the results were discussed per the empirical literature and theory of interactionism and mutualism.

Ecosystem services from natural and semi-natural land cover to the Ga-Dangme culture

Provisioning services

Dependency on land cover for food by the Ga/Dangme in the Greater Accra Region had reduced as many people have shunned agricultural activities for non-farm activities. The problem of how land cover changes were affecting food production was explained by an aged male respondent in Teshie Maame:

There were vegetable farms around houses and coconut trees were common in the olden days (30 years ago). Okro, pepper, and tomatoes were the things which were common in these farms [FGD: Female Aged, Teshie, 12th April, 2018].

In Dodowa, an aged male focus group discussant explained the reason for the low food provision from land cover. He said:

Now, where are the lands to farm for food? They have sold the lands. In order to farm you have to move to the hills. How much land can you clear on the hill? [FGD: Male Aged, Dodowo, 12th April, 2018].

For culture or people to survive, provisioning services from natural land covers are crucial (FAO, 2010, Barbier, 2003; Zuze, 2013). This assertion can be linked to the story of Homowo. History has it that when the Ga/Dangme first inhabited Greater Accra, they were faced with hunger; hence, they cultivated the land which gave them a bountiful harvest of maize and millet, and hence they instituted the *Homowo* festival to celebrate the bumper harvest. This supports Penrose's (2002) assertion that the Ga/Dangme view their land and its cover partly as a substance that is fundamental to human life (for food, water and wealth generation).

Although fishing was a major agricultural activity in the region, it does not provide enough food. In Prampram, a focus group discussant who was a fisherman indicated that:

At first, we hunted animals (for food) in the areas around the lagoon (Lalu) but now it is not like it used to be. We also fished

in the lagoons but the story now is different [FGD: Male Aged, Prampram, 14th April, 2018].

Korle and Kphesie lagoons were highly polluted (Aglanu & Appiah, 2014; Boadi & Kuitunen, 2002), making aquatic life within them unwholesome while the Lalu lagoon in Prampram had dwindled in size, reducing its capacity to accommodate aquatic life. Hunting, which used to supplement household protein besides fish, has experienced a downturn because urban space and activities have driven wild animals into forested areas of the Eastern region and other conducive environments (Goudie & Viles, 2013).

Another ecosystem provisioning service was water supply. Immediate land cover provision of water supply was also decreasing as, in Teshie Maame, a female interviewee lamented on the water shortage in the community. She noted:

In the olden days, we had boreholes. With these boreholes, if it rains or it doesn't rain you will always get water. But currently only one exists and the name of that one is Okesekon. Some have dried up, with the rest closed to allow for the construction of houses [FGD: Female Aged, Teshie, 12th April, 2018].

Greater Accra Region is drained by several rivers such as the Densu, Odaw, Sakumo, Volta, etc. which means Ga/Dangme communities should have easy access to water. The comment by the female respondent and reports from the Ghana Statistical Service (2010) show a huge water deficit in traditional Ga/Dangme communities. The conversion of natural and semi-natural land covers to artificial surfaces accounted for the dwindling water supply because

it limited rainwater percolation which in turn reduced borehole recharge and caused them to dry up. This explained the low water supply in Teshie Maame.

Medicinal trees were also hard to find within the Greater Accra Region. As an aged female discussant at Prampram explained:

Now everything is hospital, but we used to treat ourselves with herbs, some of them are still there while others are not; those leaves are gone with their names. We could use the mango tree as a blood tonic and for pregnant women. Also, "Zugba mio" is a leaf which is no more, when you are sick or when a child cannot defecate well they prepare that for him [FGD: Female Aged, Prampram, 22nd April, 2018].

The decrease in medicinal plants was also increasing the shift from usage of herbal medicine as reiterated by Gyasi, Mensah, Osei-Wusu and Agyemang (2011) as well as Ameade, Amalba, Helegbe and Mohammed (2015).

Survey respondents corroborated the dwindling ecosystem provisioning services from the land cover. About 36.9% of respondents for Teshie Maame, 40.0% (Ga Mashie), 22.7% (Dodowa) and 16.5% (Prampram) claimed they never get household food from their immediate land cover as at 2018 (Table 14).The percentage of respondents who never got household food from their immediate land cover 30years ago was lesser, with 2.9% of respondents for Teshie Maame, 1.9% for Dodowa, 3.9% for Prampram and a high figure for Ga Mashie (32.9%) (Table 14). That a high figure of respondents does not get household food from their immediate land cover in Ga Mashie can be attributed to the fact that even 30 years ago the area was already built.

Table 14: Provisioning services from land cover in Ga/Dangme

Responses	Dangme (n=510)		Ga (n=510)	
	Dodowa (255)	Prampram (n=255)	Ga Mashie (n=255)	Teshie Maame (n=255)
Food provision from land cover, 2018 (Current) %				
Always	0.4	0.0	0.8	0.4
Often	2.7	0.4	3.5	25.5
Sometimes	38.4	38.4	9.0	26.7
Rarely	35.7	44.7	46.7	10.6
Never	22.7	16.5	40.0	36.9
Total	100.0	100.0	100.0	100.0
Food provision from land cover, 1988 (30 years ago) %				
Responses	Dodowa	Prampram	Ga Mashie	Teshie Maame
Always	11.3	23.7	7.3	20.6
Often	13.1	35.5	1.8	20.6
Sometimes	58.7	32.9	20.7	51.0
Rarely	15.0	3.9	37.2	4.9
Never	1.9	3.9	32.9	2.9
Total	100.0	100.0	100.0	100.0
Freshwater provision from land cover, 2018 (Current) %				
Responses	Dodowa	Prampram	Ga Mashie	Teshie Maame
Always	0.0	0.4	0.8	0.4
Often	5.5	20.4	3.1	3.1
Sometimes	21.2	42.7	19.6	27.5
Rarely	47.1	21.6	24.3	20.0
Never	26.3	14.9	52.2	49.0
Total	100.0	100.0	100.0	100.0
Freshwater provision from land cover, (30 years ago) %				
Responses	Dodowa	Prampram	Ga Mashie	Teshie Maame
Always	8.0	14.5	6.7	9.8
Often	7.5	18.4	0.6	13.7
Sometimes	23.5	46.1	15.9	42.2

Rarely	46.0	14.5	34.8	23.5
Never	15.0	6.6	42.1	10.8
Total	100.0	100.0	100.0	100.0

Medicine provision from land cover, (Current) %

Responses	Dodowa	Prampram	Ga Mashie	Teshie Maame
Always	0.4	0.4	0.4	2.4
Often	8.6	3.1	7.5	12.5
Sometimes	55.7	56.5	30.2	45.1
Rarely	24.3	28.6	11.8	18.8
Never	11.0	11.4	50.2	21.2
Total	100.0	100.0	100.0	100.0

Medicine provision from land cover, 1988 (30 years ago) %

Responses	Dodowa	Prampram	Ga Mashie	Teshie Maame
Always	16.0	17.1	13.4	34.3
Often	19.7	22.4	0.6	18.6
Sometimes	58.2	56.6	19.5	18.6
Rarely	4.7	1.3	29.9	26.5
Never	1.4	2.6	36.6	2.0
Total	100.0	100.0	100.0	100.0

Source: Osman, 2018

Thirty years ago (responses by persons aged 48+), 7.3% for Ga Mashie, 11.3% for Dodowa, 20.6% for Teshie Maame and 23.7% for Prampram claimed they always got their household food from their immediate land cover. Respondents who always get household food from their immediate land cover dropped to figures below 1% for 2018 in all the communities under study.

Most respondents believe water accessibility was high 30 years ago than in current times. On medicinal benefits of natural and semi-natural land cover, about 34.3%% of respondents from Teshie Maame, 17.1% (Prampram), 16.0 (Dodowa) and 13.4 (Ga Mashie) asserted that they get medicinal plants & herbs

from their immediate natural and semi-natural land cover 30 years ago. Respondent's claim of getting medicinal plants and herbs from natural and semi-natural land cover in 2018 dropped to 0.4 for all the study communities, except Teshie Maame which had 2.4 (Table 14).

Regulating services

According to McCarthy et al. (2010) and Houghton (2003) if the natural and semi-natural land cover of a place is intact then rainfall will be adequate and less destructive with floods. Temperature and air quality should be at their optimum for humans. The factors of regulatory services by McCarthy et al. (2010) sought to understand how these services were being provided by the natural and semi-natural land cover in the communities. In recent times, regulating services were claimed to be low as land covers rather produce disservices. In Dodowa, a respondent lamented about low rainfall and its increasing intensity:

The rains are not coming again. It comes when it wants to come and stops. But when it comes sometimes, it's very violent. Don't you hear people dying from floods in Accra? [FGD: Female Aged, Dodowo-12th April, 2018].

The temperature was, however, labelled by aged female respondents in Teshie Maame as being the same over the 30 years:

For the temperature, we don't think it has changed much [FGD: Female Aged, Teshie, 12th April, 2018].

But the male focus group discussants, also in Teshie Maame, were of a different view:

Then, there were no built shades along the beach like what we are currently sitting under. It was just coconut trees and a few houses close to the beach. The temperature was always good

[FGD: Male Aged, Teshie, 10th April, 2018].

Data from the survey supports the notion of decreasing regulating services (Table 15). About 22.1% of survey respondents in Dodowa, 17.7% (Ga Mashie), 18. 8% (Teshie Maame) and 14.5% (Prampram) were of the view that rainfall 30 years ago (1988) was very frequent (Table 15) as opposed to 1.2% (Dodowa), 0.0% (Ga Mashie), 0.8% (Prampram) and 0.4% (Teshie Maame) for the same responses in 2018. For the Ga/Dangme, regulating services move beyond provisions made by natural and semi-natural land covers to the spiritual realms as prayers are offered by the *Wulomei* for rain before the farming season and good air/wind for fishing (Reindorf, 1895; Kilson 1974). Whether it is the natural and semi-natural land covers that are responsible for regulating services or the supernatural beings, one thing is clear: regulating services are at their wits' end because of frequent floods, storm surges, polluted air and hot temperatures. This is largely supported by studies by Asumadu-Sarkodie et al. (2015), Appeaning-Addo et al. (2013) and Okyere et al., (2012).

The Accra Metropolis, which houses Ga Mashie, is in the news yearly because of floods resulting from the inefficient regulating services. This trend is shifting to Teshie Maame which reported deaths in the 2018 floods and subsequently to Dodowa and Prampram. Apollonio et al. (2016) and Dewan and Yamaguchi (2008) studies in Cervaro Basin (Italy) and Greater Dhaka respectively also identified that regulating services suffer when natural and

semi-natural covers reduce in size. This is because new artificial concrete surfaces prevent infiltration and increase the speed of run-offs.

Table 15: Regulating ecosystem services for 1988 and 2018

Responses	Dangme (n=510)		Ga (n=255)	
	Dodowa (n=255)	Prampram (n=255)	Ga Mashie (n=255)	Teshie Maame (n=255)
Rainfall frequency for 2018 (currently) %				
Very frequently	1.2	0.8	0.0	0.4
Frequently	5.1	1.2	0.4	0.4
Occasionally	87.5	47.5	33.3	56.5
Rarely	5.9	50.6	56.5	28.6
Very rarely	0.4	0	9.8	14.1
Total	100.0	100	100.0	100.0
Rainfall frequency for 1988 (30yrs ago) %				
	Dodowa	Prampram	Ga Mashie	Teshie Maame
Very frequently	22.1	14.5	17.7	18.8
Frequently	10.3	38.2	36.0	35.1
Occasionally	67.1	46.1	42.7	36.3
Rarely	0.0	1.3	3.7	9.8
Very rarely	0.5	0	0.0	0.0
Total	100.0	100.0	100.0	100.0
Temperature intensity for 2018 (current)%				
Response	Dodowa	Prampram	Ga Mashie	Teshie Maame
Very high	12.2	4.7	63.1	19.2
High	11.0	10.4	18.8	32.5
Neutral	72.2	67.8	14.1	36.1
Low	4.7	17.1	2.4	7.8
Very low	0.0	0.0	1.6	4.3
Total	100.0	100	100.0	100.0
Temperature intensity for 1988 (30yrs ago)%				
Response	Dodowa	Prampram	Ga Mashie	Teshie Maame

Table 15 cont'd

Very high	11.7	15.8	4.9	8.8
High	59.6	22.4	23.2	46.1
Neutral	22.1	60.5	54.3	33.3
Low	3.7	1.32	5.4	6.8
Very low	2.8	0.0	12.2	4.9
Total	100.0	100.0	100.0	100.0

Quality of air for 2018 (current)%

Response	Dodowa	Prampram	Ga Mashie	Teshie Maame
Very good	18.4	28.6	1.2	2.0
Good	63.5	25.1	24.7	19.2
Somewhat good	8.6	32.9	31.4	27.8
Poor	9.4	12.5	34.1	16.5
Very poor	0.0	0.8	8.6	34.5
Total	100.0	100	100.0	100.0

Quality of air for 1988 (30yrs ago)%

Response	Dodowa	Prampram	Ga Mashie	Teshie Maame
Very good	25.4	44.7	36.6	48.0
Good	71.4	35.5	37.8	39.2
Somewhat good	3.3	19.7	18.9	7.8
Poor	0.0	0	5.5	2.9
Very poor	0.0	0	1.2	2.0
Total	100.0	100	100.0	100.0

Source: Osman, 2018

Temperature was attested by respondents to be on the rise with Ga Mashie having the most of responses for very high temperature (63.1%) and Prampram, the least for high temperature in the community currently (2018) (Table 15). Tolle et al (2016) study in Southeast Asia and that of Ngwana et al. (2010) in South Africa hold that the absorptive ability of trees is replaced with heat generation from concrete surfaces in recent times, generating urban heat systems.

Last on regulating services was air quality. Responses were in the negative at all the communities visited. In Ga Mashie, a lady claimed:

Years back, in the evening we used to come from Avanor to Russia for fresh air as there were a lot of coconut trees but now smoke, smoke and scent from the shore, Korle and abattoir

[FGD: Female Aged, Ga Mashie, 22nd March, 2018].

Dodowa and Prampram which were far from the urban core had more respondents claiming air quality was within the range of good (63.5% - Dodowa and 19.2% - Prampram) and very good (18.4% - Dodowa and 28.4% - Prampram) currently (2018) (Table 15). The communities which experienced a sharp drop in quality of air was Ga Mashie and Teshie Maame as responses for very good air dropped from 36.6% to 1.2% for Ga Mashie and 48.0% to 2.0% for Teshie Maame between 1988 and 2018 (Table 15). Air quality was compromised as the rate of air filtering was reduced when the natural and semi-natural cover was reduced. It is no surprise that Dodowa had more responses for good air quality as the area still had more natural and semi-natural vegetation cover. Also, Dodowa's closeness to the forest belt, the Eastern region, can contribute to good air quality.

Supporting services

Supporting services were measured in terms of soil fertility. Focus group discussants were of the opinion that soil fertility within their community was not good and has reduced over time. In Dodowa, one said:

We apply fertilizers because the fertility of the soil has reduced and does not support farming activities as it used to be previously [FGD: Male Aged, Dodowo, 12th April, 2018].

There is generally poor soil quality in the Greater Accra region, and this has been noted and documented long ago. For example, the Governor of the Gold Coast (now Ghana) in 1933 wrote to England about the livelihood of Ga people and describes their soil as:

Their (people of Accra) lands are not as good as those in Akwapim or Akim for planting purposes [Extract: Native Affairs of Accra, 1933, Ghana Public Records and Archives].

This is because the region is in a coastal savannah zone and its soil is mainly clay with low nutrients but increasing natural and semi-natural land cover change further stress soil quality. Adugna and Abegaz (2016) studies in Northeast-Wellega (Ethiopia) also confirmed the decrease in supporting services provided by natural and semi-natural land covers. This, they explained, was as a result of the clearing of immediate vegetation and exposing the soil to the elements of the weather and other anthropogenic activities. This also has effects on soil fertility as it encourages high run-offs and leaching which make the soil infertile; hence, the application of fertilizers. Also, Tezera et al. (2015) as well as Sharma et al. (2011) studies explain that tons of soil are washed away as natural and semi-natural land covers decrease. This explained the high incidence of wetlands in Greater Accra Region. Connecting fertiliser application and lagoons, there is a likelihood of biomagnification from fertilizers carried in run-offs that end up in the aquatic food chain of lagoons in the study community. Consumption of aquatic products from the lagoons with

fertilizer run-offs can have health implications for consumers as postulated by Bowen et al. (2007) and Wadhwani (2018).

Cultural services

Natural and semi-natural land covers as places of home (sense of place) and spirituality were the measures for cultural services. On natural and semi-natural land covers offering a sense of place, a young male in Dodowa responded that:

> As soon as I meet the green vegetation when coming from Accra (central) then I know I am home [FGD: A Male Youth, Dodowa, 14th April, 2018].

With respect to natural and semi-natural land covers being a place of solitude and health rejuvenation, an aged male focus group discussant in Teshie Maame also remarked:

> In the olden days, you visit the beach and you can relax and think about so many things in your life. You will be refreshed under the trees; but now, there are no coconut trees to sit under. You have to be in your room or sit under the community shade which can be noisy [FGD: Female Aged, Teshie, 12th April, 2018].

Survey respondents still had a strong connect with natural and semi-natural land cover with most of the responses within agree and strongly agree for both currently (2018) and thirty years ago (Table 16). This complements the focus group responses. In terms of natural and semi-natural land cover providing solitude for Ga/Dangme currently, Prampram (72.5%) and Dodowa (66.3%)

had more respondents agreeing to this assertion than the other Ga groups because of their closeness to natural and semi-natural land cover.

Table 16: Cultural services to Ga/Dangme by natural and semi-natural land cover

Responses	Dangme (n=510)		Ga (n=510)	
	Dodowa (n=255)	Prampram (n=255)	Ga Mashie (n=255)	Teshie Maame (n=255)
Connect to natural and semi-natural land cover currently				
Strongly agree	0.8	4.7	16.9	4.3
Agree	66.3	72.5	55.3	47.8
Neutral	29.8	17.3	20.4	11.8
Disagree	2.4	0.8	2.7	27.1
Strongly disagree	0.8	4.7	4.7	9.0
Total	100.0	100.0	100.0	100.0
Connect to natural and semi-natural land cover current 30 years				
	Dodowa	Prampram	Ga Mashie	Teshie Maame
Strongly agree	15.0	40.8	25.0	29.4
Agree	73.2	47.4	43.3	50.0
Neutral	9.9	11.8	21.3	15.7
Disagree	0.9	0.0	2.4	4.9
Strongly disagree	0.9	0.0	7.9	0.0
Total	100.0	100.0	100.0	100.0
Natural and semi-natural land cover & spirituality current (2018)				
	Dodowa	Prampram	Ga Mashie	Teshie Maame
Strongly agree	2.7	7.5	12.5	4.3
Agree	9.8	67.8	12.2	38.8
Neutral	24.7	19.2	22.4	6.3
Disagree	38.4	1.2	5.1	36.1
Strongly disagree	24.3	4.3	47.8	14.5
Total	100.0	100.0	100.0	100.0

Table 16 contd

Natural and semi-natural land cover & spirituality 30 years ago (1988)	Dodowa	Prampram	Ga Mashie	Teshie Maame
Strongly agree	10.3	42.1	17.1	29.4
Agree	16.0	51.3	7.9	26.5
Neutral	13.1	5.3	22.6	11.8
Disagree	47.9	1.3	7.9	28.4
Strongly disagree	12.7	0.0	44.5	3.9
Total	100.0	100.0	100.0	100.0

Source: Osman, 2018

In terms of natural and semi-natural land cover and spirituality, most of the respondents were neutral as they do not believe or disbelieve the existence of gods in natural and semi-natural land cover currently (2018). The other responses were, however, skewed toward disagree and strongly disagree, with Ga Mashie (47.8%) having the highest frequency for strongly disagree while Prampram (4.3%) had the least.

