CULTURE, GENDER AND FORESTS: SOCIAL DIFFERENTIATION IN COPING AND ADAPTING TO CLIMATE CHANGE AND OTHER STRESSORS IN THE SOUTH WEST AND EAST REGIONS OF CAMEROON

BY

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ABSTRACT

Climate change adaptation scholars and practitioners are beginning to acknowledge that the impact of climate change and other related shocks and stressors will be felt, and reacted to, differently across genders and other types of intersecting social categories, such as age, wealth, and culture, in rural communities. However, to date, most research unpacking these differential impacts and responses has been limited to 'men' versus 'women'. Few studies go beyond this male-female dichotomy to include the different gender structures of households and the intersection with other social factors that contribute to marginalisation, such as ethnicity. This research aimed to explore how different gendered household types in two ethnically diverse communities, the Ejagham and the Baka communities in the SSouth West and East regions of Cameroon, experienced and responded to climate change and other stressors. The central argument of the study is that social differentiation present dynamics and complexities across intersecting identities which determines varied levels of vulnerabilities, adaptive capacity, and livelihood outcomes. The study thus sets out to examine cultural and gendered differentiation in household assets and livelihood activities, how multiple shocks and stressors are experienced, and the differentiated responses to these, focussing specifically on forest and social safety nets. The findings were used to develop an integrated understanding of the complex socially differentiated dimensions of vulnerability and adaptation within the two communities and the implications for more climate secure and equitable livelihoods. The study drew on social-ecological systems, social justice, and feminist political ecology as guiding theoretical lenses. The study further integrated the Moser gender planning and Harvard analytical frameworks as tools for unpacking gender inequality. It followed a mixed methods research design that included household surveys, key informant interviews, and focus group discussions that applied participatory exercises.

Financial, human, and physical capital were arguably limited within all household types in both the Ejagham and the Baka communities. Social and natural capital were the most common form of assets that households relied on, with ‘savings groups’ in the Ejagham communities being particularly prevalent. Most households were involved in crop cultivation and forest product collection although there were gendered and cultural differences. Collection of wild fruits, medicinal plants, and condiments, for example, was a more common livelihood activity within the Baka communities and amongst female-headed households. Cultivation of pumpkins and vegetables was dominant amongst households in Ejagham, with these being grown mainly by women, while the cultivation of yams was done by men. Across both communities, female-headed households had less ownership of land compared to male-headed households. The current pressure on agricultural land in the Ejagham communities has decreased crop productivity, with female-headed households disproportionately affected by less ownership of land and thus, options to diversify agricultural activities. Similarly, the rise in individual and private land ownership, in response to resource scarcity and large-scale deforestation in East Cameroon, has further dispossessed female-headed households in the Baka communities, already marginalised by their ethnicity, of land. Inequitable access to assets and the disparity in ownership of these assets across the study communities was both a cause and effect of households' differential livelihood activities and responses to shocks and stressors.

Several of the shocks and stressors households were exposed to differed across the two sites. The Ejagham communities, being predominantly agricultural, frequently identified warming temperatures as a climatic stressor and increased sensitivity to the impacts of these. The Baka faced similar climate stressors, although more frequent storms were mentioned as a shock by a significant number of households. The impacts of these storms include damage and destruction of houses due to the traditional construction methods used. Since women are often tasked with the building of houses this adds another layer of stress for them. In terms of idiosyncratic shocks, the death of the main breadwinner was most frequently reported in both communities as a non-climatic shock, although this was higher within the Ejagham communities than in the Baka communities, and particularly so for female-headed households.

The varied experiences from multiple shocks and stressors resulted in households' differential coping and adaptation responses. Among the different response options, social and forest safety nets, especially the use and sale of forest products (NTFPs) remained the main response options used by households in both communities. Forest products further supported households during periods of food shortage, especially female-headed households in the Ejagham communities. Households further supported one another through social groups such as savings, farming, hunting (particularly for men) and NTFP collection (for women) groups. By exploring social-ecological interactions, the study highlights the complexities around gender inequalities, vulnerabilities, and responses across socially differentiated groups of people which should be considered in policy, practice, and research. Several of my findings challenge mainstream discourses that generally group women, for instance, as a homogenous category when looking at vulnerability. For example, findings revealed that it is possible for different types of households, both women *and* men, to be both advantaged and vulnerable at the same time, depending on the shock or stressor faced and the livelihood activities they engage in. The same also applies to ethnicity.

DECLARATION

I, **Ojongetakah Enokenwa Baa** hereby declare that the work contained in this thesis is my own original work and that all other sources used or quoted have been fully acknowledged and referenced. The work has not been submitted before for the award of any other degree at any other university.

Signature: …… Date: …….....

DEDICATION

This thesis is dedicated to my husband, Ebenezer Baa,

for his unconditional love and support throughout my studies,

my sons Ngwang and Nsah for accepting to see me put in so much focus on my work even at their young age

and

my parents Comfort & Ben Enokenwa for fuelling this journey and believing in me always.

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Special thanks are due to my principal supervisor, Professor Sheona Shackleton, for having given me this opportunity to further my studies. Your invaluable advice, guidance, comments, and encouragement throughout this project have undoubtedly contributed to the successful completion of this research. Many thanks are due for not only giving me academic guidance but for the many times you sought to see I balance my schoolwork with raising kids, as you sometimes offered to stay with my first kid in your office when I needed to get other things done. I also want to acknowledge my co-supervisor, Dr Kaera Coetzer who, together with Professor Shackleton have spent time discussing my research and objectively challenging me to work and think beyond any limits I would have imagined. Together my two supervisors provided me with the needed space to learn and make relevant contributions in a field that I would like to apply relevant ideas to in the future. Thanks for your support and mentorship

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in planning appropriate days to ensure workshops with participants ran smoothly. I am glad you were part of my research journey.

I especially want to thank the staff and students at the Department of Environmental Science for companionship and support. To Gamuchirai, you always critiqued my work and pushed me to believe in myself, that as a mother in academia I could break frontiers and strike a balance. I appreciate the sisterhood I found in Rebecca Powell for continually reminding me there is a need to push my efforts to the end and not to give up. Thank you for always being available for support whenever I needed help and encouragement. A big thank you to all colleagues in the department for your encouragement to finish this thesis.

The completion of this thesis would not have been possible without support from my family, especially my parents, Comfort and Ben Enokenwa, for being my cheerleaders who encouraged me to stand tall in the face of challenges. To all my brothers and sisters, thanks for believing in my journey. I am also indebted to the entire Grahamstown Baptist Church family and friends for your unwavering support. To my late brother-in-law Cyprain Kongnyu, you always provided me with good counsel, and I acknowledge your assistance until your last moments with us in South Africa. You all made me realise that family can always go above one's immediate relatives to people you had never known.

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LIST OF ABBREIVATIONS

AIDS	Acquired Immunodeficiency Syndrome
BGS	British Geological Society
CED	Centre for Environment and Development
CGIAR	Consultative Group on International Agricultural Research
CIFOR	Center for International Forestry Research
CIP	Climate Information Platform
CSAG	Climate System Analysis Group
COVID-19	Coronavirus Disease of 2019
ERD	European Report on Development
FCFA	Franc de la Communauté Financière Africaine
FPE	Feminist Political Ecology
FTA	Forest, Trees and Agroforestry
GEF	Global Environment Facility
GDP	Gross Domestic Product
HAF	Harvard Analytical Framework
HIV	Human Immunodeficiency Virus
IFAD	International Fund for Agricultural Development
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
MINEPDED	Ministre de l'Environnement, de la protection de la nature et du développement durable (Ministry of Environment, Nature Protection and Sustainable Development)
MMR	Mixed-Methods Research
NGO	Non-Governmental Organisation
ODI	Overseas Development Institute
OHCHR	Office of the United Nations High Commissioner for Human Rights
PE	Political Ecology
PEN	Poverty Environment Network

SES	Social Ecological Systems
SJ	Social Justice
SLF	Sustainable Livelihood Framework
SPSS	Statistical Package for the Social Sciences
SSA	Sub-Saharan Africa
TNS	Tri-National de la Sangha (Sangha Tri-National)
UCT	University of Cape Town
UNEP	United Nations Environment Programme
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs

PART I: SETTING THE SCENE

CHAPTER ONE: INTRODUCTION

SOCIAL DIFFERENTIATION, CLIMATE CHANGE AND FOREST NEXUS

"The climate is changing. The proper political debate would be how to deal with these risks" – Steven Chu.

This stream shows what some communities in the East region of Cameroon rely on for drinking water. The study participants note that changes in weather conditions and the increasing temperature have reduced the size of this stream which could become completely dry in the years ahead. Photo credit: Eyan Johnson. O.

1.1. CHAPTER OVERVIEW

This chapter sets the context for my study. I begin by providing a general introduction on global environmental change within Sub-Saharan Africa (SSA), and explore how this, when coupled with non-climatic shocks and stressors, impacts rural households. I consider how households respond to these impacts, especially in relation to forest-based responses and the gender dimensions of such responses across households. The study specifically focuses on the intersectionality between gender and ethnicity, drawing on a comparative analysis within agricultural and forest-dwelling communities in the East and South West regions of Cameroon.

I outline how this study helps to mainstream gender in the discourses on environmental change, especially climate change, highlighting the existing gaps in understanding the gendered dimensions of vulnerability and the role of forest products in reducing this vulnerability for rural households. I explore the importance of forest products, specifically the use of non-timber forest products (NTFPs), as a safety net for coping with complex global change challenges. I consider how responses based on forest products could become maladaptive and potentially increase the

vulnerability of households and women in particular, who are highly dependent on these resources. Following this, I present the aim and objectives and key guiding research questions for my study. The last section of this chapter outlines the structure for the remaining part of the thesis.

1.2. BACKGROUND CONTEXT

1.2.1. Climate and Non-Climatic Shocks and Stressors, Social Differentiation and Gender in Sub-Saharan Africa (SSA)

Accelerated global environmental change, characterised most notably by climate change and rapid loss of biodiversity, has ushered in a new Anthropocene as raised by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES (Diaz et al., 2019). The impact of climate change on the African continent is already significant and is expected to worsen in the years ahead (Niang et al., 2014). Due to the continent's vulnerable nature, as identified by the IPCC (2014), it is highly exposed and sensitive to the effects of climate change and has a low adaptive capacity to overcome such impacts (Niang et al., 2014; Agrawal et al., 2009). Climate change, adaptation, resilience and vulnerability continue to receive increasing attention in the literature, and this includes aspects related to gender (Bunce & Ford, 2015). This has enabled researchers to begin to understand that climate change risks are contextualised within and across communities and that climate change risk is differentiated for different types of households (Bunce & Ford, 2015).

Many studies have concluded that the impact of climate change will not be shared equally among the world's population, especially along economic, class and gender lines (Thornton et al., 2009; Sultana, 2014). It is on this note that SSA, characterised by high levels of inequality and social injustice, has been portrayed as one of the most vulnerable regions globally, with the repercussions of climate change felt by both natural and human systems (Kotir, 2011; Serdeczny et al., 2017; Samson et al., 2011). This region still has the largest proportion of people living below the poverty line, leaving them extremely vulnerable to climate change and extreme weather events which, together, affect their adaptive capacity (FAO and ECA, 2018).

International organisations and national agencies are reacting to the dangers that climate change poses, which are likely to have both a direct and indirect effect on the population, especially on their welfare status. People living in poverty tend to rely on climate-sensitive resources and activities as the basis for their livelihoods, which will only heighten their vulnerability to climate

change effects (Aguilar et al., 2007). The effects of climate change will thus be far-reaching due to its multi-dimensional nature and its interaction with other non-climatic stressors such as crime and conflict; poverty; HIV/AIDS and other health concerns; poor government policies; gender inequality; food insecurity; unemployment, and lack of education (Raworth, 2012). In this respect, climate change will further aggravate existing social, economic, and political vulnerabilities across different households and communities.

The multiple climatic and non-climatic risks such as natural disasters, economic crises, political instabilities and social crises have shown to increase the vulnerabilities of poor communities (Shackleton et al., 2014; Dasgupta et al., 2015), although this may not be uniform, especially as the vulnerability of poor communities, as well as that amongst different people within these communities, varies greatly (Pettengell, 2010; Tschakert, 2015). Poor and marginalised people/social groups will, therefore, face multiple and complex challenges which leave them less able to adapt to the effects of a changing climate than others (Jerneck, 2018).

The climate change debate has shifted over time from simply stating that men and women are affected differently, to a more complex view of intersectional identities within categories (Garutsa et al., 2020; Tschakert, 2007; Hankivsky, 2014). Many scholars have therefore added their voices to acknowledging multiple social, cultural, economic, and physical characteristics that interact to create differentiated vulnerabilities to climate change risks (Ravera et al., 2016; Sultana, 2014; Kaijser & Kronsell, 2013; Carr, 2008). Culture, like gender, leads to differentiated climate change impacts and can be excerbated in communities already marginalised based on their cultural practices. Massey (2020), noted that cultural patterns can shift over time as culture is lived and edited by people who form the culture, but environmental changes and perturbed seasonality can also present challenges such as increased competition over resources. Such environmental changes can result in the disruption of traditional activities (farming, forest exploitation, cultural recreation) for both people and ecosystems, making marginalised groups of people more vulnerable than other communities (United Nations Climate Change Secretariat, 2018).

People who are culturally and otherwise marginalised are especially vulnerable to climate change given their limited adaptive capacity (IPCC, 2014). Their inability to respond to these challenges can further break down cultural groups who try to make choices needed to overcome multiple stressors (Massey, 2020). Climate change therefore has the potential to threaten the cultural

dimensions of people's livelihoods and the lived aspects of culture, identity, community cohesion and sense of place, which demands sustainable responses and adaptation options to climate and non-climate related risks (Adger et al., 2013; Chechi, 2014). Studies that have considered integrating the concept of intersectionality within climate change continue to stress rather that a gendered lens might offer an opportunity to focus on social differentiation that could hinder adaptive capacities (Colfer et al., 2018; Hankivsky, 2014; Elmhirst, 2011).

While this debate is ongoing, Flatø and colleagues (2017) have suggested that women and female-headed households are likely to become highly vulnerable to climatic and non-climatic risks due to their 'triple burden' of production, reproduction and community roles (Flatø et al., 2017). The concept of 'triple burden' was first introduced by Caroline Moser (1989) in the Moser gender planning framework, referring to the multiple tasks women are faced with - from their productive roles (work for income and subsistence, including work in informal and formal sectors), reproductive roles (domestic work, child caring and rearing, adult care, caring for the sick, water and fuel-related work, health-related work), to their community roles (activities primarily related to women's involvement in politics and collective action) (Moser, 1989). The idea is that division of labour based on sex reinforces women's subordination and prevents them from exploring their full potential, including a range of options to assist them to respond to climate change effectively (see works of Moser, 1989; Ludgate, 2016).

As highlighted in Moser's framework, the gendered division of labour could potentially widen the inequality gap and the vulnerability of women. As such, the portrayal of women as a homogenous group, and the most vulnerable and affected in the context of climate change impacts, has been rejected and contested time and again (Djoudi et al., 2016; Tschakert et al., 2012). Hence, there is a need to integrate a feminist intersectional approach that explores the nuances of gender and social differentiation that shape adaptive capacity (Ravera et al., 2016). Moreover, an intersectional approach that acknowledges that exclusion and marginalisation often intersect with other factors such as age, class, and ethnicity, and are very context-specific (Djoudi et al., 2016) would emphasise the risk multipliers of social differentiation and culture in understanding gendered vulnerability and response strategies (Colfer et al., 2018).

Rural people's livelihoods are often dependent on ecosystem services and resources such as land, forests, water, and fisheries, amongst others. However, limited access to obtaining food or securing

other forms of assets often leave them vulnerable to shocks (Baumann, 2002; Osborne, 2017). Securing land tenure rights and access to land for agriculture and collection of forest products has shown to be more complicated for women and marginalised communities, with diverse impacts on livelihoods (Pyhälä, 2012; Schwartz & Cotula, 2017; Freudenthal et al., 2011). Some studies have highlighted the gender-related risks that women may experience in poor communities such as walking long distances to collect fuelwood, water, and other forest products, often endangered by potential violence (Tirivayi & Rodriguez, 2017; Kristjanson et al., 2017), or restricted access to resources (Calow et al., 2002).

Ongoing research shows that communities and governments are responding to environmental change by adjusting economic activities, and changing land-use practices, which often do not benefit everyone in rural communities (Boillat & Berkes, 2013). Where ready solutions and support are not available, people often turn to harvesting and selling resources from their local environment as a safety net, causing a threat to biodiversity and critical ecosystem services and the long-term sustainability of livelihoods (Shackleton and Shackleton, 2012; Pettengell, 2010). For instance, the absence of social protection schemes to assist communities to cope with multiple shocks and stressors, such as drought relief interventions, social grants and other social benefits, can push communities into the exploitation of forest products (Hallegatte et al., 2016; Davies et al., 2008).

1.2.2. Gender, Climate Change and Forest Dependence

Climate change and extreme weather events affect all dimensions of food security, ranging from a direct effect on crop cultivation to changes in market food prices and supply chains (Kotir, 2011). Indirect effects emerge when, for example, rural households relying on subsistence agriculture may increase agricultural pressure on forest land, thereby affecting long-term ecosystem service supply. Additionally, rapid population and urbanisation growth continue to expand the demand for food and land for the cultivation of food crops (Jayne et al., 2017). Climate change, however, adds another layer of complexity when responding to this challenge, resulting in water scarcity, temperature and rainfall variability, and an increased emergence of novel pests and diseases, affecting crop yields (Pereira, 2017). The recent IPBES report (2019) further confirms these impacts by indicating that increasing frequency of extreme weather events over the last five

decades, with implications for resource supplies, has resulted in increased conflicts around available resources such as water, land, forests, and food.

Global estimates show that more than 1.6 billion people depend on forests to varying degrees for their livelihoods, and about 60 million indigenous people are almost wholly dependent on forests to assure food security (Chiwona-Karltun et al., 2017). While forest resources have long played a role in rural livelihoods, global environmental changes have pushed many people in SSA to be more forest-dependent. Their reliance on forest products such as NTFPs helps meet the demand for food and generate an income to boost household livelihoods in times of crises, including those related to climate and extreme events (Sonwa et al., 2012; Shanley et al., 2014). The exploitation of forest resources generally requires limited levels of financial capital, such that when misfortunes such as extreme weather events strike, forests provide livelihood options and can make the difference for a household's welfare by providing the necessary food or products for sale (Fisher et al., 2010).

In South Africa, households that can source income from other livelihood activities are more likely to rely less on forest resources (Shackleton & Shackleton, 2006). Lower dependency is associated when households have employment opportunities and participate in social protection schemes (Shackleton & Shackleton, 2006). However, in other countries, households' reliance on forest resources is based on limited alternative options. Findings from Cameroon confirm that income received by rural forest communities, from harvesting forest resources, constitutes a safety net that can be used to fill deficits resulting from poor yields of crops (Makoudjou et al., 2017), with a strong seasonal signature of dependency.

Dependence on forest resources by rural communities in Cameroon is more pronounced during the major dry season associated with poor agricultural output - with forest resources representing 44% during January to March and 46% from April to June, respectively, of the total cash income (Makoudjou et al., 2017). This dependence, as discussed by Makoudjou and colleagues, drops to 26% from July to September as agricultural harvests start again. However, for households with lower access to resources such as land to cultivate, coping with the different weather events could become even more challenging, and reliance may remain consistently high, regardless of seasonal effects (Asfaw & Maggio, 2018).

Similarly in Rwanda, food, health and education insecurity tend to influence the forest dependence of poor households who now consider forest products as a way to overcome the many stressors they have to confront daily (Munanura et al., 2014). Such resources are mainly used during the "lean season" or in times of famine or food shortage (Asfaw & Maggio, 2018; Tibesigwa et al., 2016). For low-income families, forests provide an essential safety net, and it is in these critical periods of, for example, crop failure that the importance placed on forest foods is most significant (Müller et al., 2011).

However, gender can determine use rights, access rights, and responsibilities for households who depend on NTFPs and/or access to land to cultivate (Djoudi et al., 2016). Thus, for many, NTFP use is often determined by gender; some NTFPs are labelled as 'women's goods' whilst others are used and controlled by men (Paumgarten, 2005). Yet even the 'gendering' of NTFP collection and access can vary amongst different cultural and ethnic groups. Within communities in the Cross River National Park in Nigeria, findings revealed that women were involved in collecting NTFPs almost four times more than were men (Terver et al., 2014). In Tanzania, Robinson and Kajembe (2009) found that women typically collected vegetables, fruits, and mushrooms with the help of children. Both genders collected firewood, weaving materials, and medicine, but the collection of bushmeat, honey, poles, ropes, charcoal, black pepper, and timber was typically done by men (Robinson & Kajembe, 2015). A study by Brown (2011) in 25 markets in the humid forest zone of Cameroon showed that 89% of those trading in NTFPs were women, although the few men who traded in these products as well had other larger businesses. Thus, the ability of men to respond and adapt to shocks and stressors was, therefore, suggested to be higher than that of women (Brown, 2011).

The different products collected by men and women have differential value in the market, indicating that the benefits they will enjoy for participating in the NTFP value chain will be different. Studies by Shackleton and colleagues showed that men traded their collected forest products in district markets with higher prices, while the women trade in village markets close to their homes to avoid the cost of transportation and other barriers within the forest value chains (Shackleton et al., 2011; Shackleton et al., 2012). The examples drawn from different studies, as mentioned here, suggests that women and men potentially use NTFPs differently, providing varied benefits to households based on what is collected (Makoudjou et al., 2017). Using forest products,

therefore, has a gendered dimension which can be reflected in the commercialisation and income inequality of forest products (Shackleton et al., 2011; Sunderland et al., 2014).

Climate change may require that people adjust their practices, i.e., adapt, in response to changing climatic and environmental scenarios. However, these same responses in the short-term may compromise future livelihood options and adaptive capacity, while increasing vulnerability to subsequent shocks and stressors (Work et al., 2019). Many women turn to NTFP exploitation as an informal income-generating activity, especially when they have few livelihood alternatives (Enokenwa, 2014). Exploitative use, without consideration of long term consequences for the sustainability of these resources, could lead to maladaptation (Adger et al., 2011). Often, the adverse effects that may occur are unintentional, stemming from intentional measures from official policies and community practices set to reduce vulnerability (Work et al., 2019); this strengthens the claim that not all adaptation actions will be successful (Juhola et al., 2016). There is, therefore, the possibility that while official policies and practices try to encourage adaptation in the short term, this could insidiously affect communities' long-term vulnerability and/or adaptive capacity to climate change and other stressors (Bele et al., 2011; Magnan, 2014).

The significant dependence on the forest by households in the East region of Cameroon has been argued to have some effects on deforestation through their livelihood activities (Chia et al., 2013). However, stopping deforestation would mean compromising livelihood outcomes for rural communities (Chia et al., 2013). For instance, 95% of the population of Nomedjoh, in the East region of Cameroon, are involved in subsistence agriculture, with about 66% in NTFP exploitation (Chia et al., 2013). The engagement of most households in both subsistence farming and NTFP collection has provided opportunities to provide food and income for the family.

Though there are indications that the rate of deforestation is alarming in the East region, requiring urgent conservation attention, concerns raised by the Baka pygmy group around forest resource use in Cameroon is that their ability to turn to the forest for forest products is affected by government policies, which often do not favour forest dwellers (Permunta, 2013). Thus, for the minority, already vulnerable to shocks and/or stressors, they could be disproportionately affected by government policies that aim to support long-term use of the forest and protect its services to avoid maladaptation. For example, the Baka attribute their poverty to the disturbances caused to the forest by the 'strangers' who have invaded it - forest exploiters, conservation organisations and

safari companies - preventing them from gaining access for the exploitation of NTFPs and remarking that:

> *"If you do not collect fruits, you cannot have soap, if you do not go fishing, you cannot eat salt, if you do not cultivate cassava and plantains to sell you cannot buy clothes. I am dirty and without clothes because I do not do anything. I have already been forbidden from entering the forest".*
>
> (Permuta, 2013: p9)

While forest products have been shown to have diverse functions such as ensuring incomeand food security, and for reducing household vulnerability, households also depend on land for cultivation which are equally associated with gendered implications based on land and resource rights.

Research done in Cameroon revealed that rural women farmers have access to arable land but fail to have control over such land, revealing that major decisions on how to use land still lie in the hands of men (Fon, 2011). The issue of land rights is central to food production and income - in Cameroon, women produce 80% of food in rural communities; however, they own only 2% of the land and benefit only 5% of the total agricultural inputs (Gender Empowerment and Development, 2010). Their access to land often depends on the relationship with men; either as husbands, fathers, brothers or male relatives (Kameri-Mbote, 2013). Even though women are assuming more responsibilities in the family unit and community than in the past, such as sending their children to school, providing food, and paying for medical services for their families, they continue to lack land tenure rights in many countries (Fonjong et al., 2013).

A 2005 study by Tiani and colleagues (2005) showed how international and national environmental policies, through the creation of parks and/ or protected areas, and the presence of logging companies and agro-industrial plantations such as La forestière de Campo (now part of the Bollore Group and HEVECAM), may affect local communities' access to forests. For example, they noted that in two villages (Bifa and Ebianemeyong) adjacent to the Campo-Ma'an National Park in Cameroon, the presence of such companies provided jobs and easily accessible markets. However, women accused ecoguards of failing to demarcate the boundaries of the park clearly and to spell out the rules and regulations governing hunting, in a bid to seize any game found with the women in the market or in the village; yet these economic activities were what allowed women to increase their income (Tiani et al., 2005).

Gender considerations continue to alter and deconstruct, reconstruct and re-conceptualise notions of access, control and ownership (Kameri-Mbote, 2013). Consequently, in Angola, Namibia, Zambia, Malawi, Tanzania, Lesotho, and Madagascar, customary land tenure rights have been altered in favour of both men and women (Kameri-Mbote, 2013). Similarly, in some Kenyan communities, families whose unmarried daughters have children, have found ways to provide land for their daughters to work and live on, rather than what is seen in other communities, including Cameroon, that often rely on marriage to access land. Typically, in Cameroon, women's access to land and forest is limited and, in most cases, women only have usufruct rights with the customary system often overpowering national statutes (Bandiaky-Badji et al., 2016).

1.3. RESEARCH GAPS AND MOTIVATION FOR THIS STUDY

1.3.1. Understanding the Gendered Dimensions of Climate Change Vulnerability, Livelihoods, and Coping Responses to Climatic and Non-Climatic Shocks/Stressors

Although climate change is often framed as a global problem for all of humanity, the varied nature of its manifestations, impacts, and responses must be carefully considered (Sultana, 2014). Men and women may be affected differently, due to place-specific circumstances in the environment and the types of livelihood activities they are involved in (CARE, 2014). As a result, research on climate change and vulnerability continue to receive significant attention with efforts to mainstream gender into climate change discourse increasing (Macgregor, 2010; Sellers, 2016). However, most research done in Cameroon has not adequately captured gender and how it intersects with other social categories, and this is where my study aims to make contributions.

Environmental changes have gendered outcomes because rural men and women in these vulnerable regions in Cameroon (South West and East regions) will likely experience the impacts of climate change differently. Differential livelihood options are culturally and community gendered, especially around access to land and NTFP collection that shapes the adaptive capacity and vulnerabilities of men and women (Gallopín, 2007). These environmental changes particularly threaten women because it challenges their survival mechanisms, workload, adaptation strategies and vulnerability during adverse circumstances (Arntzen, 2015). The vulnerability of men, women, and children to climate change and related stressors, can influence how much they would rely on forest products, particularly NTFPs for their livelihoods (Babugura et al., 2010). Inequality and marginalisation of intersecting identities could present a significant

challenge for those who rely on forest products and land for cultivation to meet household needs in terms of their livelihood and food security (Colfer et al., 2018).

Few studies assess the nexus of gender, climate change, and forest dependence that brings out the connections between human and environmental vulnerability (Shackleton et al., 2001; Shackleton & Shackleton, 2004; Shackleton, 2004). In Cameroon, most research projects done under the Centre for International Forest Research (CIFOR) incorporate gender, but this is often limited to the category of 'men' versus 'women', until recently. The lack of research which considers a further breakdown of the category of gender (e.g., by households with different gender structures) could overlook hidden inequalities that households may experience. Without such crucial knowledge, policy and practical interventions will fail to meet with the lived realities of poor communities who rely on forest products for their survival. I have therefore identified this as a gap in which this study seeks to make relevant contributions through an approach that further disaggregates data by gender, by going beyond the simple male- and female-headed dichotomies to better understand how different people and households respond to different shocks and stressors (Shackleton et al., 2014).

The challenges of gender, vulnerability, climate change impacts and coping and adaptation are interwoven; however, limited studies have been done to understand how these relate to complex patterns of forest product use and use of land for agricultural purposes by different genders (Babugura, 2010). This increases the risks, unpredictability and uncertainties surrounding livelihoods as these activities are sensitive to climatic change (Carr, 2020; Fisher et al., 2010). Recognising this gap enables my study to build on knowledge about gender and the differentiated impacts and responses to climate change, particularly in relation to forest dependence.

1.4. RESEARCH PROPOSITION

My study focuses on how climate change and other non-climatic shocks and stressors affect households and their responses to dealing with these shocks. 'Coping' amongst different genders within households can affect the use of resources (e.g., forest products and farming land) and increase household vulnerability to climatic and non-climatic shocks. Drawing from theories and relevant literature, my research is grounded on the premise that climate change continues to have diverse impacts across different contexts and social groups. The vulnerability to climate change impacts are further worsened by non-climatic shocks and stressors, such as political instability,

poverty, inequality, poor governance etc. which leaves households more vulnerable. When individuals and households respond to these shocks and stressors, they make use of assets, including forest products, to cope and adapt. However, most of these resources are not equitably distributed within and across communities owing to prevailing cultural norms; this raises issues of gender [in]equality and power relations within and between households. When responses become unsustainable, it sends negative feedback to the environment on which they depend, potentially resulting in maladaptation.

1.5. RESEARCH AIMS AND OBJECTIVES

This study aims to explore how different types of gendered households in two ethnically diverse communities respond, through both coping and adaptation, to climate change and other related stressors in the South West and East regions of Cameroon.

I explore this by addressing four objectives. For each objective, I have identified several specific research questions. The different objectives provide the framework for the empirical chapters of this thesis. The objectives and associated questions are:

1. *To examine cultural and gender-differentiation in household assets and livelihood activities, and consequences for adaptive capacity and vulnerability to climate change*
   - How do livelihood assets differ across the different household types and sites, and what does this mean for their adaptive capacity?
   - What are the different livelihood activities practised by different household types across sites, and how does this influence their vulnerability to multiple shocks and stressors?
2. *To explore the cultural and gender-differentiated experiences of exposure to multiple shocks and stressors.*
   - What are the main climatic and non-climatic shocks and stressors households across the sites have experienced?
   - What are the impacts of these shocks and stressors across different household types?
3. *To identify the cultural and gender-differentiated responses to these multiple shocks and stressors, and how they influence long-term livelihood outcomes.*
   - What are the coping and adaptative responses to climatic and non-climatic shocks and stressors and how do these vary across household types and sites?

- How are forests and forest products included in coping and adaptative responses and which household types and ethnic groups depend on them most?
- Do household coping and adaptive responses improve livelihood outcomes and reduce poverty or are some responses maladaptive, reducing long-term adaptive capacity, and for who?

4. *To develop an integrated understanding of the complex socially differentiated dimensions of vulnerability and adaptation across household types and sites and explore the implications for more climate secure and equitable livelihoods.*
    - How will climate change and other related shocks and stressors impact household types across sites in the future, drawing from the current findings?
    - How can households, especially vulnerable women-headed households improve their adaptive capacity for a more sustainable livelihood outcome?

1.6. THESIS OUTLINE

This thesis is composed of eight chapters divided into three parts (Figure 1.1). In **PART I**, I set the scene and context for the research and in **PART II**, I present three empirical results chapters relating to gender, livelihood assets, vulnerability, climatic and non-climatic shocks, and the different responses to these shocks by households. I end the thesis with **PART III,** which brings the empirical results together and presents reflections, that bring out the implications of climate change for livelihoods and suggest recommendations (a way forward) for future adaptation and livelihood security.

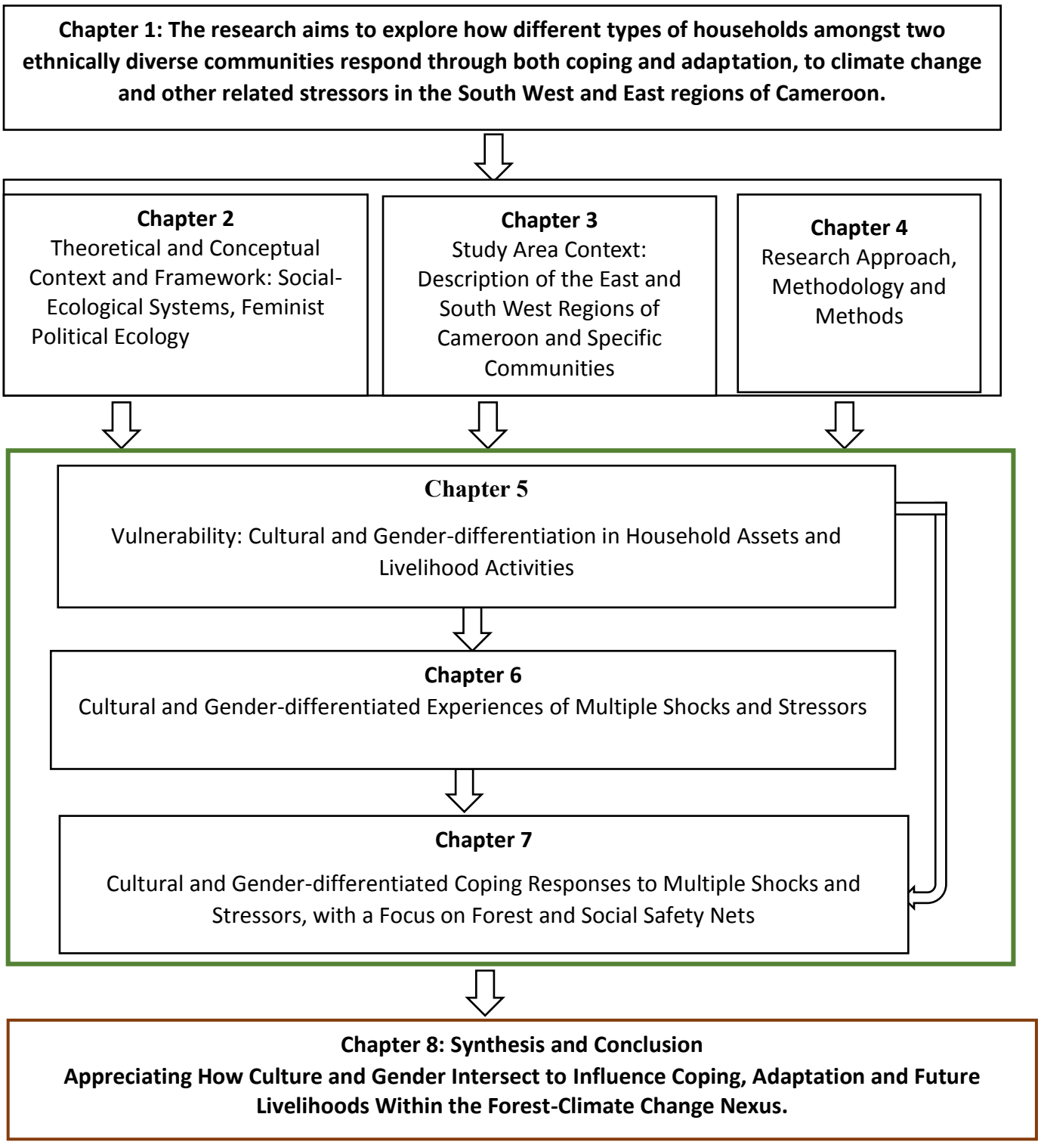


Figure 1.1: Thesis structure. Illustrating the overarching aims and objectives (Chapter 1), the theoretical and conceptual context/frameworks, study area context and research approach (Chapters 2-4), the results Chapters (Chapters 5-7) and the synthesis and conclusion (Chapter 8).

PART I of my thesis begins with **Chapter One,** where I present an overview of the overall research, discuss the possible research gaps as well as my motivation for this study. I then outline the research aim and objectives, bringing out guiding research questions and ending the chapter with the thesis outline.

In **Chapter Two,** I discuss the theoretical and conceptual context and frameworks of this study. I introduce social-ecological systems theory (SES), the feminist political ecology (FPE) theory and the social justice lens (SJ), which helped me explore the linkages between climate change, gender, and vulnerability. I also introduce the Sustainable Livelihood Framework (SLF), which I used to unpack the concepts of livelihoods, assets, and vulnerability. I explain the strength in drawing from more than one framework by highlighting their conceptual limitations as a reason for using multiple theoretical lenses for this work. I end this chapter with a conceptual framing that brings all the theoretical lenses together, as well as the key concepts to show the link between gender, adaptation, and forest products.

In **Chapter Three,** I describe the study area, where I first introduce the Cameroon context. I then describe the two regions selected for this study: the East and the South West regions, specifically bringing out their biophysical characteristics, presenting their cultural differences and their historical and livelihood contexts.

I present the research approach, methodology and methods guiding the study in **Chapter Four.** I argue for an inter-disciplinary approach guided by a mixed-method research design. I draw from two gender frameworks: Moser's gender planning framework and the Harvard analytical framework as guiding methodological frameworks for my research design and methods. I then present the methods for the study including how I disaggregated households into gender types and end this chapter by discussing the ethical considerations, as well as the assumptions and limitations of this research.

PART II comprises of three empirical chapters and begins with **Chapter Five**. I present the key findings from the surveys, interviews, and focus group workshops on the different assets that households rely on and what this means for their adaptive capacity. The chapter further explores different livelihood activities across both study communities and household types, and how this could influence their vulnerability level, as well as their capacity to respond. The data for this

chapter builds the understanding for subsequent chapters of the types of assets households use when responding to shocks and stressors.

In **Chapter Six,** I present results on the gendered impacts of exposure and sensitivity to multiple shocks and stressors by households. I then discuss in depth the main climatic and non-climatic shocks, comparing how these affect the two study communities, and what these mean in terms of gendered livelihood strategies and vulnerabilities. I end this chapter by discussing how different genders are affected differently and how this impacts on their adaptive capacity.

Chapter Seven highlights the different coping and adaptive responses households consider. Different gendered household types are affected differently, and their strategies to cope with shocks are often based on their available assets. I further discuss the use of forest products, especially NTFPs, as a safety net to cope with shocks and stressors that affect households and communities. I end this chapter by presenting in-depth discussions on understanding future livelihood trajectories in relation to forest products under a context of multiple shocks and stressors.

The last **PART (III), Chapter Eight,** presents a holistic view of social differentiation focusing on the intersectionality of gender and ethnicity within the context of climate change and other related shocks in the study communities. I discuss how culture and gender intersect and influence coping, adaptation, and future livelihoods of households and unpack this within the forest-climate change nexus. I then discuss the key take-home messages (i.e., the 'lessons learnt') and what needs to be considered in building the adaptive capacity of vulnerable communities. I end this thesis by presenting emerging insights from this research, situating it within other mainstream narratives and approaches in the discourse on gender, forests, climate change and vulnerability.

Portions of this research have been included in an additional publication that is not presented in this document as one of the emerging themes from my research. Details of this conference proceedings chapter are presented below:

Baa Enokenwa Ojong, Sheona Shackleton, Kaera Coetzer-Hanack: Gender, culture, and natural resource use: How this nexus manifests in the Baka communities in the East region of Cameroon. In Petrik, D., Ashburner, L. *Conference Proceedings of Adaptation Futures 2018* (2018). Adaptation Futures 2018. University of Cape Town, Cape Town. Pages 153-159.

https://openbooks.uct.ac.za/uct/catalog/book/AF18

CHAPTER TWO

THEORETICAL AND CONCEPTUAL CONTEXT AND FRAMEWORK: SOCIAL ECOLOGICAL SYSTEMS, FEMINIST POLITICAL ECOLOGY AND SOCIAL JUSTICE

"When we were children, we used to think that when we were grown-up, we would no longer be vulnerable. But to grow **up is to accept vulnerability... To be alive is to be vulnerable". Madeleine L'Engle.**

Here, I am sitting in front of a traditional home on a rainy day in Mominkoubo, East region of Cameroon (24/07/2017), working with the Baka communities to understand their use of forest products and what has changed over time.

2.1. CHAPTER OVERVIEW

This chapter provides the philosophical and theoretical frameworks that helped me understand and unpack the linkages between gender, climate change vulnerability (including other related shocks and stressors) and forest dependence. In the sections that follow, I start with an outline of social-ecological systems (SES) thinking as an overarching guiding lens for examining the multiple interactions that take place within a system and how this affects both humans and the environment (Bronfenbrenner, 1979; section 2.2.1). Section 2.2.2 presents the social justice approach as a theoretical entry point to unpack gender and other aspects of social difference (Haggard, 1994; Rawls, 1999; Sen, 1995). Section 2.2.3 focuses on feminist political ecology (FPE), as a feminist approach to political ecology (PE) (Forsyth, 2005; Rocheleau et al 1996). Both PE and FPE present an opportunity to understand the central ideas of environmental politics as well as power relations, specifically related to access to forest products as well as land ownership and acquisition

(Elmhirst, 2011; Robbins, 2012). Section 2.2.4 looks at the sustainable livelihood framework (SLF) in understanding livelihood activities and vulnerabilities of households and community processes (Farrington et al., 2002). The framework has been used in this study, not as a primary theoretical lens like the other frameworks, but as a guiding framework in exploring the concept of vulnerability.

Individually, each framework has conceptual limitations, requiring a complementary approach drawing on multiple theoretical lenses. In this chapter, I highlight the limitations of SES thinking and the need to embrace other complementary frameworks to address the objectives of this study. I draw on a social justice approach to highlight issues of social differentiation, intersectionality and FPE, which addresses gender issues as well as power dynamics (Stojanovic et al., 2016). This pluralistic framing helps to address the perceived limitations of SES thinking, providing an opportunity to unpack issues that relate to gender and power relations in a more significant way within communities and households and allowing me to determine how these interplay and allow households to respond to shocks and stressors (Smith et al., 2007).

Thus, each new theoretical framework brings with it an additional dimension and contribution through which to focus this research. This chapter also unpacks and defines the key concepts used in this study, as well as highlighting the linkages between the different conceptual and theoretical framings, while providing the necessary understanding of the intersectionality and multiple dimensions of gender, power, vulnerability, and forest product use that this study seeks to explore.

2.2. FRAMING THIS STUDY

2.2.1. Social-Ecological Systems (SES)

Applying an SES framework means recognising that the livelihoods and well-being of communities are deeply intertwined with ecosystems, which provide them with ecosystem services (Galafassi et al., 2017; Schlüter et al., 2019). The term social-ecological systems (SES) evolved when an ecology-dominated community of researchers used this term to differentiate themselves from ecological scholars who disregarded the human footprint in ecosystems (Ripple et al., 2017; Stojanovic et al., 2016). Social ecological systems have been defined as complex adaptive systems that link people and nature, with more recent work by Preiser and colleagues (2018) emphasising the complex adaptive nature of system behaviour (i.e. its inter-dependencies, interactions, feedbacks) of the SES (Preiser et al., 2018).

Social ecological systems are noted to have diverse characteristics typical of complex systems, such as nonlinear feedbacks (i.e., the possibility of systems change through positive feedback as a result of both social and ecological interactions), strategic interactions (i.e., the joint product of interdependent actors who always respond to, and often try to anticipate, one another's choices; this is common with forest product users). The other characteristic is individual and spatial heterogeneity (i.e. the different occurrences of feedback over large or small spaces) (Berkes, 2017; Levin et al., 2013). For a more detailed explanation of SES, see the works of Berkes et al., (2014); Bran, 2010; Garmestani, (2013); Leslie et al., (2015); Milkoreit et al., (2018); Ostrom, (2007); Ostrom et al., (2007).

In this study, I make use of the adapted SES framework by Gardner et al. (2013) who re-conceptualise SES from the perspective of agricultural and/ or forest communities (Figure 2.1; Gardner et al., 2013).

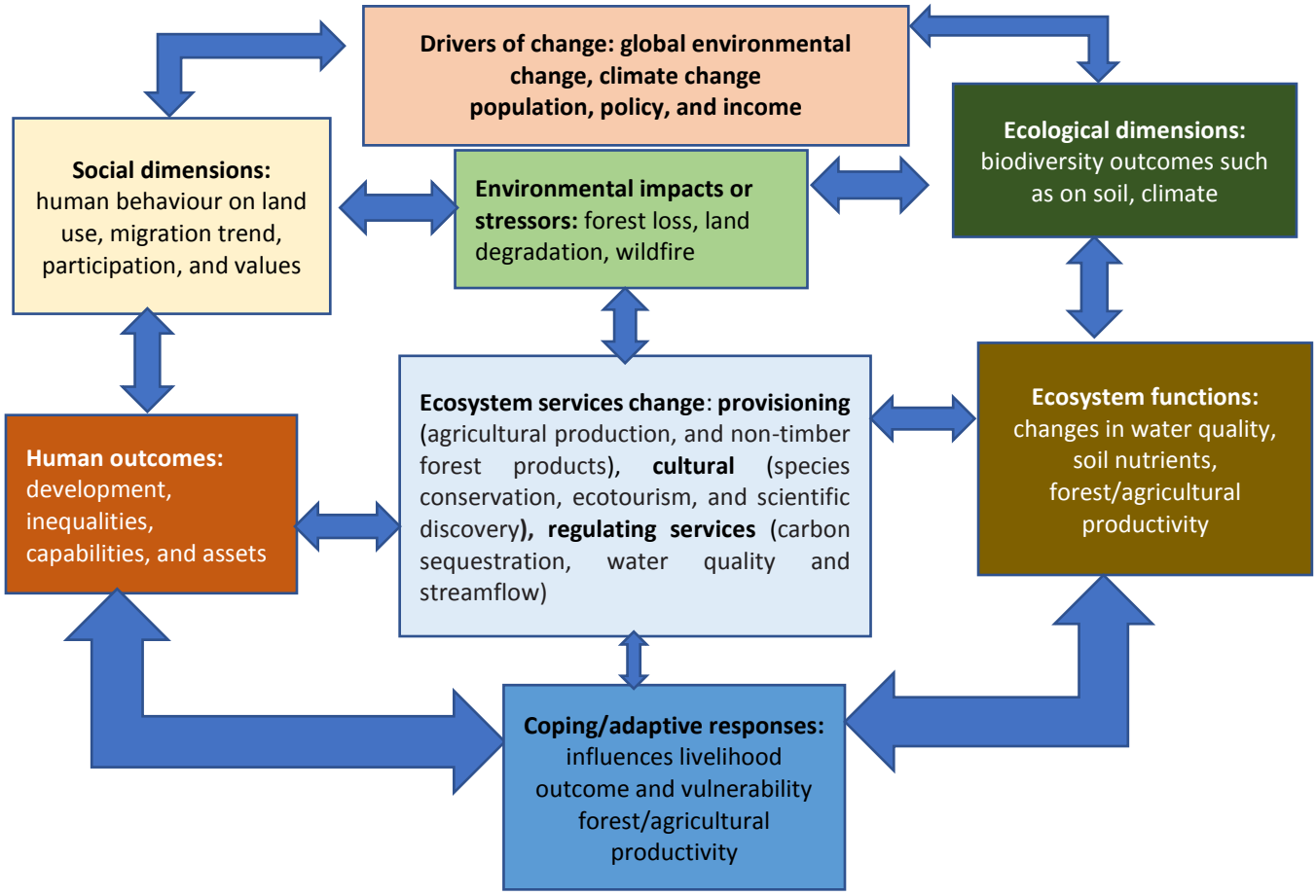


Figure 2.1: SES Framework showing multiple levels of interacting components of a SES within forest-dwelling/agricultural communities. Source: Gardner et al. (2013).

Gardner's framing reiterates the linkages between land use by communities and the broader human and ecological system as affected by different drivers of change (social and environmental dimensions) (Ross & Berkes, 2014). For example, with continuous changes in land-use and land-cover patterns as a result of increasing resource demands from larger and wealthier human populations, coupled with the effects of increasing economic globalisation and land scarcity, land-based communities are bound to experience some shift in their livelihood outcome (Gardner et al., 2013).

In unpacking this for use within this study context, I have considered the ideas raised by Gardner et al. (2013) to understand how the well-being of a community is supported through ecosystem services (Berkes, 2017). The framework emphasises that global environmental problems do not occur in isolation, but are interconnected, sometimes in unexpected ways (Berkes, 2017). I quote from Swyngedouw (1999: pp 445) who said:

> *'contemporary scholars increasingly recognise that natural or ecological conditions and processes do not operate separately from social processes, and that the actually existing socionatural conditions are always the result of intricate transformations of pre-existing configurations that are themselves inherently natural and social'* (Swyngedouw, 1999).

Gardner's framework reveals what communities experience and highlights the role of ecosystem services for communities. Through the constant pressure on ecosystems which comes from activities such as agriculture and timber exploitation, for instance, the framework introduces the drivers of global environmental change. These global changes, as well as climate change, will further drive new interactions between humans and nature, which are often inter-related. For example, the outcomes of land use patterns usually reveal underlying inequalities and contestations on land as a valuable asset (Berkes, 2017). Another dimension of such interactions, from an ecological standpoint, is where rainfall and temperature variability may increase households' vulnerabilities as a result of impacts from land degradation, soil erosion, floods, and droughts, etc. It is, however, difficult to separate these interactions from one another as they are often intertwined and affect poor communities, households, and individuals simultaneously.

Schlüter and colleagues further broaden the social-ecological concept to include social action situations (S-AS), as discussed by Ostrom. They posit that a social-ecological AS involves human actors and ecological entities, their capacities, and the social and biophysical rules participating in

the structures that govern their interactions (Schlüter et al., 2019). Human actors in this context would be individuals, groups, or organisations, such as resource users, farmers, a monitoring agency, or a community, that have a relation or interaction with components of an ecosystem; ecological entities can be any component of an ecosystem, such as a nature reserve, parks or protected areas that affect and are affected by human actors (Schlüter et al., 2019). Applying SES framing to understanding adaptive capacity (Figure 2.1) reveals that different combinations of environmental and social factors determine the relative exposure of communities to diverse shocks and stressors, which could be both climatic and non-climatic and their associated vulnerabilities. These often leave communities with low adaptive capacity (Ross & Berkes, 2014); as such, the SES thinking helps us explore and understand ways in which households have continued to adapt and adjust (or, conversely, *not* adjust) overtime, despite being exposed to these multiple shocks and stressors (Berkes, 2017). It also unpacks specifically how households' relationships with nature may be a critical determinant of these outcomes.

Gardner's framework highlights the continuous pressure that ecosystem services receive and how this tends to affect the livelihood outcomes for communities (Shackleton et al., 2014). Studies have revealed that most households continued to use a critical set of resources or assets (natural, and socio-economic) as a coping mechanism to overcome the shocks they are exposed to (de Sherbinin et al., 2008; Adger et al., 2011). Nevertheless, existing assets are often depleted due to multiple shocks and stressors (Shackleton et al., 2014), restricting household coping and adaptive responses to each successive shock event. Increasing pressure from human activities, including those related to 'coping' demands, could also present a negative response or feedback on the ecosystems, further depleting available assets, and leading to maladaptation and increased vulnerability in the longer term (Adger et al., 2011; Shackleton & Shackleton, 2012). Such pressures can be seen from activities related to the expansion of forest areas for agriculture given for food security, as well as other activities related to timber exploitation and mining (Freudenthal et al., 2011; Permunta, 2013). While ecosystem services remain important in unpacking social-ecological systems, the idea of relational values is gaining traction and has been shown to be a useful framing as it moves away from capitals (assets) being viewed as a stock to being viewed from a perspective of reciprocity and care (Chan et al., 2018; Himes & Muraca, 2018).

Gardner's framework makes the distinction of social versus ecological dimensions of change. Although the SES approach acknowledges the coupled nature of humans (society) and

environmental (nature) relationships for operationalising this in practice, it still tends to make the distinction between nature versus human dimensions. In recent times this dichotomy has been seriously debated as the 'false binary' (Collard et al., 2018) and the SES approach has received criticism in the broader scholarship of human and social sciences (Stojanovic et al., 2016). Its top-down functional analysis disguises the political and power issues plaguing communities and households, such as issues related to conflicts on land use and ownership (Stojanovic et al., 2016) and access to assets and natural resources.

2.2.2. Social Justice

2.2.2.1. Defining the Concept of Social Justice

A social justice (SJ) lens takes a 'recognitive stance' that values all members of society irrespective of ethnicity, gender, age, disability, sexuality, etc. and has positive regard for social difference where it recognises the marginalisation of particular minority groups and communities (Akoyoko, 2014). In this respect, issues related to power dynamics and marginalisation are at the forefront in achieving SJ. Social Justice emanated in the second half of the twentieth century when John Rawls, in his *A Theory of Justice* (1999a), provided the point of departure for virtually all of the current debates related to SJ (Powers, 2014).

The 1970s saw the emergence of discourses on distributive justice, equality in relation to functioning and capabilities, and access to resources (Jackson, 2005; Powers, 2014). In most societies, the space, in terms of voice and participation, occupied by socially marginalised people (women, children and the disabled) often becomes insignificant. Coninck (2013) demonstrates that SJ can be used as (1) a *political concept*: in explaining how it deals with the nature and structure of the state, (2) an *economic concept*: as it is concerned with equal distribution of goods and services within a society and (3) as an *ethical concept*: because it is grounded in an ethical framework that contributes to the transformation of gender roles associated with care (Coninck et al., 2013; Caputo, 2002). Social justice highlights several dimensions of justice that are captured within the spheres of economic, political, social, and environmental justice. Underneath the different nested spheres are issues related to poverty alleviation, access to education, labour market inclusion, access to natural resources, land tenure rights, social cohesion and non-discrimination, and not least to healthcare for communities, particularly minority groups (Chiwona-Karltun et al., 2017; Odinioha, 2014).

In its recognition of marginalisation, a SJ lens accentuates the need for thinking about gender and how particular individuals or household types might suffer social injustices as a result of their gender (Adger, 2003). Gender roles within different communities can have varied outcomes which may leave particular individuals and differently gendered household types more vulnerable due to the types of roles they perform and their access to assets (Chiwona-Karltun et al., 2017). It is on this basis that gender has widely been accepted and included in climate change and adaptation debates (Kameri-Mbote, 2013). From my perspective regarding ethnicity and its consideration in this research, I also use SJ to specifically recognise the *intersection* between two aspects of marginality – gender and ethnicity.

Generally, an ethnic group refers to a group of people who share a common tribe, race, religion, a sense of identity or language and has remained the most discussed concept in social sciences (Gabbert, 2006). Ethnicity, as explored in older sociological and anthropological literature, was argued to be something given, ascribed at birth, deriving from the kin-and-clan-structure of human society, and hence something fixed and permanent (Isajiw, 1992). However, other scholars considered ethnicity as a situational and/or purely subjective phenomenon, often not fixed, but contingent and socially constructed (see the works of Chai, 2005; Geertz, 1963; Stack, 1986). The discussions around the term ethnicity and social justice introduced the term 'ethnic minority' which refers to an ethnic group in a given country in which they occupy a non-dominant position and are often socially excluded (Loury, 2000). In Cameroon, the Baka pygmies, one of the target communities for this research, are considered an ethnic minority (Oyono, 2005).

The concept of gender has been used and defined differently by many referring to it as the qualities or characteristics that society ascribes to each sex, be it male, female or other (FAO-IFAD, 2010). Gender differences feature significantly in the social justice approach (see a detailed discussion on the concept of gender in section 2.3.1). Social justice emphasises the participation of women and minority groups across different levels in making decisions that affect their daily life (Coninck et al., 2013). My study builds on this premise and seeks to explore what gender inequalities lie within the household context and what this means for their coping capacities and vulnerability to climatic and non-climatic shocks (Kameri-Mbote, 2013).

The concept of SJ is recognised in several policies and programmes in Africa such as in Article 15 of the "Protocol to the African Charter on Human and People's Rights", which links the right to

land to that of food security. At the same time, Article 19 promotes women's access to and control over productive resources such as land and guarantees their right to property (African Union Commission, 2003). Concerning the many charters that have been ratified at the continental level, the "Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa" pays attention to land and environmental resources (African Union Commission, 2003).

Some countries in Africa are living up to the expectations of this charter (Kameri-Mbote, 2013). For example, in Malawi, where the majority of the communities are practising a matrilineal system[1], property rights favour women, which has allowed them to move into dominantly male agricultural sectors, such as the cultivation of cash crops (coffee, cocoa, palms) (Asfaw & Maggio, 2018). However, elsewhere, successes are less apparent, and most parts of Cameroon practice a patrilineal system[2]. It is on this basis that I have used the SJ lens to bring out the importance of gender and how this can help with understanding social and gender differentiation within societies and households. Additionally, I deepen the analysis of justice and equity in this work by looking at equity of what, and between whom, as argued by Leach et al. (2019).

2.2.2.2. Social Justice and Access to Resources

Studies have shown that households' experiences of shocks are likely to vary based on the different rights of access to resources. *Social injustices* in this respect prevent households from reducing their vulnerability level (Asfaw & Maggio, 2018). Social justice expands on how equity can enhance the use of resources by all sexes and emphasises the duty to value every community's cultural, social and knowledge systems (Akoyoko, 2014). Gender inequality is often shaped and backed by patriarchal structures that undermine women and limit their adaptive capacity when confronted with shocks and stressors (Babugura et al., 2010). Thus, a SJ lens stresses the importance of exploring dominant power structures within communities, as well as cultures that breed inequality within households and ethnic groups (Gonda, 2015; Segnestam, 2017).

Concerns have been raised around how culturally embedded power relations, gender, and patriarchy are related to, and reinforced by, other forms of injustices witnessed today in the form of traditional land dispossessions (Permunta, 2019; Schwartz & Cotula, 2017). Often these are driven by dominant neo-liberal development paradigms that conflict with traditional modes of

[11] In matrilineal kinship systems, lineage and inheritance are traced through female members.

[2] In patrilineal kinship systems, lineage and inheritance are traced through male members.

production and livelihoods such as farming, hunting, and herding (Permunta, 2013; Freudenthal et al., 2011). The SJ lens, therefore, allows studies to critically unpack issues around inequalities and how communities can build a more robust social and cultural agency that is sustainable. It is no longer possible, nor desirable, to address challenges of equity and sustainability separately as it requires new thinking and approaches that recognize their interlinkages, and the multiple dimensions involved (Leach et al., 2019). Since equity and sustainability are intertwined, this study seeks to unpack how a SES lens brings together the social and natural sciences, to show how (in)equity and (un)sustainable practices are produced by the interactions and dynamics within communities.

Social justice emphasises the need to assess inequalities within social, political, economic and cultural structures (Parvin, 2018). It further articulates the concept of social differentiation, however aspects of access to resources, gender power relations and the dynamics thereof have not been fully explored through this framework (Osborne, 2015). It is on this basis that I use additionally, feminist political ecology (FPE) as another theoretical guide in exploring access to forest products as a function of 'gendered [in]access', which in this study is considered an important safety net for households and women in their response strategies (Chiwona-Karltun et al., 2017).

2.2.3. Feminist Political Ecology (FPE)

Political ecology (PE) refers to the relationship between ecological science and environmental politics, in particular those formed through environmental conflicts between social actors such as the state and NGOs (Forsyth, 2005). More recently, PE definitions also focus on the access to and control of resources and their implications for sustainable livelihoods (Elmhirst, 2011). Over time, PE has continued to provide an interdisciplinary framework for enabling studies and research to look at environmental impacts, access to natural resources, and unequal power relations based on sex, age, class, education, and political representation (Abeysekera, 2007). It brought in a new wave of thinking in the 1990s known as feminist political ecology (FPE) (Elmhirst, 2011).

A feminist perspective on political ecology looks not only at the unequal relations between men and women, but also at how diverse understandings of masculinity and femininity shape people's control over necessities such as food, water, forests and land (Pla Julián & Guevara de Molina, 2013). Thus, FPE continues to push, in a more nuanced way, the determinant of access to and

control of environmental resources, explicitly addressing gendered experiences of land and responses to environmental, social, and political change that affects the livelihoods and social relations of people (Collard et al., 2018).

With a background rooted in feminism, FPE raises questions that challenge the 'big questions' of who 'counts' as an environmental actor and how political-ecological knowledge is guided (Jarosz, 2001). Research in the field of FPE tends to demonstrate how social identities are constituted in, and through, relations with nature and everyday practices, but even more so, elaborates how these also interplay between different genders (Jarosz, 2001). This further strengthens the position of the SES approach, which brings out people's interaction with the environment for their livelihoods. Studies under FPE have highlighted multiple axes of power that may define people's access to resources (Rocheleau et al., 1996).

The quest for understanding how different groups of people will respond to, understand and cope with different climatic change and non-climatic shocks have led FPE, as well as feminist geographers, to look beyond the scope of gender (Sultana, 2014). Many strategies used in the 1980s by feminists tend to contain women within the confines of patriarchal control and domination, especially when looking at land tenure (Abeysekera, 2007). Feminist political ecology scholars have indicated that when cultural norms continue to determine women's property rights and resource allocation, it may enlarge, instead of narrowing, their vulnerability to shocks (Asfaw & Maggio, 2018). The above discussion sums up a FPE framework as presented in the works of Rocheleau, (2008), adapted appropriately to suit the context of this study (Figure 2.2) by highlighting crucial components and linkages to the environment.

Figure 2.2 explains how a combination of factors or processes could shape access to resources. Households in any given community have resources, such as forest products or land for agriculture, on which they depend. Often their access and control of these available resources are shaped by diverse characteristics such as age, ethnicity, or gender. For example, the gender or age of a person could determine their ability to own or control land for agriculture in certain communities.

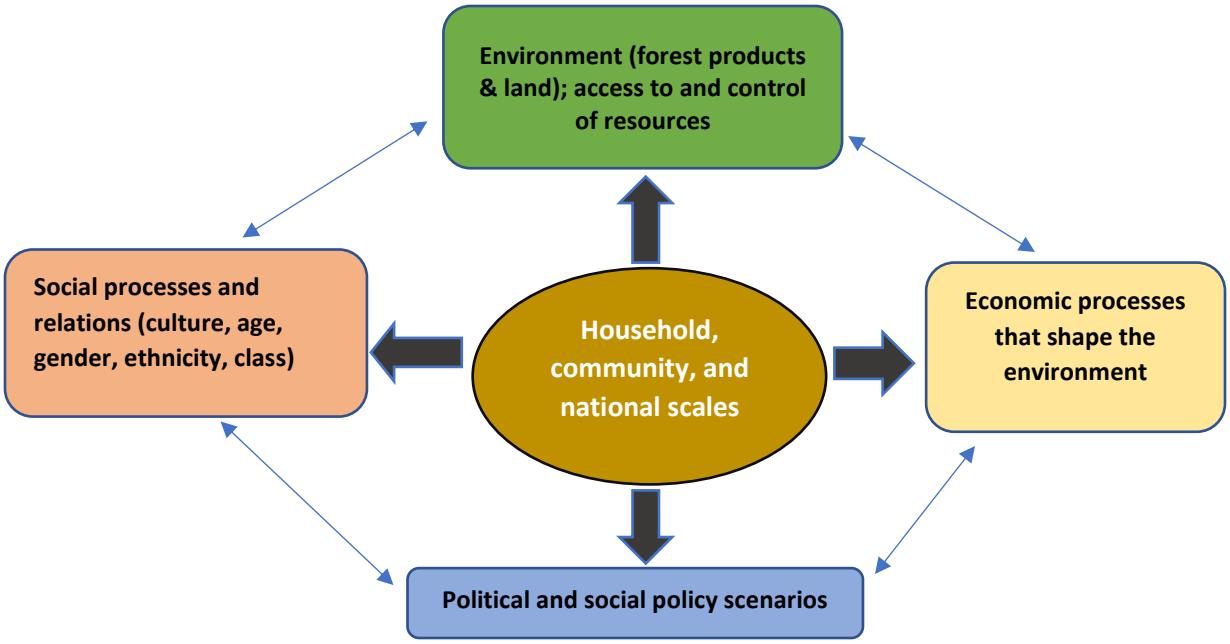


Figure 2.2: Feminist political ecology framework adapted from Rocheleau's framework (2008).

The distribution of, and access to, forest products as well as land ownership and acquisition is a key component of FPE and has been used in many studies to understand gender inequalities concerning resource allocation (Pla Julián & Guevara de Molina, 2013). This framework thus indicates the multi-dimensional scale of the environment and political ecology. The framework focuses on gendered relations within the household level that also transcends to community and national levels, making it essential for my study (Rocheleau, 2008).

Drawing on FPE allows one to triangulate environmental, economic, cultural, social and political processes that relate to the use and access to forest products and land for farming activities, which often determines the livelihood outcomes for rural households and communities (Rocheleau, 2008). I use this framework to draw attention to how power relations can affect use of and access to resources and households' responses to overcoming shocks (Tschakert, 2015), looking at households of different ethnicity and gender status.

2.2.4. Sustainable Livelihood Framework (SLF)

The concept of vulnerability has often been associated with livelihoods, since differentiated assets and livelihood activities are potentially exposed to, or become sensitive to, multiple shocks and stressors (Gallopín, 2007; Farrington et al., 2002). I, therefore, discuss the concept of sustainable livelihoods, drawing from the Sustainable Livelihood Framework (SLF), and linking it to

vulnerability, as households are more likely to be vulnerable based on their livelihood activities, as well as their available assets. A livelihood has been defined as –

"Comprising the capabilities, assets (stores, resources, claims, and access) and activities required for a means of living; a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long-term"- (Chambers & Conway, 1992: p6)

Since the first work on livelihoods, there has been a steady increase in the literature that contributes to and expands knowledge of livelihoods (Ellis, 1999; Shackleton, 2004; Shackleton et al., 2001; Scoones, 2009; Carr, 2020). Studies have started giving attention to livelihoods and global environmental change. These studies, particularly those related to ecological change (Robbins, 2012; Collard et al., 2018) and social-differentiation and resource access (Forsyth, 2005; Osborne, 2017; Osborne, 2015) have offered another perspective on livelihoods with more nuances around coping responses and livelihood adaptation (Seneviratne et al., 2012). Such approaches have time and again provided insights into the way complex rural livelihoods intersect with cultural, economic, political, and environmental processes (Farrington et al., 2002). In understanding livelihood strategies and outcomes, assets have had a central place within the livelihoods discourse with a focus on *access/equity* to assets as being essential to poverty reduction and climate change adaptation. Figure 2.3 further unpacks the different assets (i.e., physical, natural, social, financial, and human capital) in this study, and their relationship to the different livelihood activities (agriculture, livestock, and the collection of forest products) in determining vulnerabilities and livelihood outcomes for households and communities.

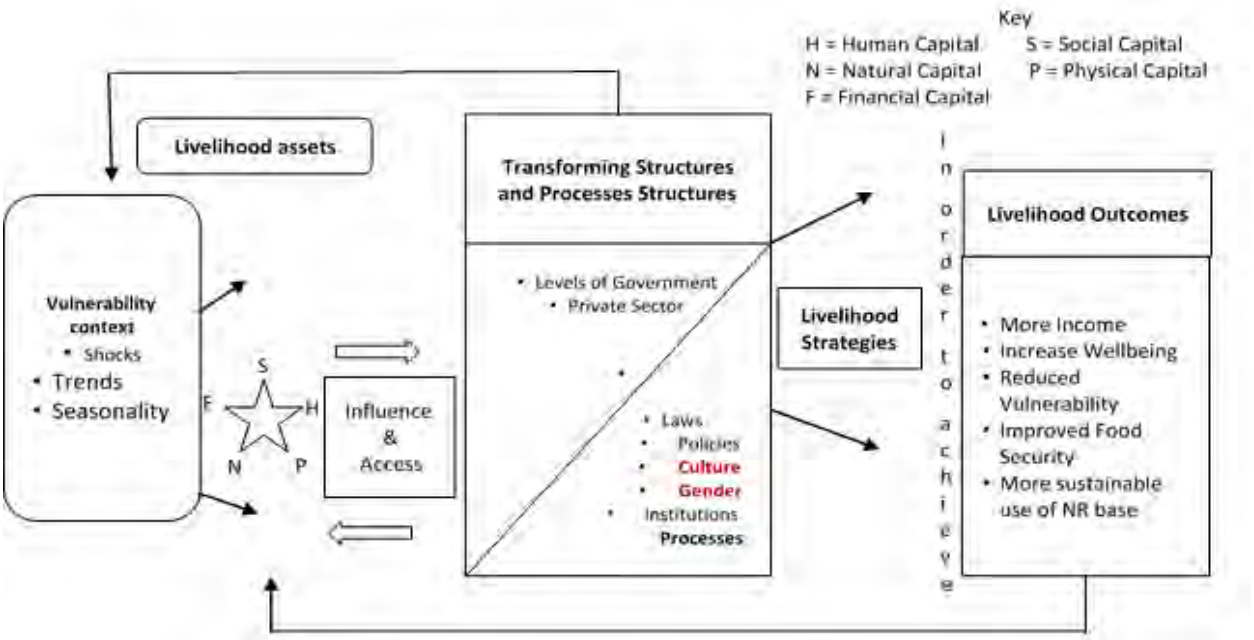


Figure 2.3: **SLF showing complex interactions of key livelihood components and outcomes.**
Interpretation note: **Culture and gender are in red to illustrate how they intersect to influence vulnerability and livelihood outcomes for households in this study. Source: Krantz (2001).**

According to the SLF, households and communities become vulnerable based on different factors such as exposure and sensitivity to shocks and stressors, spanning different times and seasons, which are very complex (see section 2.2.1). In coping and responding to these shocks and stressors, people often turn to the different livelihood assets (natural, physical, social, human, and financial) that are at their disposal, to achieve a positive livelihood outcome as raised in section 2.2.2.2. However, access to such assets can be constrained by structural processes, institutions, policies, gender, and culture (ethnicity). In this study, I specifically look at the intersectionality of gender and culture whose varying roles could influence how people translate their assets into activities, as well as coping responses. For example, Leach et al. (2019) noted that the concentration of power (influence) and resources (particularly economic wealth) in the hands of a few can facilitate them polluting and degrading the environment with impunity, exacerbating inequity, influencing economies and regulations in their favour, knowing that they have the capability to escape the consequences. Unfavourable responses to the impacts of climate change and other shocks could leave gendered households more vulnerable to the effects of climate change (Djoudi et al., 2016). I further explore how gender and culture could also influence the decision-making processes within the households and communities, and how this affects people's coping responses and levels of vulnerability.

Other factors and processes such as policies, institutions, and inequalities are often linked to people's starting context, which leaves differentiated impacts and abilities to respond across households (section 2.2.3; Tschakert, 2015). For example, a study done by Flatø and colleagues (2017) in South Africa showed that there were substantial differences in vulnerability that exist between dual-headed and single-headed households, affirming that vulnerability across households cannot be homogenous. I am particularly interested in how forest products, and other land-based activities, feature in responses due to women's higher dependence on these (Arntzen, 2015; Elmhirst, 2011). The framework also seeks to unpack how rising livelihood vulnerability could potentially drive an increase in the dependency on natural capital, especially forest products by rural communities (Shackleton & Shackleton, 2012).

The SLF developed by Chambers and Conway, therefore, remains a useful approach for this study in understanding the nuances around vulnerability and adaptive capacity. I have used this framework in my study to help explore livelihood activities and the assets of households to understand how they could adapt when faced with multiple shocks and stressors. In addition, I use the SLF to explore how their responses could, in turn, determine their livelihood outcomes (Figure 2.3).

2.3. DEFINITION OF KEY CONCEPTS

2.3.1. Gender

The concept of gender refers to the socially and culturally accepted ideas (roles, behaviours, and identities) that are taught by society about what it means to be female or male, which requires understanding of socialisation practices (Jhaveri, 2020). The term is therefore, not a natural human attribute, but one that is created and re-created in everyday work interactions through organisational cultures that establish the normative rules, values, and meanings in the workplace (Reed, 2008). Gender roles and systems are often institutionalised through education systems, political and economic systems, legislation, and culture and traditions (FAO-IFAD, 2010). However, socialisation processes can allow men and women to learn, so that gender roles are not fixed but are changeable (FAO, 2011).

Annecke (2010) unpacked the concept by stating that not only does it refer to the relations between men and women but also the significant differences that exist in most societies between the rights and opportunities of men and women, including the rights to land, resources, work and wages, and

participation in decision-making processes (Annecke, 2010). The perceptions of gender are deeply rooted in social and cultural norms, varying widely both within and between cultures (see section 2.2.2.1). The perception that gender determines power and resources for women and men (Segnestam, 2017), has been broadly discussed by FPE and SJ advocates, with unequal power relations and access to natural resources at the centre (see section 2.2.3 & 2.2.2.2). Holmgren and Arora-Jonnson (2016) further indicated that the concept of gender can be used in two ways: (i) gender equality as a policy issue whose meaning requires analysis (i.e., policies on equality requires a gender analysis), (ii) as an analytical category that illustrates the position of men and women (Holmgren & Arora-Jonsson, 2016). My study unpacks gender using both ways, as it allows one to explore some of the thinking between men andwomen towards gender identity and power relations which maintain people in certain subject positions.

2.3.2. Intersectionality

Intersectionality refers to the theory where different forms of oppression intersect and impact on people's lives. Feminists have argued that gender, race, and class are interconnected as intersecting oppressions (Sigle-rushton, 2018). Coined by Crenshaw (1989) the concept of intersectionality was used to grasp how the interactions of gender and race affected black women's access to resources, and how a lack of understanding of this intersection could heighten the marginalisation these women and their experiences (Walby et al., 2012). Additionally, people can face multiple barriers to participation in leadership positions, associated with their social categorisations and identifiers, such as gender and ethnicity (IPCC, 2019).

While climate change will affect people differently based on their contexts and situations, further exclusion and marginalisation of disadvantaged people, as a result of intersecting factors such as age, class, ethnicity, and gender, needs to be carefully explored to better understand livelihood vulnerability (Djoudi et al., 2016). In some instances, however, evidence continues to show that women are not always the most vulnerable, as when other considerations such as age, ethnicity, race and status are added to vulnerability, then alternative vulnerabilities may arise (Colfer et al., 2018). Hence, an intersectional approach to climate change can illuminate how different individuals and communities relate differently to climate change, based on their social categories but, more importantly, challenge and renegotiate power structures and categorisations that reinforce inequality for all genders (Kaijser & Kronsell, 2013).