Respondents in Prampram and Teshie Maame still held high spirituality for natural and semi-natural land cover. Most of the respondents in Prampram and Teshie Maame fell within strongly agree (7.5%-Prampram and 4.3%-Teshie Maame) and agree (67.8%-Prampram and 38.8%-Teshie Maame) responses (Table 16). The divided opinion on the connection between natural and semi-natural land cover and spirituality was not different from focus group discussions and interviews. In Ga Mashie, the aged female focus group claimed:

There is no goddess in the lagoon; she should be gone by now with all the pollution. If she is there we don't believe in her as we are Christians [FGD: Female Aged, Ga Mashie, 22nd March, 2018].

The male focus group discussants in Ga Mashie, however, disagreed as one claimed:

> *Yeah, the Korle goddess is still there (in the lagoon). Last year, in May, before the clearing of the farms, we invoked her, and she responded. I was personally present when she was invoked* [FGD: Male Aged, Ga Mashie, 22nd March, 2018].

In Teshie Maame, it is believed that the spirit is around but limited to a space occupied in the Kphesie lagoon. The traditional priest asserted that:

> *Kphesie (goddess) has just moved aside to a small part of the lagoon which is not really polluted. She is there as she brings us messages* [Interview: Teshie Priest, Teshie Maame, 29th April, 2018].

In Dodowa, there was a belief in the spirituality of natural and semi-natural land covers but only that the spiritual powers and influence were now limited. An aged male focus group discussant in Dodowa remarked:

> *Because of religion (Christianity), we are eventually destroying some of the powers of these deities/gods in the Dodowa Forest, making them less effective compared to the olden days* [Interview: Asafoatse, Dodowa, 18th April, 2018].

Regarding land cover as a place to learn, the deputy to the high priest of Teshie Maame remarked:

> *Formally, the deity (Kphesie) can lead you to a quiet place where you will be in the shrubs for some days. She will then teach you so many things* [Interview: Teshie Priest, Teshie Maame, 29th April, 2018].

The link between cultures, natural and semi-natural land cover and spirituality is a common interaction for most indigenous cultures such as the Amazonian societies (Butler, 2017), Amis people of Taiwan (Chang, 2015), Aborigines of Australia (Fuary, 2009) etc. but such bonds get broken with urbanisation, formal education and Abrahamic religion influence. Reindolf (1895) and Quarcoopome (1993) asserted that the disconnection between spirituality and natural and semi-natural land covers can be traced to the agenda of Christian missionaries who largely opposed such beliefs and restrained the Ga/Dangme. The change in beliefs about the association between nature and spirits has implications for the preservation of Ga/Dangme culturalscapes such as the Dodowa forest, Korle lagoon, Kphesie and other sacred groves in the Greater Accra Region. As Walwyn (2014) claimed, the dissociation between natural and semi-natural land covers and spirituality was one of the main reasons for the destruction of most sacred groves known as Kaya forests in Kenya.
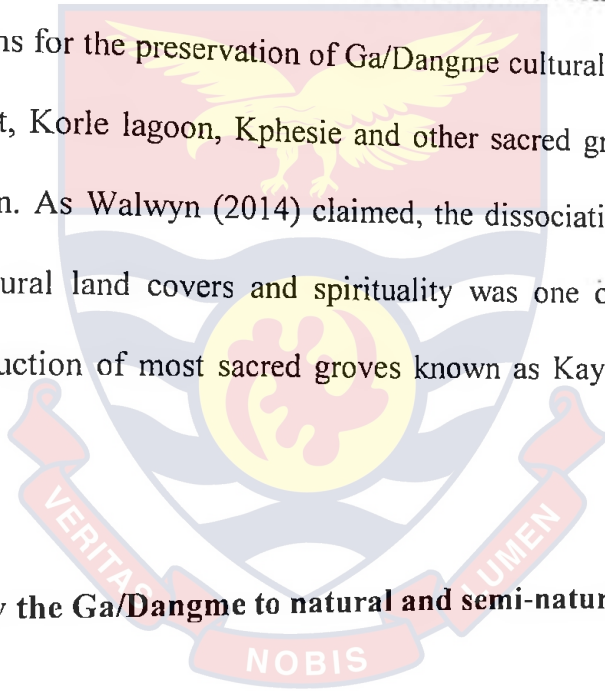
Services provided by the Ga/Dangme to natural and semi-natural land cover

Protecting services

The first service provided by the Ga/Dangme to natural and semi-natural land covers was the protective service through traditional laws. For natural and semi-natural land covers deemed to have spiritual connection to the Ga/Dangme people have the *Wolomei* (traditional priest) who is an intermediary between them and the people. Also, there are regulations about the accessibility and

usage of these natural and semi-natural land covers. The *Asafoatse* for Dodowa Forest claimed:

> There is a law that you can't cross the white stone in the Dodowa forest and also walk through it with your canvas. If you violate it you have to slaughter a goat to perform rituals [Interview: Asafoatse, Dodowa, 18th April, 2018].

In instances where traditional laws were not protective enough, physical walls were erected to protect the sacred natural and semi-natural land covers. In extreme cases, the *Wolomei* or stewards took individuals to court for selling parts of the sacred natural and semi-natural land covers.

Survey respondents were of the opinion that traditional laws were more effective 30years ago in protecting sacred covers than in recent times. Responses for strongly agree and agree for 30years ago were over 20% for each of the communities, respectively (Table 17). On traditional laws helping to protect natural and semi-natural land covers for 2018, most respondents were in favour of neither agree nor disagree led by Prampram (63.2%) and least being Teshie Maame (12.0%).

Protecting services by the Ga/Dangme to natural and semi-natural land covers take root from the spiritual perception and ritual regulations which allow traditional laws to be created for their management. This follows the social interactionists' idea of laws for management and regulation of social behaviour and perception. But the situation is different now because belief systems and allegiance to traditional systems of governance have reduced as more Ga/Dangme will rather adhere to the formal laws than the traditional laws. This is because of the fact that there exist formal adjudication and enforcement of the

formal laws or regulations. As claimed by Thani et al. (2015), the formal systems can persecute but informal systems cannot.

Table 17: Traditional laws help in protecting natural and semi-natural land cover

Responses	Dangme (n=510)		Ga (n=510)	
	Dodowa (n=255)	Prampram (n=255)	Ga Mashie (n=255)	Teshie Maame (n=255)
Traditional laws help in protecting the land cover in 2018 (Currently)(%)				
Strongly agree	2.0	7.2	6.4	3.2
Agree	6.8	12.8	7.2	8.4
Neither agree or disagree	24.4	63.2	33.6	12.0
Disagree	13.2	0.8	37.6	34.4
Strongly disagree	53.6	16.0	15.2	42.0
Total	100.0	100.0	100.0	100.0
Traditional laws help in protecting the land cover 30years ago (%)				
	Dodowa	Prampram	Ga Mashie	Teshie Maame
Strongly agree	26.6	21.2	27.5	24.6
Agree	19.8	31.4	38.6	23.5
Neither agree or disagree	34.0	40.9	22.3	33.3
Disagree	12.1	1.5	8.8	8.7
Strongly disagree	7.5	5.1	2.8	9.8
Total	100.0	100.0	100.0	100.0

Source: Osman, 2018

Moreover, constant fights between chiefs reduced their influence on the people and, thus, hinder their authority to enforce traditional laws. In Teshie Maame, the absence of a chief could be linked to the high number of respondents who strongly disagree to traditional laws having an influence on protective services to nature.

Supporting services are belief systems of the Ga/Dangme that help in protecting natural and semi-natural land covers. Supporting services were low as most indigenes of the study area were Christians and do not subscribe to traditional beliefs. Most respondents strongly disagree and disagree that the Ga/Dangme's beliefs were enough to protect natural and semi-natural land cover (Table 18). For 1988 Prampram was the community with the highest frequency of respondents who strongly agree (63.1%) followed by Dodowa (53.7%) (Table 18) that beliefs help in protecting natural and semi-natural land cover within the communities. Responses for thirty years ago were in favour of traditional beliefs being a major player in the protection of natural and semi-natural land cover.

As Christianity takes over, traditional beliefs subside and people have no fear in precautions attached to the breaking of traditional laws governing natural and semi-natural land cover. In Dodowa, a male respondent who was a motor rider confirmed the dwindling belief in traditional systems to protect natural and semi-natural land cover. He said:

The priest did not allow you entry to the forest. Do you want

to go to the forest? I can ride you to the back because the

gods are lenient now.

Table 18: Beliefs supporting the protection of natural and semi-natural land cover

Responses	Dangme (n=510)		Ga (n=510)	
	Dodowa (n=255)	Prampram (n=255)	Ga Mashie (n=255)	Teshie Maame (n=255)
Traditional beliefs helps in protecting the land cover in 2018 (currently) (%)				
Strongly agree	1.9	7.1	6.3	3.1
Agree	6.7	0.8	15.3	8.2
Neither agree or disagree	13.3	12.9	13.3	12.2
Disagree	24.3	16.1	33.7	34.5
Strongly disagree	53.7	63.1	31.4	41.9
Total	100.0	100.0	100.0	100.0
Traditional beliefs helps in protecting the land cover 30 years ago (%)				
	Dodowa	Prampram	Ga Mashie	Teshie Maame
Strongly agree	17.8	21.1	38.4	8.8
Agree	22.1	31.6	32.9	23.5
Neither agree or disagree	38.0	40.8	18.9	33.3
Disagree	13.6	1.3	7.3	24.5
Strongly disagree	8.5	5.3	2.4	9.8
Total	100.0	100.0	100.0	100.0

Source: Osman, 2018

This remark means people have less or no fear in the ability of deities to invoke curses and misfortunes in their lives for going against them. This works against the main tenets of Kpele teachings where deities are to be revered and the traditional beliefs serve as protection for their abodes.

Enhancing services

Enhancing services was measured in terms of pruning trees to rejuvenate it. In Prampram, pruning is undertaken on trees considered to have family spirits or where ancestors lodged when they first settled in Prampram. The pruning is done by the traditional priest and priestess to signify a new beginning and mark the beginning of the *Kpledum* Festival. From the survey data, Prampram (63.5%) and Dodowa (25.5%) had more respondents claiming trees are pruned to enhance their growth in 2018 (Table 19). However, most respondents in Ga Mashie (85.1%) and Teshie Maame (69.0%) indicated very rarely as a response because there is virtually a nonexistence of trees in the community.

Table 19: Pruning of trees

Responses	Dangme (n=510)		Ga (n=510)	
	Dodowa (n=255)	Prampram (n=255)	Ga Mashie (n=255)	Teshie Maame (n=255)
Pruning of trees in 2018 (currently)				
Always	0.8	2.4	0.0	0.0
Often	7.8	3.1	0.4	1.6
Sometimes	25.5	63.5	1.6	14.5
Rarely	38.0	18.8	12.9	14.5
Very rarely	27.8	12.2	85.1	69.4
Total	100.0	100.0	100.0	100.0
Pruning of trees 30 yrs ago				
	Dodowa	Prampram	Ga Mashie	Teshie Maame
Always	2.8	7.9	0.6	2.0
Often	6.6	11.8	0.6	9.8
Sometimes	29.1	63.2	11.0	37.3
Rarely	46.9	10.5	19.5	19.6
Very rarely	14.6	6.6	68.3	31.4
Total	100.0	100.0	100.0	100.0

Source: Osman, 2018

In these communities. Pruning was mostly undertaken on trees with cultural significance. These trees are mostly sited in front of family (*We*) houses and have small shrines/posts for performing rituals. They are believed to house spirits of the *We* so they are nurtured to enhance growth by pruning before festivals or during funerals. Its symbolic meaning is the cleansing of the house to pave way for the commencement of festivals in the community. Trees grow better when they are pruned; as Comberti et al. (2015) assert, the Amazon forest has imprints that indicate that humans/indigenes pruned most of the trees.

Restoring services

For restoring services, responses for very rare and rarely were very high, with Ga Mashie having the highest frequency for very rarely both currently-2018 (82.7%) and thirty years ago-1988 (61.0%) (Table 20). Burning of vegetation to restore them currently (2018) had low responses for metropolitan Ga Mashie (94.5%) and municipal Teshie Maame (65.5%). This result was anticipated as these areas lack the natural and semi-natural land cover to be burnt (Table 20). In Dodowa and Prampram, restorative services in burning and planting are sometimes provided by respondents in current times. Restorative services have been provided by Ga/Dangme communities in burning vegetation mainly to clear the land for farming and, in turn, restore the land. It is such burning that Reindorf (1895) claimed the Cathegians called the mountain of fire when they explored the coast of Accra plains. Such an activity is a common practice in savannah ecosystems. As Whitehead et al. (2003) claimed, it is a management technique adopted by indigenes for the restoration of vegetation especially in the savanna regions. But such burning activities were on the

downturn as respondents claimed they rarely burn for restorative purposes. As one may ask: "where is the vegetation to burn?

Table 20: Planting of trees and other vegetation

Responses	Dangme (n=510)		Ga (n=510)	
	Dodowa (n=255)	Prampram (n=255)	Ga Mashie (n=255)	Teshie Maame (n=255)
Planting of tree in 2018 (Currently)				
Always	2.0	0.8	0.0	0.4
Often	3.9	1.2	0.4	0.8
Sometimes	25.9	48.2	5.1	15.7
Rarely	36.5	35.3	11.8	5.9
Very rarely	31.8	14.5	82.7	77.3
Total	100.0	100.0	100.0	100.0
Planting of tree 30 years ago				
	Dodowa	Prampram	Ga Mashie	Teshie Maame
Always	2.3	9.2	1.2	4.9
Often	7.5	11.8	0.0	13.7
Sometimes	31.5	57.9	17.7	38.2
Rarely	49.3	13.2	20.1	13.7
Very rarely	9.4	7.9	61.0	29.4
Total	100.0	100.0	100.0	100.0
Burning of vegetation to restore in 2018 (Currently)				
	Dodowa	Prampram	Ga Mashie	Teshie Maame
Always	1.6	1.6	0.0	0.4
Often	5.9	3.5	0.0	3.1
Sometimes	19.2	12.9	1.2	15.3
Rarely	51.4	16.5	4.3	14.5
Very rarely	22.0	65.5	94.5	66.7
Total	100.0	100.0	100.0	100.0
Burning of vegetation to restore in 2018 (Currently)				
	Dodowa	Prampram	Ga Mashie	Teshie Maame

Table 20 contd'

Always	2.3	6.6	0.6	2.0
Often	5.2	14.5	0.0	12.7
Sometimes	25.4	63.2	5.5	41.2
Rarely	54.0	6.6	6.7	14.7
Very rarely	13.1	9.2	87.2	29.4
Total	100.0	100.0	100.0	100.0

Source: Osman, 2018

On planting, respondents hardly engaged in planting, but stewards of the Dodowa forest have indicated that they plant new trees within the forest to restore it from excess encroachment and lumbering. The advantage of tree planting is its future yield of regulating services such as providing quality air and reducing the temperature in the community. Scanga and Leopold (2012) and Questad et al. (2011) claimed that restorative services have the ability to improve the biodiversity of any area; hence, it is important that such activities are undertaken to restore the natural and semi-natural land covers in the Ga/Dangme communities and the Greater Accra Region at large.

Landscape ecosystem services index

An index (0-0.20-Very low, 0.21-0.40-Low, 0.41-0.6-Moderate, 0.61-0.8 High and 0.81-1- Very High) for ecosystem services was generated based on survey responses (Figure 17). This index was necessary to compare ecosystem services across the various Ga/Dangme communities study. Also it helped in comparing results from cultural change index and ecosystem services. The index was computed by generating the mean of various assigned to the individual responses (always-1, often-0.75, sometimes-0.5, rarely-0.25 and very

rarely-0). Thirty (30) years ago, ecosystem services were moderate (0.54) but reduced to low (0.39) for 2018.
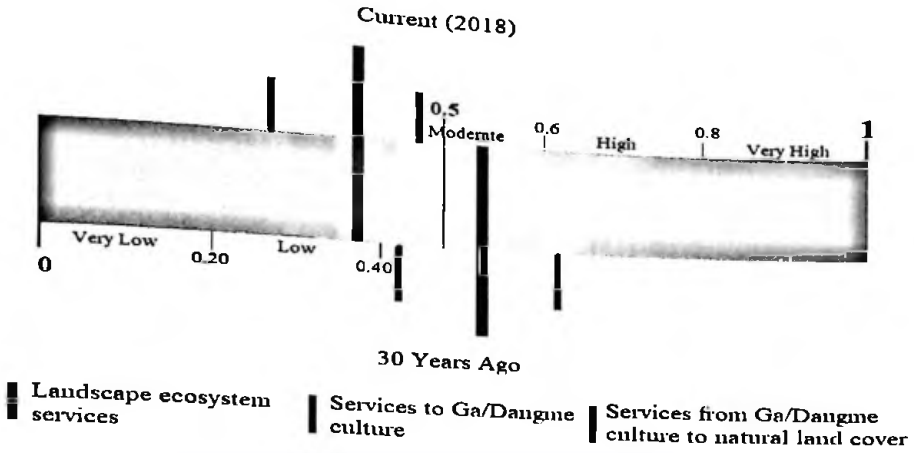
Figure 17: Landscape ecosystem services index for 2018 and 30 years ago

Source: Osman, 2018

Services provided by natural and semi-natural land covers to the Ga/Dangme reduced from 0.63 to 0.49 while services from Ga/Dangme to natural and semi-natural land covers reduced from 0.45 to 0.29 (Figure 17; Table 21). Services provided by natural and semi-natural land covers in the last 30 years for the Ga/Dangme were high in Prampram at 0.77 while Ga Mashie had the least services at 0.52 (Table 21). This pattern remained as Prampram still provided the highest services rendered to natural and semi-natural land covers, with Ga Mashie providing the least. However, the story changed with the current year under study as Dodowa enjoyed the highest services provided by natural and semi-natural and semi-natural land covers (0.59) while Teshie Maame (0.39) had the least services. Interestingly, the results from the ecosystem service index and that of the culture index related to land cover were correlated.

Communities with high culture change index had low ecosystem services and vice versa. Teshie Maame, which had the highest culture change

index at 0.51, had the least ecosystem services at 0.29. Prampram, with the least culture change related to land cover (0.31), had the highest in terms of ecosystem services (0.49) (Table 21). One can conclude that as land cover changes, culture also changes; thus, affecting the interaction between them and consequently, the services each provides for the other. Theoretically, the ecosystem services between natural and semi-natural land covers and the Ga/Dangme could be further explained by the interactionism theory complemented by the theory of mutualism. Physical objects within the Ga/Dangme landscape were trees, lagoons, rivers and animals, confirming Blumer's (1986) assertion.

Table 21: Ecosystem services index per communities

Community	Services to Ga/Dangme culture	Services from Ga/Dangme culture to natural and semi-natural land cover	ESI
Services provided currently (2018)			
Dodowa	0.59	0.31	0.45
Ga Mashie	0.45	0.22	0.33
Prampram	0.53	0.44	0.49
Teshie Maame	0.39	0.18	0.29
Average	0.49	0.29	0.39
Services 30 years ago			
Dodowa	0.64	0.41	0.53
Ga Mashie	0.52	0.28	0.40
Prampram	0.77	0.66	0.71
Teshie Maame	0.63	0.45	0.54
Average	0.63	0.45	0.54

Source: Osman, 2018

On the other hand, traditional institutions such as the *Wolomo* were the social actors who ensure the protection of natural and semi-natural land covers. Concepts and ideas of interactionism could be expressed through the *Kpele* teachings which see natural and semi-natural land covers as being infused with supernatural beings and, recently, the doctrine of Abrahamic religions.

On the social dimension, provisional services such as food were defined by social systems of the Ga/Dangme created centuries ago. Cultural services provided by natural and semi-natural land covers to the Ga/Dangme were socially constructed from education, wellness, spirituality and sense of place and were embedded in the social orientation of individual members of the Ga/Dangme communities. This supported Stryker's (2008) assertion regarding social systems and their influence on interaction.

Furthermore, the traditional laws which govern specific natural and semi-natural land covers such as the Korle, Kphesie and Dodowa forest were based on years of social interaction with nature and laws made to further entrench these interactions. However, the Ga/Dangme, within the social domain, were not just followers of traditionally and socially constructed concepts and ideas; hence, modified them with the new socially constructed meanings they were exposed to (churches, government and other cultures). It is these new social interactions that have affected individual interactions with natural and semi-natural land covers, resulting in diverse opinions on the spirituality of covers and decreasing ecosystem services.

In addition, the mutualism theory best explained the landscape ecosystem services index generated from the results of services provided to the Ga/Dangme and services provided by the Ga/Dangme to natural and semi-

natural land cover. Largely, mutualism is concerned with mutual benefits of the interaction between two entities as claimed by Bronstein (2015). There was an exchange between the Ga/Dangme and the natural and semi-natural land cover. In Landry's (2010) argument on mutualism, he clearly stated that mutualism doesn't necessarily lead to equal benefits. This is reflected in the landscape ecosystem index where 30 years ago and currently, the natural and semi-natural land cover provided more services to the Ga/Dangme than the Ga/Dangme provided to it. It, also, clearly showed that since the services provided by the Ga/Dangme to the natural and semi-natural land cover were minimal, the services provided by the natural and semi-natural land cover to the communities in the current year under study were also affected. This was evident as natural and semi-natural land cover services dropped from moderate to low. By projection, it is likely that these services will further drop to the very low category within the next 30 years if similar conditions persist.

This notwithstanding, one cannot solely blame the Ga/Dangme for the little benefits granted to natural and semi-natural land cover as there was an increase in urban population and an inclination towards government laws. As Tylianakis et al. (2008) asserted, the blame cannot be apportioned to only people within an ecosystem, but other anthropogenic factors far beyond the immediate ecosystem. To enhance the landscape ecosystem index of the Ga/Dangme and the entire Greater Accra, the advice of Schwartz et al. (2006) must be adhered to as they recommend restoration measures, preservation of habitats and collaboration between all persons affected.

Chapter seven started with an introduction to the chapter by outlining the intended headings to be discussed. Per the outline, results presented were on ecosystem services provided by natural and semi-natural land covers to the Ga/Dangme, services provided by the Ga/Dangme to natural and semi-natural land covers and the generation of a landscape ecosystem service index from these two services. Services provided by natural and semi-natural land covers to the Ga/Dangme include provisional, regulating, supporting and cultural services. On the other hand, services provided by the Ga/Dangme to natural and semi-natural land covers were protecting, restoring, enhancing and supporting.

The results clearly indicated that services provided by natural and semi-natural land covers outweigh those provided by the Ga/Dangme. Also, services provided by these two entities tend to reduce with time; as such, have reduced over these 30 years. This was supported by the landscape ecosystem index which indicated that initially (30 years ago), services to the Ga/Dangme were within the moderate domain while those by the Ga/Dangme were in the low domain. However, since this balance was not checked, services by the natural and semi-natural land covers have also dropped into the low domain currently. In discussing the results, empirical analogies per the results were given while highly supported by the interactionism and mutualism theories.

CHAPTER EIGHT

CULTURAL SUSTAINABILITY AMONG THE GA/DANMGE OF GREATER ACCRA REGION, GHANA

Introduction

Sustainability is a core component of modern discourse towards ensuring the preservation of humanity and nature. The sustainability discourse is often centred on the economy, society and environment with less focus on culture; yet culture is the binding force for all the three dimensions of sustainability. Thus, this chapter presented results on achieving sustainability through culture using the following indicators as subheading: cultural heritage, vitality, diversity, locality, economic viability, eco-cultural resilience and education. Lastly, a section on culture sustainability index was discussed using the indicators to ascertain whether the culture of the Ga/Dangme is sustainable in the present context.

Heritages of the Ga/Dangme culture

Heritages are handed-over tangible and intangible aspects of society, making their preservation by the current generation crucial for sustainability. In this regard, the study measured heritage as natural and semi-natural physical entities, monuments and festivals in the Ga/Dangme communities. The natural and semi-natural physical entities were wetlands/lagoons, forests and trees with cultural importance to the Ga/Dangme. Monuments include castles/forts, scared groves and wetlands and other colonial structures such as merchant houses and offices in the communities. Regarding festivals, only *Homowo* was considered

because all the four Ga/Dangme communities celebrate this festival. These
heritages were measured per their significance, accessibility and protection for
future generations. The significance looked at the importance each respondent
placed on the heritages, thus ranging from aesthetic, education, identity,
income, inspiration to spiritual. Accessibility looked at how easily one was
allowed to enter or interact with heritages while protection focused on measures
to safeguard the heritages. Accessibility and protection were both measured on
a likert scale.

Results indicated that cultural forest and trees had accessibility
restrictions (physical-walls) in all the communities studied. The Dodowa forest,
although not walled, has customary restrictions on access. The *Asafoatse*
explains that:

> With Dodowa forest, one cannot just enter the forest without
>
> certain authorisations or rituals performed [Interview:
>
> Asafoatse, Dodowa, 18th April, 2018].

But these restrictions were flouted by some community members. A biker the
research team met on the way from the forest offered the team a ride saying:

> The priest did not allow you entry into the forest. Do you want
>
> to go to the forest? I can ride you to the back, a lot of people use
>
> that unapproved entry point into the forest

As the survey responses showed, most respondents in Ga Mashie (95.3%) and
Teshie (60.4%) claimed they had less physical accessibility to cultural trees and
forests (Table 22).

Table 22: Physical accessibility, significance and protection of cultural trees and forest

Significance (%)	Dangme (n=510)		Ga (n=510)	
	Dodowa (n=255)	Prampram (n=255)	Ga Mashie (n=255)	Teshie (n=255)
Aesthetic	0.8	0.0	2.6	9.3
Education	19.1	0.8	1.7	13.0
Identity	20.3	36.7	20.5	14.1
Income	11.2	2.7	0.0	19.3
Inspiration	24.1	23.9	8.5	10.0
Spiritual	16.2	31.9	35.9	21.2
None	8.3	4.0	30.8	13.0
Total	100.0	100.0	100.0	100.0

Accessibility (%)	Dodowa	Prampram	Ga Mashie	Teshie
Highly accessible	34.1	7.1	1.2	0.8
Moderately accessible	29.0	46.7	2.7	16.1
Less accessible	30.6	2.7	0.8	22.7
Not accessible	6.3	43.5	95.3	60.4
Total	100.0	100.0	100.0	100.0

Protection (%)	Dodowa	Prampram	Ga Mashie	Teshie
High protection	6.3	4.2	16.7	3.3
Moderate protection	31.0	88.9	41.7	14.3
Low protection	55.6	6.3	33.3	75.8
No protection	7.1	0.7	8.3	6.6
Total	100.0	100.0	100.0	100.0

Source: Osman, 2018

The Dangme side had moderate accessibility to cultural trees and forest because there were less physical barriers to the trees and forests compared to Ga Mashie and Teshie. Protection of trees and forests was lower for Dodowa (55.6%), accounting for the increase in the degradation of the Dodowa Forest.

Table 23: Physical accessibility, significance and protection of sacred wetlands and lagoons

Significance	Dangme (n=510)		Ga (n=510)	
	Dodowa (n=255)	Prampram (n=255)	Ga Mashie (n=255)	Teshie (n=255)
Aesthetic	3.6	0.9	5.8	15.4
Education	12.3	13.6	1.4	14.3
Identity	17.8	36.1	26.5	14.6
Income	4.2	1.1	2.6	18.7
Inspiration	14.8	28.4	14.2	11.6
Spiritual	8.4	20.0	37.9	16.6
None	38.9	0.0	11.6	8.9
Total	100.0	100.0	100.0	100.0
Accessibility	Dodowa	Prampram	Ga Mashie	Teshie
Highly accessible	0.0	30.6	37.6	14.5
Moderately accessible	0.0	54.5	26.3	25.9
Less accessible	0.0	1.6	7.1	22.4
Not accessible	0.0	0.0	26.7	26.3
Not applicable	100.0	13.3	2.4	11.0
Total	100.0	100.0	100.0	100.0
Protection	Dodowa	Prampram	Ga Mashie	Teshie
High protection	4.3	2.0	23.9	7.1
Moderate protection	14.9	55.3	18.0	6.7
Low protection	22.7	5.1	32.2	55.3
No protection	58.0	37.6	25.9	31.0
Total	100.0	100.0	100.0	100.0

Source: Osman, 2018

The significance attached to this heritage of cultural trees and forests was mostly in the domain of spirituality (Ga Mashie 35.9%, Prampram-31.9%, Teshie-21.2% & Dodowa-16.2%) and identity (Prampram-36.7%, Ga Mashie-20.5%,

Dodowa-9.0% & Teshie-14.1%) (Table 22). The least significance attached to these cultural trees and forests was their aesthetic importance. The Dangme side had the least of aesthetic value to cultural trees and forests as Prampram had 0.0% and Dodowa with 0.8%. Most respondents attached their identity (Prampram-36.1%, Ga Mashie-26.5%, Dodowa-17.8% & Teshie 14.6%) and spirituality (Ga Mashie-37.9%, Prampram-20.0%, Teshie-16.6% & Dodowa-8.4%) to wetlands and lagoons (Table 23).

Wetlands and lagoons had more responses for moderate accessibility with Prampram having the greatest accessibility (54.5%). Ga Mashie had the highest responses for high level of accessibility with a percentage over 37.6%. Soini and Birkeland (2014) claimed that limiting accessibility can lead to heritage unsustainability. But this cannot be true for wetlands because high-level accessibility can rather lead to unsustainable heritages since natural and semi-natural heritages have to be regulated to prevent overuse and pollution. This was evident in the wetland destruction of the Korle Lagoon and its wetlands. High accessibility was also blamed by Nelson (2017) as the cause of the destruction of the natural and semi-natural heritages of the Kogi (an indigenous group in Colombia) and Native Indians in Wyoming (USA).

However, the solution is not in limiting access to these natural heritages like walling them as seen in most Ga communities with cultural trees and forests; but, educating people about the significance of these natural and semi-natural heritages. The significance attached to natural heritages was high in identity and spirituality but, interestingly, this did not reflect in their conservation. However, it presents a window of hope which can be used to rally Ga/Dangme's help in the conservation of their natural and semi-natural

heritages. Also, a well conserved natural heritage can help stimulate tourism in the respective Ga/Dangme communities. It can break the sharp contrast of wide built concrete in Accra to give tourist and city dwellers to enjoy nature.

In relation to monuments, identity had the highest frequency (Prampram, 34.9%; Ga Mashie, 27.2%; Dodowa, 25.8% & Teshie, 11.7%) followed by education (Dodowa, 27.9%; Teshie, 15.8%; Ga Mashie, 14.9% & Prampram, 12.9%) (Table 24). The high responses for identity attached to monuments can be explained in that forts and castles helped the Ga during wars hence the high association with their identity. This is reflective even during the *Homowo* festival where the *Gbese* quarters visit Usher Fort to perform rituals in honour of Chief Okaidsha who was interred in the fort.

Table 24: Significance, physcial accessibility and protection of monuments

Monuments	Dangme (n=510)		Ga (n=510)	
	Dodowa	Prampram	Ga Mashie	Teshie
Significance	(n=255)	(n=255)	(n=255)	(n=255)
Aesthetic	1.4	0.9	18.2	17.3
Education	27.9	12.9	14.9	15.8
Identity	25.8	34.9	27.2	11.7
Income	11.8	2.1	10.3	19.6
Inspiration	26.5	28.7	13.5	7.9
Spiritual	6.2	20.1	13.9	3.8
None	0.5	0.4	2.0	23.8
Total	100.0	100.0	100.0	100.0
Accessibility	Dodowa	Prampram	Ga Mashie	Teshie
Highly accessible	32.5	32.2	22.7	3.9
Moderately accessible	49.4	48.2	50.6	32.5

Table 24 contd'

	Dodowa	Prampram	Ga Mashie	Teshie
Less accessible	13.7	3.5	16.9	18.8
Not accessible	0.8	0.4	9.8	36.1
Not applicable	3.5	15.7	0.0	8.6
Total	100.0	100.0	100.0	100.0
Protection	Dodowa	Prampram	Ga Mashie	Teshie
High protection	13.3	1.6	42.0	1.6
Moderate protection	60.0	52.2	8.2	6.7
Low protection	17.6	3.1	3.5	21.2
No protection	9.0	43.1	46.3	70.6
Total	100.0	100.0	100.0	100.0

Source: Osman, 2018

Unfortunately, these castles and forts are deteriorating. For instance, the Fort Augustaborg at Teshie is completely deteriorated. This can explain the low identity attached to it by respondents in Teshie. The intangible heritage measured in this study was the Homowo festival which is celebrated by both the Ga and Dangme. Identity was also a major significance attached to the Homowo festival as being the second highest in terms of significance (Table 24). The Homowo festival and its narrative were seen as an inspiration to current Ga/Dangme and everyone as it narrates how the Ga/Dangme came from a point of despair (hunger) to fullness and sustainability. This is a story of humanity to be shared to give the Ga/Dangme hope for their ability to overcome diverse challenges as their ancestors had once done.

Accessibility to Homowo festival was very high in all the study communities but Ga Mashie and Teshie had more responses for high accessibility, with frequencies of 76.9% and 60.4% respectively (Table 25).

Table 25: Significance and customary accessibility of festivals

Significance	Dangme (n=510)		Ga (n=510)	
	Dodowa (n=255)	Prampram (n=255)	Ga Mashie (n=255)	Teshie (n=255)
Aesthetic	0.3	0.6	23.1	12.6
Education	24.2	0.8	12.4	21.0
Identity	24.6	34.6	22.7	19.5
Income	18.3	0.8	6.8	18.7
Inspiration	22.9	23.8	14.3	14.0
Spiritual	9.1	33.2	13.9	12.5
None	0.6	6.1	6.8	1.8
Total	100.0	100.0	100.0	100.0
Accessibility	Dodowa	Prampram	Ga Mashie	Teshie
Highly accessible	47.5	51.8	76.9	60.4
Moderately accessible	23.9	27.8	15.3	17.6
Less accessible	21.6	13.3	6.3	11.4
Not accessible	7.1	7.1	1.6	10.6
Total	100.0	100.0	100.0	100.0

Source: Osman, 2018

In Teshie, an aged male focus group discussant reiterates the high accessibility to festivals without discrimination to other ethnic groups from other regions of Ghana:

At first, we were having seven clans with their individual flags but now we have a lot of people (different groups) coming in with their own flags. Some come from the Northern, Central, Ashanti, all other regions and they come with their own flags [FGD: Male Aged, Teshie, 10th April, 2018].

Festivals are a way of building social bonds between people; hence, opening access to all is great for sustainability. Jarvis, Harris and Tokarchuk (2013)

explained the importance of festivals by saying that they help families to meet up, escape the very humdrum of daily life and, at the same time. be entertained while learning. It is through festivals that younger folks can learn more about their culture in just a short period of time. This notwithstanding, the high accessibility of festivals in Ga/Dangme communities also makes them vulnerable to change. Ga/Dangme festivals are besieged by various persons from other parts of the world and advertising companies, which can lead to acculturation.

Culture commodification theorist Yudice (2003) explain that when foreigners and businesses are highly engaged in indigenous festivals, the cultural essence of the festival can be reduced. This is because cultural importance is substituted for attraction of high inflows both in monetary terms and attendance; hence, the indigenous nature of the festival is lessened to accommodate foreign and marketable ideas.

Vitality of the Ga/Dangme culture

Vitality for cultural sustainability can be achieved through a sense of belonging, education on indigenous cultural practices and respect for traditional institutions (Soini & Birkeland, 2014). Respondents were made to select on a likert scale their sense of belonging, their respect for traditional elders and rating of education on cultural practices. The Ga communities had a higher sense of belonging than the Dangme communities. Ga Mashie (43.5%) had more respondents who claimed they had a high sense of belonging to their respective communities (Table 26).

Table 26: Vitality of the Ga-Dangme culture

	Dangme (n=510)		Ga (n=510)	
	Dodowa (n=250)	Prampram (n=250)	Ga Mashie (n=250)	Teshie (n=250)
Sense of belonging				
Very high	2.4	4.7	22.4	41.6
High	25.5	47.1	43.5	12.5
Moderate	27.1	22.7	10.2	6.3
Low	25.9	0.4	0.4	6.3
Very low	19.2	25.1	23.5	33.3
Total	100.0	100	100	100.0
Education on Ga/Dangme culture	Dodowa	Prampram	Ga Mashie	Teshie
Always	32.9	0.4	20.8	13.7
Often	44.7	7.5	10.6	33.3
Sometimes	5.9	81.6	38.8	28.6
Rare	6.3	8.2	21.2	17.6
Very rare	10.2	2.4	8.6	6.7
Total	100.0	100.0	100.0	100.0
Respect for traditional authority	Dodowa	Prampram	Ga Mashie	Teshie
Very high	6.7	2.7	18.8	13.7
High	29.4	42.0	43.9	25.1
Moderate	14.1	30.6	27.5	34.9
Low	12.5	17.3	3.5	16.5
Very low	37.3	7.5	6.3	9.8
Total	100.0	100.0	100.0	100.0

Source: Osman, 2018

Respondents in Teshie had more responses for very high sense of belonging to their community with responses being around 41.6% (Table 26). An aged female discussant explained her sense of belonging to Teshie as follows:

My family home is here, and my children were born here. Everything in Teshie, our culture, from Kenkey to fish, the way we celebrate Kpanshimo, you will not get it anywhere. You should be here to witness our festival [FGD: Female Aged, Teshie, 12th April, 2018].

Remarks made by the focus group discussants supported the notions held by Palang et al. (2017) that the indicators of culture sustainability were intertwined since the focus group discussants used heritage, family and place of birth in explaining vitality. It also goes to confirm Wu (2013) notion that a sense of place may not be directly gained through the building itself, but may be derived from the interactions with various components of the culture; in this case, food, family, birthplace and festival. The high sense of place expressed by the respondents is a healthy sign towards nurturing communalism and the call for cultural sustainability. This is because the sense of place is the bonding glue for community members, and where it is low, the community is likely to disintegrate.

The vitality of a culture can also be achieved by educating the younger generations to carry on the cultural practices. All communities expressed great concern about the limited ability to educate the younger generation. In Dodowa, a youth female focus group discussant expressed her view on educating the younger generation:

Education on Dangme culture plays a role in its sustainability but more Dangme have now received formal education. They think that certain aspects of our culture are primitive and

barbaric; hence... there is no way they are going to learn and champion it [FGD: Female Youth, Prampram, 8th April, 2018].

Although the youth female focus group discussant in Dodowa talked about the dwindling education of younger generations on Dangme culture, Dodowa had the highest number of respondents teaching younger generations with individual responses for always and often teaching being about 32% (Table26). Ga Mashie and Teshie had low proportion of respondents teaching Ga/Dangme culture to younger generations as their responses for rarely were 21.2% and 17.6% respectively. The low level of education of Ga/Dangme younger generations on their culture was a worry as the *Nai Wolomo* of Ga Mashie expressed how the traditional council was trying to teach the young generation who were hooked to television programs.

We don't have buildings where we will bring people to teach them but we use the media as in the TV, radio and newspapers, to put all these things (cultural knowledge) there so that people can learn [Interview: *Nai Wolomo(Numo Akwaa Mensah)*, Ga Mashie-1st April, 2018].

The use of television, newspapers and radio has also been adopted by the Amazonian indigenous groups such as Kayapo (Xing, 2017), Yanomami (Caballero-Arias, 2003) and Kogi (Nelson, 2017) etc. in the quest for culture sustainability. In this era of social media, traditional media is suffering and cannot do much. Efforts must, therefore, be channeled to social media platforms such as WhatsApp, Facebook, Twitter etc to send information about the Ga/Dangme people and culture to the younger generations.