As raised in Chapter 1, the concept of intersectionality has over time been integrated into the gender and climate change adaptation scholarship, but scholars have warned of the dangers of considering women as a homogenous group and always seen as victims (Thompson-Hall et al., 2016; Ravera et al., 2016; Djoudi et al., 2016; Arora-Jonsson, 2011). In all, incorporating an intersectional approach in this study is useful as it allows the possibility of exploring the different social characteristics such as gender and ethnicity (culture) and how these shape the coping and adaptive responses of rural communities from a feminist perspective (Ravera et al., 2016).

2.3.3. Shocks and Stressors

Shocks and stressors are concepts that have been used over time within the discourses on climate change, resilience, and adaptation in describing different risks that people encounter in their interactions with humans and the environment (Mitchell & Harris, 2012; Fuente, 2008; Sinha & Lipton, 1999). In the context of climate change, *stressors* have been described "to encompass direct, indirect, and mediated experiences with global climatic patterns and region-specific weather conditions and physical environmental impacts" (Reser & Swim, 2011 pp280). *Shock*s have been defined as "the realisations of risks to highly unexpected events that cause welfare losses" (Fuente, 2008 p1). The term has specific connotations as framed by Sinha & Lipton (1999) which encompasses: i) unexpectedness (i.e., the risky, damaging fluctuations that have already happened, though with low *ex-ante* probability); ii) size - large or small; iii) high damage due to the concentration of persons with high vulnerability and low resilience; iv) exogenousness to the source; and v) physical or psychological strain to one or more individuals due to that stress (Sinha & Lipton, 1999).

It is therefore clear that a single stressor/shock can have various impacts of a diverse nature and time scale, as posited by Reser & Swim, (2011). Shocks may emanate from two broad sources, namely, *idiosyncratic* and *covariate* shocks. These categories of shocks form the basis of the different shocks I will focus on in this thesis. Idiosyncratic shocks refer to the experience where one household, or a small group of households, experience a shock that is typically unrelated to that of the neighbours (i.e., they are household-level related shocks). In contrast, covariate shocks refer to the experience where many households in the same geographical location suffer a similar shock (Pradhan & Mukherjee, 2018). Examples of idiosyncratic shocks are death of the primary breadwinner, injury, chronic illness, unemployment, and loss of assets. Covariate shocks are, but not limited to, natural disasters like floods, cyclones, droughts, epidemics, price inflation and

political instability (Azam & Imai, 2012). In a study by Wunder and colleagues (2014), they highlighted that idiosyncratic shocks could allow households to draw on more social and economic networks (such as borrowing and increasing labour), but when covariate shocks occur, it reduces the potential of communities to rely on such networks (Wunder et al., 2014).

2.3.4. Vulnerability

Social scientists and climate scientists have often conveyed different interpretations when they use the term "vulnerability". Social scientists tend to view vulnerability as representing a set of socio-economic factors that determine people's ability to cope with stress or change (Brooks, 2003). In contrast, climate scientists often view vulnerability in terms of the likelihood of occurrence and the impacts of weather and climate-related events (Brooks, 2003). Owing to the diversity of conceptualisations of vulnerability by different researchers, there exists a suite of different methodological approaches to explore it (Adger, 2006; Gallopín, 2006; Füssel, 2007). The IPCC report holds that vulnerability to climate change is the degree to which geophysical, biological and socio-economic systems are susceptible to, and unable to cope with, adverse impacts of climate change (IPCC, 2007). Dolan and Walker (2006) brought out a nuanced categorisation of vulnerability which is now gaining popularity on how to view vulnerability. Their approach seeks to view vulnerability in relation to three broad areas:

1) exposure to hazardous events and how this affects people and structures,
2) only a human relationship, not a physical one, and
3) as a concept that integrates both the physical event and the underlying causal characteristics of populations that lead to risk exposure and limited capacity to respond.

Turner and colleagues (2003) also define vulnerability as encompassing exposure to harm, sensitivity, and the ability to cope and recover from environmental, social or political change - irrespective of it being a shock or stressor and over what period (Turner et al., 2003). With a changing climate, households' vulnerability is likely to increase, while climate may also decrease the ecosystem services that people depend on for their livelihoods (Gardner et al., 2013). In this study, I apply both the social and the climate scientists understanding of vulnerability as captured in the vulnerability framework by Turner (Turner et al., 2003). I argue that this understanding of vulnerability provides the opportunity to question: i) who and what is vulnerable to both environmental and human-induced changes? ii) what can be done to reduce such vulnerability?

and iii) how can a more adaptive society be built that is resilient to such harmful changes? (Turner et al., 2003). Below, I further explore each of the main components of vulnerability: *exposure, sensitivity*, and *adaptive capacity*.

2.3.4.1. Exposure

One of the most acceptable definitions of the term exposure is that of the IPCC of 2012, which defines exposure as:

"The presence of people, livelihoods, environmental services and resources, infrastructure, or economic, social, or cultural assets in places (or situations) that could be adversely affected by hazards and which, thereby, are subject to potential future harm, loss, or damage (Lavell et al., 2012: p32)"

A significant proportion of the rural population is more exposed to the effects of weather events owing to their dependence on land and ecosystem-based climate-sensitive livelihoods (Bele et al., 2014). Thus, under exposed conditions, the levels and types of adverse impacts will be the results of a physical event(s) such as droughts, floods, wildfires, interacting with socially constructed conditions (poverty, inequality) denoted as vulnerability (Lavell et al., 2012).

2.3.4.2. Sensitivity

Sensitivity has been defined by Adger (2006 pp270) as "the degree to which an individual, household, community, or system is modified or affected by perturbations". McCarthy and colleagues (2001) further explain that a community could be adversely or beneficially affected by climate-related stimuli, and that such an effect could be direct or indirect (McCarthy et al., 2001). Much has been discussed on sensitivity to the concept of human vulnerability which shows that sensitivity results from dependence on the ecosystem for livelihoods, food, shelter and medicine (Bachofen & Cameron, 2010). Equally, the lack of access to decision making and justice, geographical context, and a range of intersecting inequalities including financial, socio-economic, cultural and gender status could leave households more sensitive to climate change (Bachofen & Cameron, 2010).

2.3.4.3. Adaptive Capacity and Assets

Adaptive capacity is considered to determine "the ability of an individual, household, community, or other social group or system to adjust to changes in the environment, guaranteeing survival and sustainability" (Cardona et al., 2012: pp73). Adaptive capacity is thus seen as the pre-conditions

necessary to enable adaptation and the ability to mobilise these elements (Adger et al., 2011). A more universally acceptable definition of the term adaptive capacity has been that of the IPCC, which refers to adaptive capacity as:

> *"The combination of the strengths, attributes, and resources available to an individual, community, society, or organization that can be used to prepare for and undertake actions to reduce adverse impacts, moderate harm, or exploit beneficial opportunities (IPCC, 2012: pp 556)".*

This study pays particular attention to adaptive capacity as it will be imperative to understand the factors that limit adaptive capacity, across gender, household types and settings, to shocks and stressors (Pettengell, 2010). The impact on households of multiple shocks and stressors can only be reversed by their adaptive capacity, which, in most cases, is gender-segregated (Shackleton & Shackleton, 2012). For example, studies suggest weak adaptive capacity would leave women and female-headed households in a disadvantaged position, owing to the embedded social injustices which they face, such as lower earnings, fewer assets and less access to productive resources such as land (Flatø et al., 2017). Women who are heads of households with no adult help might also be forced to perform both domestic and breadwinner roles (Flatø et al., 2017). Many Cameroonian women already perform breadwinner roles too, even when they have a spouse (Bandiaky-Badji et al., 2016).

Livelihood assets have been found to play an essential role in shaping human vulnerability, resilience and adaptation and can thus be used to make connections between these concepts (Nunes, 2016). The term asset has been defined as "*stocks of capital that can be utilised directly, or indirectly, to generate the means of survival of the household or to sustain its material well-being at differing levels above survival"* (Ellis, 1999: p31). As in the livelihoods framework (section 2.2.4) for this study, assets are differentiated as financial capital, human capital, social capital, natural capital, physical capital, and the additional cultural capital (Ellis, 1999). Research has indicated that access to capital in general (be it financial, human, physical, social or natural) is critical for building resilience and fostering adaptation to environmental stressors, as well as supporting positive livelihood outcomes (Christopher et al., 1994). Thus, through profiling these assets across heterogenous household types and geographical contexts, I can explore the constraints and opportunities that differently placed households face.

Gender differences determine who can access resources and how men and women then use these resources differently (World Bank, 2009). When there is no access to the necessary resources, assets and entitlements that provide a household with the capabilities to pursue key livelihood activities, they will be unable to respond to shocks and stressors (Baumann, 2002).

2.3.5. Coping and Adaptation to Climate Change and Multiple Stressors: Coping Responses, Adaptation, and Maladaptation

Households respond and adapt differently to climatic and non-climatic shocks and stressors in their attempt to cope with climate change and multiple stressors over time (Adger, 2003). Much of this adaptation depends on previously mentioned factors – gender, assets, and livelihood activities. Households' responses are short-term (coping), while long-term adaptation measures are considered more sustainable.

2.3.5.1. Short-Term Coping Responses

Coping as a response has been defined "as the ability of people, organisations, and systems, using available skills, resources, and opportunities, to address, manage, and overcome adverse conditions which are often within a short to medium term" (IPCC, 2012: pp 558; Seneviratne et al., 2012). These short-term responses are often reactive, unplanned mechanisms to overcome immediate threats to households (Boissière et al., 2013). Strengthening people's coping capacities usually builds resilience to withstand the effects of natural and other hazards (Levina & Tirpak, 2006).

Many poor households in forested places (see section 2.3.6) tend to rely on the forest and other environmental resources as a way of responding to the different types of shocks they face (see Chapter 1, section 1.2.2). These shocks could either be covariate (e.g., climatic events, price fluctuations) or idiosyncratic (e.g., health and death related events, and unemployment), leaving them more vulnerable to an already changing climate that might affect forest resources (Asfaw & Maggio, 2018; Wunder et al., 2014). This is particularly so when responses in the short-term become negative and erode the assets households depend on for reducing shocks and stressors.

2.3.5.2. Long-term adaptation responses

The term adaptation has been defined as the process of adjustment to climate effects, and long-term adaptation often will depend on building adaptive capacity, which helps to moderate the negative and/or enhance the positive impacts of climate change (Fankhauser, 2016). Various types

of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation (Easterling et al., 2004; Glantz et al., 2009). Adaptation to climate change and other shocks and stressors include many responses which can significantly reduce vulnerability to climate change and make rural communities better able to adjust to climate change and variability, moderating potential damages, and helping them cope with adverse consequences (Bryan et al., 2009). Most less-developed countries feel that their need for adaptation strategies has not been met, or received sufficient attention, from international organisations (McDowell & Hess, 2012). Thus, there is a need to understand adaptation to multiple stressors in terms of access to assets and providing insight into the complexity of vulnerability as discussed by McDowell & Hess (2012).

2.3.5.3. Maladaptation

The Third IPCC Assessment report defined maladaptation as "an adaptation that fails in reducing vulnerability but increases it instead" (McCarthy et al., 2001: pp 990). Maladaptation is, therefore, a process that results in increased vulnerability to climate variability and change, directly or indirectly, and/or significantly undermines capacities or opportunities for present and future adaptation (Magnan, 2014; Noble et al., 2015). Specific adaptations can push systems closer or further from the point at which they start experiencing potential transformative change (thresholds); if such a change is met with negative responses in the quest to ensure livelihoods, it could lead to maladaptation (Adger et al., 2011). Poor planning has been noted to be one of the primary causes of maladaptation. Although its manifestations remain complex and uncertain, there is now sufficient experience to provide examples of how maladaptation can occur and ways to design strategies that can avoid such outcomes (Schipper, 2020).

In the forest context, a strong dependence on forest products in the context of climate change could potentially lead to a maladaptive response as communities and households might over exploit available forest resources, without considerations for the future (Shackleton & Shackleton, 2012; Chapter 1, section 1.2.2). In this study, we make the distinction between negative coping responses (often arising from short-term coping responses) and maladaptation (resulting from poorly planned adaptation). Although maladaptation is often associated with adaptation strategies, not coping responses, the lines are often blurred between the two. Jones and colleagues (2015) provided a framework that can be used in assessing strategies that do not explicitly seek to address clmate change, or are not labelled as adaptation (and hence cannot be considered as maladaptation in the

traditional sense of the term) (Jones, Carabine, & Schipper, 2015). The framework is useful for this study as it allows one to unpack coping responses that may become negative and maladaptive to households and communities (see Chapter 7). Schipper (2020) further explained that coping strategies which are short-term actions, are what help people get through a difficult time, with the hope of getting back to the "normal" situation soon. However, coping strategies can become maladaptive over time if the situation does not improve (Schipper, 2020).

2.3.6. Social and Forest Safety Nets

When facing shocks and stressors, people often turn to various safety nets such as social and forest-based safety nets to cope. Safety nets can be seen as the use of natural and cultivated resources to support households after they are affected by a shock, as well as drawing on social capital through seeking assistance from relatives, friends, and other non-state organisations when households experience shocks and stressors (Hamer & Shackleton, 2015).

Social safety nets refer to private and public mechanisms that assist individuals in maintaining a minimum level of consumption (Paitoonpong et al., 2008). Generally, most countries promote social safety net schemes more as a response to the short-term adverse effects of shocks experienced by people (Adato et al., 2004). Social safety nets have remained a significant buffer to households and increase resilience to shocks, which often come in the form of cash transfer programmes, free food distribution, price subsidies, and social health schemes (Adato et al., 2004). Nevertheless, in countries where people are generally poor, there is little to give out, especially in times of added shocks and stressors - this is when people turn to forest products as a major and continuous safety net. A study by Paumgarten and colleagues (2018) done in South Africa, showed that different households had different coping strategies such as reducing meals, finding work, getting NGO assistance and relying, to a greater degree, on NTFPs as a safety net when faced with climate-related shocks, or just shocks more generally (Paumgarten et al., 2018).

The safety net function of forest products, especially the collection of NTFPs is explained twofold in work by Delacote (2008). First, NTFPs occupy/enable a diversification livelihood strategy, and some communities are traditionally reliant on these forest products, not just as a result of multiple shocks and stressors. Second, as a coping strategy where agricultural output is relatively too low for households (Delacote, 2008), 'filling the gaps' during periods of low crop productivity (Shackleton & Shackleton, 2004; Chapter 1, section 1.2.2 & 1.3.1). Both mechanisms have been

shown to support poor rural households in times of major shocks and stressors, when other social safety nets like social protection schemes are not available to households (Hallegatte et al., 2016). When deforestation and forest degradation occur, the most affected are often the forest-dependent, whose livelihoods rotate around the harvesting and collection of these products (Nerfa et al., 2020).

CHAPTER THREE

STUDY AREA CONTEXT: DESCRIPTION OF THE EAST AND SOUTH WEST REGIONS OF CAMEROON AND SPECIFIC COMMUNITIES

"What use do **cities have for us? Their greatest use is to make us realise the beauties of the rural life!" –** Mehmet Murat Ildan.

Figure A: Large Bush mango tree at the entrance to Mfuni village (Ejagham community)

Figure B: Mominkoubou village (Baka community)

The first frame (Fig. A) was taken on my first trip to Mfuni village to get authorisation from the chief and brief him and the council of elders on the objective of my research/visit. As we drove into the village, a large Bush mango (*Irvingia gabonensis*) tree with ripe fruits caught my attention, and I wondered as to its contribution to household livelihoods. In Fig. B, I was using the only path to get to Mominkoubou in the Baka community on a very rainy day. Going under trees with no clear road for either cars or bikes in the heart of the forest was an experience I had never had. The serenity and the sounds from forest birds and animals as I walked was the beauty of rural life! Photo credit: Eyan Johnson. O.

3.1. CHAPTER OVERVIEW

In this chapter I provide the reader with a description of the study sites as a way of gaining insights into their geographical, historical, and cultural context. Understanding the role of local context and cultural differences at the nexus of forest use, gender and climate change will provide the necessary insights to aid in the interpretation of results. I further elaborate on the biophysical, historical, and socio-economic characteristics of the communities found within these two regions, namely, the East and South West regions, bringing out the complexity of household livelihood activities as households cope and adapt to climatic and non-climatic changes.

3.2. SELECTION OF STUDY SITES WITHIN CAMEROON

The study was done in Cameroon, located in western central Africa, on the coast of the Gulf of Guinea, between 2° and 13° North and 9° and 16° East (Pouokam & Lemnyuy, 2012). The

southern regions of Cameroon are generally humid and equatorial, but the climate becomes semi-arid in the northern regions. National parks, and protected forest areas cover 54.7% of the country and are an essential asset, containing diverse plant and animal species which most communities rely on for their livelihoods (Pamo, 2008). Many protected areas are accessible by communities with some level of permission to sustain their livelihoods. The country has a population size of approximately 26 million, shared across its ten major regions (World Population Review, 2020). The South West region is one of two English-speaking regions in Cameroon, while the East region is a French-speaking region and the largest spatially (CLGF, 2019). The study was carried out in the East (see section 3.3) and South West regions (see section 3.4), as they share common humid and equatorial climatic conditions but differ in terms of their ethnicity and cultural practices (Figure 3.1).

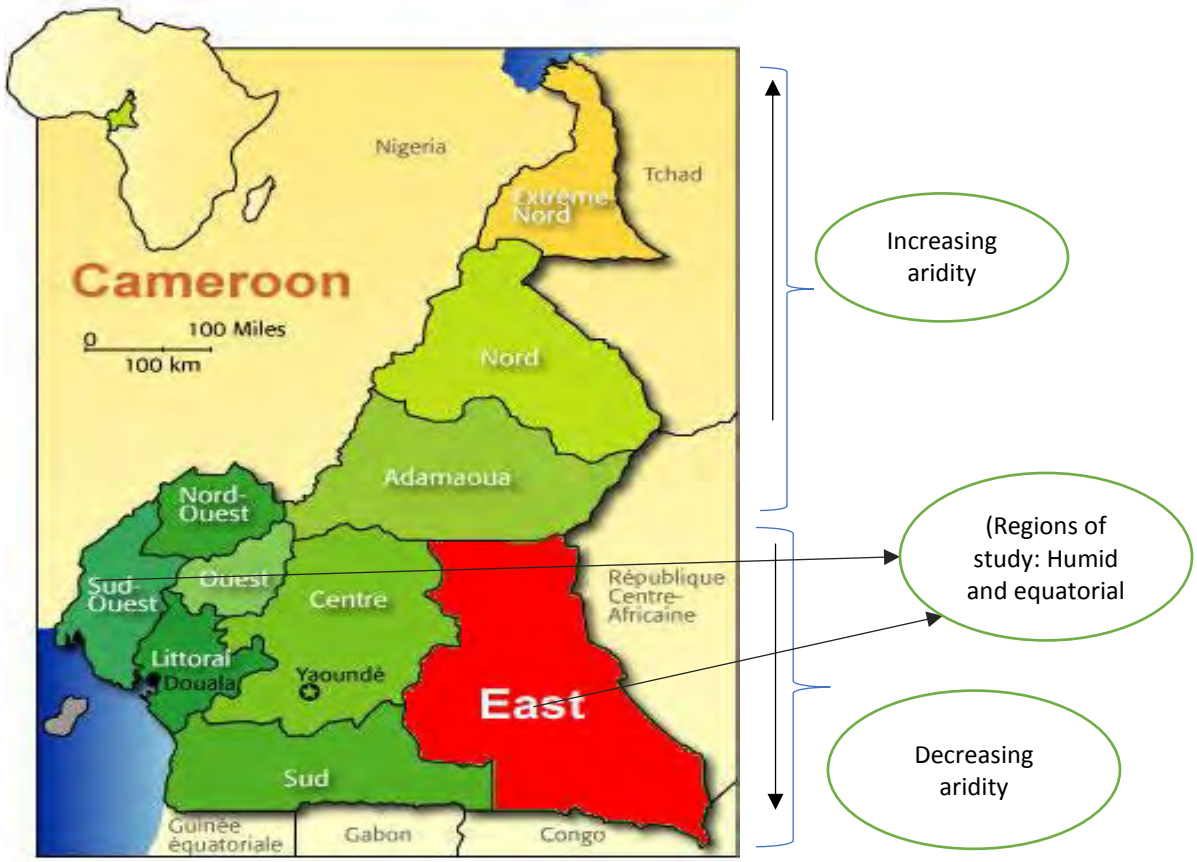


Figure 3.1: Map of Cameroon showing the ten regions with specific study sites.
Interpretation note: **The circles at the top and bottom of the diagram shows an increasing and decreasing aridity gradient; regions within the decreasing aridity gradient are humid and equatorial, including the study regions (East and Southwest) Source: https://www.hc-cameroon-ottawa.org/34/en/The-land-All-Africa-in-one-country.html**

3.3. THE EAST REGION

3.3.1. Geographic Location

The East Region, with the French appellation 'Région de l'Est', occupies the south-East portion of the Republic of Cameroon (see Figure 3.1). It is bordered to the East by the Central African Republic, the south by the Republic of Congo, the north by the Adamawa Region, and to the west by the Centre and South Regions. With 109,011 km² of territory, it is the largest region in the nation as well as the most sparsely populated. The target communities of the Baka people are in the Boumba and Ngoko divisions of the East region.

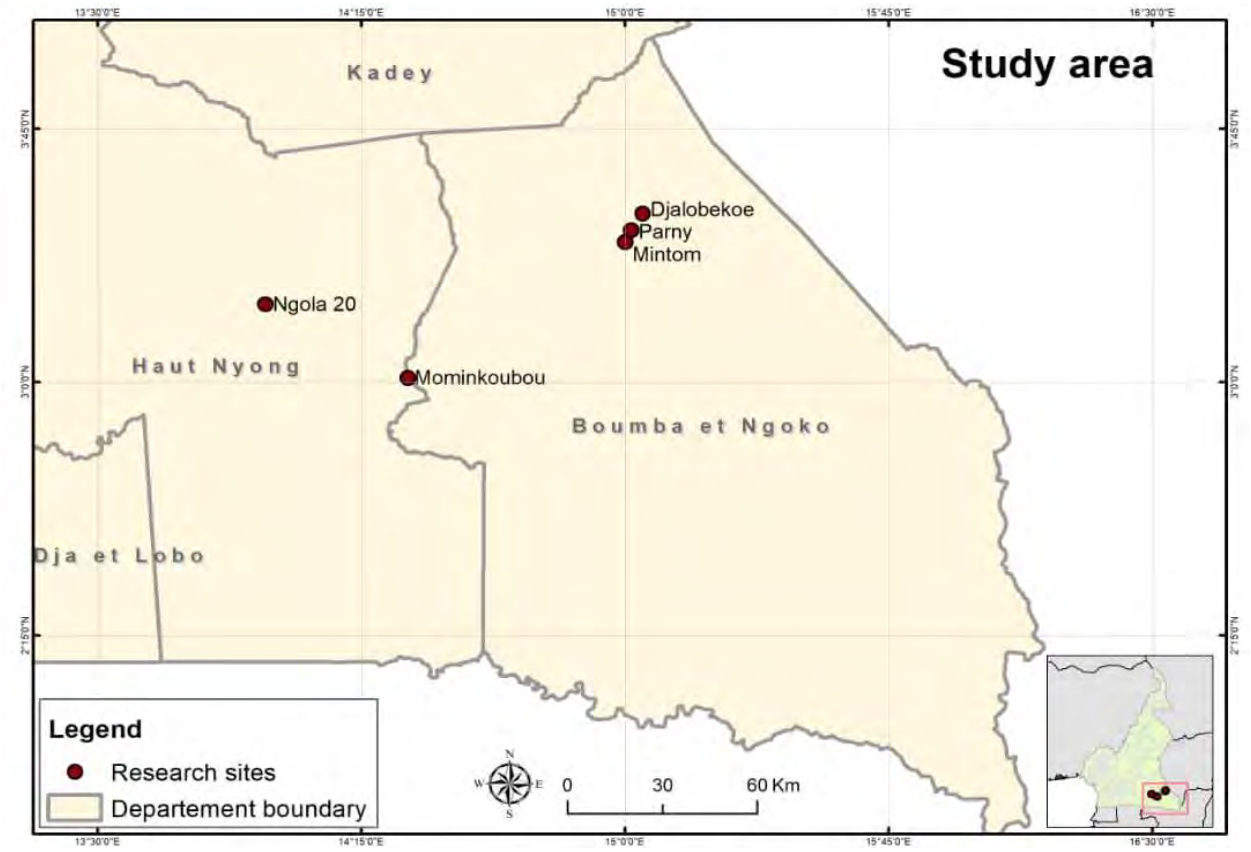


Figure 3.2: Map of the East region showing the location of study communities.

The selected villages of Djalobekoe, Parny, Mominkoubou, Ngola 20 and Mintom span Yokadouma to Moloundou along the border of the Central African Republic and The Republic of Congo. Some of these are in the protected landscapes of the "Tri-national de la Sangha", known in English as the "Sangha Trinational zone-TNS" (Tieguhong & Nkamgnia, 2012). This protected landscape falls within the transboundary complex of three adjoining national parks, namely; the Lobéké National Park in Cameroon, the Dzanga-Ndoki National Park in the Central African

Republic, and the Noubalé-Ndoki National Park in the Republic of Congo (Devisscher et al., 2013). Some of the Baka communities within the Lobéké National Park were part of this study.

3.3.2. Biophysical Characteristics: Climate, Vegetation, Soils, and Land Uses

The East region falls within the tropical rainforest zone as classified among the ecological zones of Cameroon. However, a smaller proportion of this region lies within the lowland Savanna zone moving northwards. The selected Baka communities are located only within the tropical humid dense forest zone.

While the South West, Littoral, Centre, South and East regions all fall within the same tropical humid dense forest zone, they differ in terms of mono (uni) versus bi-modal rainfall patterns, as well as the amount of rain received during the year. For example, the Littoral region tends to experience an annual rainfall of about 4028 mm following a mono-modal distribution lasting approximately nine months, with the wettest months being June, July and August (Kekeunou et al., 2014; Molua & Lambi, 2006). The East region might experience considerably less, with rainfall between 1500 mm - 2000 mm per annum (MINEPDED, 2012). The climate in the East region falls into four main seasons: the major dry season (November to March) and the minor rainy season (April to May), followed by a minor dry season (June to July), and then a major rainy season (from August to October).

This region has been affected by a general trend of a 2% decrease in rainfall since 1960 with accompanying increase in temperature which is reported to be the primary cause of the increased prevalence of malaria in the country (Molua & Lambi, 2007). While detailed climate information is lacking for most parts of Cameroon including the East region, data from the town of Abong-Mbang has been collected and mapped by CSAG. This town is one of the nearest weather stations located 367.7km away from the study communities in the East and sheds light on the climatic conditions and changes of the study area.

Past historical climate records show that April, May (~minor rainy season), August, September, and October (~major rainy season) had the highest average monthly rainfall during the period 1979-1999. Future projections under 'business as usual' RCP8.5 projections (2030-2050) suggest that May and June will experience a severe decrease or almost no monthly rainfall with a possible increase in total monthly rainfall in November (Figure 3.3).

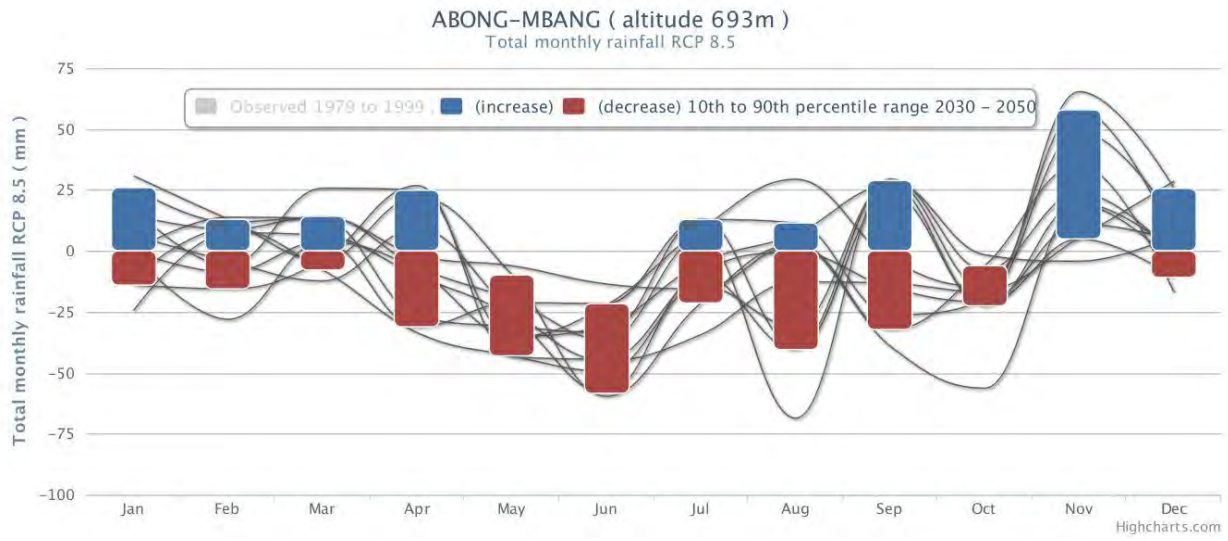


Figure 3.3: Rainfall projections for 2030-2050 for Abong-Mbang. Source: CIP- CSAG, UCT

The East region will also likely experience further increases in temperatures. During the periods 1988-2008, temperatures increased throughout most months, with an average maximum temperature increase of 0.5°C. Future projections now show that average monthly temperatures will continue to rise throughout the year as in other regions, and the East region might reach increases of above 1.5°C, with the possibility of reaching 2°C as an annual increase during the period 2030-2050 (Figure 3.4).

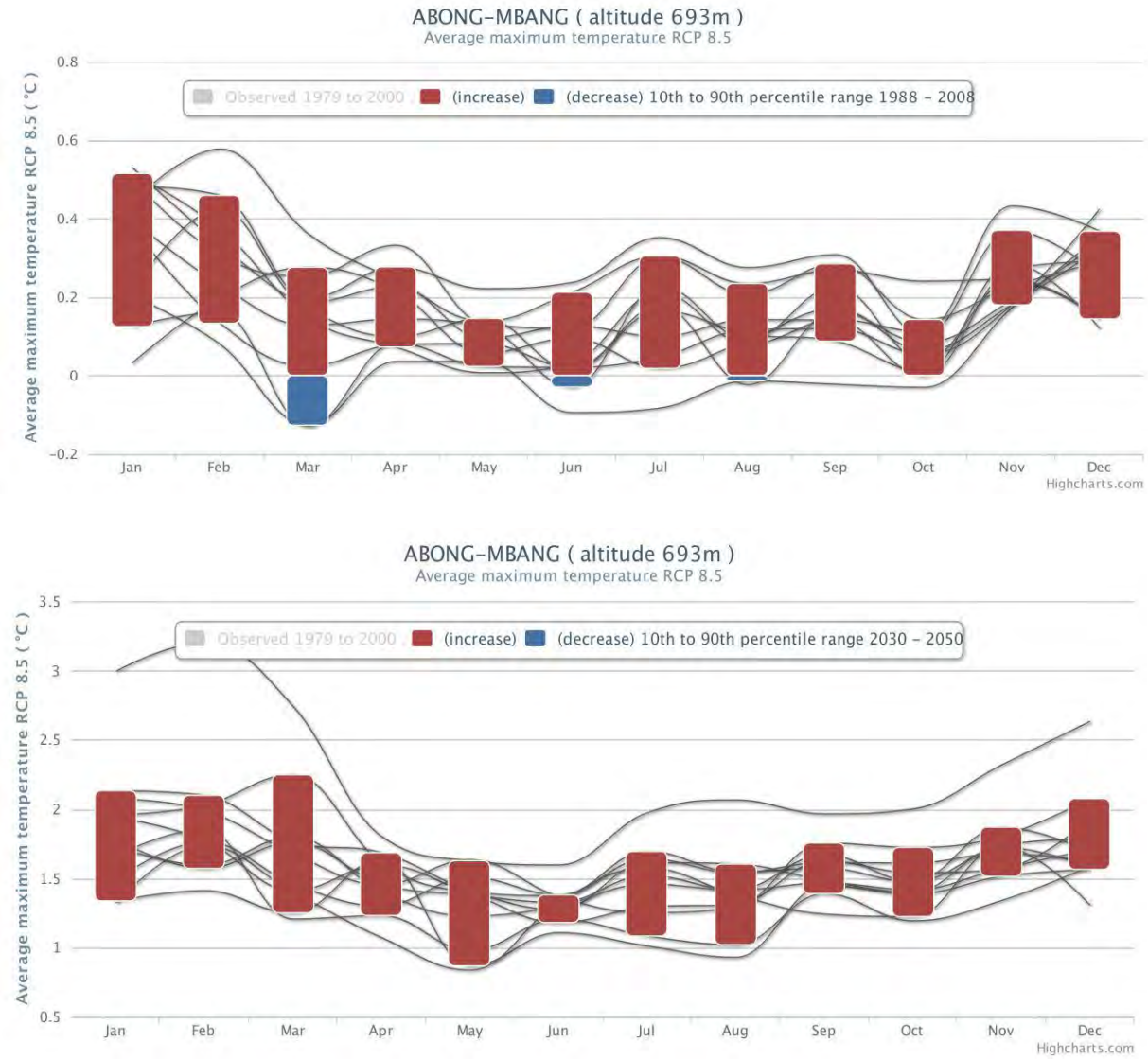


Figure 3.4: Average maximum temperature[3] historical record (top figure) and projections (2030-2050) (lower figure) for Abong-Mbang. Source: CIP- CSAG, UCT.

Corresponding with the high rainfall, 68.7% of the East region is dense forest cover (Pamo, 2008). The dense forest is dominated by species from the Sterculiaceae and Ulmaceae families- a homogenising of the original forest as a legacy of long-term deforestation activities (Temgoua et al., 2018). Land-use predictions for the East region suggest that some communities in the East region will experience substantial losses of forest cover (25%-50%) as a result of deforestation by

[3] The y-axis showing average maximum temperature are labelled this way to reflect temperature variations, which are standard deviations from the mean. The same explanation holds for fig. 3.7.

2030 (Mosnier et al., 2014), with likely implications for livelihoods that are reliant on forest products.

This region has a ferrallitic soil (also known as lateritic soils), rich in iron and red in colour. This tropical soil has poor agricultural potential due to its high clay content and low soil nutrients, and it is thus understandable that the Baka communities were not traditionally involved in agricultural practices as a result.

3.3.3. Historical Context and the Socio-Economic Status of the Baka People

Historically, the peoples of the East region have been settled in Cameroonian territory for longer than any other of the country's many ethnic groups (Permunta, 2013). The different ethnic groups in this region are the Baka pygmies, the Bangando and the Bakwele ethnic groups, but over the years the area has witnessed the migration of Muslims and the Bantus into the area (Tieguhong & Nkamgnia, 2012). In some villages, the Baka live in proximity with the Bantus, but in others, the Baka people are geographically isolated from their Bantu neighbours. The Baka (or Babinga) pygmies, the first inhabitants to the East (Permunta, 2013), are indigenous forest people of about 40 000 in number scattered within the region, making up approximately 0.4% of the total population in Cameroon (CED, 2008; Permunta, 2013). They have a hunting-gathering culture which can be traced as far back as 2400 years ago and depend on the forest for everyday resources, as well as a spiritual home (UNEP, 2012).

Research done in these communities has shown that the socio-economic status of the Baka people remains relatively low compared to other regions (CED, 2008), and the Baka people are considered the most marginalised groups in the East territory. Most of the Baka work as labourers in Bantu-run plantations and logging and mining companies where exploitation, both sexual and financial, is high (CED, 2008). These indigenous people have emphasised how their "social independence" is hindered due to subjugation experienced from their Bantu neighbours who continue to settle in their territory (Pyhälä, 2012). Most who work as labourers earn as little as 0.43 US$ (equivalent in 2020 to R6.65 or 237.7 FCFA) a day, making it difficult for them to improve their economic and financial status. This exploitation, however, differs from community to community (Pyhälä, 2012). For instance, the Baka communities that are located along the Yokadouma-Moloundou road towards the border with the Central African Republic and the Republic of Congo borders are exploited more by the Bantu people as labourers (Pyhälä, 2012). It would seem the traditional

relationship between the Baka and the Bantu is one in which the Baka are basically treated as slaves and with a lack of respect.

The illiteracy rate of the Baka people is still high in relation to poor access to formal education. A clear majority do not go to school, and even those who go could are mainly absent for extended periods, especially during months for gathering NTFPs. Many still rely on informal learning where knowledge of hunting, rituals and gathering of NTFPs are taught and handed down from the older to the younger generations. Although the government has enabled the creation of a few schools in the area, their nomadic lifestyle makes it difficult for them to be fully involved in education (Permunta, 2013).

Further, constant stigmatisation and victimisation from the Bantus in communities shared with the Baka people make it difficult for them to be in schools. A few who go to school are frustrated with the insults and stigma they receive from others who refer to them as "primitive" (Pyhälä, 2012). Their inability to communicate fluently in French makes it difficult for most of them to gain employment, and this serves to maintain their level of poverty (Pemunta, 2019a). While the introduction of socio-economic programmes in the Baka communities is well-meaning, they continue to fail because such programmes often do not align with their traditional way of life (Pemunta, 2019a).