Van Dijck (2013), however, advises that social media should be used with caution because it has the tendency to remove people from their social and cultural environment to a virtual environment. All hands have to be on deck to help educate the Ga/Dangme on their culture. This, Hawkes (2001) asserts, will help enhance vitality. Hawkes (2001) further advocated for respect to complement education. Learning is the transfer of knowledge through a bond based on respect for student and teacher.

Hence, the research sought to determine the respect of respondents for the custodians of the Ga/Dangme culture. Dodowa (37.3%) had respondents claiming they had very low respect for traditional authority (Table 26) while Ga Mashie (43.7%) and Prampram (42.0%) had respondents claiming they have high respect for traditional authorities (Table 26). Respect is crucial but what drives the respect is more important. Some focus group discussants expressed that their respect for traditional authority was based on fear. A male youth focus group discussant in Prampram explains:

If you are not very careful you will have a problem with the elders. They can even kill you using some charms so the youth are quiet and have to just respect them and keep quiet [FGD: Male Youth, Prampram, 8th April, 2018].

Respect out of fear should not be encouraged as it has the potential of leading indigenes away from their culture. Taras et al. (2013) espoused that when students have higher esteem for teachers they don't only learn what they are taught but the teachers' lifestyle. This is the way to achieve cultural sustainability with minimal effort. Traditional leaders should first accept the opinion of the youth and learn to accommodate them because if they (younger

generation) shift from the Ga/Dangme traditional leaders, culture sustainability will be affected.

Economic viability of the Ga/Dangme culture

The economic viability of culture is essential for its growth. The study measured this indicator in terms of respondents' expenditure in the community, tourist expenditure in the community and economic vibrancy of the communities. Most respondents complained about the low economic opportunities in their communities. In Ga Mashie, a male aged discussant lamented:

During the olden days, we had a fishing harbor (Ga Mashie)

here but the work collapsed and it was transferred to Tema.

Since then, everything has changed. Financially, we are poor

now [FGD: Male Aged, Ga Mashie, 22nd March, 2018].

This was supported by an aged female focus group discussant also in Ga Mashie:

The main economic activities that were here are the

slaughterhouse and fishing. There were people who came here

to work and even support our work. Students also came to work

during vacations to get some money to support themselves. But

now the place is used for criminal activities, which is not helping

[FGD: Female Aged, Ga Mashie, 22nd March, 2018].

In Prampram, a youth female discussant who was a fishmonger laments low income:

Now we have to buy fish from cold stores in Tema as our fishermen in Prampram are having less catch. Look at the cost of transport, buying wood for smoking. You won't make enough profit to sustain yourselves and buy basic things [FGD: Female Youth, Prampram, 8th April, 2018].

A female focus group discussant in Ga Mashie explained how tourism influences income and sales:

During the Homowo, sales from drinks and water are high with all the people in the community [FGD: Female Aged, Ga Mashie, 22nd March, 2018].

Quantitatively, in terms of expenditure, Ga Mashie had most respondents asserting that they spend *always* (44.9%) in their community (Table 27). Dodowa, also, on the Dangme side, had the highest frequency for *always* spending in the community. Prampram was the least of all the communities. This can be understood from the fishmonger who claimed she has to get her fish from Tema. Ga Mashie had the highest frequency is because the economy of the community is highly connected to the main Accra central market and is easy to get what one wants; whereas, the rural nature of the Dangme community means folks have to travel to Accra or Tema to get basic goods. Prampram and Dodowa had respondents who claim tourism improve their household income (Table 27). This result was interesting as Ga Mashie, which was seen as the most likely flow of tourist point among the Ga/Dangme communities, had lower responses in this respect. It could be inferred that the people benefiting from all the visits to the monuments and festivals were not indigenes of the community.

Table 27: Economic viability of Ga/Dangme communities

| | Dangme (n=510) | | Ga (n=510) | |
	Dodowa (n=255)	Prampram (n=255)	Ga Mashie (n=255)	Teshie Maame (n=255)
Expenditure in community				
Always	16.9	2.0	44.9	16.9
Often	41.2	3.7	12.7	27.6
Sometimes	37.8	83.1	28.8	41.8
Rarely	1.8	6.1	9.2	3.5
Very rarely	2.4	5.1	4.3	10.2
Total	100.0	100.0	100.0	100.0
Tourist expenditure effect on household income				
	Dodowa	Prampram	Ga Mashie	Teshie
Completely true	3.9	0.4	8.6	0.0
Mostly true	18.0	31.0	4.7	7.1
True half of the times	13.3	50.2	10.2	16.1
Slightly true	4.7	2.4	17.6	29.8
Not true	60.0	16.1	58.8	47.1
Total	100.0	100.0	100.0	100.0
Economic vibrancy of the community				
	Dodowa	Prampram	Ga Mashie	Teshie
Very vibrant	11.0	14.9	26.3	1.6
vibrant	15.3	16.9	12.9	36.9
Somewhat vibrant	58.0	66.3	26.7	18.4
Less vibrant	5.9	0.0	7.8	14.5
Not vibrant	9.8	2.0	26.3	28.6
Total	100.0	100.0	100.0	100.0

Source: Osman, 2018

On the overall economic vibrancy, survey respondents confirmed earlier remarks by focus group discussants that dwindling fish output and the removal of the fishing port to Tema had affected the study communities as more

responses were in the range of *somewhat vibrant* (Prampram-66.3%, Dodowa-58.0%, Ga Mashie-26.7% & Teshie-18.4%) (Table 27).

Soini and Birkeland (2014) asserts that economic viability is important in achieving sustainability when cultural occupation is self-fulfilling, generates income and boosts the economy. But for Ga/Dangme communities, it was the opposite that existed; fishing and farming were experiencing a downturn. The fishing industry was the lifeline of the three study Ga/Dangme fishing communities (Ga Mashie, Teshie and Prampram). Thus, the dwindling fish catch affected all other parts of the community (Aryeetey et al., 1995). Trading sustained the Ga/Dangme societies during colonial times as they taxed merchants and also served as middlemen for inland traders and European traders (a catalyst for frequent wars with the Asantes who wanted direct trade) (Riendolf, 1895).

In modern times, trade in the Greater Accra Region is dominated by migrants or foreigners who are the most economically vibrant, with the indigenous Ga/Dangme marginalised spatially to their traditional communities. Trading activities within Ga/Dangme communities are limited to petty trading which is characteristic of most indigenous societies.

Diversity of the Ga/Dangme culture

The cultural diversity measure looked at the participation of people in decision making. In this regard, the research asked respondents to rank their involvement in decision making at the *We* (family) and community levels. This was crucial for community involvement, togetherness and tolerance (Palang et al., 2017). Most respondents indicated that they sometimes participated in

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decision making at the We level (Prampram- 88.2%, Teshie-27.4%. Ga Mashie-25.8% & Dodowa- 22.7%) (Table 28). Dodowa (56.1%) had the highest frequency of respondents claiming they are always involved in decision making at the family level while Teshie (1.6%) had the least.

It can be observed from Table 28 that the youth are rarely involved in decision making at the family level. For example, most of the respondents within the age of 16-30 reported that it is very rare for them to be engaged in decision making decisions (age 16-20years, 58.7% and 21-30years, 42.9%).

Table 28: Participation in decision making at the family (We)

Community	Always	Often	Sometimes	Rare	Very Rare	Total
Dodowa	56.18	7.4	22.7	4.7	9.0	100
Ga Mashie	15.78	5.5	25.8	18.0	34.9	100
Prampram	5.5	1.2	88.2	1.2	3.9	100
Teshie	1.6	10.6	27.4	9.8	50.6	100
Age						
16-20	2.27	0.0	28.3	10.8	58.7	100
21-30	3.5	1.4	34.5	17.6	42.9	100
31-40	16.9	6.5	53.9	3.5	19.0	100
41-50	33.9	9.8	38.4	4.9	12.8	100
51-60	32.4	11.7	38.7	7.2	9.9	100
61-70	45.7	8.6	30.0	2.8	12.8	100
71-82	23.5	5.8	58.8	5.8	5.8	100
Sex						
Female	17.1	4.5	42.7	10.5	25.2	100
Male	21.9	7.6	39.7	6.7	24.1	100

Source: Osman, 2018

In terms of sex and decision making at the We level, 21.9% of male and 17.1% of female respondents asserted that they were always involved in

decision making (Table 28). Having younger generations and both sexes in decision making at the *We* level was a good indicator of cultural diversity. As Palang et al. (2017) asserted, the link between cultural diversity and cultural sustainability was when the elderly opened up to the opinions of the younger generation. At the community level, similar patterns of participation in decision making were observed (Table 29). Generally, respondents sometimes participated in decision making at the community level, with females and those between the ages of 16 and 30 rarely getting involved.

Table 29: Participation in community decision making

	Always	Often	Sometimes	Rare	Very Rare	Total
Community						
Dodowa	2.76	6.28	42.76	27.44	20.8	100
Ga Mashie	5.48	3.52	21.96	29	40	100
Prampram	4.72	3.12	86.28	1.16	4.72	100
Teshie	1.16	3.92	27.44	15.68	51.76	100
Age						
16-20	2.17	2.17	26.09	19.57	50.00	100
21-30	2.11	0.35	35.56	16.90	45.07	100
31-40	2.08	4.15	51.90	16.26	25.61	100
41-50	5.42	5.42	47.78	20.20	21.18	100
51-60	2.70	10.81	49.55	22.52	14.41	100
61-70	10.00	7.14	45.71	21.43	15.71	100
71-82	11.76	5.88	47.06	11.76	23.53	100
Sex						
Female	2.35	2.99	43.38	19.87	31.41	100
Male	4.53	5.25	45.65	17.03	27.54	100

Source: Osman, 2018

The low participation of the youth in decision making at the community and family levels explained the cultural orientation of the Ga/Dangme and most African societies where decision making are along gendered and generational

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lines, with males and the elderly dominating. Such instances should not be encouraged as sustainability is about the younger and unborn generations.

Eco-cultural education of the Ga/Dangme culture

Measuring eco-cultural education, to a great extent, was about the education on nature's importance to the sustainability of culture. Beyond educating kinsmen on nature's importance were cultural practices or approaches or initiatives that looked directly at conserving nature. Results showed that teachings about the importance of natural and semi-natural land cover, an embodiment of *Kpele* teachings of the Ga/Dangme, was low. More than 63% of respondents claimed they were not taught about the importance of natural and semi-natural land cover to the culture of the Ga/Dangme and that they are not teaching it to the younger generation (Figure 18).
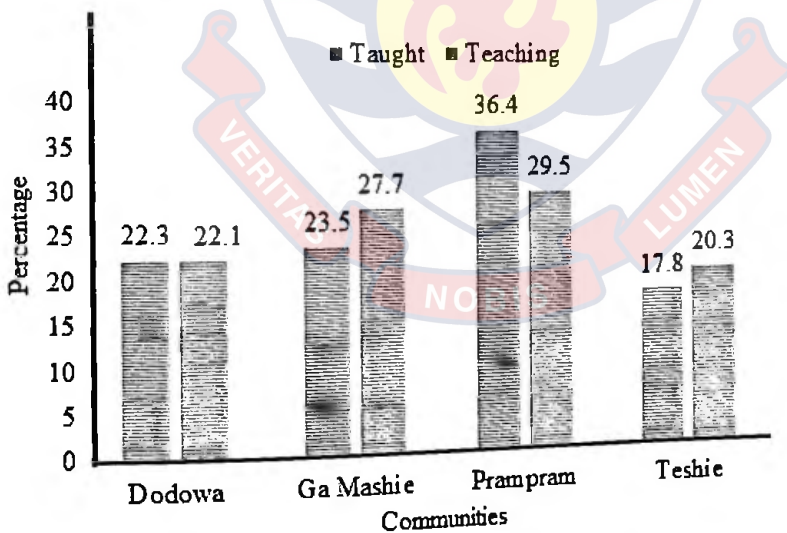
Figure 18: Teaching of the importance of natural and semi-natural vegetation to Ga/Dangme culture

Source: Osman, 2018

Prampram had the highest responses for people who were taught (36.4%) and are teaching (29.5%) the younger generation about eco-cultural education.

Teshie had fewer people claiming they were not taught (17.8%) and also that they are not teaching the younger generation (20.3%) (Figure 18).

Walwyn (2014) claimed most indigenous Kenyans have not been taught about the spiritual and ecological importance of the Kaya forest; hence, they believed it had no importance and could even be destroyed. Education about natural and semi-natural heritage is very crucial if the eco-culture of the Ga/Dangme communities are to be sustained. Schools should organise tours for children to cultural sites to learn about their heritages and importance of conserving them. With the current state of natural and semi-natural land covers, community involvement in conservation is very important. Only 2.9% respondents out of 1,020 respondents in all the four communities claimed their actions were directly and indirectly geared towards the conservation of natural land cover. Some of the activities they stated were preventing people from taking beach sand if they see them and preventing people from cutting trees in wetlands.

The research further probed if people were willing to undertake conservation activities. A greater majority (81.57%) of the respondents indicated that they were not willing to do so, suggesting that there was no will to dedicate time and other resources for conservation of nature. The remaining 18.43% who showed willingness to engage in conservation activities indicated the various hours convenient for them in a month. Most of them claimed they were willing to spare about 1-5 hours (Dodowa-98.6%, Prampram-89.0 %, Ga Mashie-70.0% and Teshie-57.9%) (Table 30). Interestingly, Prampram and Dodowa (two communities of rural characteristics and also Dangme communities) had more people willing to dedicate some hours a month to

conservation activities (Table 30). This could be explained from communal orientation of most rural folks in community-based activities as opposed to urban folk's mindset of individualism.

Table 30: Amount willing to pay and time to spend per month to conserve of natural and semi-natural land cover

Time to work (per month)	Dangme (n=510)		Ga (n=510)	
	Dodowa (n=255)	Prampram (n=255)	Ga Mashie (n=255)	Teshie Maame (n=255)
1 to 5	98.6	89.2	70.0	57.9
6 to 10	0.0	5.4	27.5	28.9
11 to 20	0.0	2.7	2.5	7.9
21 to 40	0.0	0.0	0.0	2.6
41 to 80	1.4	2.7	0.0	2.6
Total	100.0	100.0	100.0	100.0
Amount to pay (per month)	Dodowa	Prampram	Ga Mashie	Teshie
1 to 50	98.2	53.3	87.9	69.4
51-100	1.8	28.9	6.1	30.6
101-150	0.0	6.7	0.0	0.0
151-200	0.0	8.9	6.1	0.0
201-250	0.0	2.2	0.0	0.0
Total	100.0	100.0	100.0	100.0

Source: Osman, 2018

Most of the respondents were willing to pay 1-50 Ghana cedis for the conservation while only one person was willing to pay between 201-250 Ghana cedis per month (Table 30). Prampram had more people willing to pay more between 151-250 Ghana cedis per month for conservation activities than people in the urban communities. Per Nandagiri's (2015) assertion that if willingness to pay for conservation is high then people have in high esteem the natural and

semi-natural land cover. It can be said that most Ga/Dangme have little value, either cultural or ecological, to their natural and semi-natural heritages. The reason for the low value could be that the government has taken away management rights; hence, people believe it was a government responsibility. It is important that Ga/Dangme understand that mobilising themselves through willingness to allocate time and money to conserve their natural and semi-natural heritages will have a larger effect than currently being witnessed.

It could also be that respondents have low economic viability and cannot give what they do not have. But this should have reflected in the time they are willing to dedicate to conservation; therefore, Nandagiri's (2015) assertion that if people are not willing to pay and spare time for conservation then they are ecologically unconcerned is true for respondents of this study.

Moreover, Palang et al. (2017) arguement that when local societies have a low level of consciousness of the environment, then cultural sustainability is irrelevant and is taken on the face value, then one can say that there is no need for sustaining the Ga/Dangme culture as most of the respondents showed less consciousness of its preservation. Efforts need to be made rather than neglecting the course of sustainability of the Ga/Dangme culture by increasing the consciousness of the Ga/Dangme on the need to preserve their culture.

Locality of the Ga/Dangme culture

In cultural locality, the emphasis was on how well a culture still holds on to its traditional ways without modification even though it was exposed. It is an anti-globalisation concept, as claimed by Soini and Birkeland (2014), but can be said to include anti-ethnicity in a country with multiple ethnic groups. It is,

however, more of culture change and the needs to keep a culture in its local state.

A culture change index was used as the proxy to assess the cultural locality of the Ga/Dangme culture. The overall index was 0.51 on a scale of 0-1 with Dodowa having 0.46; Ga Mashie, 0.55; Prampram, 0.42 and Teshie, 0.61 (Culture change index –Table 12, page 180). These results, as already presented and discussed in Chapter 6, clearly show how the Ga/Dangme culture is losing its indigenous nature; hence, its locality. There were changes in family systems of inheritance and an occupational shift from fishing and farming to white collar jobs such as administrative works, legal (lawyers), financial (bankers, mobile money vendors etc.) health practitioners (medical doctor, nurse). Others have abandoned their indigenous Kpele doctrine for Christianity while festivals were performed without some rites and for a fewer number of days. Besides, chieftaincy was riddled in monarchy systems from fetishtocracy which was generating complications of conflicts. All these changes originate from contact with other cultures (Europeans, Akans, Ewe and Mole Dagbani), technology, formal government policies, economic pursuits and Christianity as purported by Akyeampong (2002), Koranteng et al. (1993), Quarcoopome (1992), Reindorf (1895).

Eco-cultural resilience of the Ga/Dangme culture

Eco-cultural resilience is the measure of a culture's inter-relationship with nature. This interrelationship was exhibited in landscape ecosystem services: services from nature to cultures and services from culture to nature. This variable of the Ga/Dangme had been discussed largely under Chapter 7

(Ecosystem service index Figure 17, page 214). The results showed that landscape ecosystem services were 0.39 on a scale of 0-1, with nature providing more services to the Ga/Dangme culture; that is, 0.49 and against 0.29 from culture to nature.

Low eco-cultural resilience took its roots from high locality change which affected people's eco-spiritual beliefs. Ga Mashie and Teshie were low in eco-cultural resilience compared with Prampram and Dodowa which had higher figures. Nonetheless, the opposing figures do not mean that the Dangme were more ecologically concerned than the Ga but rather, that they have not yet been exposed to the woes of high urbanisation. This was because with the minimum urbanisation they are experiencing, family heads and even chiefs have started selling parts of spiritual groves. Chiefs and family heads' sale of spiritual groves defeated Von der Pahlen and Grinspoon's (2002) assertion that traditional stewards are better managers of groves. In these instances, they were rather the wreckers of their own groves and very identity.

The protection agenda, with few walls around spiritual groves in Prampram and Dodowa, was commended but such a measure was not the best because it limited ecological flow. Ellis and Pontius (2006) also asserted that a walled grove disjoined from its adjourning lands had a higher chance of destruction than connected groves. The destruction of the groves will, in the future, affect the sustainability of the Ga/Dangme culture as these places will not be available to visitors as customs demand.

Cultural sustainability index of the Ga/Dangme culture

Combining all the indicators of cultural sustainability, that was cultural heritages, vitality, economic viability, diversity, locality, eco-cultural resilience and eco-cultural education, an index was generated for the study communities. The cultural sustainability index (CSI) for all the four communities were in the range of 0.4-0.5 with an average of 0.46 on a scale of 0-1 (Table 31).

Table 31: Cultural sustainability index of the Ga/Dangme

Community	NSLC	CCI	ESI	CSI Current	CSI (Next 30 yrs)	CSI (Next 100 yrs)
Dodowa	0.25	0.46	0.45	0.49	0.74	0.66
Ga Mashie	0.3	0.55	0.33	0.44	0.75	0.63
Prampram	0.27	0.42	0.49	0.45	0.84	0.93
Teshie	0.21	0.61	0.29	0.44	0.70	0.60
Average	0.26	0.51	0.39	0.46	0.76	0.71

NSLC-Natural and Semi-Natural land cover, ESI-Ecosystem Service Index, CSI-Cultural Sustainability Index

Source: Osman, 2018

The highest index was 0.49 for Dodowa and the least was 0.44, shared by Ga Mashie and Teshie. On the contrary, the cultural sustainability index as espoused by the respondents were about 0.25 greater for the CSI for 100 years to come and 0.20 for the CSI for the next 30 years. Respondents in Prampram had a higher notion that their culture would be highly sustained with an index of 0.84 for 30 years to come and 0.93 for 100 years into the future.