The Baka people have indeed identified themselves as indigenous people and recognise their marginalisation in the political spheres in the country's development process. Their culture and lifestyle differ significantly from those of the dominant Cameroonian society in terms of customs, language, and rights and access to their traditional lands as well as dependence on ecosystem services (Pemunta, 2019b; Pyhälä, 2012). At the cultural level, the issue of socio-economic development of the Baka arises due to the non-recognition and non-respect of their cultural identity. Expressions such as 'underdeveloped', 'backward', or 'primitive' are often used to refer to these people (Pemunta, 2013). These negative stereotypes and constant discrimination are additional to the dispossession of their ancestral lands and natural resources in the interests of large-scale forest exploiters, agro-industrial companies and conservation organisations (Pyhälä, 2012). This can lead to the impoverishment of the Baka people and threatens their culture and their survival, especially as national policies and land tenure laws often do not take their cultural specificities into account (Permunta, 2013).

The traditional land tenure arrangements in the Baka community do not follow the form of landholdings as land is managed commonly (i.e., as communal land). Prior to the coming of the Bantus, the Baka made use of the forest for their hunting-gathering activities with no defined area, and thus, no restrictions on access (Schmidt-Soltau, 2003). Schmidt-Soltau further noted that although the areas were undefined, the Baka practiced a sustainable forest management system where once a given area shows visible impacts of use, they changed to another area. Regulations laid down in Cameroon's forestry legislation of 1994, based on development and conservation activities, further restricted access and use rights of forests and forest resources (Pemunta, 2019b). Coupled with these restrictions, the absence of traditional methods and systems to defend their land from the Bantus (i.e. strangers) and the absence of legal landholdings (provided by government) resulted in an increasing vulnerability of the livelihood, culture, and lifestyle of the Baka (Schmidt-Soltau, 2003).

3.3.4. Cultural Practices and Livelihood Activities: Dependence on Forest Resources

3.3.4.1. Forest Dependence

The Baka people are men and women of the forest *par excellence*, whose existence is organised around the forest and its resources (Permunta, 2013). They depend greatly on the forest from where they obtain the essential products needed for their subsistence (honey, fruits, wild yams, caterpillars, hunting, etc.), as well as for their health. They thus consider the forest as their 'breadbasket' and are predominantly a hunting and gathering society (Dounias & Colfer, 2008; CED, 2008). The Baka adopted cultivation in their own fields from the 1950s, although it remains unplanned as cultivation was more of a spur of the moment strategy and not applied as a livelihood strategy. It resulted in some Baka accepting agricultural produce from neighbouring farmers in exchange for forest products (Kitanishi, 2003). It is therefore clear that the Baka engage in crop cultivation, although past studies had not really focused on this but rather on their hunting-gathering culture, as noted by Kitanishi.

In terms of health, most of the Baka people continue to rely on the use of medicinal plants obtained from the forest (Dounias & Colfer, 2008). However, with the transformation of their forests into plantations, the increase in logging activities as well as protected areas with restricted access, they find it challenging to get specific plants for medicinal purposes.

Picture 3.1: Medicinal plant used by women for stomach ailments. Photo credit: Ojong Enokenwa

Their nutritional levels tend to be low, partly because their access to resources has become limited. Also, in many communities, traditional rituals for health purposes remain dominant, with several households making use of plants for toothaches, microbial infections and a range of diseases such as malaria, diabetes, tuberculosis and trypanosomiasis (Ntie-kang et al., 2013). The lack of government-run medical clinics within these communities makes it difficult for the people who may want to rely on western medicine for treatment (Pemunta, 2019a). Additionally, communities complain of not being able to pay the fee charged for consultation, nor that required to purchase prescribed medication (Pyhälä, 2012).

3.3.4.2. Settlements and Major Activities

Since the 1990s, the Baka have increasingly begun living a more sedentary life. As a result, the gradual transformation of their traditional lifestyle of forest dependence has led to changes in their principal means of survival and livelihoods outcomes (Tsuru, 1998). The Baka have two types of settlements: the hunting 'Maka' campsites often used for hunting and gathering activities and the 'Molongo' campsites used for multiple subsistence activities. They generally live in the 'Molongo' in small-sized, traditional semi-spherical, leaf-and-twig huts (Permunta, 2013). The shifts to a more sedentary way of life have also altered settlement practices. Most of the hunting campsites in the forest which in the past were more of a permanent site are now only used for short periods. The changes to their nomadic traditions have been noted in the number of spiritual performances they have (Permunta, 2013).

Over 51 spirit ritual performances, which are noted as 'quite important' for ongoing daily life, are performed in the Boumba and Ngoko division (Tsuru, 1998). The Baka people believe the home of the spirits is in the forest and must be treated with respect; thus the extinction of forest species

could have negative consequences, not just ecologically for products harvested from the forest, but also for spiritual/cultural health (Pyhälä, 2012).

Different livelihoods activities such as hunting, fishing, and harvesting of NTFPs are linked with cultural norms and roles shared between men and women in the Baka communities. For instance, in terms of subsistence activities the men are involved in hunting (using traps, spears and dogs), harvesting of wild honey, and brewing of traditional beer while the women and young girls often rally themselves in groups for the collection of wild fruits, mushrooms, edible insects, wild yams and condiments from the forest (Toda, 2014). Snare hunting (made with steel wires) is one of the most common hunting techniques used by the Baka and is mostly targeted at small to mid-sized animals like brush-tailed porcupines (Yasuoka et al., 2015). Agricultural activities can influence hunting activity because of forest loss, especially during the major dry season when people clear the secondary forests to open new fields (Hayashi, 2008).

Fishing is traditionally women-dominated, but men are increasingly participating in fishing practices. However, the method of fishing is gender-separated: women practice fish bailing[4] whereas men make more use of hook-and-line fishing (Bachuchet, 2014; Gallois & Duda, 2016; Hayashi, 2008). Collection of NTFPs for commercial purposes leads to the creation of social networks within the community as groups collect products from the forest. However, with the shifts to a more sedentary lifestyle, both men and women practice farming (irrespective of the poor soil fertility typical of the region as shown in section 3.3.2), where crops such as sweet potatoes, vegetables, cassava, cocoyam, plantains, and groundnuts are being cultivated for consumption and income generation. Some of the Baka communities also practice some form of animal husbandry, although it is poorly developed. Households keep animals such as goats, pigs, and chickens. However, it is not clear if households now prefer crop agriculture over livestock or forest products and if livestock farming makes up a significant part of their livelihood activities (Pyhälä, 2012).

3.4. SOUTHWEST REGION

3.4.1. Geographic Location

The South West region is one of the two English-speaking regions in the country with a population of above 1.5 million. The capital is Buea, with other major towns being Kumba, Limbe, Tiko and

[4] In this fishing practice, a group of women construct a dam from fallen trees and mud, creating a small pool in the river. They then bail the water out until they can see and catch fish, shrimp, and crabs.

Mamfe. It has six administrative divisions, namely Manyu, Fako, Koupe-Manengouba, Lebialem, Meme, and Ndian (Figure 3.4.1). The Manyu division has been grouped administratively into four distinct sub-divisions: three villages within the Eyumojock sub-division (Mfuni, Ossing and Kembong) make up the study communities. The Eyumojock sub-division is bounded to the north by the Akwaya sub-division, to the south by the upper Bayang sub-division, to the East by the Mamfe sub-division and to the west by the Republic of Nigeria (Eyumojock Council, 2011) (Figure 3.5).

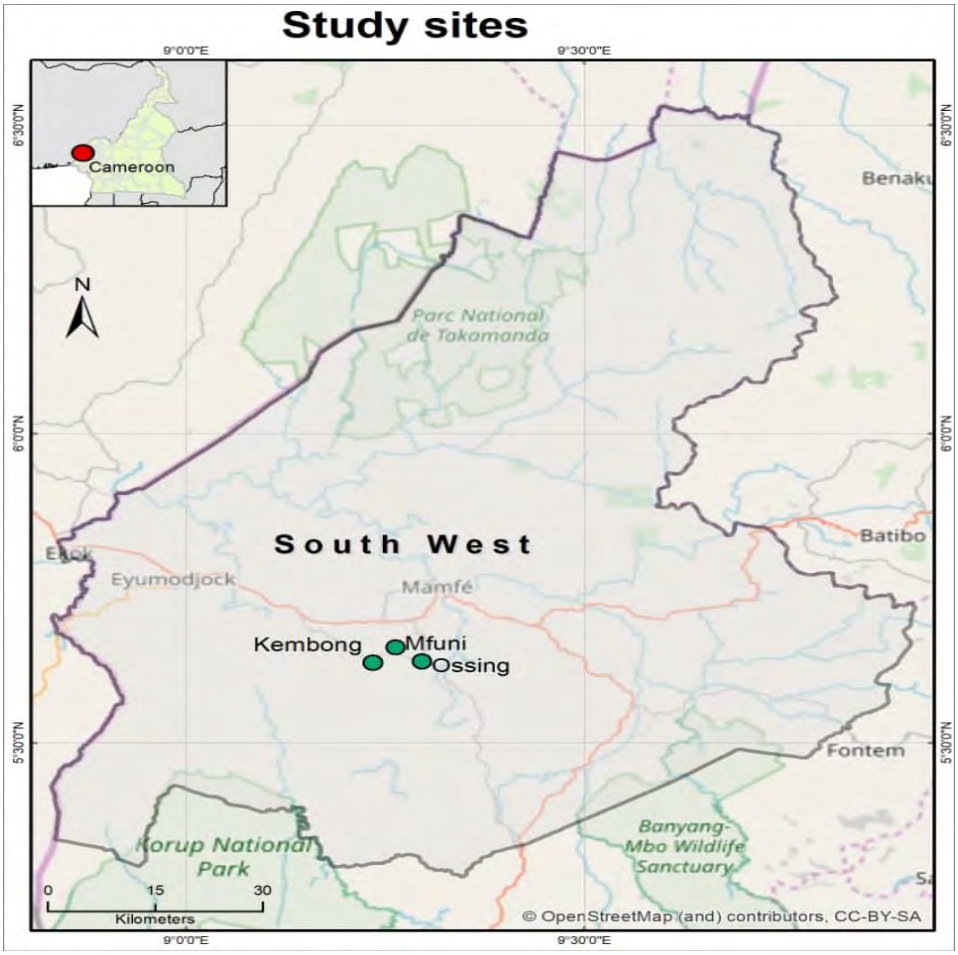


Figure 3.5: Map of the South West region showing study communities. Source: Author

The selected villages are part of the 66 villages within the Eyumojock municipality and are approximately 21 km away from Mamfe, the capital of the Manyu division (Eyumojock Council, 2011). These communities are closely located around the Ejagham Forest Reserve, which shares part of its western border with the Cross-River State of Nigeria (Nkwatoh et al., 2010). The

Reserve was created in 1934 and remains one of the first reserves to be created by the British Colonial Administration in the country; it was later modified in 2001 and partially incorporated into the Korup National Park and the Ejagham Forest (Orock, 2014).

3.4.2. Biophysical Characteristics: Climate, Vegetation, Soils, and Land Uses

In terms of climatic conditions, the Eyumojock sub-division experiences two seasons; the dry season (November to March) and a long rainy season (April to October). Usually, people start planting crops after the first rains in April, but anecdotal evidence suggests this pattern is gradually changing (as was also observed during my fieldwork) due to changing weather patterns, with the dry season extending almost to May. During the rainy season, the mean annual rainfall may reach 3000 mm with the highest rainfall being recorded in July and August. Historical climate records for the periods 1979 to 2000 highlight similar months of rainfall with the highest rainfall recorded during August and September (CIP-CSAG, UCT) (Figure 3.6).

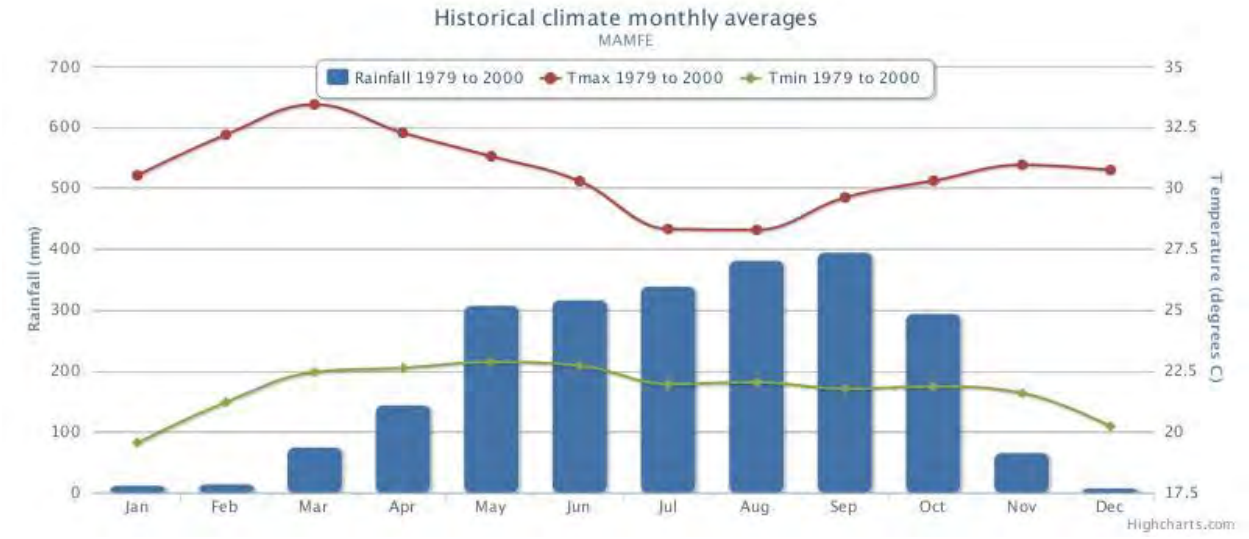


Figure 3.6: **Historical climate records from 1979-2000 for Mamfe. Source: CIP- CSAG, UCT**

During the dry season, average maximum temperatures range from 25˚C to 30˚C, but in recent times this seems to be increasing with more heatwaves being experienced (Eyumojock Council, 2011). Past historical climate records from CIP for the Mamfe area within the study zone, showed that average maximum temperatures from 1979 to 2000 could reach 36°C. The excessive heat in this area could suggest difficulty in crop cultivation for communities (Eyumojock Council, 2011) (Figure 3.7).

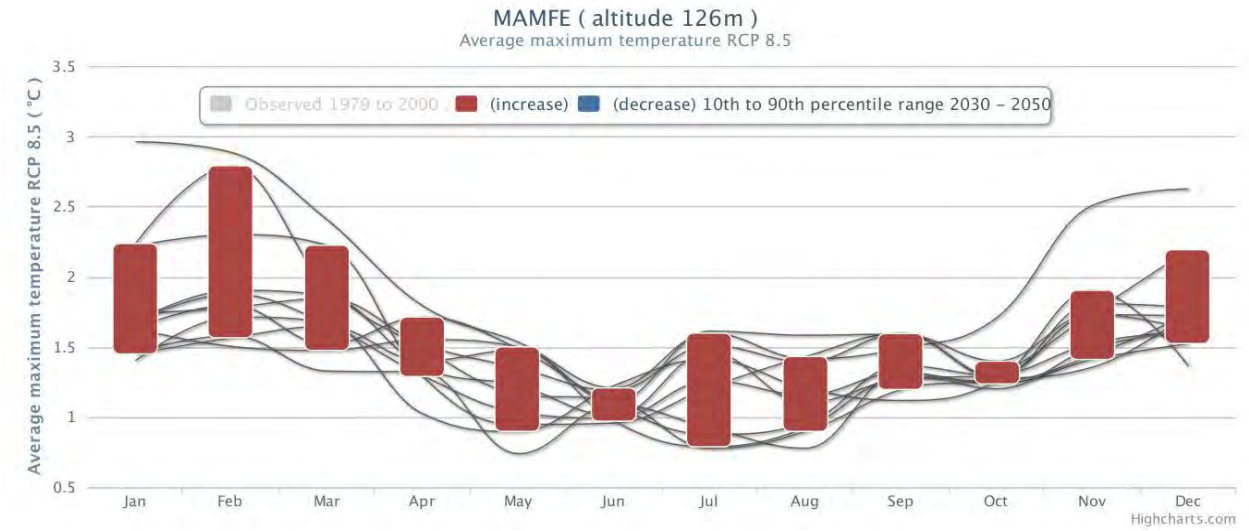


Figure 3.7: Average maximum temperature future projections (2030-2050) for Mamfe. Source: CIP- CSAG, UCT

Future temperature projections under a climate change scenario within this zone by CIP indicates that the average maximum temperatures for the period 2030 to 2050 could experience an increase of greater than 1.5ºC compared to current monthly averages for about nine months in a year. The months of December, January and March may exceed 2°C, with the hottest month of February likely exceeding 2.5°C.

The Eyumojock sub-division falls in the lowland Guinea-Congolian vegetation type, consisting of moist evergreen dense forest which contains a variety of timber species such as Bubinga *(Guibourtia tessmanii),* Doussie (*Afzelia bipindensis*), Moabi (*Baillonella toxisperma*), Iroko *(Milicia excelsa),* Bilinga (*Nauclea diderrichii*), Poga *(Poga oleosa)* and NTFPs such as Bush mango (*Irvingia gabonensis*), Njangsang (*Rhicinodendron heudelotii*), Country onion (*Afrostyrax lepidophyllus*), Bush pepper (*Piper guinensis*), Bitter kola (*Garcinia cola*), Eru (*Gnetum africanum*), Shea nuts (*Vitellaria paradoxa*), and several others with market potential and medicinal value (Enokenwa, 2014).

The Ejagham communities are endowed with natural resources such as Lake Ejagham and many rivers like River Munaya, River Manyu, and River Badi which empty into the Ndian and Calabar rivers in Nigeria (Stager et al., 2018; Ndip et al., 2018).

Picture 3.2: Eru (*Gnetum africanum*) and edible insects all harvested from the forest. (Photo credit: Ojong Enokenwa).

3.4.3. Historical Overview and Livelihood Activities of the Ejagham People

The Eyumojock sub-division is made up of 66 villages consisting of one ethnic group known as the Ejagham. The Ejagham people's lineage takes them to parts of Cross River in Nigeria. The three villages selected from this area have some of the highest population densities in Cameroon (Eyumojock Council, 2011).

Historically speaking, the sub-division is made up of three Ejagham clans with most of them speaking the Ejagham dialect. The term "Ejagham" is believed to derive from the combinations of three words: "Ekub" (meaning parcel), "Ejag" (meaning split or broken), and "Haam" (meaning without end). Together they refer to "a unified parcel that was originally one but is now broken into pieces", reflecting the first break away from other tribes in Nigeria, Cameroon, Uganda, and South Africa that migrated from the historical Bantu. It also refers to the reunification of the Ejagham speaking people in both Cameroon and Nigeria (Kwekudee, 2013).

The cultural practices of the Ejagham people are similar to those of the Cross-River State in Calabar, Nigeria. They have similar traditional dance and ritual groups for men and women such as the "Ekpe" and the "Moni-Nkim", as well as similarities in their food and traditional dressing styles. The Moni-Nkim, for example, is a well-established ritual group for women which is performed to signify the successful orientation into womanhood and possible motherhood (Takon, 2016).

Picture 3.3: Traditional outfit for Moni-Nkim. Photo credit: Takon Ndoma. N.

The Ejagham people of Cameroon have continued to have a good relationship with neighbouring Nigeria where similar livelihood activities are practised. In terms of farming activities, about 60% of the population cultivate food and cash crops (such as plantains, cassava, maise, cocoa and coffee), for both commercial and domestic use. The remaining 40% are involved in trading, transportation businesses, fishing, hunting, forest exploitation (especially NTFPs) and administration (Orock, 2014). It is also common to find households that engage in livestock cultivation for home consumption as well as for commercial purposes. The majority of those who do this, do so for income generation and to sell to food vendors who run businesses along major highways, as well as around markets.

Due to the extensive involvement of the population in the collection of forest products, the villages have become an NTFP economic "pull zone", attracting many people from Nigeria and neighbouring villages during harvesting seasons (Enokenwa, 2014), and reflecting a shift towards greater engagement in the exploitation of forest products. The rising change in climatic conditions could bring more persons into the NTFP zone, as farming over the years has become more difficult. Table 3.1 presents a summary of the main activities, by gender, that are carried out in different villages.

Table 3.1: Livelihood activities of the Ejagham people. Source: Eyumojock Council Report, (2011)

Main Activities	Male	Female
Farming	Cocoa, Palm, Coffee, Cassava	Cassava, Plantains, Banana, Cocoyams, Vegetables
Hunting	Monkey, Bush Pig, Porcupine	
Fishing	Mudfish, Craw nose, Tilapia, Dogfish	
Gathering of NTFPs	Bush mango, Bush pepper, Country onion, Njansang	Bush mango, Bush pepper, Country onion, Njansang
Petty trading	Farm produce, Cosmetics, etc	Farm produce, Cosmetics
Livestock husbandry	Pig, Goat, Fowl, Cane rat.	Pig, Goat, Fowl, Cane rat.

These different activities are, however, changing in terms of gender roles as now women and men are gradually becoming more involved in activities that were traditionally more explicitly gender defined. For example, many women are gradually moving into cash crop cultivation which had traditionally been culturally-constructed as a male-dominated activity (Klarer, 2014). The transition of women into cash crop cultivation, however, could be met with challenges such as land tenure rights. Land tenure follows the customary rights system where the first occupants of an area are recognised as the rightful owners of that land and can transfer such land from generation to generation, through the male family head. The family head owns and controls the land, with women limited to user's rights (Fonjong et al., 2013).

3.5. CONCLUSION

This chapter draws together the different characteristics of the two study sites, bringing out their commonalities and differences in culture and livelihood activities. The chapter further describes how livelihood activities have traditionally shaped the biophysical and geographical contexts of the landscapes in which they are located. It is the differences in culture and ethnicity that will likely result in divergences in how households within these different cultural backgrounds respond to multiple shocks and stressors. Given that both communities have clear traditional gender roles/division of livelihood roles, it is particularly interesting to assess how this shapes the way the households respond to different shocks and stressors.

Both the Baka and the Ejagham communities have unique cultural practices; however, both communities are gradually experiencing changes with regards to their livelihood activities and strategies, as well as how these strategies are gender-defined. For instance, the Baka were

traditionally a hunter-gatherer people who primarily depended on the forest and its products for survival. Today, their nomadic lifestyle is gradually altering/disappearing, and they now increasingly practice agriculture, especially the cultivation of food crops as part of their livelihoods, despite the infertile soil. Ejagham communities, on their part, are becoming more expansive in their livelihood activities and increasingly incorporating reliance on NTFPs as complementary to traditional agricultural activities.

Anecdotally, the shifts apparent in both communities appear not only regarding basic livelihoods activities, but also in how the roles within each gender in the community are gradually changing. These recent shifts in roles will likely be exacerbated by the impacts of climate change (OHCHR, 2019) which will, in turn, present new challenges to households as they seek different ways to adapt and respond to both climatic and non-climatic shocks. This, when considered in combination with broader geographic responses such as an influx of people or companies into the Baka communities for resource exploitation, for instance, will likely further exacerbate household stressors and necessitate innovative adaptive responses.

CHAPTER FOUR

RESEARCH APPROACH, METHODOLOGY AND METHODS

"It is important to get results from experiment (research) but the most important is the process in getting those results"– Dr Nik Ahmed Nizam.

This picture was taken during a focus group workshop in Ngola 20 (East region of Cameroon). During the session, I was able to reflect deeply on the concept of livelihood and forest products. I ended this session reflecting on the research assumptions I had indicated and how most of them were flawed. I was relieved because field observations and interactions altered most of my assumptions while spending time with the Baka pygmy. Photo credit: Eyan Johnson.O.

4.1 CHAPTER OVERVIEW

This chapter explains the research approach and methods guiding my study and how these are applied to explore the research objectives related to household assets, exposure to shocks, as well as adaptive responses to climate change impacts amongst forest-dependent communities. Creswell (2014) defines a research approach as the plans and procedures for research that span the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation (Creswell, 2014: pp31). I adopt two gender analytical frameworks, namely the Harvard analytical framework and the Moser gender planning framework. Further, I applied a mixed-method research (MMR) design which encompasses both qualitative and quantitative methods of data collection and analysis. These methods are explained in the sections that follow under this chapter.

4.2 STUDY DESIGN

In designing this study, I drew on an exploratory research approach (Leavy, 2017), which allowed me to explore the intersectionality of gender and ethnicity within the study sites. In a study that

aims to be interdisciplinary, the ability of MMR to combine quantitative and qualitative research methods and questions makes it widely acceptable and well established in sustainability and SES research (Leavy, 2017). The combination of both quantitative and qualitative research methods provides the opportunity for data triangulation (Scott, 2010; Olsen, 2004). For the quantitative methods, I conducted household surveys where questionnaires were administered. For the qualitative methods, key informant interviews and focus group discussions were done. I also made use of participant observation to critique the portrayals of the study communities present in the exisiting literature with my own experiences (e.g. Bodegom et al., 2009).

Since gender and intersectionality are central to this study, I used the Moser gender planning framework (Moser, 2014) and the Harvard analytical framework as guiding tools in designing the methods and interview questions (Candida et al., 1999). Both gender frameworks map out the gender division of labour within households (Fernández et al., 2016; Lusiba et al., 2017), assessing how assets, resources and income are being allocated and accessed by households (Arntzen, 2015).

4.3 DATA COLLECTION FRAMEWORKS

4.3.1 Moser Gender Planning Framework

Caroline Moser's framework, now known as the 'Moser Framework', helps to understand the division of labour within the household and community, and the inequalities in women's and men's social roles (Moser, 1989). It was designed as a framework for use in gender-sensitive intervention planning but is equally useful in a research context to guide the types of question to explore. The framework highlights the triple roles (*productive*, *reproductive* and *community* activities) that household members of different sexes engage in (Ludgate, 2016). Productive activities are those roles related to producing goods and services for either consumption or trade. Reproductive roles are activities that involve childbearing, rearing, and domestic tasks. Community roles are activities that support the collective consumption and maintenance of community resources (Jelassi & Brown, 2011).

In building her framework, Moser explains that it provides space for the recognition that men and women have different positions in the household and different control over resources, and thus, they would have different needs that pertain to their livelihoods. The framework also challenges the traditional assumptions relating to the structure of the household such as 'man as the

breadwinner' versus 'woman as the homemaker' as this has proven not to be the household structure today in most communities (Moser, 2014).

The framework thus goes beyond traditional planning tool methods that often do not acknowledge the differences in gender roles, needs and strategies (e.g. Sida, 2015), and highlights aspects of the gender division of labour and power relations across the scales of community or household (Pagano et al., 2012). In this respect, the framework has raised discussions around time management, especially for women, and tailors the type of interventions to the roles of both men and women (Ludgate, 2016). Such an approach differs from the typical top-down planning approach that assumes a single intervention aimed at one scale can address all areas of inequality at different scales (Hummelbrunner & Jones, 2013). It is possible for individuals to have multiple roles within a household and there might be biases that could arise in the [mis]allocation of such roles to different household members, potentially reinforcing skewed power dynamics (Sida, 2015; Smith, 2005), with implications for the success of interventions. The Moser framework was necessary to explore gendered power struggles as a way of understanding the vulnerability of different types of households and men and women, while also focusing on what allowed both men and women to better adapt to the changes that affect them (Collard et al., 2018).

Table 4.1 presents the framework employed in this study to guide the discussion in the focus groups regarding gendered roles and responsibilities within households. The framework guided the types of questions asked about the division of labour within households and the roles that different household members carry out as a contribution to household livelihoods, specifically, the collection of NTFPs, the cultivation of crops, and the care of livestock. The framework was applied using a participatory approach to map the activities of men and women in the household for over 24 hours (Ludgate, 2016).

In the focus group discussions across both study sites, men and women were interviewed separately and were asked to pick an activity that was predominantly done by their respective genders (see details in section 4.4.2).

Table 4.1: Activities related to the household division of labour.
***Interpretation note*: Participants of focus groups were asked to identify activities predominantly done by their gender.**

Activities	Responsibility of Women/Girls	Responsibility of Men/Boys
Productive: Agriculture Collection of NTFPs Livestock activity Income generation Employment		
Reproductive: Water-related, cleaning/repair Fuel related. Food preparation Childcare, health-related Cleaning and repair Market-related		
Community activities Attendance at meetings/ religious activities Saving (credit) society meetings NTFP collection and farm groups Recreation (traditional dance groups), sport events		

4.3.2 Harvard Analytical Framework (HAF)

The Harvard Analytical Framework was developed by the Harvard Institute of International Development to draw attention to the issue of resource allocation between men and women in society (Candida et al., 1999). The HAF provides a systematic way to understand the agricultural and productive systems of households and is easily linked to the different households' triple role activities in the Moser Framework. The HAF seeks to create gender awareness within the household and role diversity with regards to resource access and allocation, rather than identifying the specific causes of gender inequalities. When combined with the Moser Framework, HAF enables insight into the different inequalities that might emerge from the gender division of labour (Pagano et al., 2012).

I used HAF to explore issues of access to and control of assets, resources, and income (Figure 4.1, box B) by men and women. During focus groups discussions, I used it to explore issues tied to

resource allocation and what this may mean for different households, as well as specific members, in the face of climate change.

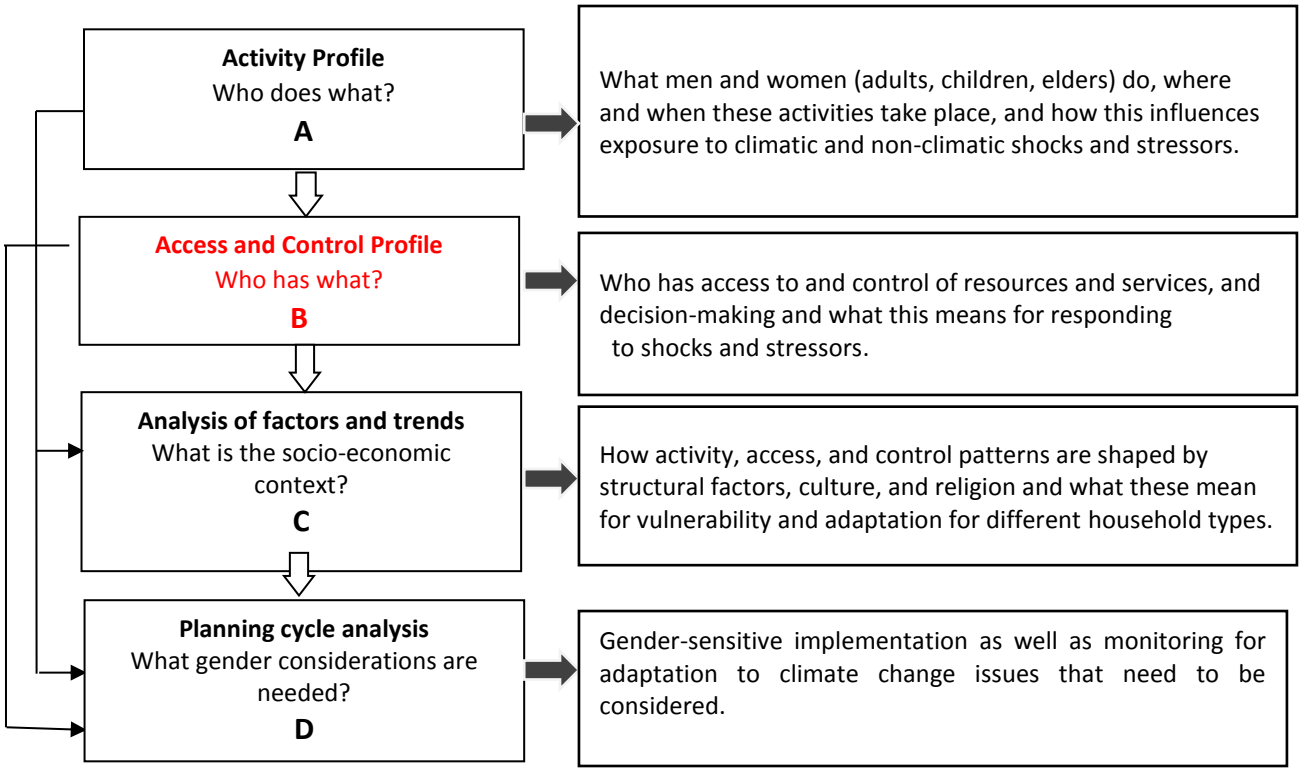


Figure 4.1: Harvard Analytical Framework adapted from (Candida et al., 1999).
***Interpretation note*: Box B is in red to emphasise how access and control of resources can play a major role in the livelihood outcomes of poor people.**

4.4 METHODS

The results presented in the empirical chapters that follow, were based on all the methods described below.

4.4.1 Household Survey

The primary quantitative data were collected using household surveys within the study sites. The sampling procedure, questionnaire design and development, and data collection protocol is detailed below.

4.4.1.1. Site Selection and Sampling

The targeted population sampled within the two study regions were from the communities of Mfuni, Ossing and Kembong (for the South West region) and Djalobeko, Parny, Mominkoubou,

Ngola 20, and Mintom (for the East region). Villages within the South West region were purposely selected based on my previous knowledge of the systems and institutions in place (i.e. Moser & Korstjens, 2018). Villages within the East region were selected based on expert recommendations from IUCN, Yaounde who are well-established within the Tri-National de la Sangha (TNS) landscape.

In total, 240 households were interviewed across both regions. Seventy respondents were interviewed from the five villages in the East region where the Baka communities are located. In the South West region where the Ejagham communities are located, 170 respondents from three villages were interviewed. Table 4.2 details the number of respondents interviewed per village. Respondents were drawn from different types of households affected by shocks and stressors. I used gender of household head, alongside other adult household members, to come up with three categories of households which could be used to disaggregate the findings based on the gender structure of households. It was therefore best to talk to the head of the household where possible, and women who were household heads were also prioritised, although this number was smaller compared to male household heads.

Table 4.2: The distribution of respondents across villages for the study sites.

East region: Baka communities		**South West region: Ejagham communities**	
Names of villages	**N = 70**	**Names of villages**	**N = 170**
Djalobekoe	23	Mfuni	60
Parny	13	Ossing	41
Mominkoubou	9	Kembong	69
Mintom	11		
Ngola 20	14		

In the South West region, the larger sample size (n=170) reflects the household density and population sizes of Ejagham villages. The population size for the three villages sampled was more than that of the five villages in the East region combined. In each of the three villages, sampling followed a systematic approach wherein every third house was interviewed. The initial choice was to select every fifth house within the village, which is approximately a five-minute walking distance. Due to the relatively high population density, every third house was selected. However, in cases where there was no adult in the third household, an adult from the next household was interviewed.

In contrast, in the East region, most of the settlements have low population sizes; this combined with the fact that some groups spend a lot of time living very deep into the forest, made achieving an equivalent large sample size difficult. Owing to the difficulties in accessing potential participants, I selected respondents using a snowball sampling technique, i.e. Fallon (2016). Given that the Baka settlement spans from clearly identifiable/demarcated villages that are sometimes shared with Bantu-speaking people, to deeply forested areas with only the Baka pygmy households, snowball sampling allowed for the identification of households of only the Baka peoples.

4.4.1.2. Questionnaire Design and Development

A structured household interview schedule with both open-ended and closed-ended questions was used (see Appendix 1). The questionnaire had six sections namely demographic profile (section A), human and social capital (section B), financial capital (section C), physical and natural assets (section D), Livelihood strategies (section E), and shocks, climate change and coping responses (section F).

In section A, the questions focused on household demographics, including the number of persons within the household, household structure type, marital status of the respondent, ages of household members, level of education, employment status and other skills of household members.

In section B, the questionnaire gathered information on human and social capital. I considered human capital as the skills and knowledge that give household members the ability to make a living. I also used a subjective measure of how households' living conditions have evolved over time[5] (see Table 4.3). The health status of the households was also recorded from responses to questions relating to whether they had any chronically ill or injured persons within the household and if sicknesses of such household member(s) affected their ability to work.

Social capital was centred on social relationships, and I explored the following major dimensions of social capital, namely informal social support groups (networks), leadership roles and decision-making ability (Brown & Sonwa, 2015; Abdul-Razak & Kruse, 2017; Phuong et al., 2017). The

[5] How contented households were based on their living condition compared to ten years ago, was based on a scale of 1 = Better off; 2 = Worse off; 3 = About average.

data collected includes information on the types of existing support groups[6] households belong to and what sort of activities these groups carry out. I explored social relationships between people by looking at aspects related to trust and mutual support, as well as comparing these relations with what existed in the past. With respect to leadership roles and decision-making within groups or organisations, I focused on household heads who occupy a decision-making/leadership position within a social group. Responses to all questions were classified into yes or no and analysed through cross-tabulation to compare across sites and household types.

For section C, questions focused on financial capital, and were considered as the savings households were able to make as well as debts and access to credit sources (amount given by households were often in approximation).

Section D focused on the different physical and natural capital that households have at their disposal. I assessed physical capital in terms of items of economic or material value that were used for everyday life that enabled households to carry out their specific livelihood activities. These items were grouped into two categories: household items and agricultural/NTFP items, which included farming tools, phone, radio, bicycle, water drums, solar, hoe, cutlass etc. Natural capital was considered as natural resources at the disposal of households, including forest resources, land, and water sources. However, forest products were often considered in tandem with livelihoods as respondents did not disentangle them. However, forest resources were discussed as 'forest products' by participants under the livelihoods activities they engaged in.