The result for an increase in the sustainability index for 100 years into the future was strange because of the pressures of increasing urbanisation and

the rapid urbanisation of Prampram. An aged male focus group discussant's comment in Prampram can help explain this finding. The discussant espoused:

The olden ways of marriage ceremonies, naming ceremonies and funeral rites will still be sustained. The new things that have been added to funeral rites such as the use of clothes (specific to the funeral) and others will go back to where they came from with time since most families have realized that it doesn't help and increases the cost of funerals. Some families have abolished that and with time others will also do a similar thing [FGD: Male Aged, Prampram, 14th April, 2018].

The community in which respondents had the least index for 30years and 100 years to come was Teshie with 0.70 and 0.60 respectively below the means of 0.76 and 0.71 respectively. Interestingly, Ga Mashie and Teshie which had the least CSI also had the highest rate of natural and semi-natural land cover change and cultural change index (CCI) but least ecosystem services (ESI) (Table 31). The opposite was, however, true for Dodowa. As natural and semi-natural land covers decreased, culture changed faster and ecosystem services expected from both natural land cover and culture decreased.

Research findings on culture sustainability fitted well with the conceptual framework of this thesis based on the fact that a change in land cover affected/ influenced change in culture and vice versa. This inversely goes to influence a change in ecosystem services and the ability of a culture to sustain itself. This was evident in results from Teshie and Ga Mashie which have a low culture sustainability index, low ecosystem services and high culture change and land cover as compared to Dodowa and Prampram.

Theorising that a culture changes when land cover and ecosystems change stems from the encompassing nature of culture involving social, economic and environmental sustainability, as claimed by Soini and Birkeland (2014), Nussbaum (2011) and Throsby (2008). It is also supported by other research works by Zhang et al. (2016), Alagia (2014) and Kokaisl (2013). which hold that changes in culture affect the social and economic life as well as the environment of a given community. Thus, sustainability can only be achieved when culture is maintained as the achievement of the other components relates to it. Palang et al's (2017) claimed that cultural sustainability should be the main focus for sustainability discourse holds true per the results of this research.

Qualitatively, through focus group discussions and interviews, the research demonstrated that the study of cultural sustainability is not utopian as earlier argued by Antrop (2006). Complementing cultural sustainability with statistical results moves it from a utopian and abstract level to an achievable entity. This is because, from the results, specific parts of culture and interventions can be proposed for maximum sustainability. Hence, helping solve the utopian argument levelled against cultural sustainability on which part of culture needs sustainability and who should determine it. Also, the argument that cultural sustainability was taken care of by dimensions of social sustainability was debunked by this research because vitality, diversity and locality were all dimensions of culture sustainability which rather determined a wide variety of social settings of participation, discrimination, unity, peace, identity and social wellbeing.

theoretically. Pierson's (2000) path dependency theory holds true for the Ga/Dangme by showing the importance of preserving, protecting and sustaining socially defined interactions passed on from generations to the present in simple terms as history matters. In other words, the Ga/Dangme should not be consumed by modern day pressures to neglect the traditions of older generations because what is handed down as culture are tested and workable solutions for world problems.

The increasing return and self-reinforcement which Rixen and Viola (2009) explained as the cost of switching to new forms of culture can be said to be high for the Ga/Dangme. The Ga/Dangme should rather be locked in indigenous practices because Liebowitz and Margolis (1999) stipulated that being locked-in is not always as bad a notion as the younger generations mostly think but can be positive. The positive side of being locked in is the vast indegenous knowledge of leaving in harmony with nature. It also promotes mutual and peaceful co-existance between community members and help in transfer of indegenous knowledge across various generation.

Chapter summary

The chapter began with an introduction to the indicators of cultural sustainability. The indicators considered were cultural heritage, vitality, economic viability, diversity, locality, eco-cultural resilience and education of the Ga/Dangme. Natural and semi-natural Ga/Dangme heritages had low accessibility with high protection and significance as identity and spirituality. This, however, did not reflect in their preservation as most have degraded.

communities had moderate accessibility with low protection and high deterioration. Vitality was high in terms of sense of place and respect for authority but low for educating Ga/Dangme youth on cultural practices. Although vitality was high, the respect was borne out of fear rather than mutualism while education, which was low, affects the transfer of indigenous knowledge to the younger generation. Diversity, on the other hand. was high at the family level and low at the community level; yet, it was low for the youngsters and females.

Economically, all the communities complained about low vibrancy which affected livelihoods as a result of dwindled fish catch and crop outputs. Locality, eco-cultural resilience and education were all low, indicating that as culture changes, the indigeneity of the Ga/Dangme culture reduces because it absorbs other cultures. This affects its relationship with its ecological setting and knowledge about the ecology. In all, the Ga/Dangme culture was moderately being sustained but had a high tendency of dropping. The way out is to tackle the causes of culture change among the Ga/Dangme in Greater Accra Region through conscious efforts by the Ga/Dangme people, traditional leaders and formal governments.

CHAPTER NINE

EVALUATION OF POLICIES AND AGENCIES FOR LANDSCAPE AND SUSTAINABILITY OF THE GA/DANGME CULTURE

Introduction

The focus of this chapter was to evaluate policies which can positively or negatively affect the sustainability of the Ga/Dangme culture in the Greater Accra Region of Ghana. Policies evaluated were the Cultural Policy of Ghana and the Land Policy. Furthermore, the chapter evaluated the Environmental Protection Act and Land Use and Spatial Planning Act because of implementation accounts for the success or otherwise of the Cultural and Land Policies of Ghana. The evaluation was based on the identification of stakeholders and the establishment of criteria for evaluation. The criteria used were efficiency, equity, technical feasibility, political viability and administrative operability of the policies and acts in sustaining the Ga/Dangme culture. The research acknowledges the subjectivity of policy evaluation (thus two people with the same policy will conclude differently); hence, tried to assign reasons for various values assigned.

Identification of the problem

The main problem set for the analysis of policies was ensuring cultural sustainability of the Ga/Dangme in Greater Accra Region. The Ga/Dangme culture and land cover are subject to changes caused by chieftaincy disputes, influence of Christianity, urbanisation, formal education, etc. which go a long way to affect cultural sustainability. It was, therefore, necessary to evaluate

available policies and their positive or negative effects on sustaining the Ga/Dangme culture. The specific components of the main problem for policy review were 1) how policies affect the changing land cover in Greater Accra Region and 2) how policies affect the changing culture of the Ga/Dangme in the Greater Accra Region.

The policy documents (data) considered necessary for these analyses were Cultural Policy, Land Policy, Environmental Protection Agency Act and the Land Use and Spatial Planning Act. In Ghana, the Culture Policy, Land Policy, Land Use and Spatial Planning Act and Environmental Protection Act clearly outline how government should deal with the sustainability of cultures; for that matter, the Ga/Dangme culture. This was reflected in the definition of culture by the Ghana Cultural Policy as the node through which social, economic and environmental sustainability can be achieved; hence, advocating for cultural sustainability long before Soini and Birkeland (2014), Palang et al. (2017) and UNESCO (2015) call for cultural sustainability.

The reason for the choice of the Land Policy, Environmental Protection Agency Act and the Land Use and Spatial Planning Act of Ghana was because land related issues and culture are intertwined as supported by McLeod (2005) and Wiens (2012). One would expect Ghanaian cultures to play a big role in national development but the reality is far from that. Quarcoopome (1992) claims that these policies on land, since colonial days, have been unfavourable to the Ga/Dangme by spatially marginalising them. The various policies and their core tenets are briefly decribed in the sections below.

The Cultural Policy of Ghana was launched in 2004. It had its legal backing from the Fourth Republican Constitution under the Directive Principles of State Policy Article 39, Clause 2 and the Provisional National Defence Council (PNDC) Law 238 which established the National Commission on Culture (Ghana National Commission on Culture, 2004). The policy defines culture as the totality of the way of life evolved by Ghanaians through experience and reflection in our attempt to fashion a harmonious co-existence with our environment (Ghana National Commission on Culture, 2004). The policy's aim is to use Ghanaian customs to meet the needs of society and foster development and pride in Ghanaian cultures. This is achievable through fifteen (15) specific objectives to be implemented by the Ghana National Commission on Culture through administration, operational principles and budget allocation with the help of stakeholders such as the Houses of Chiefs, District Assemblies, religious bodies, educational institutions, social groups, voluntary associations, artistic groups and associations, non-governmental organisations and the media. The objectives are as follows:

1. Create awareness of the traditional values and generate pride and respect for the nation's heritage

2. Enhance the role of the media as channels for promoting understanding our cultural values and the potential of the rich diversity of ethnic expressions for nation building

3. Foster national unity among the diverse ethnic groups of Ghana by promoting cultural interaction and inter-ethnic understanding through

programmes that create an enabling environment for national development.

4. Make the people of Ghana aware of the contemporary relevance of their traditions and cultural heritage and assist local communities to mobilise their cultural resources for human and material development.

5. Identify and disseminate local knowledge of the environment and support communities to sustain positive traditional concepts and practices to protect nature and biodiversity for the benefit of the nation.

6. Create an institutional framework for the collection, preservation and conservation of tangible and intangible assets.

7. Eliminate, through public education and appropriate legislation, cultural practices that lead to the abuse of the rights of the individual on account of ethnic differences, gender, age, religion, physical challenge or economic status.

8. Promote the arts.

9. Promote the cultural awareness of the youth through formal and non-formal education to ensure that they are prepared to play their role in the cultural life of their communities.

10. Develop data and resource materials on Ghanaian culture for schools, colleges and the general public.

11. Undertake and promote research to create a database on culture for policymakers, academics, administrators, artists and artistes, embassies, foreign visitors and all other interested persons.

12. Maximise capacity of the cultural sector to develop and promote the economic aspects of culture in order to enhance Ghana's image as a culture-tourism destination.

13. Create positive linkages between all cultural institutions thereby ensuring synergy in all cultural activities and maximise the benefits of the limited resources available to the cultural sector.

14. Mobilise resources from public, private, local and foreign sources to support cultural programmes.

15. Promote the harmonisation of African cultures in fulfilment of Ghana's objectives of promoting Pan-Africanism.

The National Commission on Culture of Ghana groups the 15 specific objectives into 6 implementation ways (Table 32).

Table 32: Implementation, approaches and indicators of the cultural policy

Implementation	Approaches	Indicators
1. Preservation and conservation of culture	1.Identification and conservation of the nation's tangible and intangible heritage through research, documentation, exhibition and establishment of museums and galleries	1.Preserve all cultural monuments 2.Legislation to exercise planning control of threatening structures and sites of historical importance

Table 32

		3.Recognition and respect of other's religion 4.Legislation to protect the medicinal plants, knowledge of traditional cure
2. Development and promotion of culture	1.Promote formal and informal education as vehicles for inculcating cultural values	1.Ghanaian languages as medium of instruction in schools 2. Develop culture syllabus for schools 3.Develop a culture of producing what you eat 4.Heritage Clubs in the country 5.Excursions to interesting historical and cultural sites 6.Regional and District Centres for National Culture to train people 7.Operate community libraries

Table 32 continued

		and theatres for culture works
		8.70% Ghanaian content on mass media
3. Presentation of culture	1. Through festivals, durbars and rites of passage and media, theatre, exhibitions, seminars and workshops	1. Ghanaian cuisines at state functions
4. Establishment of appropriate administrative structures	1. Encourage Architects, Planners and Designers of Civil Works and Engineers to incorporate traditional ideas in planning and make laws for parks and monument developments	1. Designated guarded and preserved cultural lands in town planning
5. Establishment of linkages with various sectors of national development	1. Collaborate and coordinate activities with government agencies and international organisations	1. National Commission on Civic Education (NCCE) and media, to organise cultural programmes
6. Provision of funds for the implementation	1. Establish a Cultural Trust Fund	1. Financial, technical support for culture writers 2. Fund workshops and seminars for culture promotion

Source: Ghana National Commission on Culture, 2004

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The land policy of Ghana was developed because of the several weaknesses in the various acts developed by colonial and post-colonial governments. These include the Public Lands Ordinance, 1876 (Cap 134), Land Appropriation Ordinance of 1901, the Kumasi Lands Ordinance, 1943 (Cap 145), the Land and Native Rights Ordinance, 1927 (Cap 143), the Akim Abuakwa (Stool Land) Act (No. 28), 1958 and the Stool Lands Act, 1960 (Act 27) (Ghana Lands Commission, 1999). The main objective of the Land Policy of Ghana is to ensure judicious use of the nation's land and all its natural resources by all sections of the Ghanaian society, support various socioeconomic activities undertaken in accordance with sustainable resource management principles and to maintain viable ecosystems (Ghana Lands Commission, 1999). There were 11 objectives to help achieve these stipulated main objectives:

1. Ensure that Ghana's international boundaries are maintained at all times and cross-border activities are managed jointly.

2. Ensure that every socio-economic activity is consistent with sound land use through sustainable land-use planning in the long-term national interest.

3. Facilitate equitable access to and security of tenure of land based on registered land.

4. Protect the rights of landowners and their descendants from becoming landless or tenants on their own lands.

5. Ensure the payment. within reasonable time, of fair and adequate compensation for land acquired by government from stool, skin or traditional council, clan, family and individual.

6. Instil order and discipline into the land market to curb the incidence of land encroachment. unapproved development schemes, multiple or illegal land sales, land speculation and other forms of land racketeering.

7. Minimise and eliminate, where possible, the sources of protracted land boundary disputes. conflicts and litigations in order to bring their associated economic costs and socio-political upheavals under control.

8. Create and maintain effective institutional capacity and capability at the national, regional effective institutional capacity and capability at the national, regional, district, and where appropriate, community levels for land service delivery.

9. Promote community participation and public awareness at all levels in sustainable land management and development practices to ensure the highest and best use of land and thereby guarantee optimum returns on land.

10. Promote research into all aspects of land ownership, tenure and the operations of the land market and the land development process.

11. Ensure continuous education of the general public on land matters.

   In order to achieve the policy objectives, the Ghana Lands Commission set out various implementation approaches and indicators for the Land Policy of 1999 (Table 33).

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Table 33: Implementation, approaches and indicators of the land policy

Implementation	Approaches	Indicators
1. Securing Ghana's International Boundaries and Shared Water Resources.	1. Secure and managed by the boundaries of Ghana by the Joint Border Commission of neighbouring countries. 2. Manage shared waterbodies with neighbouring countries. 3. Prohibit smuggling across international borders.	1. Provide adequate resources to secure border. 2. Establish joint committees, Joint Border control and transboundary water bodies. 3. Resolve cross-border conflicts of settlement and farming
2. Facilitating Equitable Access to Land	1. Ensure access to land by all persons. 2. No valid transaction in private lands between or among private entities. 3. MMDA's develop planning schemes for all land uses. 4. Transparent and open land market.	1. Land-use schemes at district levels. 3. Adequate compensation for compulsory government land acquisition. 4. Create land banks. 5. Land bonds for financing. 6. Appropriate levies, penalties and/or taxes on allocated, but undeveloped lands. 7. Reasonable time to land request.

Table 33 (contd.)
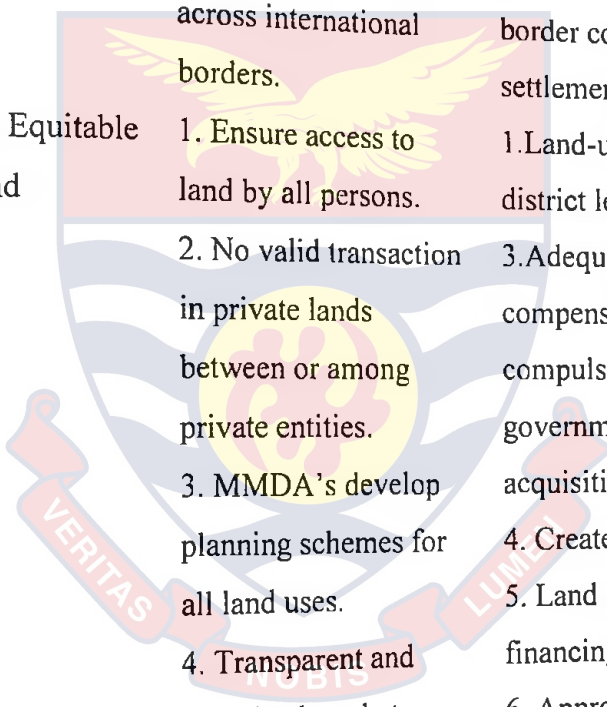
		8. Facilitate the development of land management knowledge and skills
3. Security of Tenure and Protection of Land Rights	1. Traditional land ownership is legitimate. 2. Disposal of land-based resources on land and future generation. 3. No compulsory land acquisition without appropriate payment and time. 4. Land transfer or stewardship must be approved by customary practice. 5. Customary laws precede government if land is not utilised for the purpose for which it was acquired. 6. Land disposal should not render a land title holder, his kith and kin and descendants completely landless.	1. Speed up title registration. 2. Production of large-scale maps of land parcels. 3. Require stool, skin, clan, family and other landowners to survey and demarcate their land. 4. Early Warning Mechanism to detect land disputes.

Table 33 cont'd

	7. Structures on lands without title or development permit may be demolished at the cost of the developer.	
4. Ensuring planned land Use	1. Forest reserves, strict nature parks, wildlife sanctuaries shall be fully protected.	1.Plan and service land before disposal.
	2. Permanent forest and wildlife estates are available for other uses determined by land-use plan.	2. No development in a minimum of 100 metres off the high water mark of water bodies.
	3. Inland and coastal wetlands are environmental conservation areas but can allow socio-economic developments which conserved ecosystem.	3. Social and economic activities on hills only with appropriate technology.
		4. No draining of wetlands.
		5. Development and protection of a greenbelt.
	4. Land for socioeconomic activities will be guided by population density, growth and distribution pattern.	6. Maintenance of adequate tree cover to protect urban areas.
		7. Resolve land conflict before economic activities are undertaken.

Table 33 cont'd

5. Enhancing Land Capability and Land Conservation.	5. Government may intermediate in facilitating investors access to land. 1. No mining on primary forest covers. 2. Land use to be based on sustainable methods of soil protection. 3. Ecosystems with biodiversity or scenic beauty may be declared a protected area.	8. Implement District, Regional and National Land-Use Plan and Atlas. 1. Shrines, sacred groves and others will be demarcated and protected.
6. Developing Effective Institutional Capacity and Capability.	1. Restructure, and strengthen land administration agencies. 2. International cooperation and support in all aspects of land policy. 3. Human development programmes for land sector institutions 4. Collaboration with the traditional landowners. 5. Educate the public on land policy.	1.Inter-ministerial and interagency cooperation to coordinate land-use policies and plans. 2.Establish a Geospatial Framework database. 3.Develop a land information system.

Source: Ghana Lands Commission, 1999

The implementation strategies can be grouped into 6 with focus on (1) securing the land of Ghana to (6) developing effective institutional capacity and

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capability to many of land (Table 33). Indicators set out were deciphered from the policy document as being funds for border security and development of land information management system.

Environmental Protection, and Land-Use and Spatial Planning Acts of Ghana

The Cultural Policy and Land Policy of Ghana are supported and executed with the help of the Land Use and Spatial Planning Act of 2016 and Environmental Protection Act of 1994. The Land Use and Spatial Planning Authority was established by the Land Use and Spatial Planning Act and the Environmental Protection Agency by Environmental Protection Act. The Environmental Protection Agency has 19 functions grouped into policy formulation on the environment, coordination with other agencies for environmental protection, issuing of permits and guidelines for discharge of pollutants, environmental impact assessment, education and research and levy collection. Functionally, the Environmental Protection Agency is supported by the Finance Ministry and National Environmental Fund to be able to carry out its responsibilities.