In section E, the questions were related to livelihood activities, based on various activities that allowed people to live, based on their different lifestyles and ways of meeting their daily needs (FAO, 2007). I asked households the kinds of agricultural, livestock and collection of forest product activities they engaged in and their reasons for engaging in these activities. For the collection of NTFPs, I was also interested in understanding the types of products culturally collected by men and women and the duration for which they have carried out these livelihood

[6] The data I collected for social groups were; churches, saving clubs, farming societies, volunteer groups, sport and dance, healthcare, men's group, women's group, school groups, NTFPs/hunting groups, development/income generation, and those not found in any groups. I further grouped them into five categories: Farming and hunting groups (i.e., farming societies, NTFPs/hunting); Recreational/Social groups (i.e., school, church, dance); Development groups (i.e., volunteer, healthcare, income generation); Saving groups (i.e., Men's, women's, saving clubs); Not in any group.

activities. Households were also asked about other livelihood activities they were engaged in, such as local jobs (carpentry, tailoring, food vendor, etc.) that were non-farm and forest-related.

In the last section, section F, questions asked were based on climatic and non-climatic shocks and stressors that households are exposed, and sensitive to, during a period of the last five to ten years. An open-ended list of the different types of shocks and stressors that households have experienced were read out to them with respondents given the option to add additional shocks and stressors to the list. Respondents were able to indicate more than one shock/stressor having been experienced. These were ranked into a score from 0 to 3 according to severity, with level 3 considered most 'severe'[7]. In presenting the results here, I considered only the proportion of households who rated the shocks and stressors as severe (i.e., level 3). I also note however, that some responses ranked certain issues as low, i.e., between 0 to 2, as most likely respondents were drawn from across all sectors and not just farmers, who often noted severe impacts from climate change. The results of these shocks and stressors on households were grouped into two main categories:

a) **Climatic shocks and stressors:** This included changes in weather and climate such as storms, warming temperatures[8], rainfall variability[9], droughts, and floods affecting water quality for households, but also some of the impacts resulting from the climatic changes, e.g., reduced food security, decrease in soil fertility and crop productivity, soil erosion/degradation, the decline in livestock, and a decline in forest products.
b) **Non-climatic shocks and stressors:** These are related to human illness or injury of a household member, death of the primary breadwinner, death of a household member(s), job loss, loss of assets, land loss, loss of grazing land, and fire accidents. Inflation was also considered as a covariate shock. Expensive events (weddings, funeral, traditional ceremonies), while not a shock *per se*, were also included as these require additional resources from the household.

The grouping of the above shocks and stressors into climatic and non-climatic, considers both the covariate and idiosyncratic shocks that households have experienced over time and its varied

[7] Being 0= no crisis; 1= minor; 2= moderate; 3= severe.
[8] Warming temperatures are considered an increase in temperature in dryer months compared over a period of 5-10 years.
[9] The findings from this study noted more of the rainfall seasons gradually shifting (shift in seasonality) which affects the planting and harvesting of crops like maize, which is grown more than once within the year in the study communities.

impacts on them. Further, in section F, I also assessed the nature of household responses to these diverse shocks, with a focus on the role of NTFPs as a safety net in such times. The section on responses queried the strategies used by households and the challenges faced when it comes to the use of NTFPs as a safety net. Questions asked in the survey were: Did households consume forest products to meet food needs during months of not having enough food? What were the most used forest products during such months? Did households sell any forest products during the crisis period? Did the sale of such products improve the household situation? Respondents were asked explicitly about food shortages as almost all households were involved in agriculture; this was done as the study needed to assess if households will depend on forest products when crop cultivation is affected due to climate change and other factors.

Table 4.3: Summary of variables used to assess household assets (based on types of capitals) and livelihood activities across households and sites.

Social capital:	
Groups	Number of social groups households are involved in
Decision making and leadership roles	Number of household heads which are part of making decisions in groups
	Informal social relations between households
Human Capital:	
Health status	% of household members who are either healthy or not (and how this affects the ability to work)
Education	% of the educational level of household heads: The levels of education for household heads were classified in the following way: 1=Illiterate or literate without formal schooling, 2= Primary, 3=Secondary/High school, 4= Graduates[10].
Employment status/skills	% of the employment status of household heads: To understand households' employment status/skills, I followed three categories: 1=Employed[11], 2=Self-employed, 3= Unemployed.
Contentment/ well being	Sum rating of household-level of contentment were 1 = Better off; 2 = Worse off; 3 = About average.
Financial capital:	
Savings (approx. of annual savings)	% of household total annual savings in banks and saving clubs. The amounts were ranked 1= 1.8US$-172US$ (1000-99000 CFA), 2=174US$ - above 260US$ (100,000 – above 150,000 CFA), 3= those not saving at all.
Debts (approx. of annual debts)	% of household total annual debts (amounts ranked from 1 – 3, same as in savings)
Access to credit	% of households that have access to credit for farming or self-employment business venture
Household credit schemes (credit source)	Number of credit schemes households use
Physical capital:	
Household items	Number of households with household items worth 17,4US$ (10000 FCFA) and above, e.g., car, phone, bicycle, TV, radio, stove, fridge, generator, fabric, water drums, beds, solar panel.
Agricultural/forest products and business assets	Counts of agricultural tools/equipment used by the household for cultivation, e.g., wheelbarrow, cutlass, hoe, sewing machine, chainsaw, axe, gun/rifle, spraying can.
Natural capital:	
Land	% of households with land ownership and access to land for use
Water resource	% of households using different water sources (rainwater tank, tap on the property, dam, borehole, community tap, river sources
Livelihood activities:	
Agricultural activities	Types of agricultural activities households are involved in and reasons for cultivation
Livestock activities	Types of livestock households keep and for what purpose (i.e., domestic consumptive or commercial)
Forest products (NTFPS)	Types of forest products that households collect, gender of who collects and the purpose of collecting
Household reliance for livelihoods	% of households who rely more on crops, NTFPs, livestock or all three

[10] For graduate levels I considered those in graduate programmes and postgraduates who were enrolled or had completed the course.

[11] For employed, I grouped them into full-time and part-time work as a way of differentiating these categories of persons from those who are self-employed.

4.4.1.1 Data Collection and Administration of Questionnaire

A pilot test for the survey instrument was done in South Africa in Peddie village within the East Cape province of South Africa, in February 2017. Each questionnaire took 45 minutes to an hour per household to administer. Necessary adjustments were made after that for use in Cameroon within the different study sites. In Cameroon, the fieldwork period in both the East and the South West region, during which questionnaires were administered, lasted for three months from June to September 2017.

For the East region, a French translator translated the questionnaires from English to French. Where questionnaires required further translation from French to the Baka language (also called the 'Ubangian' language), the local co-ordinator of an established NGO, *Centre d'Information de Formation d'environnement et le Développement* (CIFED) recommended by IUCN, Yaounde, assisted. The local coordinator supported this study through training a team of enumerators who could speak the Baka language. Since this organisation has experience working with the Baka pygmy communities, obtaining their support reduced the risk of information being lost during translation from Baka into French and English. Administering the questionnaires in either French or the Baka language took between 1 hour 15 minutes to 2 hours 20 minutes per household. A total of three enumerators assisted in administering questionnaires across all the five villages, and quality control was done at the end of each working day.

Regarding quality control, enumerators were trained to note the start time of every interview as well as any challenges they encountered for that day while collecting data. I went through each questionnaire that had been filled alongside the enumerators; raising key points that may need further probing with respondents. This process also allowed the enumerators room to make necessary adjustments to these challenges during the fieldwork.

In the South West region, questionnaires were administered using English for those who could understand but, in most cases, it was done in Pidgin-English (also known as 'broken English'). Given my own experience in speaking Pidgin-English, I was able to train enumerators myself. Administering these questionnaires per household lasted for a period of 45 minutes to an hour. A total of three enumerators assisted me in the Ejagham community. Similar quality control was done as described for the Baka communities. However, it was easier to understand the challenges raised by the enumerators, as I was also part of the process of administering questionnaires and encountered some of these challenges.

Being rural communities, I found it occasionally difficult to meet the household heads (men and women alike) who were mostly involved in long hours/days of work in the farms or forests. Particularly because my fieldwork was during the harvesting season for both crops and forest products across both communities. In such cases, a relative who was above the age of 18 years who lived in that house was interviewed. In some cases, a follow-up was done, and we spoke with the head of the house at their convenience.

4.4.1.2 Analysis of Questionnaire Data

The surveys were collated, and the data captured into an Excel spreadsheet. These data were later coded and entered in SPSS version 21 (Landau & Brian, 2004) and Statistica Version 13 (de Smith, 2018) for mainly descriptive statistical analysis. The frequency of responses to specific questions was compared across regions and gendered household types, going beyond the male and female-headed dichotomies, as explained in Chapter 1. Drawing from the study of Shackleton and colleagues in the East Cape of South Africa (Shackleton et al., 2014), the data were disaggregated by site and then by gendered household types. The three household gender categories considered were male-headed households with an adult female (i.e., the typical family structure), female-only headed households (i.e., widowed, divorced, or single women with only adult females living in the household), and female-headed households with an adult male (widowed, divorced, or single women with an adult son, brother, or other adult males living in the household).

The total number of respondents who were interviewed that came from these household types is shown in Table 4.4.

Table 4.4: Distribution of respondents based on household structure.

Villages in the Baka communities	**Male-headed hh with adult female(s)**	**Female-only headed hh**	**Female-headed hh with adult male(s)**	**Total**
Djalobekoe	12	7	4	**23**
Parny	12	0	1	**13**
Mominkoubou	6	1	2	**9**
Mintom	12	1	1	**14**
Ngola 20	8	3	0	**11**
Total	**50**	**12**	**8**	**70**
Villages in the Ejagham communities	**Male-headed hh with adult female(s)**	**Female-only headed hh**	**Female-headed hh with adult male(s)**	**Total**
Mfuni	44	8	8	**60**
Ossing	29	5	7	**41**
Kembong	52	7	10	**69**
Total	**125**	**20**	**25**	**170**

Henceforth, I refer to the male-headed households with an adult female as “male-headed households”, female-headed households with an adult male as “female-headed households with a male presence” and to female-headed only households as “female-headed households”. These different gender categories were considered as a way of identifying and exploring any possible hidden gender inequalities that might exist between households, how these might affect livelihood strategies, access to assets which could affect their response strategies to climatic shocks.

4.4.2 Focus Group Discussions

For the collection of qualitative data, I made use of focus group discussions and organised one workshop per region. In the Ejagham communities, I conducted one focus group discussion where the selected participants (12) were brought together in Mfuni village. In the Baka communities, participants (8) were all brought together in Ngola 20 village due to road accessibility (see Table 4.5). Participants from the four other villages were transported to this village and where needed, transports costs were reimbursed.

For the focus group discussions men and women were placed in separate groups to identify different types of natural capital and their importance. The types of livelihood activities that household members engaged in were also discussed. Moser's Framework was applied, and participants were able to come up with distinct roles and activities for both men and women. Each group was later asked to discuss how that activity was done, alongside their daily chores within 24 hours following their daily routine. The exercises were meant to explore gendered division of labour following the triple roles (i.e., productive, community, and reproductive activities) as discussed in Moser’s Framework and how household livelihoods could be affected based on the kind activities men and women may perform. The discussion also encompassed access to various assets and resources, focusing on resource allocation across gender, as explained by the Harvard Analytical Framework. The focus group discussions often lasted for over two to three hours with occasional breaks. Participants were able to narrate their lived experiences through storytelling and structured discussions on livelihoods within the context of this study (Acaps, 2012; Moser & Korstjens, 2018).

For the participatory exercises concerning shocks and stressors, I asked participants in their various groups to identify recurrent shocks such as storms, and lower rainfall, and discussed how this has affected them in terms of crop cultivation or obtaining forest products. Participants in the Baka communities explained what their seasonal calendar patterns look like at present, i.e., in the last ≤5years; I compared this to the data presented in work done by Tsuru (1998)

within the same region in the 1990s (Table 6.2). Participants also crafted seasonal calendars for crop cultivation, identifying how this had gradually changed over the past years (e.g., Table 6.3). We also explored how different shocks could affect households differently based on the types of capital available to them. In exploring the multiple shocks that had affected households over time, participants were further put into age groups[12] to share their experiences related to key climatic and non-climatic shocks and stressors. Discussions focused on experiences related to landscape changes, the decline in forest products, and decreasing crop productivity. Their responses allowed the study to note the differential impacts of shocks and stressors on households.

Participants were asked to reflect on what these changes meant for future livelihoods and to think of the possibility of maladaptation if land and forest resources are not well used. The concept of maladaptation was discussed using simple questions such as 'in the event of an acute crisis (hardship, unemployment, reduced crop yields, etc.), how would households respond when their options are limited to the use of forest products'. Also explored were any considerations on how these products were being harvested, especially regarding the future availability of these products, i.e., if they would want to have the same products for generations to come.

I purposively selected participants for the workshops based on household types (i.e., to ensure all three household categories were represented) and age group (i.e., elderly male and female, young male, and female)[13] (See Table 4.5).

I selected these participants based on the information they had given during the questionnaire data collection or based on information the local authorities had given me. Eight participants were selected for the focus group workshop in the Baka communities (East region) and twelve for the Ejagham communities (South West region).

[12] The discussion from participants grouped according to age were based on previous studies done in Cameroon by Porro et al. (2001) showing the degree to which the grandparents' generation is seen as 'hogging all the benefits' to resources.

[13] Participants within the age group of 18 years to 40 years were placed within the category of young (male or female) during the focus group discussions while 41 years and above 70 years were considered in the old category.

Table 4.5: Distribution of participants for focus group discussions

Villages in the Baka communities	**Male-headed hh with adult female(s)**	**Female-only headed hh**	**female-headed hh with adult male(s)**	**Total**
Djalobekoe	1 (elderly)	1 (young)	0	**2**
Parny	1 (young)	0	1 (young)	**2**
Mominkoubou	1 (elderly)	0	0	**1**
Mintom	1 (young)	0	0	**1**
Ngola 20	1 (young)	1 (elderly)	0	**2**
Total	**5**	**2**	**1**	**8**
Villages in the Ejagham	**Male-headed hh with adult female(s)**	**Female-only headed hh**	**female-headed hh with adult male(s)**	**Total**
Mfuni	4 = (3 young), 1 (elderly)	0	1 (elderly)	**5**
Ossing	2= (1 elderly), 1 (young)	1 (young)	0	**3**
Kembong	3= (1 young), two elderly)	1 (young)	0	**4**
Total	**9**	**2**	**1**	**12**

The disparity in participation of men and women in the focus group discussions was based on their availability. It was easier for men to attend as women often turned down attending based on their commitment to other activities. In some villages, where women had confirmed their attendance, they later withdrew before the workshop and men, who were willing to share their experiences, came to attend instead. However, for the women who attended, having segregated groups for discussions allowed them to voice their challenges without intimidation.

The audio data from the focus group discussions were transcribed and entered in NVivo 11 (Bazeley & Jackson, 2013). Thematic analysis was done, and emerging themes such as culture, vulnerability, safety nets, and forest resources allowed me to make sense of what participants were saying, how their ideas differed, as well as any emerging perspectives that provided alternative ways of understanding the concepts for my study. Direct quotes captured the voices of respondents without any alterations. Additionally, I was able to collect memos for my journal reflections which helped me understand and reflect on existing literature.

4.4.3 Key Informant Interviews

Semi-structured key informant interviews, also known as in-depth interviews, were used to allow selected participants to explain what could not be captured in the questionnaires (Moser & Korstjens, 2018). Key informant interviews were done for both the East and South West regions, respectively. I selected participants using a purpose sampling technique, based on my judgment regarding which potential participants would be most informative (i.e. after Moser

& Korstjens, 2018). In total, nine participants were involved in the in-depth interviews with five from the East region and four from the South West region. I also interviewed quarter heads[14] and local state actors (municipal counsellors). The quarter heads (also known as quarter chiefs) that were interviewed bridged the gap between the local chiefs and the population, and as a result, they provided the necessary connection across the decision-making hierarchy, providing further insight on responses from both household interviews and those with local chiefs in the communities.

The average time for each key-informant interview was 45 minutes and participants were interviewed in different locations, some being at their homes, at the town halls or their job sites. The central themes that were covered during these interviews were: land rights, decision making, NTFP availability and collection, coping responses to climatic and non-climatic stressors, gender roles, and social networks. All these central themes unpacked the gender dynamics of provisioning ecosystem services used, in terms of reliance and dependence by households in the face of a changing climate. The data collected from the in-depth interviews were entered and transcribed in NVivo software, identifying nodes that could be identified into themes.

4.4.4 Participant Observation and Critical Reflection

Observation of participants and situations during each data collection phase helped me to reflect on the key concepts and themes for my study. Using a reflective journal brought out my thoughts as a researcher and what the discussions and observations meant for my work. These critical reflections helped me understand existing literature related to my research, and my results, as well as with the lived experiences of households. I was able to live in the villages I worked in (especially in the Ejagham communities), which presented an opportunity to attend market events, meetings, and spend time with a few households during the harvesting of some NTFP products. The evenings were often spent with families who narrated their experiences about what has changed over time and provided me with an opportunity to talk and raise questions that I would not have covered during the limited time I had administering questionnaires.

[14] Quarter heads here refer to people in positions elected by a council of elders in the villages. Their role is to ensure the smooth running of their different quarters and report back to the chief, while also taking decisions made by the local village council to their respective areas. In some instances, they are sub-chiefs, and the villagers report first to them and wait for them to react in terms of handing down decisions.
However, the functioning of quarter heads was more common in the South West region as it was easier to interview the chiefs directly in the East regions.

The value of participant observation has been stressed in the literature and is the central methodology used by anthropologists (Klink et al., 2019; Balsiger & Lambelet, 2014; Kawulich, 2005). For my research, I was able to gain the authority of 'insider knowledge', as well as being able to report on what matters in terms of culture and why the study communities are likely to respond differently to shocks (e.g. Jorgensen, 2015). I therefore built from the strengths of being a participant observer and explored local practices, value systems and what constitutes the livelihoods of people in both communities (Hammer et al., 2017), which placed me as less of an outsider and allowed me to be more involved in the everyday life of the communities.

4.5 ETHICAL CONSIDERATIONS

The research was done following the Rhodes University Ethical Standards guidelines and was started only after the Department of Environmental Science's Ethical Committee approved (Project no: ES 17/1). This research received signed approval from the relevant authorities who were the local chiefs in all the villages. Consent forms were obtained, as well as non-verbal consent from all the participants indicating their willingness to be part of the research (see Appendix 2).

Ethical principles were strictly respected as the rights to privacy, confidentiality, and anonymity of all participants were ensured, while being sure they were not at risk at any given time during the work (Steneck, 2012). Participant names were changed for both the focus group workshops and in-depth interviews. I carried out the surveys when respondents felt the most comfortable and not under pressure from any other member in the household; this allowed the study to have some level of transparency in gaining trust, mutual respect and fairness (Morris, 2015).

4.6 ASSUMPTIONS AND LIMITATIONS

In designing this research, I was aware of the likelihood of encountering some difficulties in gaining access into the Baka pygmy communities based on past studies that have termed them ‘reserved’ (Permunta, 2013). A principal constraint was using the snowball sampling to select participants, as I needed to ensure those selected were the Baka within the East region considering that some of the communities have Bantus who have settled and live together with the Baka people. However, working with a research facilitator who was a resident, and coordinating with an NGO based in that region, allowed me to overcome this constraint. Additionally, in contrast to the observations from the literature, I found the pygmy communities

enormously welcoming and hospitable; the constant hospitality from respondents either through food or smiles I got from them was not the preconceived perception I had gone in with.

It was difficult to get respondents to sign or to attest to having answered the surveys for fear of signing a political document. In this regard, given that the country was gradually moving into many electoral processes in 2018 (municipal, senatorial, parliamentary, and presidential elections), I had to continually affirm the study was in no way related to the government and had no political affiliations. Again, the participation of local government officials across both sites during workshops was limited, as many of them indicated their presence would give any insights shared a political connotation. I ended up meeting the government officials individually to discuss the purpose of my work, and it turned out well, as their responses and feedback provided more clarity to relevant questions.

Similarly, household survey questions requesting income of household heads was met with fierce opposition with most respondents unwilling to state the actual amount. As such, I used approximations of what they earned; thus, the amounts that will be discussed in this work are approximations and not the actual amounts of income flowing into households. In going with approximations, the resultant limitation here is that it may tend to reduce household income to broad categories, and this may not be a true reflection of income earned within households.

Furthermore, my time in the field was often constrained by the 'Monday Ghost Town days' in the South West regions and impacted my work within the Ejagham communities. This day had been traditionally imposed by separatist fighters in 2016 as a way of rebelling against the government of Cameroon regarding poor treatment of English-speaking Cameroonians. I negotiated this by planning travels, meetings, workshops, and interviews on every day except on Mondays. As a team, quality control of questionnaires, planning, and training with enumerators for the week was done on Mondays. It was also a day to spend time walking around the villages and making time to talk with people who were willing to share additional knowledge on what my research was addressing.

The period of conducting fieldwork as earlier mentioned was from June to September, which coincides with the rainy season in Cameroon. One of the major challenges I encountered within both study sides was the difficulties in penetrating the villages due to the nature of the terrain. In the Baka communities, the team often walked on foot along bush paths to get to where the people were located. In the Ejagham communities, the roads leading from one village to another were very inaccessible and made the fieldwork experience quite an intense one.

PART II: INSIGHTS FROM THE FIELD | EMPIRICAL CHAPTERS

CHAPTER FIVE

VULNERABILITY: CULTURAL AND GENDERED DIFFERENTIATION IN HOUSEHOLD ASSETS AND LIVELIHOOD ACTIVITIES

"Our livelihood is intimately tied to the food we eat, the water we drink, and the places where we recreate. That is why we have to promote responsibility and conservation when it comes to our natural resources"- Mark Udall.

This woman had just returned from the forest and harvested *Irvingia gabonensis (*Bush mango). It is one of the NTFPs she collects - like many other households - and sells to raise income for her house. She also uses it as a condiment when preparing food, and her livelihood surrounds the use of this and many other NTFPs. She hopes the forest does not fail them in the future so that they can continue to rely on the Bush mango. Photo credit: Eyan Johnson. O.

5.1. CHAPTER OVERVIEW

This chapter provides the results and discussion for objective one of this thesis. The objective of this chapter is to examine cultural and gendered differentiation in household assets and livelihood activities, and consequences for adaptive capacity and vulnerability to climate change. This is done by addressing the following research questions:

- How do livelihood assets differ across the different household types and sites, and what does this mean for adaptive capacity and levels of vulnerability?
- What are the different livelihood activities practised by different household types and sites, and what do these mean for vulnerability to multiple shocks and stressors?

I explore what might leave households across sites vulnerable, when affected by multiple shocks and stressors. I start with a brief contextual background on the importance of livelihood assets for understanding the adaptive capacity and vulnerability of households across different cultural communities and household types (section 5.2). Following that, I present my results and then discuss these results with regard to the challenges households might face when

adapting to climate and non-climatic shocks and stressors. This chapter lays the foundation for Chapter 7 by unpacking the available assets that different types of households, across the two culturally different communities, would rely on when coping with and adapting to multiple stressors.

5.2. BACKGROUND CONTEXT

Climate change and interacting with other non-climatic shocks and stressors, can have severe impacts on households and communities and increase their vulnerability, especially amongst those whose livelihoods are centred around land and ecosystem services (Chapter 1, section 1.2.1; Sujakhu et al., 2019; Collard et al., 2018). Several studies have highlighted that in order to understand human vulnerability (Chapter 2) as well as identify who is most vulnerable to climate and non-climatic shocks and stressors, the links between livelihood assets and activities need to be explored from a gendered perspective (Alam, 2017; Wei et al., 2016). This is importance as it reflects and amplifies gender differentiation in structures of asset ownership (Chapter 2, section 2.2.3), while providing space to explore the conditions that impede people from accessing and owning assets needed to improve livelihoods (Chapter 2, section 2.2.2.1; Masika & Joekes, 1996; Shahbaz et al., 2015).

Livelihood assets act as influential 'internal factors' in household and individual choices and decision-making, especially in terms of how to respond to shocks or stressors as discussed in Chapter 2, section 2.2.4 and Pour et al. (2018). However, a household's access to assets and their ability to fully utilise their livelihood assets, especially when they need to adjust to social-ecological changes, is mediated by a range of internal and external factors such as gender, ethnicity, local institutions and norms and government policy, amongst others (Chapter 2, section 2.2.4; Cardona et al., 2012). Just as household assets shape adaptive capacity, different types of livelihood activities may be more sensitive when exposed to shocks and stressors than others. For example, farming households may be more sensitive to temperature and rainfall changes than a household dependent on the gathering of forest products for their livelihoods. How much a community or household can improve their adaptive capacity, reduce vulnerability and respond to shocks and stressors will thus be influenced by the assets they have access to and the kind of livelihood activities they engage in (Shackleton & Shackleton, 2012).

The concept of 'livelihoods' is a useful boundary term for bringing together several diverse elements that influence how people and their households are vulnerable to change, as acknowledged in Chapter 2 (Scoones, 2009). These elements include, for example, the

relationship between assets and adaptive capacity, as well as how livelihood activities can shape exposure and sensitivity to shocks and stressors (Goldman & Riosmena, 2013; Gallopín, 2007).

The linkages between livelihoods assets, adaptive capacity and vulnerability have, time and again, provided insights into the way complex rural livelihoods intersect with cultural, economic, political, and environmental processes (Figure 2.3; Farrington et al., 2002). This chapter adds knowledge to the understanding of the vulnerability of households in two ethnically and culturally diverse groups, the Baka and Ejagham communities, through a gendered-differentiated analysis of household assets, livelihood activities and what the results mean for their ability to respond to climate change and other shocks and stressors. The two communities traditionally belong to different cultural orientations as they represent a hunter-gatherer community (more of forest-dwelling) and an agricultural community (crop cultivation) respectively (see Table 5.1; Chapter 3, section 3.2.3 & 3.3.2). As a result, one would anticipate them to be vulnerable in different ways. I consider this in this chapter.

Table 5.1: Selected traditional characteristics of the Baka and Ejagham communities

Characteristics	**Communities**	
	Baka pygmy (East region)	**Ejagham (South West region)**
Traditional livelihood strategy	Hunting and gathering	Crop cultivation
Contemporary livelihood strategies	Forest products (NTFPs and hunting), fishing, livestock farming, wage labour, crop cultivation, etc.	Trading, transportation business, agriculture, livestock farming, harvesting of forest resources, etc.
Cultural values	People of the forest and dependent on the use of medicinal plants and NTFPs. Mostly practice a nomadic lifestyle	Tied to being agricultural peoples Mostly practice a sedentary lifestyle

5.3. RESULTS – ASSETS

5.3.1. Human Capital: Educational Level, Employment Status and Health Circumstances

Similar proportions (50%) of household heads in both the Baka and the Ejagham communities have similar levels of primary education. However, Baka households displayed a higher number of household heads who were either illiterate or literate without formal education, with this most apparent in female-headed households with a male presence (62.5%). In both communities, female-headed households (female only and female with males) appear to demonstrate higher levels of illiteracy and have less formal education. Households in the Ejagham communities by far outnumber the Baka regarding secondary and tertiary levels of education (Table 5.2).

Table 5.2: Different measures of human capital across household types in the Baka and Ejagham communities

	Ejagham communities (n = 170)			**Baka communities (n = 70)**		
	Male[15] with female (n=125)	**Female only (n=20)**	**Female with male (n=25)**	**Male with female (n=50)**	**Female only (n=12)**	**Female with male (n=8)**
Household heads' level of education across communities (%)						
Illiterate or literate without formal education	3.2	30.0	36.0	32.0	33.3	62.5
Primary	58.4	30.0	52.0	56.0	50.0	37.5
Secondary and high school	34.4	40.0	8.0	12.0	16.7	0.0
Graduate	4.0	0.0	4.0	0.0	0.0	0.0
Employment status of household heads across communities (%)						
Employed full time/part-time	6.4	5.0	8.0	2.0	0.0	0.0
Self-employed	89.6	85.0	92.0	98.2	100.0	100.0
Unemployed	4.0	10.0	0.0	0.0	0.0	0.0
Sicknesses of household members across communities (%)						
Chronically ill or injured person (s) in the house	24.0	15.0	28.0	76.0	83.3	62.5
The sickness of a household member affects the ability to work	17.6	20.0	24.0	78.0	75.0	62.5
State of wellbeing and contentment of households across communities compared to ten years ago (%)						
Better off	36.0	20.0	20.0	50.0	25.0	25.0
Worse off	8.8	30.0	16.0	18.0	33.3	50.0
Fairly the same	55.2	50.0	64.0	32.0	41.7	25.0

[15] There were also male only households across both study communities. However, this category was collapsed and combined with male-headed households with an adult female because it was very small.

An excerpt from an in-depth interview below captures the unique challenges people in the Baka communities face daily regarding education:

"We feel betrayed by the government. Look everywhere around you and tell me how many schools you see? I cannot leave my child to go far away just to school when I am not sure of how he will be coping. Why should others have schools in their villages and with us we must push ours away. They should join me in the forest."

Regarding employment status, households across both communities are predominantly self-employed. For the Baka households "employment by others" is rare (2%), with only household heads from male-headed households having waged employment. In an interview with the local chief from one of the Baka communities, he indicated that the exploitative nature in which his people are subjected to work makes it hard for them to continue working, even on a part-time basis. Here is what he had to say:

"My people work under terrible conditions which they cannot even use their wages to provide for their families. Some are taken as 'private properties' for their masters, and so they work for almost nothing. This is not how others are treated, so I will instead encourage them to move into agriculture and cultivate cocoa or coffee than work under such severe conditions."

Picture 5.1: **A female head of house splitting Bush mango (Irvingia gabonensis) after collecting from the forest. Photo credit: Ojong Enokenwa.**

In a focus group discussion within the Ejagham communities, participants elaborated on the causes of unemployment in their communities (**Box 1**). People's perceptions around jobs in their area, as well as formal and informal skills needed to secure meaningful employment, were some of the reasons indicated.

BOX 1: EMPLOYMENT COMPLEXITIES IN THE EJAGHAM COMMUNITIES

The Ejagham communities noted that in the past, they were able to quickly secure jobs without necessarily having to move to bigger cities. Some participants from Ossing and Kembong villages shared their past experiences on how full-time jobs were easily secured in the past via the Marketing Boards (these were like 'Cooperative Societies' and existed in most communities) as this quote illustrates:

"I used to work in the warehouses for the Cocoa Marketing Board... there were others for coffee and plantain… we were well paid, especially as many buyers flocked in from neighbouring countries like Nigeria… all of these Boards and warehouses have unfortunately been closed since the 1980s, and we became jobless."

Another man (male-headed household) explained that they have the right certificate but were still unable to secure jobs.

"We were told to get educated and employed by the government which we did and have certificates, yet no jobs… where do we even get money to start our businesses?".

Possibly, others have similar challenges that leave household heads unemployed. One female-head of the house (a divorced woman) from Mfuni village also expressed her worries in securing a job, which would require her to move to the bigger towns:

"I have certificates, but never got to use them as I got married and depended on my husband for income… now, I am divorced and have my kids and other family members to support… I cannot leave them to go and get a job in the bigger towns… I will have to learn a new skill and focus on supporting my family from the village… it is hard, but it is what I have to do."

In contrast to these shared experiences, I spoke to a farmer who indicated that being the breadwinner of his family, he had to think not just in line with formal employment as this proves to be difficult. Instead, he says it is profitable to create a job for yourself:

"I have accepted the fact that jobs are scarce and the land for cultivation is also failing us… However, I have decided to do weavings of mats, caps, and other things and sell to people here in my community… it is far more beneficial to do your own than rely on employment from another, especially as jobs are scarce."

While unemployment was absent from the households sampled in the Baka communities, who are still mainly involved in subsistence activities (regarded as 'self-employed' in this study), this was not the case in the Ejagham communities. Here, unemployment, especially within the female-only headed households was at 10% and as described in **Box 1**.

There were more chronically ill or injured persons within households in the Baka communities, especially within the female-only headed households (83.3%). In contrast, in the Ejagham communities, chronically ill persons were lowest within the female-only headed households

(15%), with most of those ill residing within households with a male presence. Illness of household members greatly affected households in the Baka communities at least three times more than those in the Ejagham communities, and in all households, irrespective of the community, the sickness of household members was found to affect their ability to work.

A conversation with a widow from the Baka communities indicated that households are confronted with exposure to different types of diseases such as malaria, cholera and, pneumonia:

"We are faced with many diseases that leave our husbands and children sick… not even us are spared from this. Our biggest problem is that we must spend most of our time supporting and caring for them. In some cases, they still die, and we are expected to carry on with all the responsibilities."

My observations while in the Baka communities showed that most of the households had poor sanitary conditions, especially for their toilets, with considerable standing water around the communities, explaining why there may be diseases like malaria and cholera in the communities. For example, in one visit to a household in Parny village, I noticed the deplorable condition of the toilets used, and this was common in almost all the houses. I was even told it is common for young children to slip and fall in the very shallow latrines with some not surviving and others coming out with wounds or other acquired diseases.

Picture 5.2: Toilet facility used by a household. Photo credit: Ojong Enokenwa.

In light of the general household conditions, male household heads in both communities indicated the state of their households were better today than in the past and this was particularly so for those in the Baka communities (50%). In contrast, female-headed households in both communities confirmed their households seem worse off than previously with female-headed households with a male presence in the Baka seeming to be much worse

off (50%) than any other household type. The above quotes from in-depth interviews and focus group discussions, as well as the results in Chapter 6 provide reasons for the seemingly worsening situation.

5.3.2. Social Capital: Social Groups and Household Heads in Leadership Positions

There are four main groups that heads of households belong to, with some belonging to more than one, and others not belonging to any of these groups. The four groups are i) farming, NTFP collection groups and hunting groups ii) recreational/social groups iii) development initiative groups, and iv) saving societies.

Table 5.3: Different measures of social capital across household types in the Baka and Ejagham communities

	Ejagham communities (n = 170)			**Baka communities (n = 70)**		
	Male with female (n=125)	**Female only (n=20)**	**Female with male (n=25)**	**Male with female (n=50)**	**Female only (n=12)**	**Female with male (n=8)**
Different groups household heads are involved in across communities (%)						
Groups related to farming, NTFP collection and hunting activities.	16.8	5.0	20.0	26.0	33.3	12.5
Recreational/Social groups	21.6	15.0	16.0	28.0	8.3	12.5
Development initiative group	4.0	0.0	0.0	0.0	0.0	0.0
Saving societies	48.8	75.0	64.0	30.0	50.0	50.0
Not in any group	8.8	5.0	0.0	16.0	8.3	25.0
Household heads part of a leadership position in a group (%)						
Have a decision-making position in a group	45.6	20.0	36.0	34.0	33.3	25.0

Generally, more household heads across all household types are involved in saving societies in both communities than other social groups, with this most apparent for female heads of the house. More male heads of the house are found within recreational/social groups than female heads of households across both communities. Although both communities indicate similar levels of involvement in farming and NTFP groups, more female-only heads of house in the Baka communities (33.3%) belong to groups related to farming and NTFP activities, with only 5% from the Ejagham communities in the same group.

Several reasons were gathered from in-depth interviews and focus group discussions regarding why household heads will choose to be involved in more than one group and the benefits and challenges that come with being involved in such groups (**Box 2)**.

BOX 2: EXPLORING SOCIAL GROUPS IN THE BAKA COMMUNITIES

The Baka communities are traditionally known to be a hunter-gatherer society. They are known for their involvement in hunting animals which over the years has been greatly affected by deforestation. In a discussion I had with one of the chiefs, he clearly explained that there were various groups that people become members of, and these are not limited to hunting groups.

"People are not forced to join only the hunting groups… this group is mostly for men and as time passes, people are gradually cultivating food crops… this too has pushed them to create farming societies to assist one another in clearing and planting. But several other groups like church, ritual, and dance groups, are amongst other groups people are part of".

Though individuals are picking interest in joining groups, the saving societies seem to be a new idea that is being accepted by households. Talking to a man from a male-headed household, he explained how, after travelling to other towns, he realised saving schemes seem to be one of the ways villagers support one another, especially during death ceremonies.

" In my group, I encourage young men to join so they can put aside a bit of money as savings and use to buy seedlings for cocoa, provide for their house and use during burials and other ceremonies… I even encourage people to form small groups within their quarters… especially as this practice is gradually dying".

Several challenges were, however, noted when it comes to belonging to more than one group, such as financial responsibility and time to be an active member.

In the Ejagham communities, some interviewees explained what it means to belong to a social group. A widow throws light on why they would want to belong to a social group:

"We need to feed our children, care for our parents who are old and other family members. If we do not engage in these groups and save money, it becomes very difficult to cope especially for me whose husband is no more. These groups also support us in whatever way possible especially when one loses a family member".

Regarding being part of leadership within social groups, more male heads of the household in the Baka (34%) were in decision-making positions as well as 45.6% of male heads of the household in the Ejagham communities than female heads.