The main objective of the Land Use Planning Act is to revise and consolidate laws on land use and spatial planning, provide for sustainable development of land and human settlements through a decentralised planning system and ensure judicious use of land (Land Use and Spatial Planning Authority of Ghana, 2016). Its specific functions performed through its authority are research; development of planning standards; monitoring of compliance with planning standards; management of information system;

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formulation of spatial development framework; education. training and capacity building and communication and public relations. Also. the Land Use and Spatial Act is deemed to establish a fund to help in its operation but with financing from the Ministry of Finance of Ghana.

Stakeholders

This section presents the various stakeholders in the sustainability of the Ga/Dangme culture. In all, about twenty (20) stakeholders were identified, and they comprised, mostly, Ga/Dangme agencies and people, governmental agencies, Non-governmental agencies, universities/researchers and businesses (Table 34). The stakeholders have different positions (supporting and opposing) based on their actions and mandates with different levels of power (very low, low, moderate, high, and very high) (Table 34).

Table 34: Stakeholders, their position and power

Stakeholders	Evaluated Position	Power (+) (-)
Indigenes	Support	Moderate (-,+)
Family Heads	Support	High (+)
Chiefs	Support	Very high (- , +)
Traditional priests	Support	Moderate (+)
National Commission on Culture	Support	Very low (+)
Ministry of Chieftaincy and Traditional Affairs	Support	Moderate (+)
Land Commission	Support	High (-, +)

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Table 34 contd:

Land Use and Physical Planning Authority	Support	High (-, +)
Ministry of Food and Agriculture	Support	Very low (+)
Ministry of Tourism, Culture and Creative Arts	Support	Moderate (-,+)
Ghana Police	Support	Very high (-,+)
Ghana Armed Forces	Support	High (-,+)
UNESCO	Support	Moderate (+)
Universities/Researchers	Support	Very low (+)
Real estates	Less supportive	Medium (-)
Banks	Less supportive	Very low (-,+)
Beverage companies	Less supportive	Low (-,+)
Telecommunication companies	Less supportive	Low (-,+)
Immigrants groups/Real estate	Less supportive	Very high (-)
Mass media	Less supportive	Very high (-,+)
Land guards	Less supportive	Very high (-)

Source: Osman, 2018

Those placed in the supporting category were government agencies, universities, NGOs and the people and chiefs of Ga/Dangme while those of the less supporting category were commercial entities (banks, beverage companies and telecommunication), mass media, land guards and immigrant groups in Greater Accra Region. Chiefs were assigned very high power which can be negative or positive; family heads also have high power while indigenes have moderate power. The reason for assigning the various power levels to the chiefs, family heads and indigenes was because sustaining the Ga/Dangme culture is their duty, and if anyone else is to help sustain it, then their efforts would be needed first. This was evident in demonstrations by the Standing Rock Sioux

against oil companies who wanted to destroy their ancestral lands, they did win the sympathy and support of the large following of the American population (Volcovici, 2017). The positive influence of Chiefs and Family Heads is the power to mobilise Ga/Dangme natives. The negative aspect was the issues of chieftaincy succession conflicts and sales of cultural lands which affect their sustainability.

Different government agencies were assigned different influence and power because of their functionalities. National Commission on Culture which is tasked by the Culture Policy to protect indigenous cultures has a very low influence on sustaining the Ga/Dangme culture. This is because the commission is besieged with low administrative capacity as well as technical and financial support to implement its policies (Gharbin, Appiatsewa, & Richardson, 2019).

The Land Commission and Land Use and Spatial Planning Authority had a high power of influence which can be used positively and negatively: positively, if they ensure buildings and structures conform to a well-developed plan and negatively, when the plans developed are not good and culturally and environmentally inclined and also when they are motivated by corrupt activities. The Ministry of Tourism, Culture and Creative Art, although a supporting stakeholder, was more inclined to the commodification of culture, limiting their intended scope. This assertion was based on the fact that the ministry gave a million Ghana Cedis to *Chale Wote* festival which was a side attraction of the Homowo festival, indicating that emphasis was placed on sellable cultures than indigenous culture.

The security agencies have always been deployed to Ga/Dangme communities during conflicts and the Homowo festival to ensure peace. Such activity shows high power of positive influence; yet, security agencies have been blamed for their involvement in land guard problems and protecting factions of the feuding Ga/Dangme families. Commercial entities, on the other hand, have no prime motive of sustaining any culture unless the sustainability will increase their profit margins. Meanwhile, their products and services affect everyday life and even speed the process of culture change.

The mass media, as well, is an instrument that can promote or destroy indigenous cultures (Wright, 2016). Wright (2016) explained how the Kogi people of South America, through films telecasted on British Broadcasting Corporation, helped in promoting their culture. However, the mass media in the Greater Accra Region, with the exception of Obono TV and the Ghana Broadcasting Corporation which dedicate time for teaching Ga /Dangme culture, have negative effects as they (Mass Media) focus more on the large populace Akan culture, sports and politics.

Identification of criteria for evaluating policies and acts

In order to identify if the policies and acts were helping positively or negatively in the sustainability of the Ga/Dangme culture, a set of criteria was established to reduce the subjectivity level of the intended evaluation. The established criteria were efficiency, equity, technical feasibility, political viability and administrative operability. Efficiency was analysed as the direct cost employed to execute the policy and opportunity cost of the policy. Other dimensions of efficiency were the direct and indirect benefits derived from the

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policy, on the other hand, involves horizontal equity (equal distribution to all persons), vertical (unequal distribution), transitional (unfair situation by the policy to a group) and lastly, intergenerational (consideration of the unborn).

Technical feasibility, as well, was evaluated as ex-ante (objectives set) and ex-post (objectives achieved) while consideration for political viability was based on the acceptability of the policy by actors or stakeholders, how appropriate the objectives of the policy mesh with values of the society and responsiveness (how targeted group believes the policy will achieve its objective). Another dimension of political viability was to look at the legal frame and backing being enjoyed or the support for the policy. Finally, administrative operability focused on logistics, staff capacity and cooperation between the agencies.

All these criteria were evaluated based on a Likert scale of very low, low, moderate, high and very high in their roles in sustaining the Ga/Dangme culture based on the research understanding and field data. The policies and acts were found to be moderately helpful in sustaining the Ga/Dangme culture (Table 35).

Table 35: Evaluation of cultural and land policies of Ghana to the sustainability of the Ga/Dangme culture

Evaluation criteria	Policies		Acts	
	Cultural	Land	Land Use	EPA
Efficiency	Moderate	Moderate	Moderate	High
Cost of operation	Moderate	High	Low	High
Opportunity cost	Very low	Very low	Very low	Very low
Direct benefits	Very high	High	High	Very high
Indirect benefits	High	High	High	Very high

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Table 35

Equity				
Horizontal (+)	Moderate	Very low	Moderate	Low
Vertical (+)	Very high	Very high	Very high	Very high
Transitional (-)	Very low	Very low	Very low	Very low
Intergenerational (+)	Low	Very high	Moderate	High
Technical feasibility	High	Moderate	High	High
Ex-ante (+)	Moderate	Moderate	High	High
Ex-post (+)	High	High	Very high	Very high
Political viability	Very low	Very low	Very low	Very low
Society acceptance (+)	High	Moderate	Moderate	High
Legal backing (+)	Very high	Low	Low	Moderate
Administrative operability	Moderate	Moderate	Very high	Very high
	Low	Low	Low	Low
Logistics (+)	Very low	Very low	Very low	Very low
Capability of staff (+)	Low	Low	Low	Low
Cooperation (+)	Very High	Moderate	Low	Low
Total valuation	Moderate	Low	Moderate	Moderate

Source: Osman, 2018

Cultural policy, Land Use and Spatial Act and Environmental Policy were in the moderate category while Land Policy was evaluated as low. Arriving at this value was based on an average of all values assigned to the criteria. The reasons for the values are explained per the sub-headings of the criteria for evaluation.

Efficiency of policies

Efficiency was measured as direct and opportunity costs. Direct costs are the millions of Ghana cedis government spends on paying staff to ensure the policies are implemented. These costs cover employee's salaries and

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administrative funds for advocacy, research and enforcement while the direct cost of the policies and acts were generated from the Ministry of Finance-Ghana (2018; 2017; 2016) (Table 36).

Table 36: Budget for implementation of objectives of the policies

Policies and Acts	Budget in Ghana Cedis		
	2016	2017	2018
Culture, creative arts and heritage (Cultural Policy)	25,720,646	22,516,137	40,888,002
Land administration and management (Land Policy)	103,303,032	74,039,772	82,606,284
Land Use and Spatial Planning and Human Settlement	-	14,828,321	14,949,035
Environmental protection and management	-	46,222,791	70,876,370

Source: Ministry of Finance-Ghana, 2018; 2017; 2016

Land administration and management which supervises the Land Policy had the most funds even though it reduced from over 100million cedis to 82 million cedis. The Land Use and Spatial Planning and Human Settlement section had the least funds from government. Despite the substantial amount for the implementation of land and cultural policies, Gummow (2014) asserts they are inadequate when compared to other policies. The disadvantage with the funds is that they all are highly funded by the government. This results in the inability of agencies to execute policies when funds are delayed. Such dependency on the government for funds can be solved by implementation agencies as they can secure funds from UNESCO. But Van der Auwera (2014) asserts that challenges of limited knowledge about UNESCO application procedures and the high cost of application deter most agencies.

The opportunity cost of these policies and acts are the various uses to which government would have put the direct cost in elevating the country's poverty and improving the standard of living of the citizenry. However, the opportunity cost is very low for culture, land and the acts because no government in the world would be able to manage its culture and land without policies and agencies to execute the policies.

Also, if culture and its land are well sustained per the sustainability indicators proposed by Soini and Birkeland (2014), then the people will be better off socially, economically and environmentally. The direct benefits of a policy should be very high together with the indirect benefits which are expected, largely, to be high because of the ecosystem services to the Ga/Dangme and the Greater Accra Region. Overall, the efficiency of a policy is assigned moderate for the policies and acts except for environmental policy which had high efficiency.

Equity of policies

Horizontally, the policies and acts cover all persons by protecting all cultures and lands (Objective 4 of Land Policy, Objective 1 and 3 of Culture Policy). Per this, horizontal equity was judged as high. Horizontal equity of the policy emanates from the democratic rule based on the 1992 constitution of Ghana which respects all persons irrespective of ethnicity, religion and age. Horizontal equity is a common attribute of all United Nations countries because of the quest to protect human rights (Van der Auwera, 2014).

Vertical equity was rather very low as the policies and acts do not give attention to the Ga/Dangme or any other culture. It was important for the

policies and acknowledge that not all cultures and land cover in Ghana suffer from the same rate of change; hence, those within the highest change bracket such as the Ga/Dangme culture should have been given special attention. The Ga/Dangme people are the only marginalised persons on their own land in Ghana based on population (Ghana Statistical Service, 2010).

Transitional equity of policies and acts were in the very high and high categories, with reasons based on their objectives, implementation and approaches. Examples include implementation 4 approach 1 (Forest reserves, strict nature parks, wildlife sanctuaries shall be fully protected), 4 approach 5 (Government may intermediate in facilitating investors access to land) and 5 approach 3 (Ecosystems with biodiversity or scenic beauty may be declared a protected area) (Table 33). The specific policy from the Land Policy and Environmental Protection Act sometimes deprives the Ga/Dangme of their lands. Also, comments by the Korle Wolomo justified transitional inequality by the Land Policy and Environmental act:

> It is worrying us, and our president (Ghana President) has talked about it (pollution of Korle) several times. Even last week I went closer (to the presidency) and they told me that they have given the contract to someone and they would see to it that it is done [Interview: Korle Wolomo, Ga Mashie, 2nd April, 2018].

Also, the Land Policy gives 60-100 years of security to immigrants who purchase land, creating a situation of landlessness for younger generations of the Ga/Dangme communities. In addition, the fourth (4) implementation of Land Policy (Table 33) allows government to claim any land with or without a cultural significance under its protection. This is compounded by the

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lands such as wetlands and forest. In addition, making the wetland drain storms affects the Ga/Dangme culture. Also, on transitional equity, the Cultural Policy and Land Use and Spatial Act were classified as low because no specific objective within them deprives the Ga/Dangme of their land.

Intergenerational equity was very high as all the policies and acts try to conserve land and culture for the future and the unborn children of Ghana including the Ga/Dangme. A clear indication of intergenerational equity is elaborated by the Land Policy implementation 3 and approach 6 which states that land disposal should not render a land title holder, his kith and kin and descendants landless (Table 35). In totality, equity of the policies and acts to the Ga/Dangme is very low, confirming findings by Alagia (2014) which attest to low equity of formal government policies which disenfranchise indigenous cultures.

Technical feasibility

Technically, the focus was on the ex-ante and ex-post factors of the policies and acts in sustaining the Ga/Dangme culture. The ex-ante factor was very high for Cultural and Land policies and the acts. Specific objectives of Cultural Policy such as objectives 1, 4, 6, 10 with indicators 2.2, 4.1, 5.1 and 6.2 are well-posed for the sustainability of the Ga/Dangme culture if implemented and achieved. Also, Land Policy objectives 2, 4, 6, 8, and 11 and their implementation indicators 2.1, 2.3, 2.4, 4.2, 4.4, 4.8 and 5.1 can all help sustain the Ga/Dangme culture.

Environmental Protection Act's objectives which are to secure the environment and protect and improve its quality also record a high ex-ante. The Land Use and Spatial Planning Act's objectives of ensuring the creation of appropriate zoning schemes with measures to prevent encroachments or breach of zoning schemes and controlling physical development in uncontrolled or less controlled but sensitive areas such as forest reserves, nature reserves, wildlife sanctuaries, green belts, coastal wetlands, water bodies, water catchment areas, open spaces and public parks show the high ex-ante.

However, ex-post scores assigned to the policies and acts were in the category of very low, with reason being the inability of the policies and acts to achieve their own set indicators. Example, the Cultural Policy has the indicator of using Ghanaian languages as a medium of instruction in schools and introducing a culture centred syllabus but this is yet to be achieved. Steel and Taras (2010) have explained the importance of language and the adoption of educational systems of other countries. In training Ga/Dangme students with western styles and language, inferiority composure towards their indigenous culture will increase.

Also, the objective of the cultural policy to protect cultural groves is far from reality as cultural wetlands are cleared for farms and saltpans in the Greater Accra Region as revealed by Appeaning-Addo et al. (2013) and Asumadu-Sarkodie et al. (2015). The land market objective of the Land policy, as well, has not been achieved. Greater Accra has the highest land market price with high demand from urban folks. This has resulted in illegal land sales, racketeering and speculation. The emergence of the land guard phenomenon and land conflicts in Greater Accra are proof of the bad land market system.

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technical defect of the land policy is that it states that structures on a land may be demolished at the developer's cost. The phrase, "may be", does not give a convincing ability to implement and achieve the objective of destroying illegal structures; hence, it leaves it at the prerogative of the planner or district.

Lastly, the Land Use and Spatial Planning Act was enacted because previous town and country planning schemes were not binding and enforcing. But having waited for physical developments to reach their peak before an authoritative land scheme was implemented in 2016 means much cannot be achieved by the act. Cooperation among agencies is an integral part of achieving ex-post but the policies and acts on land and culture do not establish any type of cooperation beyond the statement in the cultural policy that the Land Use and Spatial Authority (Town and Country Planning) should develop land use schemes. The Land policy, Environmental and Land Use and Spatial Acts acknowledge the role of traditional priests in demarcating cultural lands but how to involve them is not stipulated.

Political viability

Legal frames which give impetus to the policies and acts are the PNDC law and the Ghanaian Constitution of 1992. The Fourth Republic Constitution of 1992 and the PNDC Law 238 in 1990 established culture as a necessary ingredient for the development of Ghana. The Environmental Act 490 and Land Use and Spatial Planning Act 925 give the legal backing for environmental and land protection. Because of the ability of acts to prosecute offenders, it was assigned a very high legal backing while the policies had moderate values.

Besides the acts as the highest punishable laws in the land while policies tend to be the vision of formal governments.

The Land policy and the Land Use and Spatial Planning Acts are deemed to have low societal acceptance because they have made it easy for government and immigrants to acquire lands from the Ga/Dangme. Moreover, land use and spatial planning reduce the type of usage of land by the Ga/Dangme even though they are the custodians of the land.

The Environmental Policy was adjudged to have moderate societal acceptability because it helps in protecting most lands held scared by the Ga/Dangme. In all, Land Policy had moderate political viability, Cultural Policy and Land Use and Spatial Planning had high political viability and the Environmental Policy, very high (Table 35).

Despite all the political, societal and environmental viability of the policies, adhering to them is difficult for formal government officials. A reason is that the Spatial Planning and the Environmental Acts give authorities the right to demolish buildings within 100 meters of a high water mark, but they have not been able to undertake this activity along the Korle and Kphesie lagoons. This has been because formal governments fear the possibility of losing their popularity with the populace. Volcovici (2017) asserts that executing policies on the environment is always difficult for formal government agencies as they often risk losing economic benefits and votes. This weakness of agencies and commissions in excising mandates, according to Mobolaji (2015), is a common problem in Nigeria and other developing countries.

Administrative operability for the policies and acts were classified as low (Table 35). This value was arrived at based on individual scores of logistics. staff capacity and cooperation. Logistics was very low for the commissions and agencies. The municipal planner in Teshie explained the logistic challenges the agency has:

> As we sit here we don't have a plotter, so we are waiting for our head office to assist us with revision of plans; they also have a problem with their plotter. All the plan-schemes we have worked on for more than a year now have to be at standstill [Interview: Teshie Priest, Teshie Maame, 29th April, 2018].

Waiting for plotters means planning and physical development are on different paths. The inadequacy of logistics affects smooth operations of formal governments in Africa, an assertion strongly supported by Eneh and Agbazue (2011) as one reason for low productivity in the public sector.

Also, low staff capacity is a problem for agencies working on sustainability. The Prampram-Ningo district planner commented saying:

> With the challenges, there are many: workforce, staff. But we don't have staff that has modern capacity because now is not about chair and table is about using the laptops, the GIS software and all kinds of things. So is not about the numbers is about the quality [Interview: Physical Planner for Prampram, 28th March, 2018].

Laryea-Adjei (2000) explains that the reasons for the low staff capacity of Ghanaian government institutions are politicisation, bureaucracy, excessive use

of external experts, excessive state intervention in skill development and low remuneration.

Land policy was assigned high while the Cultural policy was assigned very high cooperation. This is because of the Cultural Policy implementation 4 approach 1 (encourage Architects, Planners and Designers of Civil Works and Engineers to incorporate traditional ideas in planning and make laws for parks and monument developments) and implementation 5 indicator 1 (National Commission on Civic Education and media to organise cultural programmes). This collaboration stipulated by the Cultural Policy is more specific and acknowledges diverse groups in the collaboration. However, the collaboration stipulated by the Land Policy, that is, implementation 6 approach 4 (collaboration with the traditional landowners) is generic – without the specific entity they should collaborate with.

In all, administrative operability was low. Until the issues of logistics and low staff capacity are addressed, the operability of government institutions in executing and implementing their mandates will never be at the optimal. This has and will continue to put a strain on the sustainable development agenda and sustainability of the Ga/Dangme culture in Greater Accra.

Chapter summary

The chapter reviewed two government policies (Cultural Policy and Land Policy) and two acts (Land Use and Spatial Planning Act and the Environmental Protection Act). The choice of these policies and acts was because they relate to the problem of sustainability of the Ga/Dangme culture. The policies and acts were reviewed based on their efficiency, equity, technical

feasibility, political viability and administrative operability. The research concludes that the policies and acts were moderately efficient in sustaining the Ga/Dangme culture. Equity levels were low, technical feasibility was moderate and ex-post, very low. Political viability was high for Cultural Policy and Environmental Act but moderate for Land Policy and Land Use and Spatial Planning Acts in their ability to sustain the Ga/Dangme culture. Administrative operability was also low because the agencies and commissions tasked to ensure that the policies and acts' objectives are achieved were riddled with logistic, staff capacity and cooperation challenges.