5.3.3. Financial Capital: Savings, Debts, and Credit Situations of Households

Households generally rely on informal savings institutions[16] for saving. Informal savings institutions are commonly known as *'njangi'* or *'tontin'* groups. There were relatively few households who had savings in formal financial institutions, especially within households in the Baka communities (Table 5.4), and even then, more households in the Ejagham communities were likely to save money in informal financial institutions compared to the Baka communities. Across both sites, the majority who saved in these institutions were within the female-headed households with an adult male - 68% and 25% in the Ejagham and Baka respectively (see Table 5.5).

Of those able to save, probing into the amount households were able to save in informal institutions, this varied widely in the Ejagham communities from 1.8US$-172US$ annually. Overall, many of the households confirmed not being able to save money in either formal or informal financial institutions, especially households in the Baka communities.

In the Baka communities, several reasons accounted for the low savings in formal financial institutions, one of which was the absence of banks and other structures within and around their villages. In one of my interviews conducted with a male household head, he presented the different challenges that hinder the Baka from using banks:

"Exactly! Here in my village, I don't know of any who does that except me. I cannot blame them. The bank will tell you, to open an account you need 30000 to 50000frs (between 52$ to 87$). Who can afford that? Besides, you need to pay transport right to Yokadouma just to open an account and always travel there to save".

[16] Informal saving institutions as stated here are the same as saving societies. However, not all members of the saving societies make contributions towards savings (in cash). Some members, therefore, join just for the contributions and support they will get such as support during farming activities, burial and other ceremonies from members in their groups. Explaining why the percentages for members in saving societies do not correspond to the percentage of members who save.

Table 5.4: Financial capital across household types in the Baka and Ejagham communities

	Ejagham communities (n = 170)			Baka communities (n = 70)		
	Male with female (n=125)	Female only (n=20)	Female with male (n=25)	Male with female (n=50)	Female only (n=12)	Female with male (n=8)
Saving in financial institutions by households (%)						
Saving money in formal financial institutions	16.0	15.0	4.0	2.0	0.0	0.0
Saving money in informal financial institutions	57.6	45.0	68.0	16.0	16.7	25.0
Amount saved in informal financial institutions (saving societies) (%)						
1 - 99frs** (1.8 – 172$)	38.4	30.0	44.0	12.0	16.7	12.5
100– >150frs (174– >260$)	19.2	15.0	24.0	4.0	0.0	12.5
Not saving	42.4	55.0	32.0	84.0	83.3	75.0
Debt situations of households (%)						
Households owing money	33.6	50.0	48.0	44.0	58.3	62.5
Amount owed by households (%)						
1 - 99frs** (1.8 – 172$)	24.8	40.0	40.0	42.0	50.0	62.5
100– >150frs (174– >260$)	8.8	10.0	8.0	2.0	8.3	0.0
Not owing	66.4	50.0	52.0	56.0	41.7	37.5
Credit sources used by households (%)						
Neighbour(s) / Friend(s)	15.2	15.0	4.0	22.0	8.3	12.5
Loan sharks	3.2	5.0	0.0	4.0	0.0	0.0
Saving societies	54.4	35.0	52.0	16.0	16.7	25.0
Bank/credit unions	3.2	10.0	8.0	2.0	0.0	0.0
Family	1.6	0.0	0.0	0.0	16.7	0.0
Other(s)	0.8	0.0	0.0	28.0	25.0	12.5
No access to credit	21.6	35.0	36.0	28.0	33.3	50.0

**** Amount in FCFA is in thousand (000). So, 1 – 99 FCFA represent (1000 – 99000frs) saved or owed over an annual period.**

Concerning debts, 62% of female-headed households in the Baka communities had more debt compared to 40% of those in the Ejagham communities. Though the amount owed varied across households, for those with existing debt, it was rarely >172$.

The findings suggest that households across both communities get most of their credit from saving societies, sourcing credit for different reasons but most notably to carry out agriculture or business activities, as shown from in-depth interviews. Baka households tend to rely on credit obtained from 'other sources', to a greater extent than the Ejagham, with this the case for about 28% of male heads of the house. The in-depth interviews revealed that these other sources are mostly buyers of their forest products (Bush mango, bush meat, bitter kola, wild yams, and wild honey) or cash crops (cocoa and coffee cultivation), who provide them with

pre-harvest advances. Respondents confirmed that their buyers advanced them money as loans and when their products are available, buyers collected based on the amount they had loaned to them. Very few household heads accessed credit through family members in either community, except for 16.7% of female-only household heads in the Baka communities, who confirmed they got credit from family members.

5.3.4. Physical Capital: Household Items and Agricultural/NTFP Equipment Owned by Households

The results in Table 5.6 show that in general, households in the Ejagham communities have more household items than households in the Baka communities. While most households in the Ejagham communities owned water drums, phones and TV sets, households in the Baka communities had more radios and solar panels, arguably because of their more remote forest living. Additionally, more female-only headed households in the Baka communities had expensive items such as solar panels (50%) and generators (25%) than those in the Ejagham communities (5% and 0%) respectively. Besides motorcycles (49.6% and 10%) and radios (48% and 58%) across the Ejagham and Baka communities respectively, male-headed households owned fewer of the listed household items, compared to female-headed households.

In the Baka communities, slightly more households owned sewing machines, especially among female-only headed households (16.7%), compared to households in the Ejagham communities (10% for female-headed households), although this difference was a small number of households given the sample size differences. Fabrics owned by household heads for personal use and sale (transformed into sewn dresses) were more common in the Ejagham communities, especially in female-only households (65%), than in the Baka communities. Most households in the Ejagham communities had beds in their homes, but less than half of the respondents across all households in the Baka communities owned beds (Table 5.5).

Table 5.5:Physical capital across household types in the Baka and Ejagham communities

	Ejagham communities (n = 170)			Baka communities (n = 70)		
	Male with female (n=125)	Female only (n=20)	Female with male (n=25)	Male with female (n=50)	Female only (n=12)	Female with male (n=8)
Household items owned by households (%)						
Motorcycle	49.6	5.0	24.0	10.0	0.0	0.0
Bicycle	5.6	0.0	0.0	8.0	0.0	0.0
Phone	86.4	55.0	68.0	22.0	16.7	50.0
TV set	68.0	50.0	60.0	8.0	25.0	25.0
Radio	48.0	30.0	24.0	58.0	41.7	37.5
Generator	13.6	0.0	4.0	0.0	25.0	12.5
Water drums	47.2	45.0	64.0	16.0	25.0	25.0
Fabrics	51.2	65.0	56.0	0.0	25.0	0.0
Bed	99.2	100.0	100.0	28.0	33.3	25.0
Solar panel	9.6	5.0	12.0	10.0	50.0	12.5
Sewing machine	7.2	10.0	0.0	8.0	16.7	12.5
Agricultural /NTFP equipment owned by households (%)						
Cutlass	98.4	100.0	96.0	98.0	83.3	100.0
Hoe	99.2	100.0	96.0	76.0	91.7	100.0
Chainsaw	3.2	0.0	0.0	2.0	0.0	0.0
Axe	80.8	65.0	80.0	38.0	25.0	50.0
Wheelbarrow	16.8	10.0	8.0	4.0	16.7	0.0
Short gun/rifle	1.6	0.0	0.0	6.0	0.0	12.5
Spraying can	22.4	5.0	0.0	4.0	8.3	0.0

Regarding items used for agriculture and the collection of NTFPs, cutlass and hoes were owned by most households in both communities. However, very few households owned chainsaws, and this was only within the male-headed households in both the Baka (2%) and Ejagham (3.2%) communities. The ownership of axes featured far more in the Ejagham communities than in the Baka communities. More Baka households owned rifles, particularly within the male-headed households (6%) and one female-headed household with an adult male (12.5%) than the Ejagham communities. Other items like wheelbarrows were common within female-only headed households (16.7%) in the Baka communities, and spraying cans were relatively higher within male-headed households (22.4%) in the Ejagham communities, compared to the Baka communities.

5.3.5. Natural Capital: Land and Water Resource use by Households

Across both communities, female-headed households had less ownership over land as compared to male-headed households. While about 40% of female heads of the house confirmed owning land in the Ejagham communities, just half that number (25%) confirmed this in the Baka communities. In both communities, fewer female-only headed households owned land: 20% and 33.3% across the Ejagham and the Baka, respectively (Table 5.6).

Table 5.6: Natural capital across household types in the Baka and Ejagham communities

	Ejagham communities (n = 170)			**Baka communities (n = 70)**		
	Male with female (n=125)	**Female only (n=20)**	**Female with male (n=25)**	**Male with female (n=50)**	**Female only (n=12)**	**Female with male (n=8)**
Land ownership/access by households (%)						
Households with ownership of land	76.0	20.0	40.0	68.0	33.3	25.0
Households with access to land	61.6	95.0	88.0	54.0	75.0	75.0
Available water sources for household use (%)						
Rainwater	0.8	0.0	4.0	0.0	0.0	0.0
Tap on property	13.6	5.0	16.0	0.0	0.0	0.0
Borehole	36.8	45.0	36.0	20.0	16.7	12.5
Community tap	10.4	10.0	12.0	4.0	0.0	12.5
Rivers	14.4	20.0	8.0	26.0	33.3	25.0
Other sources	24.0	20.0	24.0	50.0	50.0	50.0

In a focus group discussion I had in the Baka communities, several respondents explained that land ownership and access is not something they originally paid much attention to, as they felt it essential to allow people in your community to harvest forest products wherever they can. One of the respondents from a male-headed household had this to say:

"Land and the forest are given to us free of charge… We are expected to allow as many people into that space, especially for cultural reasons… why would I become selfish to the extent that I say here is my land..."

Another view presented by a Baka female-head of household showed that the whole practice of considering land as a shared resource is gradually fading as many protect their spaces either as a family or an individual.

"People now turn to secure land for themselves or families… I know it is becoming difficult just to harvest the products you see there. In my case, once I left my husband, I did not have access to his land again."

In the Ejagham communities, a respondent from a polygamous home explained what it means to be a woman and have ownership and control over a piece of land as captured in **Box 3.**

BOX 3: LAND OWNERSHIP AND ACCESS IN THE EJAGHAM COMMUNITIES

The issue of land as raised by many has created several conflicts over the years as families and individuals try to secure large portions of land for themselves. As an agricultural community, the slash and burn practice often makes people seek more farmlands to enable them to rotate with crop cultivation. A woman from a male-headed household explains:

"I will say I have no ownership over any piece of land. Some women will pretend to say they own land, but when you ask for their title deed, they will have none to show you. I will keep saying it as it is. I do not have any title deed over any land, and you know my heart on this issue. If I cannot own land, I will fight for my daughters to own one so that they do not suffer like us tomorrow".

She further highlights the plight of other women who are widows and single mothers. When I asked her how difficult it was for women to either own or access land, she had this to say:

"It is complicated for women to own land. The thing is from when we were growing, our mothers did not see it good to challenge a man and say if you have title deed, I also need to have… I would say widows and women who remarry suffer more than any other woman about this land issue. Why do I say so? Imagine a woman whose husband dies; she will have to wait for months or sometimes even years for the husband's brothers or uncles to decide what to give her as a share of her late husband's land before she can continue to farm. No one thinks she needs to feed her children in the time she waits".

In terms of water availability, no households in the Baka communities indicated using water from taps within their property. In the Ejagham communities, respondents confirmed getting water from their taps at home, especially those within female-headed households with an adult male (16%). Female-only headed households relied more on water from rivers across both communities than male-headed households with about 33.3% residing within female-only headed households in the Ejagham communities. While both communities indicated the role of boreholes as a source of water (Ejagham to a greater extent than the Baka), in the Ejagham community female-only households indicated a greater reliance on water sourced from boreholes (45%).

About half of all household types among the Baka tend to rely on other sources of water for their household water needs. Further interrogation of the other sources revealed that these

households used springs as a major source of water. In the Ejagham communities, the other sources of water included springs or carrying water from the neighbouring villages.

Participants also discussed challenges related to the different sources of water which were unique to their respective villages. One of the participants from a female-only household from the Ejagham communities had this to say:

"My household cannot afford to put a tap in our home… it is also difficult to rely on community taps as they often do not flow. Our best option is to go to neighbouring villages to get water from their community taps. I cannot even depend on rainwater. Where do I store it? Moreover, the season is changing with less rainfall…"

Focus group discussions in the Baka communities suggested that one of the significant challenges households faced was that of securing clean water either from boreholes, rivers, or community taps, as well as the availability of these sources to sustain them all year round. An in-depth interview with a female head of house revealed the following:

"Usually, it is my duty as a mother to provide water for the house. I sometimes ask my children to assist me in carrying water, but you know when the distance is far off like going into the forest, then I must go alone… It is very tiring, especially when you look at the distance one must cover and the risk[17]…"

Another interviewee from a male-headed household in the Baka communities explained that they often could not rely on sources like boreholes and rivers as they tend to dry up during the dry season, leaving them with limited options for clean water.

"Our major issue is to depend on water from rivers, springs, and boreholes. Other regions have water from community taps, but here very few of those taps have been installed by the municipality… Sometimes the borehole or rivers are not good for drinking. However, again, we can't rely on rain to have water for our day-to-day use as it is seasonal…"

[17] Some of the risks mentioned during this interview were linked to kidnapping by rebels around the central African Republic border as well as animal attacks.

Picture 5.3: A spring that households in one of the Baka villages rely on. Photo credit: Sindemo Gerard.

5.4. RESULTS – LIVELIHOOD ACTIVITIES

5.4.1. Livelihood Activities Related to Agriculture

Across both study communities, most households are involved in crop cultivation and the collection of forest products. Regarding agriculture, both communities engaged heavily in crop cultivation (100%). However, by contrast, less than 50% of respondents across both communities were involved in small livestock farming, apart from poultry, where more than 50% of households from both communities owned chickens (see Table 5.7).

Over 14 crops[18] that households cultivate were recorded. Plantains, cocoyam, maize, cassava, and groundnuts were the primary cultivated crops across all household types, though crops like groundnuts were cultivated more in the Baka communities compared to the Ejagham communities.

I interviewed a male head of household from the Baka communities about the kind of crops cultivated and possible changes in crop cultivation within an individual's lifespan. He responded as follows:

"In the past, we focused on crops like cassava, maise, plantain, and groundnuts. When we started living beside the Bantus, we had to learn to eat and cultivate some of their crops. We were familiar with our wild yams, which we harvested from the forest but later cultivated yams, which is a common crop cultivated by the Bantus."

Similarly, a female head of household in the Ejagham communities expressed the frustration most households experience when it comes to the cultivation of sweet potatoes and pumpkins.

[18] A complete list of crops grown, and forest products used by households is attached in Appendix 3.

"We like to grow sweet potatoes just like we grow cocoyam and plantain, but unfortunately, we do not get the same yields, and it discourages us. Just like tomatoes, those who have tried always end up with nothing with disease affecting it."

Table 5.7: Household's engagement in different agricultural activities

	Ejagham communities (n = 170)			Baka communities (n = 70)		
	Male with female (n=125)	Female only (n=20)	Female with male (n=25)	Male with female (n=50)	Female only (n=12)	Female with male (n=8)
Household engaged in agricultural activities across sites (%)						
Households engaged in farming	100.0	100.0	100.0	100.0	100.0	100.0
Households engaged in livestock	50.4	55.0	40.0	64.0	58.4	62.5
Top 5 crops cultivated by households across sites (%)						
Plantains	93.6	100.0	96.0	98.0	83.3	100.0
Cocoyam	97.6	100.0	100.0	98.0	75.0	100.0
Maize	99.2	100.0	100.0	100.0	91.7	87.5
Cassava	94.4	100.0	92.0	96.0	100.0	97.1
Groundnuts	81.6	85.0	76.0	96.0	91.7	100.0
Purpose for cultivating crops by households across sites (%)						
For home consumption only	33.6	15.0	16.0	52.0	50.0	50.0
For commercial purposes (sale only)	0.8	0.0	0.0	2.0	0.0	0.0
For both home consumption and sale	65.5	85.0	84.0	46.0	50.0	50.0
Primary livestock kept by households across sites (%)						
Goats	24.0	15.0	36.0	16.0	33.0	0.0
Sheep	8.0	0.0	0.0	6.0	16.7	0.0
Chickens	45.6	54.4	36.0	62.0	58.3	50.0
Ducks	11.2	10.0	12.0	2.0	0.0	0.0
Pigs	14.4	0.0	8.0	14.0	25.0	62.5
Purpose for keeping livestock by households across sites (%)						
For home consumption only	36.8	40.0	28.0	34.0	16.7	37.5

Concerning livestock activities, all male-headed households across both communities had a mix of livestock types. Households in the Ejagham communities, especially female-headed households with a male presence, were more involved in keeping goats (36%) and ducks (12%) than the Baka. Baka communities, in turn, were more involved in keeping pigs and sheep, with about 62.5% of female-headed household with an adult male keeping pigs and 16.7% of female-only households keeping sheep (Table 5.7).

The main reasons for crop cultivation and livestock production varied between regions and household types. Most households across both communities indicated that they grow crops for

both sale and home consumption. Households in the Baka communities, especially female-only households (16.7%) were, however, cultivating crops mainly for home consumption compared to the same household type in the Ejagham communities (40%). Overall, only a few male-headed households cultivated strictly to sell. The keeping of livestock was mainly for home consumption, although some households also sold these.

In a focus group discussion in the Ejagham communities, participants further explained the different reasons why they kept livestock and why some are more important to them than others, as captured in **Box 4.**

BOX 4: LIVESTOCK AS A LIVELIHOOD ACTIVITY IN THE EJAGHAM COMMUNITIES

The Ejagham communities have not been known to be predominantly livestock communities. Households generally keep goats, chicken, and ducks. While most participants did not show much interest in rearing sheep, pigs, and rabbits, several issues were discussed as to why they preferred some animals over others. One of the participants responded by stating that:

"I face many challenges with my neighbours when I decide to keep pigs. Sometimes they move around and destroy crops or gardens around homes, and it gets me into trouble with other villagers."

Another indicated the lack of finance to buy feed for the pigs and transport them from the main town (Mamfe) to her village. This response had broad support from other participants who said pig feed is relatively expensive and so they would rather keep goats that feed just on grass (this is interesting given that amongst the Baka, keeping pigs was more popular).

Nevertheless, some participants indicated that regardless of how expensive it might be to keep pigs, they would remain in it due to the substantial profit returns as compared to keeping chickens. Here are the reasons put forth by some participants:

"I try to keep my pigs confined around my compound… I have built a fence where they are restricted to that area, and I try to mix feeds with other food items that I can get around like waste food and grasses for them to feed. I will continue to keep them because people will always buy them for ceremonies like traditional weddings, burial, and other celebrations. Keeping livestock gives me enough money as compared to keeping chickens or goats".

Picture 5.4: Cassava being sun-dried on a mat in the Baka communities. Photo credit: Ojong Enokenwa

5.4.2. Livelihood Activities Related to the Collection of Forest Products

The collection of forest products was recorded across all household types in both the Ejagham and the Baka communities. However, of the 24 products identified, more households in the Baka communities collected a wider range of products than those in the Ejagham communities (Table 5.8).

Table 5.8: Collection of forest products by households across study sites

	Ejagham communities (n = 170)			**Baka communities (n = 70)**			
	Male with female (n=125)	**Female only (n=20)**	**Female with male (n=25)**	**Male with female (n=50)**	**Female only (n=12)**	**Female with male (n=8)**	
Household engaged in the collection of forest products across sites (%)							
Households involved in the collection of forest products	100.0	100.0	100.0	100.0	100.0	100.0	
Top 10 forest products collected in the Ejagham communities	**Male with female (n=125)**	**Female only (n=20)**	**Female with male (n=25)**	**Top 10 forest products collected in the Baka communities**	**Male with female (n=125)**	**Female only (n=20)**	**Female with male (n=25)**
Firewood	99.2	95.0	100.0	Firewood	100.0	91.7	100.0
Medicinal plants	24.0	30.0	16.0	Medicinal plants	100.0	91.7	100.0
Condiments	41.6	45.0	40.0	Condiments	96.0	83.3	87.5
Wild fruits	47.2	55.0	40.0	Wild fruits	98.0	75.0	100.0
Mushroom	55.2	65.0	56.0	Mushroom	78.0	83.3	62.5
Eru (*Gnetum spp)*	68.8	70.0	68.0	Eru (*Gnetum spp)*	96.0	75.0	100.0
Njangsa (*Ricinodendron heudelotii)*	84.0	75.0	64.0	Njangsa (*Ricinodendron heudelotii)*	98.0	100.0	87.5
Bush Mango (*Irvingia spp)*	76.8	75.0	84.0	Bush Mango (*Irvingia spp)*	92.0	75.0	87.5
Snails	37.6	50.0	40.0	Honey beer	76.0	41.7	50.0

Country onions (*Afrostyrax lepidophyllus)*	68.8	65.0	56.0	Bushmeat	80.0	50.0	25.0
Purpose for collecting forest products by households across sites (%)							
For home consumption only	29.6	20.0	28.0	62.0	41.7	50.0	
For commercial purposes (sale only)	0.8	0.0	0.0	0.0	0.0	0.0	
For both home consumption and sale	69.6	80.0	72.0	38.0	58.3	50.0	

Ten main products were recorded, and the findings showed that eight out of the top ten products collected were similar across sites. The difference of the remaining 2 products is tied to snails and country onions mainly harvested in the Ejagham communities versus honey beer and bush meat primarily collected in the Baka communities. There was a far greater collection of condiments, wild fruits, medicinal plants, and bush meat in the Baka communities than in the Ejagham communities. In both communities, across all household types, the collection of firewood was similar.

Findings further revealed that about 80% of female-only households were likely to collect forest products for both home consumption and sale in the Ejagham communities. This compared to 58.3% of respondents in the female-only households within the Baka communities.

Follow-up responses with a female-head of the household with a male presence from the Baka households indicated the collection of NTFPs in the past was mostly for home consumption:

"In the past, I will gather wild fruits from the forest just for my household to feed. We grew up knowing food is to be shared and not to be sold out, especially when you get it for free from the forest".

Contrary to this view, a respondent from a female-only household from the Baka communities suggested that times have changed, and they must sell to be able to provide for the basic needs of their families:

"I used to harvest different foods from the forest such as wild yams, insects, and Bush mango and make sure people in my house have something to eat. However, I realised the Bantus living among us grow crops for consumption as well as sell to those who work for timber companies and made much money. I decided to do the same so that my children can have a better life."

5.4.3. Non-Farm and Forest Activities Households Engage in for their Livelihoods

Probing respondents on their employment status revealed that some households have other formal and informal skills, which allowed them to participate in other forms of non-farm and forest activities. Some of these non-farm activities were carpentry, trading, hairdressing, barbing salon, restaurant, seamstress, welding, and repairs. During focus group discussions, participants also indicated that such activities provided them with additional household income, which often enabled households to cope with the poor harvest from their farms. In-depth interviews with the heads of the households across both communities gave varied reasons for their involvement in non-farm and forest activities. The head of a male-headed household in the Ejagham community explained:

"I am a farmer, but once I plant crops and have little to do on the farm than just waiting for the harvest season, I use that time to make chairs, beds, and cupboards for people in and around my village. I often lack money during the planting season and the little I have is all invested in the farms, and this is when my carpentry business pays off as the income I make from it helps my household survive while we wait to harvest and sell crops."

Similarly, a female-head of the house from the Ejagham communities explained how she reinvested into her tailoring business from money she got from the sale of NTFPs, which helped to increase her income:

"*As a tailor, I am also involved in farming, and the harvesting of forest products, which I would say remains my primary source of income. So, once it is the season to harvest forest products like Bush mango, bitter kola, and njangsang I do so and sell to buyers from Nigeria and other major towns. The good thing is, once the season is over, I invest some of my profit from the sale of these products into my tailoring business, and this yields more profit for me to sustain my household".*

In contrast, in the Baka communities, focus group discussions and in-depth interviews indicated, that for the most part, many household heads do not participate in non-farm activities. However, a few of them engaged in activities such as craftmanship where they make wooden household items as well as work for mining and logging companies. A male head of household interviewed indicated that when he is not in the forest hunting, he spends his time making baskets for fishing, wooden household items and other artefacts which he sells in the bigger towns around his village:

"I go for hunting most of the time and remain in the forest for up to a week. However, once I return from the forest, I focus on making baskets, and other artwork from wood then sell them. My work sometimes helps my family, especially as bushmeat has become scarce over the last seven years now."

5.5. DISCUSSION

5.5.1. Building Households' Adaptive Capacity Through Human Capital

Differences in education levels achieved were varied both between the two sites and across different types of households. Overall, household heads had higher levels of education in the Ejagham community, with a lower level of secondary and tertiary education in the Baka communities. This difference could be since there are fewer local secondary schools in the vicinity of the Baka communities, and most children would have had to leave their villages to study in distant towns. The lack of schools may account for why most children tend to drop out after the completion of primary education to assist their parents in hunting and NTFP harvesting (Pyhälä, 2012). In this respect, the Baka tend to prioritise the informal learning space due to the lack of schools, a significant structural constraint (Boedhihartono et al., 2015; Permunta, 2013; Lewis, 2004).

Furthermore, sending your child to school elsewhere can be unaffordable for these communities. An additional factor may be that Baka children are often mocked while in school and referred to as 'primitive' which makes it difficult for them to push through to higher levels (Permunta, 2013). These findings align with Matambo's idea that certain forms of learning have been dismissed as inferior, but we need to consider education as a universal human activity that can vary from context to context (Matambo, 2018). Given that forms of knowledge acquired outside of the classroom often assists rural communities in adapting and responding to different challenges that affect them daily, then such communities might continue to hold on to, and prioritise, informal learning. Segadimo further argued that traditional values are completely different from values taught in the formal educational systems. In most cases, it causes a cultural mismatch as has been the case for the indigenous groups of Madebe, Botswana (Segadimo, 2018).

In terms of gender differences between households, I found that across both study communities, there was generally a lower number of female heads of the household who had acquired graduate level of education, compared to male heads of the household, especially in the Baka communities (0%). The findings show a trend in the struggle to achieve gender parity in education, especially where girls often tend to lag in secondary education compared to boys

(Lewis & Lockheed, 2008; Shabaya & Agyemang, 2010). Certainly, it appears that attaining tertiary education may be gender biased, and a gender gap prevails, but perhaps not so for secondary education where more female household heads had attained secondary level, as per the findings. This suggests that potentially the 'adult' roles and expectations placed on women, as they are now adults after secondary and high school, means that they may not continue with further study (Durowaiye & Khan, 2017; Matsolo et al., 2018).

Existing literature shows a direct link between education and employment across countries. For example, a study in Malawi confirms that the higher your level of education, the more your chances of getting higher wages from formal employment opportunities (Castel et al., 2010). Formal education plays a role in securing formal employment within communities. For instance, the generally higher levels of education in the Ejagham communities, especially among households with a male presence, explains why they had a higher level of full or part-time jobs. While there seems to be a more significant problem of unemployment in the Ejagham communities, primarily within female-only headed households, the Baka communities seem not to identify with unemployment, as they often do not possess the necessary skills and qualifications for competing in the formal sector while also being spatially removed from the location of these jobs; they see their everyday activities as self-employment.

Although unemployment may cause some people to consider migration to bigger cities as alternative coping and adaptation options, it can be met with several challenges. Those without formal education and other needed skills will potentially be negatively affected in securing meaningful jobs. The overall effect is that their inability to get jobs would affect the amount of money they would have been able to send back home as gifts and remittances (Bredtmann et al., 2019) and affecting the coping options potentially available to communities (detailed in Chapter 7). A study by Pyhälä (2012) along the Yokadouma-Moloundou stretch, showed that most labourers earned about 0.42US$ (250FCFA) per day. My interviews (see page 82) reinforced the unsatisfactory nature of wages, which often discourages Baka men from engaging in such full-time jobs. Nevertheless, there are a few men who are employed on a part-time basis for big timber or mining companies and plantations for little or almost no pay.

The challenges of acquiring employment (e.g., Box 1), however, vary across the different household types. While literacy may be a significant driver of employability, household responsibilities may dictate the availability of household heads/members to seek employment away from home. For example, fewer female-only households were found to be employed in either full or part-time jobs. Even those that had relevant credentials, i.e., certificates of study,

contended that employment away from home could be problematic, mostly as most were the primary breadwinners and carers for their children and the elderly. Hence, women are caught between accepting jobs away from home and being around to give full support to their families, (FAO, 2012).

Building robust adaptive capacity and reducing household vulnerability can also relate to how healthy a community or family is. The results highlighted a higher number of ill persons within both types of female-headed households than the male-headed households across both study communities, with this most notable in the Baka communities. The higher number of chronically ill persons across all household types in the Baka communities could be linked to higher incidences of tropical diseases like malaria as well as the use and reliance on medicinal plants (e.g., Sisingo and Ngulolo), access to which is visibly declining. This decline has been exacerbated by the presence of invasive species and other drivers of deforestation (see Chapter 6). In many places, the introduction of people from the outside is the precursor to more common (or new) diseases which could be the case of the Baka where there has been a big increase in outsiders coming to the East (Dounias & Colfer, 2008). In the Ejagham communities, greater access to hospitals may explain the lower number of critically ill persons. A chronically ill member in the household, especially within the Baka communities, can affect the head's ability to work, especially in cases where they must take up job opportunities outside their homes. Good health, therefore, has a direct effect on how productive a household can become for their wellbeing (Bloom & Canning, 2003).

In building communities' and households' adaptive capacity through human capital, priorities should be placed in enhancing informal education and skills given that the study communities, especially the Baka, have historically relied on this as a survival mechanism. For example, improving informal knowledge and skills acquisition gained through activities such as fish lining and bailing (see Chapter 3, section 3.3.4) in the Baka communities could have a direct impact on their livelihoods. Smith and Wandel emphasised that in building adaptive capacity, measures must be tailored to suit the context of that community (Smit & Wandel, 2006). Hence, such activities can be enhanced by introducing fish cultivation through ponds instead of the traditional fish bailing, considering that rivers initially used for such activities are drying out (Hayashi, 2008).

5.5.2. Building Households' Adaptive Capacity Through Social Capital

In both study communities, households are engaged in different social organisations such as farming/hunting groups, recreational groups, saving groups, and development initiative groups.

Some groups might be quite specific to activities. For example, farming groups may be formed for the clearing of farmlands or harvesting crops. In the Ejagham community, however, participation in farming groups was most common in households with a male presence, as only 5% of female-only headed households were members of farming groups. The fact that most women generally do not have substantial portions of land, nor own or control land could confirm why very few devote time to engage in such groups (Fonjong et al., 2010).

Across both communities, saving societies seem to be the primary group most households were part of, which support members through saving schemes. These saving schemes are meant to support members for burial needs, sending children to school, and buying food for the household. Households are likely to join saving societies because of their inability to provide collateral security to formal financial institutions in a bid to secure a loan and also because most financial institutions do not have offices in these rural localities (Mutebi et al., 2017). The saving societies, therefore, act as sources of support to households who in times of need can seek human, financial, and material assistance.

While a lack of awareness of formal financial institutions might also contribute to why many people are not members, a quote from one of the respondents in the Baka communities (see p.83) showed that the absence of formal financial institutions within their communities, and the need to spend heavily on transport to get to where they are located, hinders most people from joining. Saving societies are often created based on the unique needs of individuals and communities, all having their different constitutions and clearly defined roles and responsibilities for each member. A study done in South Africa to understand why people join saving schemes ('Stokvels') revealed that it is not a venture for wealth creation, but rather a way of buying cheaper 'bulk groceries' for households who would not usually be able to afford this due to high levels of poverty (Van Wyk, 2017). The results from Van Wyk's study aligns with that of the study communities, as hardship and limited access to loans in formal financial institutions resulted in the creation of informal saving schemes, which predate formal financial institutions.

There is a cultural dimension to why people come together. Most of the recreational/social groups consist of traditional dance groups and groups for performing rituals, amongst others. In the Ejagham communities, traditional groups like *'Monikim'* and the *'Ekpe society'* are informal groups open to both men and women. These groups perform specific traditional rites and rituals. Members in the 'Ekpe' societies are often seen performing during burial ceremonies, mostly if the deceased person was a member. Similarly, it is common to have cultural groups

for ritual performances and practices within the Baka communities, and the unique nature of these groups continue to give them a sense of place and social identity (Tsuru, 1998).

While households across both communities have been shown to be members of different social groups, the majority of those who had leadership positions in the Ejagham communities, resided within households with a male presence. However, female-only households in the Baka communities occupied leadership roles to a greater extent than the Ejagham communities (20%) (Table 5.3). Being involved in decision-making processes, especially for women in female-headed households can empower them to engage in decisions that relate to their income sources and have control over it, as evidenced in a study by Pavanello et al. (2016) on women's economic empowerment in Rwanda. For instance, being part of making decisions around interest rates, penalties, types of activities and number of meeting days within their social groups can allow women to better manage their time and adjust to the activities within their homes and communities.

In a background note developed by the Overseas Development Institute (ODI) on framing adaptive capacity, it was noted that a key component in building adaptive capacity is for all to be actively involved in processes that bring change (Jones et al., 2010). Several women indicated during focus group discussions why they think it is essential to be part of leadership positions within their social organisations. Being part of a leadership in social groups can, therefore, allow household heads to make decisions that could affect them directly, as well as their continued involvement and active participation, and how much time and resources they can invest in as a way of reducing vulnerability (Pavanello et al., 2016).

5.5.3. Building Households' Adaptive Capacity Through Financial Capital

The ability to make use of financial services, whether with formal or informal institutions, has been proven to reduce risk and vulnerability in rural communities (Sujakhu et al., 2019; Goldman & Roismena, 2013). As mentioned above, most households in the study communities rely on informal savings institutions/societies, commonly known as 'njangi' or 'tontin' groups. These groups can provide loans as the need arises, for example, burials and other ceremonies. However, savings were generally lower for female-only households, especially within the Baka communities. The consequences will be that their inability to save money in the groups can potentially exclude them from benefitting from loans and other group benefits that come with individual savings in the group.

Exclusion from such credit opportunities can make it more difficult for them to respond when faced with various risks compared to other households with savings, leaving them more

vulnerable. One of the reasons mentioned for the lack of savings amongst female-headed households was that they are burdened with the responsibility of providing food and other daily needs for their households, making it challenging for them to put aside money as savings. The inability to save in saving societies would, therefore, place female-headed households in a disadvantaged position by becoming more vulnerable to shocks, given their weak financial assets (Sujakhu et al., 2019). It is particularly worrisome for households in the Baka communities, especially female-headed households, whose savings are low, whileabovehalf (>50%) of them are in debt (Table 5.4).

While households in the Baka communities save less than those in the Ejagham communities, they also have more debts. These debts are relatively higher amounts than those in the Ejagham communities. Female-headed households were also found to have more debts across both communities, and this could be because of their limited ability to save in both formal and informal financial institutions, compared to male household heads. For most banks and credit unions, your ability to save or show collateral (e.g., land) could secure you a loan from any credit source, but women often do not have land title deeds that could be used to access loans/credits. It directly excludes them from accessing loans which could be used to expand agricultural activities and other livelihood diversification streams necessary in building a robust adaptive capacity (Chandio et al., 2017). Thus, this emphasises the need for women's productive capacity to be enhanced through direct access to financial resources, not necessarily mediated through their husbands (land access) as argued by Fletschner & Kenney (2011).

The Baka's low level of opportunities and the low educational status further place them in a more vulnerable position as they are less able to earn an income and honour their debts. Again, the Baka communities have shown to have fewer formal skills for the job market than those in the Ejagham communities, who often engaged in non-farm activities that can quickly bring money into their homes. With limited involvement of households in non-farm activities, the result is household heads seeking ways of accessing credit, with some collecting money from potential buyers and later paying via the collection of forest products. Beholding people to buyers could increase vulnerability as farmers and forest product collectors are often in a position where they cannot place a price for their products, given that they had collected money in advance from the buyers. Hence, their ability to build a robust adaptive capacity through financial resources is somewhat weakened and further leaves households more oppressed and marginalised (Carr, 2020; Phyhala, 2012).

5.5.4. Building Households' Adaptive Capacity Through Physical Capital

The results have shown that the Baka communities own fewer household items and equipment than the Ejagham communities. Household items necessary for the dissemination of information such as phones (e.g., female-only households), and TVs (e.g., male-headed households), are relatively low, particularly within the Baka communities. However, households in the Baka communities commonly owned solar panels (e.g., female-only households) and radios as most of these villages do not even have access to electricity. Sharing and receiving information via these devices are of high importance within rural communities in order to access weather updates and raise awareness of possible changes in weather patterns. Therefore, the inability to utilise technology for receiving and sharing information by households can leave them more vulnerable and less prepared to adjust to changing weather patterns, and other types of shocks, especially for women (Yohannis et al., 2019).

In situations of high rainfall variability, female-headed households with more water drums for storing water are likely to be more prepared to withstand or adapt to water scarcity, compared to male-headed households. Notwithstanding, water drums are generally owned by few households and regardless of the household types, the absence of water drums could affect women and children more, whose primary roles centre around providing water for household use. The International Fund for Agricultural Development (IFAD), in one of its reports, highlighted that typically, women in rural communities work for up to 16 hours a day carrying out their different tasks with a large proportion of this time related to water (Bishop-Sambrook, 2016). It is not only the loss of time that affects women and children but also the health impacts of carrying water as argued in a study by Graham et al. (2016). In the absence of storage facilities (water drums), the workload of women might increase and further expose them to other stressors.

Owning different types of productive equipment and products that can be sold can help build adaptive capacity and reduce vulnerability by supporting livelihood diversification. For example, the few households in both the Baka and Ejagham communities with sewing machines could easily engage in non-farm/forest activities to augment household income. Sewing items for sale can further provide an important fallback option and safety net in poor growing seasons. More than 50% of respondents confirmed having a store of fabrics, especially in the Ejagham communities for traditional attire, especially for cultural events. Women would often sell these fabrics when needing cash or to overcome a crisis (see Chapter 7, Box 7.1) Thus, having a collection of fabrics could be considered as having savings.

Owning equipment for agriculture and forest activities such as axes, chainsaws, cutlasses, hoes, and rifles also can provide the household with more options for livelihood activities, make these activities more efficient, and bring in more income that helps to reduce vulnerability. For instance, the absence of chainsaws across households would affect their ability to expand agricultural fields that would increase areas of production. Furthermore, the presence of mostly essential and low-cost items such as cutlasses and hoes, especially in the Baka communities, shows that households are primarily involved in traditional farming and forest activities with little use of technological tools. The higher presence of rifles in the Baka communities could be linked to their forest dependence where the hunting of bush meat is predominant, and culturally, a traditional, male-dominated activity.

5.5.5. Building Households' Adaptive Capacity Through Natural Capital

Land is essential for farming and household food security. All households across both study communities were shown to be dependent on crop cultivation, and most of the crops they cultivate are for home consumption rather than sale. Nevertheless, land is an asset that most female-headed households in the study communities lack. The lower levels of land ownership leave them less able to adapt to climatic shocks and stressors as they are unable to grow their food or make decisions about when or what to plant. Even women that previously may have had access to land through marriage, once widowed, they are excluded from accessing what is effectively their households' land by the families of their late spouse (Chapter 5, Box 3).

Land may be contested at several levels, such as the household level and between ethnic groups. Drawing on evidence from Malawi, a study by Asfaw and Maggio confirmed that women's vulnerability to temperature shocks was linked to women's land tenure insecurity, especially those within patrilineal districts where land inheritance is through the sons and not daughters (Asfaw & Maggio, 2018). It was further stressed that in such districts, investments in agricultural technology by women were lower due to contested issues around land security.

Studies by Fonjong and colleagues indicated that the economy of Cameroon is predominantly backed by agricultural activities that depend on land (Fonjong et al., 2013; Fonjong et al., 2010), and land access and ownership can help improve agricultural activities for households, especially those that are female-only headed. Land as an asset, therefore, remains an essential factor of production in enhancing and ensuring food security for both men and women. However, the fact that men are often associated with *de jure* rights (legal by court precedent) implies that women have limitations in securing tenure (Kameri-Mbote, 2013).

The challenges that women, especially those in female-headed households face, and how inequalities of land ownership and access could constrain some households from using land to enhance their livelihoods was noted from the findings in this study.. For instance, female-headed households have been shown to be involved in the cultivation of crops like plantains, maize, yams, melon, and cassava which need more space to grow owing to their spreading growth forms. Women are, however, likely to limit productivity based on the available land space as earlier raised by Asfaw and Maggio (2018) and instead, concentrate on crops that do not need large spaces, rather than expand and diversify the cultivation of crops. That notwithstanding, men without land ownership can be grossly affected too, especially those who are not the primary heirs in the family and on that basis could be skipped from inheriting land. For example, in some matrilineal communities in Malaysia and India land inherited is passed from mother to daughter, often giving women more decision-making power over land use compared to men (Lastarria-Cornhiel, 2005).

Generally, households, and particularly those in the Baka communities, obtain most of their water for both household and other uses from rivers and springs. Since these water sources are seasonal, households may experience difficulties sourcing water when seasonal rivers dry out, and springs are overburdened. Rainwater collection, mainly using drums, was relatively low in both communities, and even more so in the Baka communities, whose housing style does not easily allow for the collection of rainwater (Picture 5.5).

Picture 5.5: Picture of me in Parny village (Baka communities) conducting and assessing the difficulties households may encounter in collecting rainwater as well as storing water drums based on the nature of construction of their houses. Photo credit: Sindemo Gerard.

Very few households had taps on their properties. Financial capital was shown to be limited across both study communities, especially among households within the Baka communities. Higher incomes and access to finance could be the reason why taps on the property were more common within male-headed households in the Ejagham communities. The location of water sources, water storage facilities at home, and the people available within households to assist in water carrying can determine how vulnerable a household would become to water insecurity. For example, water drums were typical in households with a male presence in the Ejagham communities. Thus, in times of the prolonged dry season and water scarcity, specific water sources may dry out, and households with no access to public taps or taps on the property will become more exposed to further stressors as they will have to spend more time in search of water.

The implications of this can be considerable as climate change impacts on water bodies continue to affect households that rely on different water sources. In Chapter 3, I presented climate change projections within the East region (including Baka households) where the CIP data suggests temperatures will continue to increase throughout the year with chances of them rising above 1.5°C. The projections were similar to that of the South West (Ejagham households) showing the possibility of temperature increases within some months exceeding 2°C. These changes would have severe implications for water security within rural communities, potentially obstructing livelihood activities that depend on water availability. This was echoed in a report prepared by the British Geological Survey (BGS) (2002) in Ethiopia on drought, livelihoods, and water quality. The report suggested that given the ongoing drought in Ethiopia, like in other parts of Africa, water supply interventions such as repair, well deepening, and provision of water transport could help sustain the production of food as well as carry out domestic tasks related to households (Calow et al., 2002).

5.5.6. Understanding Livelihood Activities in the Context of Adaptive Capacity

Livelihood outcomes are often determined by the kind of activities households engage in, whether farming or forest-related or off-farm activities. The general trend in this study indicates that the Baka and Ejagham communities are involved in agricultural activities (both farming and livestock) and the collection of forest products primarily for home consumption, which contributes mainly to food security and nutrition. This conclusion is also supported in work by Adjimoti & Kwadzo (2018) in Benin on crop diversification as a pathway to food security.

Their study showed that the cultivation of diverse crops provided farmers and the rural population with different crops/food sources that they could not have access to because of poor physical access such as roads (Adjimoti & Kwadzo, 2018). While most households engage in these livelihood activities to provide food for their families, some have confirmed increasing their household income through the sale of either crops, livestock, or NTFPs.

However, differences related to the types of crops cultivated, livestock reared, as well as forest products collected across both communities are rooted in their cultural practices, which shape their livelihood strategies and activities. It is thus difficult to separate culture from people's livelihoods. For instance, the finding from this study shows that products such as medicinal plants, bush meat, wild fruits, and condiments are harvested more in the Baka communities than in the Ejagham communities. In such ways, culture can also influence what households and communities collect from the forest which can have a direct impact on household vulnerability.

Climate-related risks such as drought and other non-climatic factors (land, and finance) have been shown to impact livestock production in the study communities (see Chapter 6 on shocks). Households mainly have small livestock and poultry such as goats, sheep, chickens, ducks, and pigs, in small numbers. For households involved in the rearing of animals, the indications are that it is mainly for home consumption which can reduce the potential for households to make income through the sale of livestock, as argued by Herrero and colleagues (2013). The authors suggest that livestock at a large scale, as a diversification stream, can provide income and employment for developing countries (Herrero et al., 2013).

The Baka communities in the past have been known to be forest dwellers whose livelihoods depended on hunting and the gathering of wild fruits. Households in both communities collected at least ten main NTFPs for their daily survival and depended on over 20 products when affected by shocks such as reduced crop yields and inflation (see Table 5.9; Appendix 3). The results show that firewood, condiments, and wild fruits remain highly used as a coping mechanism for all household types in the Baka communities. Households, especially female-headed households, would go beyond the usage of forest products for home consumption to selling as a way of getting additional income for lean seasons, a similar finding to that observed by Suleiman et al. (2017). For example, a study conducted within the Tamale Metropolis in Northern Ghana to understand livelihood strategies of women in the shea butter industry showed that collecting and processing of shea butter for sale improved women’s income, and skills acquired as well as expanded their social networks (Dauda et al., 2014).

However, the ability of culture to remain fluid over time has now allowed the Baka people to become more involved in agricultural activities as they have continuously lived and learned side-by-side with the Bantus. Although culture and gender roles can change over time and affect the livelihood activities of communities, it does not guarantee equitable livelihoods and may instead widen the inequality gaps as discussed by Carr (2020). With most households already very vulnerable, they may not have the capacity and buffers to be able to make the adaptations needed to enhance their livelihood outcomes. Some households may be naïve in venturing into new practices and so may not have the experiential knowledge to find the best adaptation options that can increase their adaptive capacity. For instance, the collection and harvesting of forest products such as njangasa and Bush mango can be transformed into both powdered and oil products for sale by households as a livelihood diversification option; these products have been found to be compartible with Baka practices and preferences (Bourne et al., 2020).

Similarly, non-farm activities sometimes provide more income for households than farm activities, particularly in the window-period between planting and harvesting of crops.[19] As found in another study in Bangladesh, non-farm activities were a major augment to household income in the Khulna region (Nasrin & Wahid, 2015). However, Baka communities do not favour these based on their culture, lifestyle, and lack of opportunities and maltreatment when they do engage in these activities, may act as a significant obstacle to their adaptive capacity. Nonetheless, it is difficult to assess such obstacles within the study communities as often these non-farm activities are temporal (part-time) and usually only support the lean seasons. In-depth interviews further showed that some households use money from farming activities and collection of forest products to reinvest in other non-farm activities.

5.5.7. Linking Assets, Livelihood Activities and Adaptive Capacity of Vulnerable Communities

Chapter 1 and 2 discussed how assets support adaptive capacity and reduce vulnerability to climate change and other stressors. In bringing the results on assets and livelihood activities together, the findings suggest differentiated abilities to build adaptive capacity and reduce vulnerability based on household assets and livelihood activities. While no one type of asset is considered more important than the other for livelihoods and adaptive capacity, the lack of crucial capital, such as financial and physical capital, can contribute immensely to depleting

[19] Certain crops such as maize are planted and harvested more than once within a one-year period. This, however, depends on the regions in the country. For example, farmers in the Southwest region (around the Buea mountain) plant and harvest maize twice within a year.

other forms of capital (natural, social), thereby increasing household vulnerability (Lockwood et al., 2015).

The general trend within the study shows that households in the Baka communities have lower human capital than those in the Ejagham communities. Their low level of human capital puts them at a disadvantaged position in terms of enhancing adaptive capacity and livelihood strategies. For instance, the Baka communities lack the right level of formal education and skills, which is necessary for employment as this could increase their livelihood options and enhance adaptive capacity. Nevertheless, their significant indigenous knowledge of forests and forest resources could serve as an adaptive function if allowed to control other assets such as land, of which they have limited control. These different skills, knowledge, and competencies have been shown to be vital for decision making and access to relevant information, especially when hit by a stressor (Goldman & Riosmena, 2013).

Furthermore, for productivity to be significant, communities need physical, natural, and financial assets such as land for cultivation, access to forest products, savings, loans (especially from formal financial institutions), and equipment for both household and agricultural/business use. Findings here suggest that most of the access to capital is low within female-headed households across both communities, but particularly among households in the Baka communities. In terms of household items such as those for transport, water drums, and TVs, the Baka could become more vulnerable when faced with climatic shocks and stressors, although a combination of other factors such as natural and social assets, as found in the Baka communities, could help reduce the level of vulnerability.

Social networks act as a support system to many households, and household members' engagement in different social groups such as saving societies and farming/hunting groups enhances their adaptive capacity. Both communities have strong affiliations to saving societies, and this has been shown to have great potential in improving livelihoods as access to formal financial institution services is lacking (Mutebi et al., 2017). Belonging to a social group can define one's livelihood strategies and how vulnerable or resilient a household could become, also providing opportunities of social learning as argued by Abdul-Razak & Kruse, (2017); Phuong et al., (2017) and Rao et al., (2020). For example, though the Baka households have social networks for different activities, female heads of the house are less involved in such groups, and this could reduce their chances of enhancing their adaptive capacity. Therefore, building adaptive capacity and reducing vulnerability in the study communities would entail holistic gender-transformative interventions such as improving access to economic resources,

supporting communities to explore new knowledge and skills, developing infrastructure and advance technology, as well as supporingt the management of local resources. Having strong adaptive capacity/assets means that people and households are better able to adapt to future change, and so, in a sense, build their anticipatory capacity. This list is not in any way exhaustive, as will be unpacked in Chapter 8.

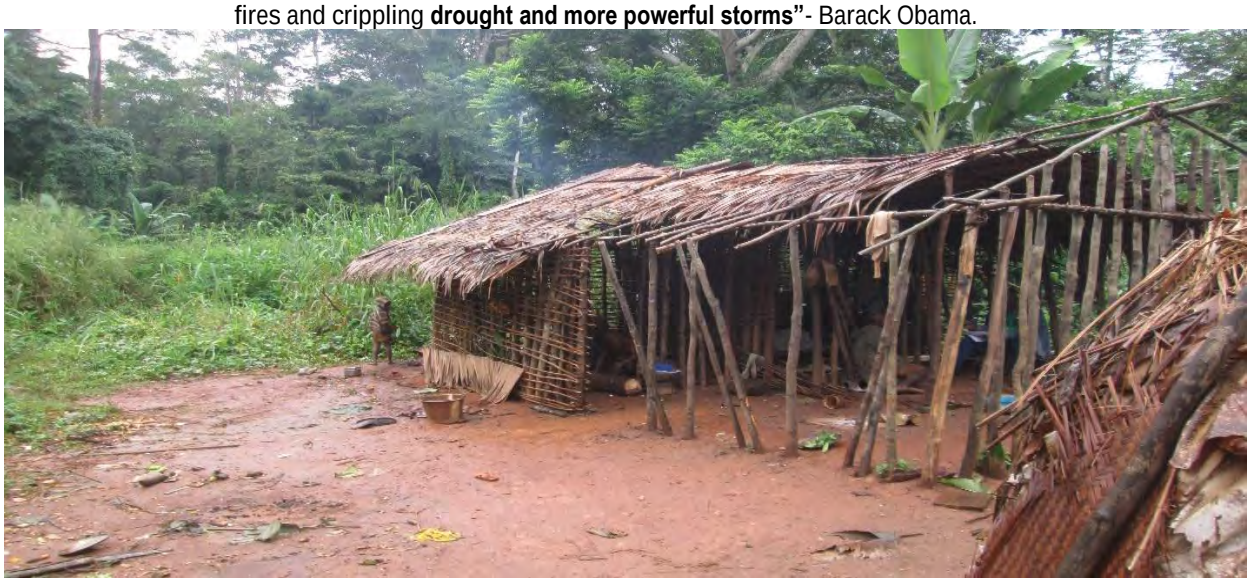
5.6. CONCLUSION

Social and natural capital seem to be more utilised within the study communities as primary assets for their day-to day survival. Gender roles and culture have been shown to influence people's livelihood activities within the study communities giving rise to varied options in terms of what assets are important for households. Households across sites have been shown to rely on social capital through social support groups such as for farming, hunting, the collection of NTFPs, and saving socieities. Financial capital is visibly lacking, particularly for female-headed households in the Baka communities with over 50% in debt, limiting alternative livelihood options. Thus, when thinking about different assets or capital to explore and understand vulnerability, it is essential to consider the dynamic nature of these assets and their ability to deplete over time, leaving households more vulnerable when exposed to shocks and stressors (Žurovec & Vedeld, 2019). The current pool of assets suggests that households may become more vulnerable when exposed to multiple shocks and stressors, impacting livelihood activities. However, the continuous reliance on specific assets such as social and natural capital for their daily survival may dictate the options available for a household when attempting to diversify their livelihood basket. A combination of assets will determine their coping and adaptation responses (see Chapter 7) and the implications on their livelihoods when assets become exhausted (Chapter 8).

CHAPTER SIX

CULTURAL AND GENDERED DIFFERENTIATED EXPERIENCES OF MULTIPLE SHOCKS AND STRESSORS

"Some may still deny the overwhelming judgement of science, but none can avoid the devastating impact of raging fires and crippling **drought and more powerful storms"**- Barack Obama.



Here stands a house affected by storms and to be rebuilt by the head of the house in Parny village, East region of Cameroon. However, they continue to live inside, as can be seen in the picture. On the day I visited this house, it was quite rainy, and they found it difficult to set up the fireside with lots of water running through the house.

6.1. CHAPTER OVERVIEW

This chapter brings together findings on the multiple interacting shocks and stressors that households across the Baka and Ejagham communities are exposed and sensitive to. The objective of this chapter is to explore the cultural and gendered differentiated experiences of exposure to multiple shocks and stressors. The main research questions that I set out to answer include:

- What are the main climatic and non-climatic shocks and stressors households across the sites have experienced?
- What are the impacts of these shocks and stressors, and how have they influenced long-term livelihood outcomes?

I begin the chapter by providing a background context of the gendered impacts of shocks and stressors and then describing the main climatic and non-climatic shocks and stressors households reported experiencing. I present the varied impacts on households, the implications of such exposure, and sensitivity to shocks and stressors amongst different types of gendered households, considering what this means for their vulnerability. I explore how multiple

interacting shocks and stressors have been experienced across different households and how their current assets could become depleted if not much is left over to accommodate these shocks and stressors. I argue that many of these shocks and stressors, whether climatic or not, are already affecting the livelihood strategies of households in rural communities, leaving them with inherently low adaptive capacity. The types of shocks and stressors and their impacts on livelihoods, as discussed in this chapter, set the scene for understanding the different coping and adaptive responses (Chapter 7) that households across both communities may consider when affected by varied shocks and stressors.

6.2. BACKGROUND CONTEXT

The impact of climate change poses a significant challenge in most parts of the world today, and these impacts affect both the physical environment and humans within the environment (Batool et al., 2018). Some communities have, however, become increasingly exposed and sensitive to varied shocks and stressors as a result of climate change and its impacts, such as rainfall variability, droughts, wildfires, storms, land degradation, and soil erosion. The starting context for rural communities in Africa is typically one of high levels of poverty and vulnerability (Di Falco & Chavas, 2015; Tibesigwa et al., 2016). Several studies across Cameroon have explored climate change impacts, and livelihood practices within communities (e.g. Makoudjou et al., 2017; Fonjong et al., 2013; Pemunta, 2013; Brown & Sonwa, 2015). However, there are still gaps that need attention, especially the differential gendered impacts of shocks and stressors on poor and natural resource-dependent households.

While susceptibility to shocks and stressors may be unique to households or communities based on their starting context, they have generally been classified into climatic and non-climatic shocks and stressors as I use them in this thesis (Mitchell & Harris, 2012; Fuente, 2008). Both the climatic and non-climatic shocks and stressors have been grouped into covariate, i.e., shocks and stressors experienced by households within the same geographical location, and idiosyncratic, i.e., shocks and stressors experienced by a particular household and unrelated to another household. In Chapter 2, I described how both covariate and idiosyncratic shocks are experienced by different households and communities (Pradhan & Mukherjee, 2018). Such experiences by households of a combination of shocks and stressors often tends to stretch poor households beyond their coping capacity, leaving them more vulnerable to subsequent ones (Wunder et al., 2014).

Many factors interplay in the determination of vulnerability and sensitivity to shocks and stressors, such as social inequalities, and are often construed in roles and expectations of

household members within the house, but also those dictated by gender, age, cultural or marital status, and geographical context. Assets, as seen in Chapter 5, often serve as a buffer to households against shocks and stressors and are essential in determining adaptive capacity. Households with low levels of capital stocks, or access to assets, are inevitably more vulnerable and will have more difficulty overcoming shocks and stressors as well as have fewer options in terms of responses. I further argue that when a household becomes exposed to multiple shocks, the chances of further asset depletion is high, as these may be eroded as they try and cope with new shocks and stressors (see more in Chapter 7 on coping responses). However, to understand how communities respond to shocks, one must consider how vulnerable they can become when exposed to multiple interacting shocks and stressors and the gender dynamics within households that could cause them to become affected differently.

6.3. RESULTS

6.3.1. Understanding Exposure and Sensitivity to Climatic Shocks and Stressors and their Effect on Different Gendered Households

Generally, more households in the Ejagham communities mentioned warming temperatures than Baka households (Table 6.1), with >90% of respondents across all household types, identifying warming temperatures as a climatic stressor. In both communities, there was little difference in response rates across household types for any of the climate shocks and stressors. About a quarter of respondents across all households in both communities indicated experiencing rainfall variability in the previous 5 – 10 years. More households in the Baka communities reported having experienced storms owing to the nature of their house construction (Picture 6.1), compared to less than 10% from households in the Ejagham communities. Drought does not seem to be a real factor across both communities as less than 10% of households mentioned this across all types.

Nevertheless, the similarity in the responses of households within each site points to the fact that storms experienced are covariate in nature and the weather patterns within the communities can contribute to the differences across sites.

Table 6.1: Climatic shocks and stressors experienced rated as very severe (3) across study communities

Climatic shocks and stressors experienced by households in the Baka and Ejagham communities (%)						
	Ejagham communities (n = 170)			Baka communities (n = 70)		
	Male with female (n=125)	Female only (n=20)	Female with male (n=25)	Male with female (n=50)	Female only (n=12)	Female with male (n=8)
Storms	2.4	5.0	4.0	34.0	33.3	12.05
Warming temperatures	91.2	90.0	96.0	64.4	58.3	87.5
Droughts	6.4	5.0	0.0	2.0	8.3	0.0
Rainfall variability	23.2	25.0	28.0	18.0	25.0	37.5
Results of climatic shocks and stressors experienced by households (%)						
The decline in water for household use	23.2	30.0	24.0	2.0	8.3	0.0
Reduced food security	21.6	25.0	20.0	8.0	8.3	0.0
A decrease in agricultural soil fertility and crop productivity	20.8	20.0	20.0	46.0	50.0	0.0
Soil erosion and associated landscape degradation	0.0	0.0	0.0	2.0	0.0	12.5
Decline in livestock	0.0	0.0	0.0	2.0	0.0	0.0
A decline in forest products	11.2	0.0	8.0	22.0	8.3	50.0

Picture 6.1: House affected by a storm in the Baka community. Photo credit: Ojong Enokenwa

Considering some of the impacts of climatic shocks and stressors, a decline in forest products was reported across all household types in the Baka communities but was higher within the female-headed households (50%). A decline in forest products was reported by low numbers of households in Ejagham communities (11.2 and 8%) and in only households with a male presence.

Key informant interviews from the Baka communities suggest that a combination of these climatic changes and other factors such as deforestation continues to impact on the collection of NTFPs which communities rely on for their livelihood. In one of such interviews, a female head of the household highlighted:

"When we were growing, the first thing I noticed was that we did not have to go far from the house to harvest any kind of thing from the forest. We were in the heart of the forest and surrounded by everything. We will never lack food too. There were so many animals that you do not have to go far to hunt. I do not even know how we got to this level that I am now struggling to give food to my family".

Another respondent also highlighted the increased presence of invasive species as another non-climatic stressor which could be linked to forest product decline and also indirectly linked to climate change. The presence of invasive species affects the availability of medicinal plants collected from the forest (see Picture 3.1), as explained by a male head of the house in the Baka communities:

"There is this 'sisingo' leaves that our women used for stomach aches, and it is used only by women. There is even 'Ngulolo' that we will use for stomach cleansing for our children. These medicines we got them free from the forest. Today, everywhere you go, you see only Bokassa (local name for an invasive plant species*). That is why you will find most of our women and children being sick now. We do not have leaves to treat them like we did before".*

Overall, a minority of households reported experiencing various impacts from climate shocks. About a quarter of respondents across household types in the Ejagham communities reported having experienced reduced food security as a result of climate shocks. In contrast, few households in the Baka communities experienced food insecurity (see Table 6.1). The decline in water for household use seemed to affect more female-only headed households in both the Ejagham (30%) and the Baka (8.3%) communities, than households with a male presence. Regarding impacts on livestock, just 2% of respondents from the male-headed households indicated a decline in livestock.

In the Baka communities, mostly those from the female-headed households with a male presence (12.5%) reported having experienced soil erosion and associated landscape degradation. No respondents in the Ejagham communities confirmed having experienced any direct effects of soil erosion and associated landscape degradation. In-depth interviews further present how soil erosion and landscape degradation, resulting from large scale timber and mining exploitation, affect households in the Baka communities; this is what a male head of the house explained:

"When I hear that name government, I get furious. They are the ones who have put us in this bad condition. Imagine they started giving out our forest to big people to cut down trees and did not even consider that is where we live and have our daily food. We just sit every day and see people coming for timber, some come and dig places, and they tell us it will make us develop. We know already that people in this country see us different. Some call us 'villageois' (being primitive in French) *and even this Bantus here feel they are more significant than us. That is why when we work under them as labourers, they will pay us very little. This timber company I sometimes work in, when we go there, they will pay us smaller than they will pay a Bantu worker. Why is that, are we not the same?"*

All households in both communities, particularly those in the Baka communities noted a decrease in agricultural soil fertility and crop productivity, except for female-headed households with a male presence. A possible reason for this anomaly in the result presented here is that only the 'very severe' level of impacts was recorded in Table 6.1.

In-depth interviews pointed out that a decrease in crop productivity was due to the increase in pests and diseases, as explained by a female head of the house in the Ejagham community:

"We had enjoyed cultivating Igbo coco for a very long time, and never imagined homes would go for almost ten years without it… I only remember noticing spots on the leaves. Before I knew my whole farm was affected…we were forced to start cultivating other types of cocoyam that we did not like to eat before, but thank God in 2017, we started getting a few harvests of Igbo coco again".

6.3.1.1. Results of Rainfall Variability and Seasonal Changes as Experienced by Households

Before the 1990s, the minor rainy season was experienced by households during April and May (Table 6.2). However, in the last five to ten years this has shifted earlier starting March and end of April, although it is a transition between dry and wet seasons.

Table 6.2: Seasonal calendars comparing results from Tsuru (1998) and by participants in the Baka communities

Seasonal calendar in the 1990s as presented by Tsuru (1998)												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Rainy season (Saison des pluies)				*	*			***	***	***		
Dry season (Saison séche)	♦♦♦	♦♦♦	♦♦♦			♦	♦				♦♦♦	♦♦♦
Current seasonal calendar as experienced by households within the last five-ten years as presented by participants in the focus group												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Rainy season (Saison des pluies)			▪	*			□□□	***	***	***		
Dry season (Saison séche)	♦♦♦	♦♦♦	■■■		♦	♦	▫				♦♦♦	♦♦♦

* = minor rainy season; *** = major rainy season; ♦ = minor dry season; ♦♦♦ = major dry season

▫ = Having minor dry season and later major rains □□□ in the month of July

■■■ = Having major dry season and later minor rains ▪ in the month of March

A similar earlier onset now occurs with the major rainy season, previously experienced from August through to October, but now extended and experienced from mid July (with the minor dry season at the beginning of July) through to October. In contrast, the major dry season has remained relatively temporally stable, though some households now indicate experiencing an additional minor dry season month during May, and a prolonged minor dry season period in recent years.

Table 6.3 captured different crops and forest products that households in the Baka communities cultivated and/or harvested following a seasonal calendar. Households indicated that how they conduct agricultural and forest activities is gradually changing due to rainfall variability. Forest products such as *Gnetum spp.* (locally known as koko/eru) are harvested all year round. *Irvingia garbonensis* (locally known as Bush mango/mangue sauvage) is harvested during July and August each year, and this now coincides with periods of major rains experienced by the community. Respondents indicated that July was usually ideal for Bush mango to be sun-dried,

but currently, the heavy rains that are experienced during that month complicate the processing and the storage of this product.

Table 6.3: Current seasonal calendar for crop cultivation/NTFP harvesting in the Baka communities

	Months of the year	**Jan♦**	**Feb♦**	**Mar♦**	**Apr***	**May♦**	**Jun♦**	**Jul***	**Aug***	**Sept***	**Oct***	**Nov♦**	**Dec♦**
Crops cultivated/ NTFP products harvested following different seasons.	Plantain	R	R	P	P	P	P			R	R	R	R
	Maize	P	P	P	P	R	R	R					P
	*Irvingia garbonensis**							R	R				
	*Gnetum spp**	R	R	R	R	R	R	R	R	R	R	R	R
	*Ricinodendron heudelotti **									R	R	R	
	Country onions*						R	R					
	Bushmeat*						R	R	R	R	R		
	Honey*							R	R	R	R		
	Cassava	R	R	P	P	P	P	R	R	R	R	R	
	Cocoa			P	P	P			R	R	R		

Key: *Shading indicates rainy (dark grey*) versus dry seasons (light grey♦) with symbol sizing indicative of minor♦* versus major♦* seasons. Unshaded column (March & July) indicates temporal overlap between rainy and dry seasons, i.e., as one begins and ends. Seasons are represented as a current seasonal calendar as experienced by households within the last five-ten years. P = Planté (Planting season); R = Recolte (Harvesting season). NTFPs and other forest-harvested products are noted with *. I am using the current seasonal calendar results from participants to explain this table and not that of Tsuru's in 1998.*

Picture 6.2: Seasonal weather calendar followed for the cultivation of crops/harvesting of forest products in the Baka communities.

> ***Interpretation note:*** **Crops and forest products are noted down row, with planting (P) and harvesting (R) period allocated monthly on a January-December cycle. Photo credit: Ojong Enokenwa**

In the focus group discussion workshops with participants from the Baka communities, different experiences on seasonality were discussed as people focused on how changing weather patterns affected them. I have captured varied opinions and experiences from participants from the Baka in **Box 6.1.**

Picture 6.3: Bush mango harvested and prepared for the market. Picture credit: Mr Eyan Johnson

BOX 6.1: SHARED EXPERIENCES ON SEASONAL CHANGES WITHIN THE BAKA COMMUNITIES

During the focus groups, we discussed how climate had changed. Participants explained their experiences on seasonal changes and how it affected their different livelihood activities. One participant recalled how seasonal changes had affected the drying of Bush mango as well as preserving the seeds:

"We usually collect Bush mango twice a year but often during the second part of the year from around July and August. July was good because we had no rainfall, and it enables us to dry the Bush mango seeds under the sun. However, it is becoming difficult these past years to do that as we start experiencing rains from July and it becomes heavy in August right through to October".

Another participant recounted their experiences during the rainy season when it comes to hunting of bush meat as heavy rains are often accompanied by storms and wild winds which makes it challenging to go deep into the forest:

"We go to the forest in groups so that we can look out for one another, especially knowing that a tree or a branch can fall on anyone during heavy rains. Remember, from August to October we have heavy rainfall which comes with winds that destroy our houses and trees in the forest. We often prefer to stay at home because you are likely to be hit by a fallen tree or branches if found in the forest wanting to hunt. We therefore practically hunt for about two and a half months in a whole year, and this has affected the quantity of meat we get to sell."

Participants, however, acknowledged the fact that certain products like Eru/Koko happen to thrive in both seasons and its availability all year round has allowed them to collect more in months when other products from the forest or crops are not available either for sale or home consumption.

In the Ejagham communities, a similar trend was recorded for weather-related impacts on harvesting, with rainfall variability making the preservation of forest products once harvested, increasingly challenging. Households indicated difficulties in proper drying of some products had negative consequences on the sale of these products and household food security, as the harvest is then wasted. A female-only head of the household in the Ejagham community described the impact of rainfall on forest products:

"We used to harvest Bush mango twice a year that is during the rainy and dry season. Unfortunately, with a changing season, we hardly can harvest this again during the dry season, but when the rains come, it is too heavy and makes it difficult for us to dry, and this affects the face value. Once the colour is not the best, the prices too are affected".

Picture 6.4A: ***Bush mango tree*** ***B: Bush mango fruits*** ***C: Bush mango (sun-dried seeds)***

Similarly, seasonal changes, as shown in Table 6.3, further reveal that country onions are harvested during June and July. These months in the past were minor dry seasons; however, July now comes with major rainfall. Similarly, activities related to the planting and harvesting of maize (given that maize can be planted and harvested more than once annually) usually occur during the months before and after the major rainy season (July-August); however, the month of July now is met with major rainfall.

Cassava, a commonly grown crop in almost all homes, is severely affected by changes in seasonality, something that has only in recent years become noticeable, as explained by a female head of the house from the Ejagham communities:

"...Nevertheless, the ways times have changed. Most of these crops do not even do well; sometimes, I wonder what has become of the farmlands. I will even insist and change the farm but will still meet the same problem. For years now, when I plant cocoyam (especially the Igbo coco), I barely get anything to harvest. Two years ago, it was cassava."

Further discussion with a male head of the house in the Ejagham communities revealed that the frequent changes in seasonality, especially having minor dry seasons in the rainy seasons, have resulted in standing water which is a breeding grounds for mosquitoes as there are not hard rains to wash out the puddles. Again, prolonged dry seasons have affected water sources with the quality of water being questioned by many. Here is how he frames it:

"People are often sick and once in the hospital you will most likely be diagnosed of malaria, typhoid and in some cases dysentery. I want to think that the water we drink, and our environment contributes to the presence of mosquitoes. We have streams that are drying out and are dirty, leaving us with stomach illnesses."

In all, the low percentages across most climatic shocks and stressors experienced by households indicated that climate impacts are not yet widespread, and most households do not perceive such impacts as problematic yet.

6.3.2. Understanding Exposure and Sensitivity to Non-Climatic Shocks and Stressors and Their Effect on Different Gendered Households

There was a higher incidence of deaths of the main breadwinner within the Ejagham communities than in the Baka communities, and this was reportedly higher across female-headed households (60%) who were often widows (Table 6.4). However, the death of other household members was seemingly higher in the Baka communities, especially within the male-headed households (48%). In terms of other household members, no female-only headed household in the Ejagham communities reported the loss of a member in the last 5-10 years.

While fire accidents were prevalent within female-headed households with a male presence (12.5%) in the Baka communities, it was negligible within the other household types across both communities. Fire accidents in the Baka communities, as described in focus groups, affected houses which were quickly burned down because of the nature of their construction. Participants described varied experiences on how fire accidents affected homes, leaving them with nothing as explained here:

"During the dry season, we are always scared especially leaving children at home and go into the forest with little supervision. It will sometimes result to children wanting to set the fireplace and wind drives it further bringing the whole house down".

Picture 6.5: A house constructed in the Baka communities with cooking ongoing at the time picture was taken. Photo credit: Ojong Enokenwa

Table 6.4: Non-climatic shocks and stressors experienced by households

Non-climatic shocks experienced by households (%)						
	Ejagham communities (n = 170)			**Baka communities (n = 70)**		
	Male with a female (n=125)	**Female only (n=20)**	**Female with a male (n=25)**	**Male with a female (n=50)**	**Female only (n=12)**	**Female with a male (n=8)**
Death of the main breadwinner	0.8	60.0	52.0	20.0	33.3	50.0
Death of household member (s)	21.6	0.0	12.0	48.0	33.3	0.0
Job loss	1.6	0.0	4.0	0.0	0.0	0.0
Loss of assets	8.8	5.0	4.0	0.0	0.0	0.0
Fire accidents	1.6	5.0	0.0	2.0	0.0	12.5
Other	0.8	5.0	4.0	0.0	16.7	12.5
None	64.8	25.0	24.0	30.0	16.7	25.0
Non-climatic stressors experienced by households (%)						
Inflation	41.6	45.0	32.0	54.0	75.0	87.5
Human illness	7.2	15.0	8.0	22.0	8.3	0.0
Unemployment	8.3	0.0	4.0	6.3	0.0	0.0
Expensive events	11.2	15.0	12.0	18.0	16.7	12.5
Political instability	31.2	25.0	44.0	0.0	0.0	0.0

Generally, both communities indicated facing 'other' shocks, which were relatively higher in the Baka communities than in the Ejagham communities. Querying the nature of other shocks further during focus group discussions in the Ejagham and Baka communities indicated that households were also faced with theft of different household items, road accidents, influx of refugees from the Central Africa Republic (particularly in the East region-Baka communities), and kidnappings – all of which contribute to household vulnerability. Nevertheless, some respondents, especially those residing within the male-headed households across both communities, confirmed they had not encountered any of the above-mentioned shocks within the past years.

Regarding non-climatic stressors, the most dominant in the Baka communities was inflation and was reportedly experienced more by households through the constant increase in the prices of food, paraffin, and fuel, as compared to the Ejagham communities. However, in the Ejagham communities, households reported experiencing political instability more than the Baka. Female-headed households in the Baka communities recorded more impacts of inflation than the male-headed households, something also found in the Ejagham communities, where female-only headed households (45%) and male-headed households (41.6%) seem to be most affected as well. Regarding political instability in the Ejagham communities, female-headed

households with a male presence (44%) had been more affected than female-only headed households (25%). Households indicated being affected by insurgence in their communities, i.e., the rise of the 'Anglophone crisis[20], which was echoed within both household types with a male presence.

Human illness and expensive events were reportedly low across both communities. However, in the Ejagham communities, female-only headed households had experienced both stressors, more than the other household types. In the Baka communities, this was consistently higher in the male-headed households, compared to female-headed households, for both illnesses and expensive events. Both stressors were generally experienced more among households in the Baka communities, compared to those in the Ejagham communities.

Qualitative results revealed that aside from funerals, communities named Christmas celebrations, traditional rituals, wedding ceremonies as well as birth/naming celebrations as a financial burden to them. An in-depth interview with a male head of the house from the Ejagham community explained the following:

"I am a member of the 'Obasinjom secret society", and we perform several rituals. While I cannot tell our different rituals and precisely what we do, you have to note that these performances and rituals are not cheap."

Households across both communities are seldom affected by sudden job loss as the figure across both sites was lower than 10%. More households with a male presence, particularly in the Ejagham communities, indicated being affected by job loss.