CHAPTER TEN
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter is devoted to the summary, conclusions, recommendation and suggested areas for future research. The summary gives a brief account of the entire work from background, problem statement, objectives, methodology and results. The results of the study served as the bases for arriving at the main conclusions. The chapter also explains several recommendations which, when implemented, will help sustain the indigenous culture of the Ga/Dangme in Greater Accra Region of Ghana. Lastly, the proposed areas for further research based on the findings and weaknesses of the thesis are outlined in this chapter.

Summary

The research focuses on landscape change and the sustainability of the indigenous culture of the Ga/Dangme in Greater Accra Region, Ghana. It starts with a conceptualisation of landscape as the interaction between land cover and culture. Land cover, here, is envisaged as the bio-physical covering on the surface of the earth while culture is the socially transmitted behaviour pattern that serves to relate human communities to their ecological settings – way of life. Culture was narrowed in this research to mean Ga/Dangme cultures which relate to land cover. These include family systems (size and inheritance), religion, occupation, festivals, medicine, diet and governance as identified through fieldwork. Per this conceptualisation of land cover and culture, there exist mutual relations between the two; as such, a change in land cover affects

culture and vice versa. What informed the choice of this topic was the fact that the Ga/Dangme have been the most exposed culture in Ghana since their 1478 encounter with the Portuguese and recently, are under siege from urbanisation, globalisation and government policies. These encounters have lasting effects on the indigenous culture and the land cover.

Based on this, the main research objective was to assess how the changing landscape (a change in land cover and culture) affects the sustainability of the indigenous Ga/Dangme culture. The focus was on culture sustainability because culture is the binding force for social, economic and environmental sustainability. Hence, if culture disintegrates, achieving these components of sustainability would be challenged. The specific objectives for the thesis were to: model land cover change from 1987 to 2017, explore cultural practices of the Ga/Dangme which have changed, explore the causes of these changes in both land cover and culture, assess the effects of changing culture and land cover on ecosystem services, measure the culture sustainability of the Ga/Dangme, and explore how policies work for or against the sustainability of the Ga/Dangme culture to enable tailor-made recommendations.

In achieving these stipulated objectives, the research adopted both cross-sectional survey and the ethnographic research design influenced by the positivist and interpretivist notions of reality. The adopted philosophies determined the mixed method approach of both qualitative and quantitative methods employed during data collection, data analysis and presentation of results. Specifically, exploratory sequential mixed method was adopted with first collecting qualitative data, which informed the design of questionnaires in soliciting data from sampled respondents. It also influenced the presentation of

results as the research first presented the qualitative outputs and supported with the quantitative results.

Theoretically, the research sits within the interactionist theory by looking at the interaction between cultures and their land cover. It postulates that it is through social interactions that laws, customs, sanctions and cultural prescriptions are determined. It further explains the interconnectedness between cultures and objects (land cover) that can be achieved through landscape biographies, mutualism and path dependency theory. Landscape biography looks at meanings assigned to objects in the world, with these meanings becoming memories formed and imprinted on the surface of the earth which is always changing in meaning and shape. Mutualism is the theory that each species (land cover and human cultures) are constantly involved in interaction which produces benefits and also cost for each species. However, path dependency affirms that cultures should continue to perform interactions which have produced benefits with the least cost to ensure the sustainability of land cover and culture as both need each other to survive.

Methodologically, Ga/Dangme traditional communities were sampled using the simple random and purposive sampling techniques. The simple random sampling technique was used to select four traditional areas, two (Ga Mashie and Ledzokuku Krowor) of which are from the Ga areas and the other two (Ningo-Prampram and Shia Osudoku) from the Dangme areas. Purposively, the seat of the traditional council was selected because the research believes that if culture will be sustained, then its core needed to be sustained first. Also, the seat of the traditional council houses the chiefs, traditional priests and cultural heritage to be studied.

Using purposive sampling again, chiefs and traditional priests, male groups (youth and the aged) and female groups (youth and the aged) in the selected communities were selected for focus group discussions while physical planners were interviewed using interview guides. Furthermore, the research used a questionnaire administered electronically through the Kobotoolbox to solicit the opinion of 1,020 household heads. These household heads were sampled based on the multistage sampling approach. Equal allocation was used to allocate 255 respondents in the four (4) selected communities. Systematic sampling was then used to select a house to visit and, lastly, simple random sampling was employed to select a household head to be interviewed.

Beyond the primary field data, the research also made use of geospatial data by downloading Landsat images of 1987, 1993, 2005 and 2017 of the Greater Accra Region from the United States Geological Survey website. The Landsat dataset were processed for atmospheric correction and coordinate and format conversation using ESRI ArcMap Pro. Furthermore, the research backed its data with archival data from the Ghana Public Records and Archives from the Native Records of Ghana compiled by the British colonial government. Lastly, the study relied on the following policy documents: Cultural Policy of Ghana, Land Policy, Environmental Protection Act and Land Use and Spatial Planning Act sourced from government institutions.

Data analyses were done based on the type of data obtained. Maximum likelihood analysis was employed to classify the Landsat datasets into land cover data/maps with the help of Erdas 2013 software. Using the combinatorial overlay function, a land cover change matrix from 1987 to 2017 was possible to quantify the rate of land cover change in Greater Accra. Fragstat software

was used to generate the land cover fragmentation indices to estimate ecological integrity of the land cover in the region.

Additionally, the focus group discussions and interviews were, afterward, transcribed and analysed based on themes important to explaining the land cover change and culture change phenomena in the study area. Using Qualitative Data Miner Lite, the research themed the causes, effects and solutions to land cover and culture change from the transcription. Verbatim quotations from the transcription were presented as results. This was supported by questionnaire data after they have been analysed descriptively and indices generated for culture change, ecosystem services and culture sustainability. Beyond these, citations from the Public Records and Archives were also used to support both the qualitative and quantitative outputs. The evaluation of sampled policies was based on the identification of the problem, evaluation parameters and generation of likert scale to value the effect of the studied policies on the Ga/Dangme culture sustainability.

Results from the analyses indicated that land cover change was mainly on natural and semi-natural covers (NSTV), artificial surfaces (AS) and cultivated and managed terrestrial areas (CMTA) in Greater Accra Region from 1987 to 2017. Artificial surfaces increased by about 28.8% from 1987 to 2017, CMTA by 10. 1% while NSTV-SG and NSTV-OF decreased by 19.3% and 17.6% respectively. Natural and semi-natural water, and natural and semi-natural aquatic vegetation, which are envisaged as abodes for the goddess of Korle, Kphesie, Lalu, Sakumo and Songor by the Ga/Dangme culture, decreased by 3% and 0.9% respectively. Per fragmentation statistics, NSTV-SG and NSTV-OF experienced the worse decrease in largest patch index of 20.2

of the Ga/Dangme culture, eco-resilience, locality, economic viability, vitality and heritage. The results of the study confirms the theoretical framework adopted, where areas with high land cover change are expected to witness high rates of indigenous culture change and low levels of ecosystem services which will lead to low sustainability of indigenous culture.

Lastly, policy evaluation revealed that the ex-post of the policies and acts were very low. Interestingly, political viability was high but because of low administrative ability, policy objectives of protecting culture and land cover are not being achieved. Also, the policies and acts had a vertical and transitional disadvantage to the Ga/Dangme in sustaining their culture.

Conclusions

Based on the specific objectives and the key findings of the study, the following conclusions have been drawn:

1. Artificial surfaces were the growing land cover trailed by cultivated and managed terrestrial areas (CMTA) by taking from natural and semi-natural land covers and natural aquatic vegetation which are cultural lands of the Ga/Dangme.

2. Culture change was more profound in terms of religion and traditional governance which have great influence on land cover change and the sustainability of the Ga/Dangme culture.

3. The main causes of land cover and culture change can be traced to chieftaincy disputes, Christianity, formal education, urbanisation/population growth, technological change and monetary pursuit.

4. Changes in land cover and culture resulted in a decrease in ecosystem services as land cover has been over-exploited. Also, services needed to be performed by the Ga/Dangme to help sustain land cover was very low. The culture sustainability index generated indicates that the sustainability of the Ga/Dangme culture in the future will be worse if the current trajectory is unchecked.

5. Lastly, policies and acts by the government to safeguard indigenous cultures and land cover were not effective in helping sustain the Ga/Dangme culture.

Recommendations

Based on the conclusions drawn, the study makes the following recommendations:

1. Land Commission, Environmental Protection Agency and Land Use and Spatial Planning Authority should embark on reforestation of all wetlands and groves within the region. This should be embarked on through policing, condemning and exacting measures to prevent further developments around these ecological zones to help reduce the rate of artificial surface development and farmlands.

2. The National Peace Council, National Commission on Culture and the House of Chiefs should increase dialogue on chieftaincy disputes by ensuring rightful heirs to thrones are enstooled and resolving related conflicts. This can be achieved through periodic meetings between conflicting families. The agency, also, has to implement harsh measures on defaulting families and individuals who break

peace agreements. In addition, they should bring together Christian clerics and traditional priests to dialogue about ensuring mutual respect for traditional religion and not castigate members for participating in indigenous cultural practices.

3. Ga/Dangme through their traditional leaders should embark on tree planting within their communities and forests/wetlands to help improve ecosystem services. This will help improve a sense of ownership and enhance protection of natural and scared forests and wetlands. Also, all Ga/Dangme families who own or are stewards of forest groves and wetlands should desist from selling them to physical developers. The land commission can enforce this by implementing a law which makes all land documents for sacred wetlands and forest areas illegal.

4. To improve sustainability of Ga/Dangme culture, all Ga/Dangme household heads should allow their wards to participate in Ga/Dangme cultural activities and not label these activities as fetish or ungodly. It is through participation that young generations will fully appreciate the Ga/Dangme culture.

5. Also, the National Commission on Culture should adhere to implementation 2 and approach 1 which talks about ensuring culture as a compulsory subject at all levels of education in Ghana. This has the ability to help all children in Ghana and the Ga/Dangme especially to learn more about their culture to help reduce the rate of cultural change. This recommendation can be achieved through collaborations among the Ministry of Education, Ghana Education

Service and Tertiary Institutions across the country to develop curriculums on culture.

6. National Commission on Culture, Environmental Protection Agency and Land Use and Spatial Planning Authority should be empowered in terms of logistics, personnel and prosecuting ability to enable them implement the policies which they are mandated to execute. Empowerment is possible if Ministry of Finance allocates sufficient financial resources to these agencies to employ and buy necessary logistics. Also, the agencies have to seek the help of other non-governmental agencies like USAID, European Union, British AID, UNESCO and the World Bank which often give free training and logistics to government agencies as a way of enhancing collaborations.

Areas for further studies

From the findings of the study, it is suggested that some further studies be carried out to fully understand land cover change and cultural sustainability among the Ga/Dangme. The following areas are therefore suggested:

1. How migrants envisage the Ga/Dangme landscape and its implication on the sustainability of Ga/Dangme natural heritages.

2. The influence of the Ga/Dangme culture on the cultural practices of migrants in the Greater Accra Region which will help understand the complete nexus of culture change between different cultures.

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APPENDICES

Appendix A

Focus group discussion guide

Hello, my name is _____ and I am a PhD student of the Department of Geography and Regional Planning, University of Cape Coast. I am conducting a research on landscape (culture and land cover) change and sustainability of Ga/Dangme culture in Greater Accra Region. I would greatly appreciate your participation in this survey. This survey is estimated to take between 20-40 minutes to complete.

All of the answers you give will be confidential and will not be seen by anyone other than members of our survey team. Participation in the survey is completely voluntary. If you do not wish to answer a particular question, please let me know so I move on to the next question. You can, also, ask that we stop the interview at any time. However, we hope you will participate in the survey since your views are important to the study.

At this point, I would want to know if you have a questions about the survey.

May I begin the interview now?

Land cover and ecosystems services

1) How was the general land cover/environment in the community 30 years ago or years past?

2) What was the extent of specific land covers (Wetlands, shrubs, grasslands and cultural lands)

3) What were some of the benefits the community had derived from natural cover 30years ago in relation with the period between then and now? (They should be specific on the provisional part)

    i.   Provisional benefits: Food, Air, Drinking water, Fuel wood

    ii.   Regulating: Flood regulation, climate

    iii.   Supporting: Farming, fishing

    iv.   Cultural: Beauty in the landscape, recreation, relaxing and rituals/festivals

Land cover change, causes and ecosystem disservices

1) Looking around, do you think the land cover has changed?

2) Among the land covers which one has changed drastically

3) Can you draw the extent of wetland and cultural lands as it pertains now?

4) Have the benefits derived from the natural cover changed over the span of 30years?

    i.   Provisional benefits: Food, Air, Drinking water, Fuel wood

    ii.   Regulating: Flood regulation, climate

    iii.   Supporting: Farming, fishing

    iv.   Cultural: Beauty in the landscape, recreation, relaxing and rituals/festivals

5) What are the factors which are causing the changes in the land cover?

Culture change and causes

1) Now, looking at the culture of the Ga/Dangme, are there changes in the culture now compared to 30years ago?

   (Diet, Birth & Death ceremonies, Rituals/Festivals, Dressing. Language, Morals and social interaction, chieftaincy)

   1a.) Ask about the emergence of contemporary/new cultures (carnivals, street art, masquerades, boxing)

2) Is it possible to describe some of these changes (per Naming ceremony, Funeral, Diet, Language, Rituals, Festivals, Social interactions, etc.)?

3) What are contributing to these cultural changes (Causes of cultural change)

4) Do you think change in land cover has any effect on cultural practices?

5) Has a change in the Ga/Dangme culture affected the natural landcover?

6) Have the changes been positive or negative to the Ga/Dangme people?

Culture management and sustainability

1) Examining the changes in land cover and culture, aren't there laws to help protect them? (Land cover- laws/taboos/ punishments: Culture laws/taboos/ punishments)

2) With these laws/taboos/punishments in place how come they have not been effective in managing the changes?

3) What are the challenges hindering the smooth implementation of community management of

-land cover

-culture

4) Have there been community initiatives to help manage the natural land cover/groves and cultural lands

5) How have the community collaborated with other agencies/government or persons to help with the management of land cover/groves and cultural lands

6) In terms of preserving the entire culture of the Ga/Dangme, are there such collaborative exercises and community initiatives?

7) How can you describe the effort of government in promoting or not promoting Ga/Dangme culture and protecting land cover?

8) As a custodian of the Ga/Dangme culture, do you think the culture and its natural land cover will be sustained in the next 30years to 100years?

9) What solutions do you propose to managing/sustaining land cover change in the area?

10) What solutions do you propose to protecting and sustaining the Ga/Dangme culture?

Thank Respondent

Appendix B

Interview guide for traditional priest and rulers

Hello, my name is _____ and I am a PhD student of the Department of Geography and Regional Planning, University of Cape Coast. I am conducting a research on landscape (culture and land cover) change and sustainability of Ga/Dangme culture in Greater Accra Region. I would greatly appreciate your participation in this survey. This survey is estimated to take between 20-40 minutes to complete.

All of the answers you give will be confidential and will not be seen by anyone other than members of our survey team. Participation in the survey is completely voluntary. If you do not wish to answer a particular question, please let me know so I move on to the next question. You can, also, ask that we stop the interview at any time. However, we hope you will participate in the survey since your views are important to the study.

At this point, I would want to know if you have a questions about the survey.

May I begin the interview now?

Priest Demography

1. Please I will like to know a little about yourself as a priest?

2. Name

3. Age and how long have you been a priest?

4. How you became a priest and the deity you serve?

5. The functions you play as we/wolomei you play for the deity/gods/spirits and the Ga's

6. Per these functions perform currently as compared to previous years, have there been changes?

7. Are there changes in the roles you perform now compared to those of your predecessors?

Land cover and ecosystems services

1. Can you remember the general land cover in the community 30 years ago and as far as you can remember?

2. Can you remember some of the benefits the community got from natural cover then in relation to the following?

    i.   Provisional benefits: Food-farming/fishing, Air, Drinking water, Fuel wood, trees medicinal plants, animals in some of the specific land cover.

    ii.   Regulating: Flood regulation, climate

    iii. Supporting: Farming, fishing

    iv.   Cultural: rituals/ festivals, spiritual

Land cover change, causes and ecosystem disservices

1) Comparing 30years and distance past (beyond 30years) to now, will you say the land cover has changed?

2) Has the change in the land cover (increase in built up, clearing of vegetation, destruction of water bodies) affected the sacred groves and cultural lands?

3) In your opinion, are there other factors besides land cover which is affecting leading to changes in the sacred groves/monuments and cultural lands?

4) How has the changing nature of sacred groves/monuments and cultural lands affected Ga/Dangme rituals/customs/spirituality?

5) How are the issues of changing scared groves/monuments and cultural lands being taken by the gods/deity you serve?

6) Are there punishments from the gods/deities as a result of changing the cover of sacred groves and cultural lands?

7) In terms of punishment can the June 2015 floods be associated with punishments by the gods/deities. (Before the flood there were news of gods not happy, how did the gods communicate their displeasure)

8) How can the repercussions be remedied to avert their negative effects from the diety? (what could have been done to saved the situation and after the situation what must be done.)

Management

1) Can you explain how sacred groves and cultural lands were managed in times past and currently?

2) Have the priesthood collaborated with anybody (traditional council, government, NGO, other persons) to manage and protect sacred groves and cultural lands?

3) Have traditional laws made some success in the management of sacred groves and cultural lands?

4) If yes, how was the success achieved. if no what are the challenges hindering the smooth implementation of traditional laws in the management of sacred and cultural lands?

5) What measures are in place to train other priest to keep up the tradition once your not around again?

6) Do you think in the face of these challenges the Ga/Dangme sacred groves and cultural lands will endure the next 30 to 100years.

   If yes what will make it endure

   If no, what solutions do you propose to managing and protecting sacred groves and cultural lands?

Culture change and causes

1) Let's take a look at the general culture of the Ga/Dangmes, have there been changes in the way the culture used to be 30yrs ago and distance past?.

   a. (Diet, Birth & Death ceremony, Rituals/Festivals, Dressing, Language, Morals and social interaction, chieftaincy, priesthood)

   b. Ask about the emergence of contemporary/new cultures (carnivals, street art, masquerades, boxing)

2) What are the factors accounting for changes in the culture Ga/Dangmes?

3) Are there effects (positives & negatives) associated with the culture change of the Ga/Dangmes?

4) What is currently being done by the priests to help solve the situation

5) Will you say the Ga culture will endure time or in years to comes

Appendix C

Interview guide for physical planners

Hello, my name is _____ and I am a PhD student of the Department of Geography and Regional Planning, University of Cape Coast. I am conducting a research on landscape (culture and land cover) change and sustainability of Ga/Dangme culture in Greater Accra Region. I would greatly appreciate your participation in this survey. This survey is estimated to take between 20-40 minutes to complete.

All of the answers you give will be confidential and will not be seen by anyone other than members of our survey team. Participation in the survey is completely voluntary. If you do not wish to answer a particular question, please let me know so I move on to the next question. You can, also, ask that we stop the interview at any time. However, we hope you will participate in the survey since your views are important to the study.

At this point, I would want to know if you have a questions about the survey.

May I begin the interview now?

Background of planner

1) Please what is your name?

2) What position do you occupy currently at the Land use and Spatial Planning Authority?

3) How long have you been in this position?

4) How long have you been working at Land use and Spatial Planning Authority and in Accra?

5) What are your main duties in this position?

6) Can you explain the core responsibilities of Land use and Spatial Planning Authority?

7) Can you give me a brief history of the Land use and Spatial Planning Authority? (When it was formed, what necessitated its formation, which laws give it a legal backing and its structure)

8) How does the agency fund its work?

9) How well is the agency equipped in terms of personnel for it activities?

10) How do funds and personnel affect the operation of the agency?

Land cover change, causes and ecosystem disservices

1) As an agency in land use planning, what is your position on the causes of the increasing land cover change in Greater Accra?

2) Can the agency be blamed for the spontaneous changes in land cover since you have the mandate to check land cover/use?

3) Can you explain some of the physical effects (positive & negative) of land cover change in the region?

4) Do you think land cover change has effects (positives & negatives) on the culture of the Ga/Dangme?

Land cover management and sustainability

1) As an agency, how do you ensure that the natural land cover is preserved and managed in the region (Accra)?

2) Are there specific/special laws (maps) by SPA which protect natural cultural heritages of people (Ga/Dangmes in particular)?

3) Have these laws/policies helped in achieving any notable success in preserving natural land cover and natural cultural heritages?

4) In your assessment, do you think the current management approach and laws by SPA are effective to ensure the sustainability of natural land cover?

5) If they are not effective, what are the practical challenges facing the agency in its management of the natural land cover in the region?

6) How has SPA policies/management been influential in incorporating Ga/Dangme traditional leaders in managing natural land cover/sacred groves/cultural lands?

7) In your opinion, what are the best solutions to challenges faced in land cover management in the region?

Thank Respondent

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APPENDIX D

Questionnaire

UNIVERSITY OF CAPE COAST

Department of Geography and Regional Planning

Landscape Change and Sustainability of Ga/Dangme Culture in Greater Accra Region, Ghana-West Africa

Introduction and Consent

Hello, my name is _____ and I am a PhD student of the Department of Geography and Regional Planning, University of Cape Coast. I am conducting a research on landscape (culture and land cover) change and sustainability of Ga/Dangme culture in Greater Accra Region. I would greatly appreciate your participation in this survey. This survey is estimated to take between 20-40 minutes to complete.

All of the answers you give will be confidential and will not be seen by anyone other than members of our survey team. Participation in the survey is completely voluntary. If you do not wish to answer a particular question, please let me know so I move on to the next question. You can, also, ask that we stop the interview at any time. However, we hope you will participate in the survey since your views are important to the study.

At this point, I would want to know if you have a questions about the survey.

May I begin the interview now?

Signature of interviewer: _____

Date: (dd/mm/yyyy): ………

		2	0	1	8

1-Respondent agrees to be interviewed: ....

2-Respondent does not agree to be interviewed: ....
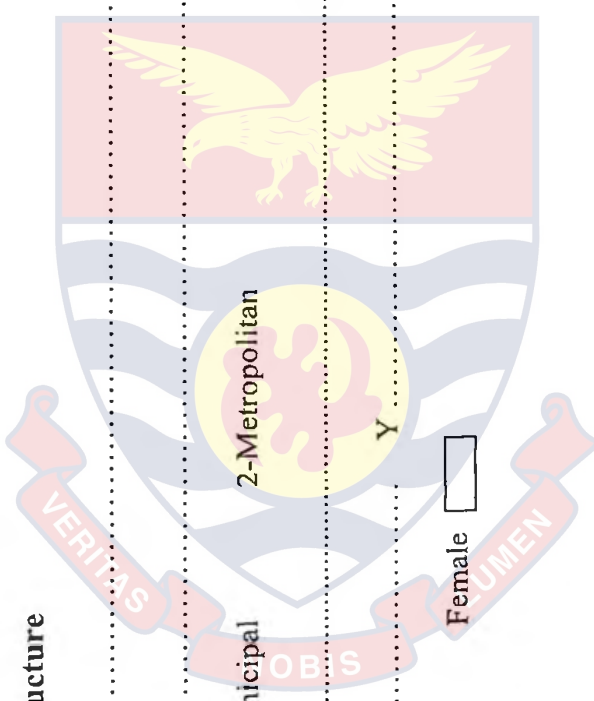
Section A. Household Identification and Structure

A1.   Date (dd/mm/yyyy): .... | 2 | 0 | 1 | 8 | | | | |

A2.   District code: ....

A3.   MMDA type: 1-District   2-Municipal   2-Metropolitan

A5.   Household code: ....

A6.   GPS location: X ....   Y ....

A7.   Gender   Male ☐   Female ☐

A8.   Ethnicity: 1- Ga   2- Dangme

       Clan/*We*: - ....

       Ethnicity of Parents: 1-Mother ....   2-Father ....

A9.   Age: ....   Marital Status: ....   Household size: ....   Religion: ....   Highest Formal education: ....

A10.   Primary Occupation   Monthly Income:

Secondary Occupation   Monthly Income:

Land cover change and causes

B1.   What are the dominant land covers in your community/environment? *(In order of largest area –Label from 1-8 with 1 being the most dominant and 8 the least dominant)*

Time span	Land cover types							
	Forested areas	Grasslands	Built areas	Bare Areas	Farms	Rivers/ Lagoons	Wetlands	Others
Current								
Ten years ago								

To be answered by persons 45 years above	Thirty years ago					
	Longest time you can remember: …………					

B2.

i) Which land cover has decreased the most in your community?

A) Forested areas b) Grassland c) Built area d) Bare areas e) Farm f) River/lagoons g) Wetlands   h) Others

ii) Which land cover has increased the most in your community?

A) Forested areas b) Grassland c) Built area d) Bare areas e) Farm f) River/lagoons g) Wetlands   h) Others

B3

i) What are the causes of land cover change in your community?

a) Population increase   b) Central government land acquisition policies   c) Other central government policies

d) Unplanned land use demarcation e) Improvement in farming activities   f) High price of land

g) Corruption /Greed   h) Chieftaincy disputes   i) Climate   j) Others

Causes	Slightly influence	Somehow influence	High influence	Extreme influence	Any specific reason
Population increase					
Central government land acquisition policies					
Other central government policies					
unplanned land use demarcation					
Improvement in farming activities					
High price of land					
Corruption /Greed					
Chieftaincy disputes					
Others					

To what extent do you believe changing land cover has affected physical heritages/ customs? (Based on what is ticked in B3i)

B4.

Tradition	Very negatively	Negatively	Positively	Very positively	Specific effects
Farming					
Fishing					
Spiritual wetlands					
Cultural farms					
Spiritual trees/groves/grass					
Spiritual/ancestral lands					
Cemeteries					
Crafts/ artefacts creations (drums,					

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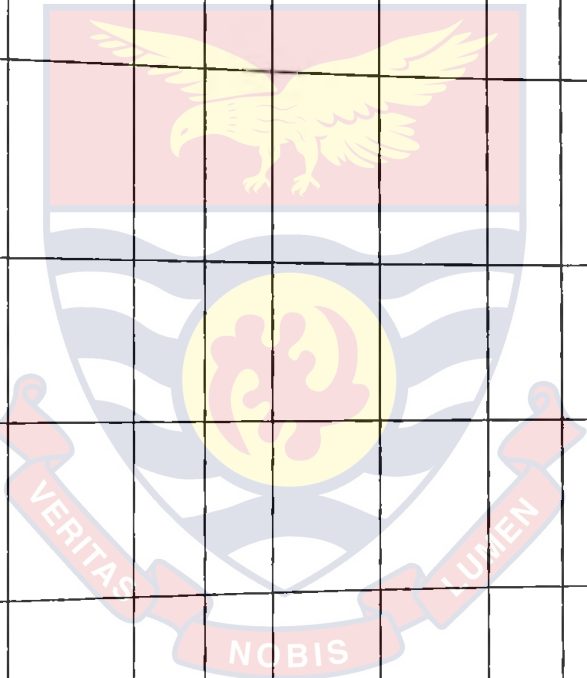
dress, customs, staffs, beads, canoes, etc..)		
Others		

C. Culture change, causes and effects

C1.	Heritage/cultural practices/activities	Change					Specific change If any	Causes of change	Effects	How has land cover change played a role in the change (1: No Effect 2: Less effect 3: Somehow effects 4: High effects)
		No change	Less	somewhat	High	Extreme				
	Birth ceremony									
	Puberty rites									
	Marriage									
	Death/funerals									
	Inheritance									

Occupation (Farming/Fishing systems/Trading)							
Festival							
Rituals							
Medication/Healing							
Language -proverbs							
Religion /belief systems							
Value systems (Morality)							
Diets (Food & drinks)							
Social interaction							
Chieftaincy/Traditional governance							
Folktales and storytelling							
Music & dance							
Housing & building							
Others							

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D. **Ecosystem services and disservices from landscape change (culture and land cover change)**

| E1. | Benefits of land cover (Please state the extent to which you agree with the following statements on a scale of 1-3, 0-Don't know/Applicable 1-Dont agree, 2-less agree, 3-Agree 4- More agree) |

C-Current/Now-2018, 10y-10years ago and 30y-30years ago (30yr should be answered by persons over 45years

Cultural ecosystem services	Forested area			Grassland			Bare Areas			Farm			Wetland			Lagoon/ River			Others		
	C	10y	30y	C	10yr	30yr	C	10y	30y	C	10y	30y	C	10y	30y	C	10y	30y	C	10y	30y
Visiting these sites makes me feel connected to nature (natural heritage)																					
At these sites, I feel part of something that is greater than humanity (Spiritual)																					

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Statement								
I have memorable experiences at these sites								
I miss these sites when I have been away from them long								
Visiting these sites makes me learn more about nature								
I bond well with my friends when I visits these sites								
When I visit these sites, I feel healthy								
I get inspirations when I visit these sites								
I feel touched by the beauty of these places								

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Visiting these sites leaves me feeling more healthy				
I free from the worlds problem when at these sites				
Provisioning services (natural heritages/land cover)				
I get my household food directly from land cover in my community				
I get fresh water directly from natural water sources in my community				

My household energy source is directly generated from the natural cover in my community				
I get medicinal herbs from the land cover in my land cover				
Regulating services (natural heritages/land cover)				
Rainfall occurrence in my community is high				
Temperature within my community is high				

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Flood occurrence in my community is high						
Supporting services (natural heritages/land cover)						
Soil nutrients in my community is very rich						
SERVICE TO NATURE						
Protection services						
I am more environmental protection conscious						
I abide by cultural/traditional laws that govern the use/protection of the cover						

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Enhancing services							
I often engage in pruning of trees in my community and surroundings							
Restoring services							
I burn grassland to enhance growth of healthy ones							
Did you plant any tree in the community within each of the time periods							

E. Culture sustainability

Heritages (Notion, accessibility, preservation)

Heritage is measured as tangible and intangible. Tangible are considered physical heritages which occupy space while the intangible are the knowledge and importance ascribed to the tangible

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Vitality is measured as contribution of heritage in promoting solidarity, making known Ga/Dangme culture to the world and contribution to local economy

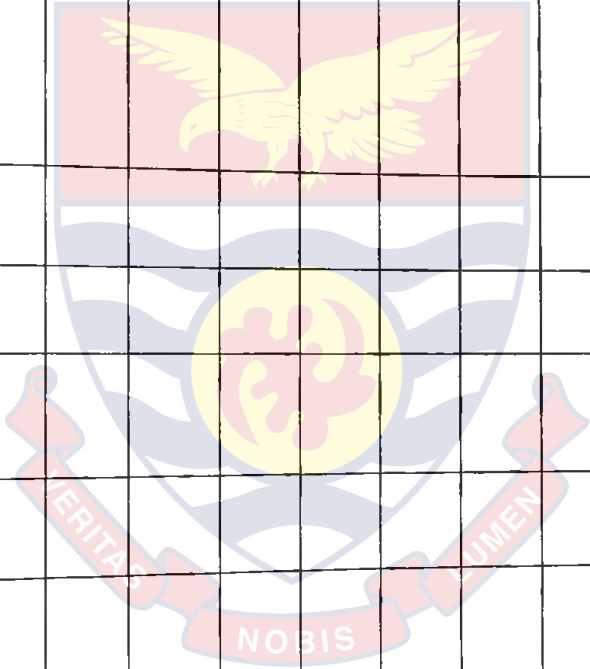| Eh1.	i)	Do you feel connected to your homeland or traditional land? a)Very strongly b) Strongly c) Less strongly d) Don't know
	ii)	What links you to your homeland? ....

		Accessibility	Knowledge/Significance (Intangible)	Level of protection
Eh2.	Heritage List	Last time visited Days, Weeks, Months	Accessibility Not accessible (1), Less accessible (2), Accessible (3), More	Relevance to Ga/Dangme (Not relevant (1), Less relevant (2), Relevant (3), Very relevant (4) 1-Aesthetic, 2-Spirituality 3-Identity 4-Wellbeing 5-Inspiration 6-Education	

	accessible (4)	1	2	3	4	5
Artificial						
Natural						
Lagoons						
Wetlands						
Farms						
Sacred groves						

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Sacred lands				
Festivals	Don't ask about			
Homowo	accesibility			

Economic viability (employment and income)

Viability of cultural economy: Number of people in cultural occupation, attractiveness of local economy to generate

Ee1. ii) Is any member of your household in a cultural occupation?   No ☐   Yes ☐   If yes no. HHs………………

ii) Type of occupation: a) Farming b) Fishing c) Craft d) Priesthood e) Others …………………

iii) Any household member(s) in production of traditional products?   No ☐   Yes ☐   If yes no. HHs…………………

If yes, name products produced? ………………………………………………

iv) Any household member(s) engaged in the development/management of non-physical cultural products (songs, folktales, etc.)? Yes

Tourism and foreigners to Ga/Dangme communities improve my household income? a)Don't b) Less likely c) Likely d) More likely

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	How best can you represent the local economy in your community? a)Not vibrant b)Less vibrant c)Vibrant d)More Vibrant
Ee2.	Expenditure on cultural products (Monthly)

Rank the your household expenditure on the following cultural products (None, Very Low, Low, Somewhat high, High, Very high)

Traditional foods, cloths, footwear, jewellery, visit to elders

Food	Clothing& Sewing	Footwear	Artefacts	Jewellery	Museums	Visit to Traditional Leader	Visit traditional priest/deity
☐	☐	☐	☐	☐	☐	☐	☐

1.Have you eaten/cooked any Ga/Dangme's traditional food today for your household?   Yes, or   No

2.   If no, When was the last time you ate any Ga/Dangme traditional food? (Days, Weeks, Months, Year)

   No:...

3. How frequent do you listen to Ga/Dangme music

a)Does not   b) less frequently c) Somewhat frequently d) More frequently

   Reason:...

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4.How often are Ga/Dangme traditional foods cooked in the household

a)Dont   b) Less often c) Often d) More often

Reason:...

Vitality (Inspiration and wellbeing) (Measured under cultural ecosystem services)

Diversity (Policy making and inclusions)

Ed1.	1.Are you a member of any Ga/Dangme social group and membership? No ☐ Yes ☐
	Number of groups joined? ....
	List of groups
	2.How supportive are the groups to your wellbeing as a member? a) Not supportive b) Less supportive c)Somewhat Supportive d) *Highly* supportive
	3.Interaction with family members in Accra
	a) No interaction b) less interaction c) somewhat interaction d) High interaction
	4.Interaction with family members in Other parts of Ghana
	a)No interaction b) less interaction c) somewhat interaction d) High interaction

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5. Interaction with family members in Other of the world

a) No interaction b) less interaction c) somewhat interaction d) High interaction

Ed2. i) Are you involved in decision making at the clan/family level?   Yes ☐   No ☐

iii) How do you rank the level of community members' involvement in decision making?   Low ☐   Moderate ☐   High ☐

iv) If low, given the opportunity, how commited will you be to helping in decision making?   No ☐   Sometimes ☐   Alw ☐

Cultural locality

1. To what extent do you bellieve your community have lost its original Ga/Dangme nature/identity? a) No idenity change b) Less identy change c) Identity change d) High idenity change

2. Which cultural influence is affecting the Ga/Dangme identity in your community? Ghanaian cultures: Akan, Ewe, Mole Dagbani,

African countries: ....

World: European, America, Asian, Oceanic/Islanders

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3.In what specific ways are the selected cultures affecting Ga/Dangme cultural identity/nature?

....

4.How will you rank the application of Ga/Dangme cultural practices in solving land cover change problems ?

a.Not applied b. Less applied c) Apllied d) Always applied   e)Don't know

5.How will you rank application of Ga/Dangme cultural practices is solving traditional polical issues?

a.Not applied b. Less applied c) Apllied d) Always applied   e)Don't know

6.How will you rank application of Ga/Dangme cultural practices in solving social problems?

a.Not applied b. Less applied c) Apllied d) Always applied   e)Don't know

7.How will you rank application of Ga/Dangme cultural practices in solving economic problems?

a.Not applied b. Less applied c) Apllied d) Always applied   e)Don't know

8.How well do you believe Ga/Dangme culture is being taught to the young generation in your community?

a. Not taught b. Less educated c. Moderately Educated d.Highly educated

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What factors affects the transmittion of Ga/Dangme culture to younger genration?................................

Eco-cultural resilience and civilization (cultural conservation measures)

Ec

iii) Were you taught the cultural significance of natural land cover by parents?   No ☐   Yes ☐

iv) Have you taught your children the cultural significance of natural land cover?   No ☐   Yes ☐

F. Current culture and land cover management

F2.	
i) Can you rank your level of respect for Ga/Dangme traditional leaders (excluding priests)? a)Low b) Moderate c) High	
ii) Can you rank your level of respect for Ga/Dangme priests? a)Low b) Moderate c) High	

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Sustainability of land cover and Ga/Dangme culture

F4. Sustainability	30yrs from now				100yrs from now			
	Unlikely to be sustained	Less likely to be sustained	Likely to be sustained	Very likely to be sustained	Unlikely to be sustained	Less likely to be sustained	Likely to be sustained	Very likely to be sustained
Land cover								
Ga/Dangme culture								

i) What measures should be put in place to ensure sustainability of land cover in the community?

....

ii) What measures should be put in place to ensure sustainability of the entire Ga/Dangme culture?

....

Terms

1. **Cultural goods and services:** products that are distinguished from other economic goods and services because they "encompass artistic, aesthetic, symbolic and spiritual values."

2. **Cultural heritage** is, broadly, both a product and a process, which provides societies with a wealth of resources that are inherited from the past, created in the present and bestowed for the benefit of future generations

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CHANGE IN CULTURE MEASURES

Indicators	Measures	Data Source		
Demography change (Population)	Population percentage of people or indigenous people (Take population census data for various years and look at the percentage of Ga/Dangme's in Greater Accra over the period, birth rate and death rate). You can extrapolate the 1964 population to 1987 as the base and start the arguments from that point.	Statistical services		
Social interactions	Participation in cultural activities (Festivals/rituals, birth-death ceremony, puberty, visit to traditional drama–concerts– physical heritages)	Household data		

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	Interaction with family members, community members and other Ga/Dannge members –within community, outside other parts of Ghana, World	
	Communication/Language	
	Attitudes/Values	
Economy (Expenditure)	Occupation in traditional works	Household data
	Purchase of cultural products	
	Sale of cultural products (Can also pick some shops to ask about their sales rate in relation to tourisits)	
	Rate of visit to heritages	
Education	Participation in cultural activities (Festivals/rituals, birth-death ceremony, puberty, visit to	Household data
		Assess change in people education of Ga/Dangme culture

	traditional drama-concerts-physical heritages, Story telling) Listening/ watching/ reading Ga/Dangme programs Likely to learn traditions from grandparents-parents-friends
Religion and cosmology	Creation of world Believe in gods Rituals and Festivals
Food & Gastronomy	Ask about likely hood to eat traditional Ga/Dangme foods. Which is the most eaten by household and which is the least eaten and reasons How food is prepared
Health & Medicine	

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Music/Dance		
Dress		
Governance		

Physical Heritages

- Number of physical heritages in community

- How many physical heritage is directly managed by traditional leaders? (

- How many physical heritages are directly managed by gov't?

- How many physical heritages are managed by traditional leaders and government?

- How many physical heritages are under international management?

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