6.4. DISCUSSION

Climatic and non-climatic shocks and stressors have proven to leave complex and multiple impacts on households in rural communities. COVID-19 as a new stressor (post fieldwork), coupled with climate change, have impacted vulnerable communities with gendered implications for households. In the context of the two study communities, ethnicity and gender play a pivotal role in the livelihood activities that households engage in, as discussed in Chapter 5, which in turn affects how stressors impact people and how they respond to these. This in turn affects how resilient a household or a community becomes (Odilon & Lokonon, 2017; Ziervogel & Calder, 2003). I focus below on those shocks and stressors and impacts that were

[20] The Anglophone crisis has been ongoing in the restive Northwest and Southwest region of Cameroon. The two regions make up the English-speaking regions in the country. Section 6.4.4 (p.135) provides more details of the ongoing crisis.

most mentioned and rated as 'severe'. I discuss these covariate and idiosyncratic shocks and stressors within four main categories: climatic shocks and stressors; shocks and stressors experienced within the landscape; shocks and stressors within the households (personal level); and shocks and stressors experienced at the society level.

6.4.1. Gendered Implications of Climatic Shocks and Stressors Affecting Households

Different climatic shocks and stressors were recorded to have been experienced by households across both study communities with some having low impact, such as storms. The experiences of more [climate-related] covariate shocks showed patterns across households in the communities. Thus, climate-related shocks and stressors such as trends in temperature, rainfall, and seasonality/variability were reported across most households. However, the impacts will be different across households based on their assets and livelihood strategies.

While many households within communities might not readily understand what causes weather changes in the environment, they are often familiar with the effect these changes have on their lives (Bangura et al., 2013), as evidenced by the communities reporting on agricultural/forest product impacts of these shocks and stressors. Warming temperatures associated with shifting rainfall seasonality seemed to be the most common climatic stressors (i.e., the presence of increased climate variability) that both the Baka and the Ejagham communities experienced, which may indicate the beginning of long-term trends of climate change. For instance, the seasonal calendar of the Baka communities highlighted some changes in both the dry and the rainy season over the last five to ten years and how this has affected their planting or harvesting activities (See Table 6.2 & 6.3). Narratives from respondents on changing patterns of Bush mango harvesting further showed how an increase in rainfall in the future may affect the possibility of sun-drying its seeds, with implications for storage. The inability to preserve these seeds, which are used as condiment, could affect food security for most households. Similarly, for the Ejagham communities, the rainfall variability could affect the drying and storage of seeds, especially the Bush mango seeds, limiting potential income earned from selling harvested products.

Similarly, the seasonal calendar, as presented by Tsuru (1998), indicates that the harvesting of maize was previously done in June and July, often during the minor dry season. However, the current seasonal calendar indicates a shift in the major rains (July) which could affect not just the harvesting of maize but the next planting season. The changes on the seasonal calendar were similar for the harvesting of country onions. On the other hand, the findings suggest that Eru/koko is harvested all year round (see Table 6.3) and potentially 'filling the gap' if other

cropped and forest products species are going to be affected by the timing of different minor/major rainy or dry seasons.

Changes/shifts in weather can pose a threat to the nature of livelihood activities performed in these communities, thus compromising agriculture production and food security (Bele et al., 2014; Sango & Godwell, 2015). Unstable weather conditions, whether prolonged dry or rainy seasons, can severely affect crop cultivation and yields putting stress on the limited finances that households have (Bangura et al., 2013). Therefore, new seasonal changes, as shown on the seasonal calendar for crop and NTFP collection, will likely introduce new livelihood strategies that households will need to embrace (Islam et al., 2019). The impact will, however, be felt differently across households, especially female-headed households whose low levels of education might not prepare them for other employment opportunities and the lack of land ownership that precludes them from planting certain crops that would need more space (Chapter 5, section 5.6.1 & 5.6.5).

It is important to note that there is a gender dimension to the impacts of weather-related shocks on households. For example, more households with males (male-headed or female-headed with a male) noted a decline in forest products suggesting that such products mainly collected by men could be declining more (e.g., bush meat, medicinal plant, honey beer). However, the number of households in the study communities agreeing with this was still 50% or less. A study done in Ethiopia stressed the contribution of honeybees to crop pollination, food security and economic stability (Fikadu, 2019). Fikadu's study, however, confirmed that there was a decline in insect pollinators, including honeybees which are responsible for pollinating 62.2% of crops cultivated in Ethiopia, hence households now experience a decrease in food security (Fikadu, 2019). The decline has raised concerns about the supply of pollination services to agriculture; this is because one-third of agriculture production depends upon pollination, mainly by honeybees. In-depth interviews revealed that female-headed households also experienced low yields in the cultivation of subsistence crops such as cassava, and cocoyam.

While my study does not provide results based on what crops are cultivated more by a particular gender, a recent study done in Southern Ethiopia on maize cultivation across gendered households indicated that productivity was generally higher in male-headed households than in female-headed households (Gezimu et al., 2019). The study accounts lower crop productivity among female-headed households as being the result of factors such as a lack of land ownership/cultural tenure traditions and accessibility, as well as access to inputs such as improved seed, fertilizer, labour and credit availability (Gezimu et al., 2019; Auma et al.,

2010). Previous studies done in Komassi, in the southern region of Cameroon also showed that sources of income for males, between 1980-1998, came mostly from cash crops (cocoa, coffee, and craftmanship), NTFPs (cane, game meat, fishing, palm oil, and palm wine), and less from food crops. On the other hand, income for females was derived primarily from food crops (cassava, cocyams, groundnuts, and plantains), and NTFPs (cooked game meat, and palm oil). The results therefore showed that by 1998, income for females relied heavily on food crops with differentiated impacts on income and livelihoods (Brown & Lapuyade, 2001).

In the Baka communities, about half of male-headed and female-only headed households agreed that climate change was affecting crop productivity. In such situations, female-only headed households, for example, could become more affected given their limited ownership to land (see Chapter 5) which helps to enhance yields (Djurfeldt, 2020; Auma et al., 2010). While the differences in terms of the results across households are lower compared to other places, future projections of increased climate change may exacerbate the vulnerability of female-only headed households based on their starting context. The findings in this study have shown that the starting context of female-only headed households are limited, particularly in terms of education, employment, and land ownership (Chapter 5). That notwithstanding, it is challenging to establish gendered impacts of climate shocks and stressors especially on agriculture and food security as there are adult females in male-headed households and vice versa, and the possibility of shared household responsibility, particularly in times of stress when households must rally together, something other studies have also indicated as challenging to determine (Doss, 2011).

A major dry season of five months (November-March) may raise challenges for ensuring household water, especially as the minor dry season (May-July) is now one month longer. A quarter to one-third of households, mainly in the Ejagham communities, reported increasing temperatures and lower rainfall resulting in a decline in water supplies. However, within the Baka communities, fewer households indicated having experienced a decline in water, reflecting the increase in the major rainy season from August-October to July-October. The major rainy season is suggestive as to why most households in the Baka communities did not raise water insecurity as a problem.

Other studies have shown longer dry seasons, and shorter rainfall periods, to have an impact on water access and the quantity and quality of water sources which households rely on for their household use and for livestock (Edokpayi et al., 2018; Mukasa et al., 2020; Omarova et al., 2019; Twisa & Buchroithner, 2019). For example, in Uganda, a study was conducted to

assess drought and households' adaptive capacity to water scarcity in Kisali following increasing temperatures and reduced rainfall. The findings revealed that about 70% of the households spend longer hours collecting water during dry years (Mukasa et al., 2020). Another example draws from the work by Twisa and Buchroithner who explored trends in annual rainfall time series in the Wami River Basin of Tanzania. The conclusion was that water points used by households in the area had been significantly affected by seasonal changes, both in terms of availability and water quality (Twisa & Buchroithner, 2019).

The above examples from Tanzania and Uganda reflect what is evident in many other rural communities, with the Ejagham and the Baka communities being no exception. If temperatures are to go above 1.5°C, as projected in the CIP models presented in Chapter 2, then most water sources risk being affected, putting pressure on women and children whose major roles centre around water collection (Geere & Moa, 2017). Although this is not yet evident (given the low score ascribed to impacts of shocks/stressor on increased water insecurity), but likely in the foreseeable future, the exposure of water sources to climatic shocks such as prolonged heat, might make it difficult for women to carry out household-related activities, with subsequent implications for food security. When rivers and boreholes dry up, the findings here suggest that the impact could be gendered for female-headed households. The absence of an adult male in the household to share household activities would mean spending more time in finding and fetching water and therefore less time for other essential livelihood activities such as cultivation or harvesting of NTFPs.

When different water sources are affected by the prolonged dry season, there is the risk of households being exposed to a low quality of water which could lead to outbreaks of diseases such as typhoid, cholera, dysentery, stomach aches and diarrhoea (Edokpayi et al., 2018). For example, some households, especially within the Ejagham communities, indicated that changes in seasonality had affected water sources, which often leave them sick from the prevalence of mosquito breeding grounds and increased risks of malaria. A report by Serdeczny and colleagues suggest that there will be an increase in the risk of malaria projected for the East, central (Cameroon inclusive) and southern parts of Africa under a 2°C warming scenario (Serdeczny et al., 2017).

Further insights from Cameroon in a review of malaria by Nkondjio and colleagues, suggest that the East region is one of the most affected by malaria in the country, and hence could constitute a reservoir for malaria dissemination in Cameroon (Nkondjio et al., 2019). Still, the argument has also been that there is significant uncertainty in anticipating changes in malaria

distribution due to the complexity of factors (both climatic and non-climatic) with the relationship between temperature and malaria transmission varying from region to region (Serdeczny et al., 2017). More recently, Mordecai and colleagues have indicated that the direct effects of warming temperatures in Africa are likely to promote greater environmental suitability for dengue and other arbovirus[21] transmission and reduce suitability for malaria transmission (Mordecai et al., 2020). Climate change could shift the disease burden from malaria to arboviruses in Africa, although this will differ across regions, leaving differentiated impacts on households and communities (Cella et al., 2019; Mordecai et al., 2020).

Similarly, the outbreak of COVID-19 has been attributed to global environmental changes affecting almost every economy across the globe but absent from the dominant narrative has been the plight of indigenous people (Rupiya & Ramdeen, 2020). Indigenous people like the Baka in Cameroontend to disproportionately experience higher rates of infection, particularly women when faced with health crises emerging from modern pandemics (Rupiya & Ramdeen, 2020). Gyapong and Colfer (2008) in their study noted certain disadvantages African women have in dealing with health providers, even when they exist. For example, the health services provided to women who have filariasis in a society where the condition is stigmatised may improve their physical health but do little to overcome other social circumstances (Gyapong & Colfer, 2008). The study further noted that women in forested areas from developed and developing countries also expressed concerns related to the lack of explanation, investigative and treatment procedures, and quality of interaction with health-care professionals.

The effect of storms was relatively low but seemed to be more problematic in the Baka communities. The frequency of storms during the rainy season comes with varied costs. I suggest Baka households are more exposed to storms and other risks based on the nature of house construction, resulting in greater destruction when compared to the Ejagham communities. For example, the destruction of houses within the Baka communities was mostly due to storms during July and August. Such an impact can be linked to the nature of the construction of their houses as leaves and sticks are used.

Women would likely be disproportionately affected because of their cultural roles and responsibilities, in which house construction is one. There is thus a likelihood that when severe storms become frequent, households might become vulnerable due to the stress of rebuilding, or replanting of crops which have been destroyed and where such disasters could affect food

[21] Arbovirus is an informal name for any virus that is transmitted by arthropod vectors like mosquitoes, with people having dengue fever.

consumption and welfare in general (Ishizawa & Miranda, 2016). The constant destruction by storms would mean more resources and energy to rebuild newer homes by women in the Baka communities. However, women may not yet be equipped with the skills to make the necessary shift in the type of houses that are resistant to strong winds likely under future climate scenarios, leaving them still vulnerable to such shocks.

6.4.2. Gendered Implications of Shocks and Stressors within the Landscape (Landscape Changes)

While shocks and stressors linked to the landscape can be climate-related, there are forest-related stressors (both covariate and idiosyncratic) that are non-climatic and impact on the landscape resulting in landscape changes such as deforestation, degradation, soil erosion, and a decline in forest products.

In the Baka communities, several households raised the problem of logging and mining exploitation taking place within their forested areas and how this has dramatically affected the availability of some forest products, especially the hunting of bushmeat (see quotes on page 118). Furthermore, the high demand for NTFPs from neighbouring countries such as Nigeria has pushed more people into the harvesting of forest products as a way of making income for their households (Nkwatoh et al., 2010). How sustainable this harvesting is and what is at stake for the future is discussed in Chapter 7. Both communities are within conservation zones, but this reservoir of biodiversity and ecosystem services is yet to make an impact on poverty alleviation (Orock, 2014), especially as households continue to be exposed to a combination of shocks. However, narratives from key informant interviews from the Baka communities (pages 118-119) are indications that these ecosystem services are found to be declining, thus unlikely to remain sustainable for future use if forestry and mining continue.

Again, drawing from the quote on page 8, the poor ferralitic soil in these communities makes it even harder for crops to be cultivated because of its high clay content (see Chapter 3, section 3.3.2). This presents a bleak picture, as suggested by Mosnier and colleagues (2014), where land-use predictions showed that significant losses of forest cover might reach 50% by 2030, requiring greater dependency on off-farm/forest livelihood activities (Mosnier et al., 2014). The loss of the forest affects the Baka to a greater extent, and when combined with poor soils mean that their traditional livelihood basket is curtailed. However, timber exploitation, as well as agricultural activities in the Ejagham communities, also impacts on the forest as well as crop cultivation. Land-use activities such as timber and mining exploitation, as well as agricultural

activities, have often been the leading causes of soil erosion and landscape degradation with adverse outcomes on communities and households (Jouanjean et al., 2014).

A decline in forest products due to deforestation and other human-induced factors would mean a decline in medicinal plants which the Baka have depended on for decades. Although human illness was not noted as a major non-climatic stressor in either community, some respondents in the Baka communities indicated having more sick people now than in the past. More illness could be a result of more disease (as discussed above) and the absence of medicinal plants following the high rate of deforestation within the area, as well as scarcity linked to alien invasive plant infestation in previous harvesting areas. Respondents indicated that the presence of invasive species, such as 'Bokassa', seemed to have dominated the forest where they would usually get medicinal plants such as 'Sisingo', which is used for treating women and children. The limited availability of medicinal plants caused by the high rate of deforestation was suggested to be among one of the reasons for the increase in sicknesses within households in this study.

In support of my findings here, another study conducted in the East region among the Baka people explored the challenges faced by the Baka such as health, due to the many changes that are taking place in the forests which affects medicinal plants, among other things (Njiei & Asongu, 2015). In Froment's 2001 study conducted in the Ntem valley in Cameroon, 14% of the whole population and 28% of children under five suffered from diarrhoea at the time of the visit; noting that diarrhoeal diseases are the first cause of malnutrition and death in tropical countries. In addition, a missionary (Father Dhelemmes), who lived among Cameroon's Pygmies between 1950 and 1980 and conducted a very detailed (unpublished) census, concluded that the lifespan of the Baka Pygmies was around 23 years (Froment, 2008a). There was also a clear correlation between climatic factors and intestinal parasites such as roundworm (*Ascaris lumbricoides*) and whipworm (*Trichuris trichiura*) (Froment, 2008b).

6.4.3. Idiosyncratic Shocks and Stressors Experienced within the Households (Personal Shocks/Stressors)

Household experiences which are typically unrelated to those of a neighbour, (idiosyncratic) are discussed in this section. A combination of such experiences (e.g., death, illnesses, unemployment) at the household level are considered as idiosyncratic shocks (Pradhan & Mukherjee, 2018).

The death or sickness of the primary support can be devasting to the children and other relatives who rely on them for their care and provision. In this study, the death of the main breadwinner

was reported by many female-headed households, especially those in the Ejagham communities. One would presume many of them are the head of the house because they have lost their husbands. Such circumstances are problematic for women in these communities. Women may not have the chance to migrate or go out to work given that the death of the main breadwinner would increase a women's burden resulting from many duties and responsibilities and that may potentially increase their vulnerability, impacting on their health (Pyhälä, 2012).

The death of household members was shown to be relatively higher among households in the Baka communities, specifically those residing in male-headed households (22%), although human illness is not mentioned as an issue by many households. Such deaths could be because of accidents, political instability (in the case of those within the Ejagham communities) or from severe illnesses. In a joint project initiated by the World Bank and WHO, poor people's experiences related to ill-health and health share reflections from different countries across the globe. The report which focused on "Voices of the Poor" presents reflections drawn from a qualitative study ranging from 85 communities in Tanzania to ten communities selected from other areas (Cassels et al., 2001). Some of the discussions highlighted that unequal access to health care is also a reflection of women's lack of power in society, especially when they need to indicate their own health needs (Cassels et al., 2001). The report further elaborates that woman often lack care and support when sick as compared to men who often have support from women:

"When women are sick, there is no one to look after them. When men are sick, they can be looked after by women. South Africa, 1998" (anonymous).

Going by this quote from the report it shows that if climate change is making things harder for households and particularly female-headed households, then coping with death and sourcing finances for health-related issues will also be more problematic.

Similarly, deaths can hit households hard, via costly burial ceremonies that reduce financial assets, which are so important in the face of shocks. When a household loses one of its members, especially the head of the house, the impact can be considerable on those left behind. Expensive events were recorded across both study communities, though higher in the Baka communities. Spending was often done on events related to burials and other ritual ceremonies. In this respect, households expressed how saving groups have been instrumental for them in times of raising money for burials, justifying why most household heads were part of informal saving societies (detailed in Chapter 5). A report shared similar experiences from South Africa,

where people tend to join funeral schemes to protect themselves against debt, thereby building communities that support one another (Storchi, 2018). While most families in Africa are trying to give their loved ones a befitting burial, such burial rites are expensive, leaving them caught between fulfilling tradition and the reality of their income and household budget (Corden et al., 2008).

While weddings have over the years become more expensive than in the past, households in the Ejagham communities highlighted that they would continue to place a high financial value on the bridewealth (brideprice) for their girl child whom they have educated. Some evidence from elsewhere in SSA suggest that, excluding inflation-related increases, contemporary celebratory events have become even more costly – something Pauli and Dawids (2017) suggest is a result of modernization (Pauli & Dawids, 2017). Households may end up spending on weddings which could constrain the household budget, with an acute impact on the nutrition of children (Thakur, 2018). Similarly, the Baka communities also have several ritual events such as the "*mbouamboua*" for death rituals and the "*Luma"* being a thanksgiving ritual, which they often perform in their communities (Tsuru, 1998). These different expensive events could affect households differently, based on their available assets such as income, and employment status.

6.4.4. Shocks and Stressors Experienced at the Societal Level

Inflation and political instability, as discussed in this section, are covariate shocks that tend to affect almost everyone within the community with their impact often stretching households to seek alternative livelihood options to improve income. While such shocks and stressors affect almost everyone in the community, the impacts are noticeably different across households based on their starting context.

Continuous increases in food prices and other commodities such as fuel continue to impact on households within both communities. All households within the study indicated having experienced inflation through high prices of goods and services, though it was higher within female-headed households, especially in the Baka communities. Inflation often tends to threaten food security in households, with many having to make an adjustment which is often linked to household income, household size, several working persons within the household, and the drought related 'inflation' on the food basket following extended droughts (Dubihlela & Sekhampu, 2014; Wyk & Dlamini, 2018).

Female-headed households within both the communities seem to be affected more by inflation. Some of the reasons that coud account for this could be that male-headed households have

ownership of the land to rely on for growing food for household consumption. Work by Shackleton and colleagues in South Africa, and Djurfeldt in Malawi, Uganda, and Rwanda highlighted external gendered constraints that female-headed households face due to limited property rights, which may be avoided by the presence of an adult male in the household (Djurfeldt, 2020; Shackleton et al., 2014). Female-headed households have less ownership of land compared to male heads of the household, as shown in this study (see Chapter 5, Table 5.7). Ownership of land thus may follow cultural norms that often dictate that women do not typically own land, forcing them to rely on purchasing food with their limited income. The presence of inflation as a non-climatic stressor exposes possible income inequality, social injustices, and the lack of other essential assets within households with drastic impacts on poorer households (Odusola et al., 2017).

The Ejagham communities are more affected when it comes to political instability and the unrest that has plagued the country since 2016. The instability is due to the "Anglophone crisis", which escalated considerably since the fieldwork for this study was completed. The Anglophone crisis has been considered to refer to the marginalisation at all levels of the Anglophone minority by the Francophone majority (Konings & Nyamnjoh, 1997). After independence from Britain and France respectively, Anglophone and Francophone Cameroon merged to form present-day Cameroon under a federal system which was intended to prevent marginalization of any of the parties (Agwanda et al., 2020). Unfortunately, this federal arrangement that was meant to cater for both cultures and value systems was unconstitutionally abolished by the Francophone-dominated government, generating much animosity among the Anglophone minority. This animosity peaked in 2016 and has raised much tension since then (Agwanda et al., 2020).

It is thus very difficult, if not impossible, for people to sustain their livelihoods in places such as the Ejagham communities where conflict and political unrest continue to thrive. A report by FAO in 2017 indicated that about 70% of most migration patterns within SSA take place within the boundaries of Africa and are likely to remain so in the future (Mercandalli & Losch, 2017). While climate change contributes to the movement of people, a combination of socio-economic factors such as fleeing from conflicts, violence, persecution, food insecurity, poverty and human rights abuses remain some of the many reasons why people move (Mercandalli & Losch, 2017).

The political instability that has occurred within the Ejagham communities seems to affect significantly male-headed households. Three main reasons could account for this impact on the

male-headed households and the female-headed household with a male adult member: agile men are forced into rebel groups to become soldiers by armed separatist rebel fighters; young men are mainly targeted/killed by the government for cooperating with rebel groups; men are quickly arrested and detained by the government or separatist fighters when in defiance to giving out information (Pedneault & Bede, 2018). As a result, most men often flee the conflict-hit zone for fear of being targeted, leaving women to assume the responsibilities of the head of the household.

There is evidence that suggests conflict and political unrest will alter the household structure and dynamics in terms of gender roles (Buvinic et al., 2013). While female-headed households in this study may seem not much affected by conflicts, they tend to assume the responsibilities of male relatives within the household who are no longer in the house due to conflict-related reasons (Rohwerder, 2017). The Moser gender analytical framework, as discussed in Chapter 4, articulated the triple burden of female-headed households who might have been forced to combine and perform traditionally male-related tasks due to the impact of conflicts in the area. With most women assuming the roles previously assigned to men due to the crisis, the traditional household structure of men being the breadwinner is challenged (Moser, 2014).

6.5. THE COMPLEXITIES OF MULTIPLE SHOCKS/STRESSORS FROM A GENDERED PERSPECTIVE

The results presented from both study communities have revealed varied experiences amongst households, with some similarities for results related to covariate shocks and stressors. Both communities are experiencing warming temperatures with far-reaching effects on crops, livestock productivity, and the availability of forest products. Experiences related to warming temperatures and rainfall variability suggest a lot is at stake for households within both communities, whose livelihoods rotates around crop cultivation and forest products (Sango & Godwell, 2015).

Seasonal changes and rainfall variations, among other shocks and stressors, might not mean a complete shift in livelihood activities. However, in some cases, it will almost certainly require diversification of the livelihood basket and require households to build and improve on skills that could permit them to carry on with non-farm activities. In this case, the Ejagham communities are more likely to be comparatively more successful in responding, because the Ejagham communities are in general better educated, have better employment statuses, and likely to be more 'employable' in the future (Stifel, 2015). In terms of adaptive capacity, the Ejagham communities are therefore more likely to be able to respond and overcome shocks

and stressors compared to the Baka communities. This realistically assumes that the big timber and mining companies in the East continue to land grab the forests the Baka live in. If such a structure were changed more equitably, Baka adaptation would work as well.

Furthermore, developmental activities initiated through government projects, such as mining and timber exploitation, have been shown to exploit households within the Baka communities (See Chapter 3). They are often taken advantage of because of their low levels of education; plus, these activities expose communities further to land degradation as a result of deforestation (Njiei & Asongu, 2015). The impacts have been shown to trickle down to result in degraded landscapes and soil erosion and the decline in water sources, with impacts most likely to be felt by women and children within communities, as most of their domestic chores require water.

While climatic shocks and stressors already having severe impacts on households, non-climatic shocks and stressors such as unemployment, inflation, and political instability further exacerbate theis. These non-climatic factors have been shown in this study to contribute to some of the reasons households tend to give up past traditional events that used to portray their unique cultures (See Chapter 3). Lastly, the deaths recorded within households due to poor health conditions can force specific genders to assume roles previously performed by others. For example, the death of the main breadwinner can force children to assume the roles of their parents, or women take up male responsibilities at home.

6.6. CONCLUSION

Climatic shocks and stressors, as experienced in the study communities, are both covariate and idiosyncratic resulting in diverse outcomes based on the level of severity. The current findings suggest that households are experiencing a shift in seasonality in rainfall patterns for the planting and/or harvesting of crops (such as maize). With households across study sites primarily dependent on agriculture and the collection of forest products, such varied impacts would affect livelihood activities (Sango & Godwell, 2015). However, other non-climatic shocks and stressors, as discussed in this chapter, can further expose households to risks and reduce their ability to respond to these shocks (Wunder et al., 2014). The complexities of multiple covariates and idiosyncratic shocks and stressors can affect a household's adaptive capacity. How they cope with the shocks they are exposed to, is based on their available assets which often serve as a safety net. Chapter 7 will present results on the local coping and adaptive responses by households, with a focus on forest-based safety nets and local social support systems.

CHAPTER SEVEN

7. CULTURAL AND GENDER-DIFFERENTIATED COPING RESPONSES TO MULTIPLE SHOCKS AND STRESSORS, WITH A FOCUS ON FOREST AND SOCIAL SAFETY NETS

"It is what it is. Isn't that how these things always go? They are what they are. We just get to cope"- Mira Grant.

This woman had just returned from the forest and harvested *Irvingia gabonensis (*Bush mango). It is one of the NTFPs she collects, like many other households, and sells to raise income for her house. She also uses it as a condiment when preparing food, and her livelihood surrounds the use of this and many other NTFPs. She hopes the forest will not fail them in the future, so they continue to rely on the Bush mango.

7.1. CHAPTER OVERVIEW

This chapter addresses objective three, namely, to identify the cultural and gendered differentiated responses to multiple shocks and stressors, and how they influence long-term livelihood outcomes. The main research questions that I set out to answer include:

- What are the coping and adaptive responses to climatic and non-climatic shocks and stressors and how do these vary across household types and sites?
- How are forests and forest products included in coping and adaptive responses and which household types and ethnic groups depend on them most?
- Do household coping and adaptive responses improve livelihood outcomes and reduce poverty or are some responses maladaptive, reducing long-term adaptive capacity, and for who?

The chapter also explores objective four, to understand future livelihoods trajectories in relation to forest dependence across different households, under a context of multiple shocks and stressors. I assess the local coping and adaptive responses to multiple shocks and stressors (Chapter 6) and explore the implications for future livelihood trajectories across different types of households. In keeping with the central themes of this thesis, I consider responses in the

context of two types of local (informal) safety nets that poor, rural people frequently turn to in times of crisis: *local social support systems* and *forest-based responses* (collection and sale of forest products). In discussing the role of forest products (NTFPs) as a potential safety net for responding to shocks faced by households, I explore the possibility of future depletion of these resources and the implications of this for household and community resilience (also see Chapter 2; section 2.3.5).

7.2. BACKGROUND CONTEXT

The chapter highlights how the interconnections between multiple shocks and stressors (see Chapter 2, section 2.2.1) will demand varying coping responses from communities and households. The responses of different types of households to climate change will be based on their available assets and capacities (Chapter 5), with multiple social, environmental, economic, and political stressors potentially amplifying pressure on communities and limiting their coping capacities as a result (Berkes, 2017; Preiser et al., 2018; Arendse & Crane, 2010).

Households in the Baka and the Ejagham communities are confronted with complex challenges affecting their ability to cope with, or adapt to, multiple forms of global and regional change, not least because of their starting context of high levels of poverty and vulnerability (see detail in Chapter 2; section 2.4) (Shackleton et al., 2014). As a result, households have few choices available to them in terms of responding to shocks and stressors. With limited options to respond, local responses, as indicated in the overview, formed the basis of social safety nets for households across the study communities.

Chapter 1 introduced forest dependence by poor communities, drawing from examples of communities in the East region of Cameroon in a study by Chia and colleagues (Chia et al., 2013). I highlighted how forest products continue to act as safety nets, especially during the major dry seasons with reduced crop yields (see Chapter 1, section 1.2.2). While forest safety nets have been shown to assist households in coping with several shocks, social safety nets from private and public mechanisms (e.g., drought and flood relief subsidies, insurance, child grants) can make a difference during a crisis (see Chapter 2, section 2.3.6).

The results in Chapter 5 of my study further illustrate how the study communities are rich in certain livelihood assets such as social capital, which act as a social safety net when other assets are lacking. Here, I discuss how different local coping responses can potentially leave some household types more vulnerable if they lack enough assets and resources, or do not have access to forest products. Furthermore, given that many of the responses made at a local level are

coping, rather than adaptive, they may not necessarily eliminate future risks and, instead, could lead to maladaptation.

7.3. RESULTS

7.3.1. Non-Forest-Based Local Responses: Gifts/Remittances, the Sale of Household Assets, and Social Networks

Local non-forest-based responses to climatic and non-climatic shocks and stressors relate to obtaining support from family and friends, primarily through gifts and remittances, as well as the sale of household assets. Ejagham households appeared to have greater access/reliance on gifts, more so than those in the Baka communities. Between a quarter and a third of households (particularly in the Ejagham communities) relied on family and friends' support, via gifts, to cope with shocks and stressors. While there were only small differences within each community, the male-headed households within the Ejagham communities (31.2%) received more gifts than other household types, while in the Baka communities, it was the female with male households (25%) who received more. The findings suggested that female-only headed households (25%) in the Ejagham communities seemed to receive more gifts than female-only headed households (16%) in the Baka communities (Table 7.1).

Table 7.1: Non-forest-based coping responses used by households

	Ejagham communities (n = 170)				**Baka communities (n = 70)**			
	Male with female (n=125)	**Female only (n=20)**	**Female with male (n=25)**		**Male with female (n=50)**	**Female only (n=12)**	**Female with male (n=8)**	
Receiving gifts from family and friends (%)	31.2	25.0	24.0		20.0	16.0	25.0	
Sold household assets (%)	3.2	0.0	0.0		10.0	33.3	12.5	
Social support system during hardship based on the following factors	**Strongly disagree**	**Disagree**	**Agree**	**Strongly Agree**	**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**
Willingness to help/receive help from neighbours and community members (%)	0.0	2.4	38.4	59.4	4.3	15.7	20.0	60.0
Can easily borrow money from community (%)	1.2	4.7	41.8	52.4	11.4	45.7	10.0	32.9

Households received gifts from family and friends in the diaspora and local cities in Cameroon, making up part of the support for their daily survival. A female head of the house from the Ejagham community shares her experience:

"When my husband died, I had to work very hard to raise my children, and I am glad I was able to give them a basic level of education. My first daughter travelled overseas and supported us a lot since the Anglophone crisis started in 2016. She sends home money every two months to buy food, and this has been a huge relief for me."

Both communities often relied on the support and willingness of people in the community to render services to them, and in return, where they could provide similar support to other households. Households generally strongly agreed that one way to cope during shocks and stressors was through supporting one another by offering food items, household items as well as labour, which were not necessarily in the form of 'cash gifts.' Households in the Baka communities indicated that they found it difficult to borrow money when in need (45.7% 'disagreement'), with just 4.7% of respondents in the Ejagham communities saying the same. The difficulty with borrowing reflects a greater difference in wealth status within the respective communities, with most of the Baka households being impoverished.

In both communities, however, some households would source extra labour from neighbours and other community members for either the collection of forest products or planting/harvesting of crops to help them cope. A female household head in the Ejagham communities explains:

"I left my marriage with the children still very young, and I find it hard when it is the planting season. So, I will beg for support from the elderly children of my neighbours and sometimes from other family members. I do the same thing when harvesting crops like cassava, egusi, and other forest products like Bush mango so that they can support me transporting them from the farms to my house."

However, another interviewee explains the challenges faced around relying on other people for labour, as detailed by a male head of the house from the Ejagham communities:

"In the past, it was easier to get labour from the young people in the village, and I would just provide food and drinks for them to follow me to my farms when I need extra hands. However, this is not the same today due to hardship; many youths have relocated to the bigger towns for greener pastures. It has affected work in the village as many cannot expand farming activities with limited labour availability."

While both communities tend to identify theirs as close-knit communities, some respondents in the Baka communities (61.4%) confirmed that close-knit communities worked in their favour, but to gain support, you must build genuine trust with the people that you live with. An excerpt from an interview with a male head of the house from the Baka community is detailed in **Vignette 7.1.**

VIGNETTE 7.1: SHARED EXPERIENCES ON TRUST AND SUPPORT WITHIN THE BAKA COMMUNITIES (V7.1)

I am a man born here in 1981, and my parents lived here in this small house you see here. My father later died, and I struggled here with my mother and sisters.

The thing is I have lived here, and I respect how people live their lives. I do not look for trouble and only bother when I see a brother or a friend wanting something, and I help if I can. Do you know it is difficult to hear of people stealing from another person? For example, before my neighbour goes to the farm or anywhere, he will let me or my family members know that if he does not return when he must, then we know something is wrong. I remember my father used to warn me that I should always make sure I live happily with the people around me as they will tend to protect me.

It is our culture, so we live together. When in the forest to hunt, we must protect one another in case something happens. So, we cannot stop when we come back home. That is why it is straightforward for me to trust my neighbour, and I do not doubt what he tells me. If he too sees that I am in trouble, he will help immediately, sometimes lending me money like 500frs, 1000frs, or even 2000frs when I badly need it. We have lived together in such a way that when our women are going out to the forest to get things like Bush mango, bitter kola, wild yams, they will go in groups and even stay in the forest for the period when they are doing the harvesting.

Moreover, you know the work is lighter, as they move from place to place, farmland to farmland helping one another. We, the men, cannot argue this because we grew and saw our parents doing the same thing. Imagine now that things are hard; you cannot have it all; you will end up dying, so we tend to rely on one another. It is our way of coping with hardship; what I have I give what I do not have you also give, and life goes on.

Regarding the sale of some household assets, the general trend is that households did not engage much in the sale of assets across both study communities. However, more Baka tend to sell assets than the Ejagham, as evidenced by all household types doing so, especially female-only households (33.3%) (Table 7.1).

Follow-up in-depth interviews with respondents who had sold one or more items explained why some households engaged in the sale of their belongings. An interview with a male head of the house from the Baka community had this to say:

"I do not have many things in my house. There is no money to buy many things for my households. I managed to buy a phone and a radio about two years ago and a 250L barrel for storing water since we have difficulties getting clean water here in the village. However, early this year (2017), my wife was sick, and I had to sell my phone and the radio just to have a bit of money for treatment, and it was not even enough".

Similarly, another interview with a female head of the house from the Ejagham community explained how selling some of what she owns has become a norm after her husband died. These findings and other responses are presented in **Box 7.1.**

Box 7.1: USING PHYSICAL ASSETS TO RESPOND TO SHOCKS/STRESSORS IN THE EJAGHAM COMMUNITIES

Only a few households in the Ejagham communities mentioned selling their assets as a way of coping with different shocks. They tend to rely on different coping strategies when they are affected by multiple shocks. One of the interviewees from Kembong village shared her coping strategy:

"*As a single mother, I have had family members who are sick, which affects my income, and the last three years, most of the crops I planted did not yield good harvest leaving me very frustrated. I usually sew clothes, but I cannot afford to buy the necessary things to run my business, so I rent out my machine to others and use the money to support in providing basic household needs*."

While she says this is not sustainable in the long run, it meets her immediate needs.

A widow from Mfuni village further elaborates that since the death of her husband, she has devised different strategies to sustain her family:

"*When I lost my husband in 2012, everything about life and my children changed. To raise their fees, I will sell my wrappers (fabrics) in the market or to those in my village who are willing to buy them. Of course, these were expensive fabrics, and I will be happy to get money from it and pay fees for my kids.*"

In a focus group discussion, many participants revealed they would only sell their household items as a last resort to enable them to handle a financial crisis at home. A male head of the house said:

"*For me, when I buy things for my household, I always like to add other things to them and not reduce. However, things became tough in 2015, and I had to sell the truck I had recently bought, which helped us fetch water and carry our farm produce. That was a painful thing to do, but I had no other alternative than to raise money that I urgently needed.*"

7.3.2. Forest-Based Responses: Using Forest Products as a Safety Net

In the Ejagham communities, female-headed households (female only and female with male) were more likely to sell NTFPs than male-headed households within the community. Results further show that female-only headed households in the Ejagham communities were also more likely to sell NTFPs (75%) than those in the Baka communities (58%). More male-headed households (66%) in the Baka communities sold NTFPs, as a coping response to food shortages, than male-headed households in the Ejagham communities (52%) (Table 7.2).

Respondents were asked if it was harder to collect NTFPs now than it was in the past, and within the Baka communities, female-only headed households (75%) reported this was the case. Although it seemed to be the prevailing sentiment across all household types in the Baka communities (>60%), for the Ejagham communities, it was evident only within the male-headed households (64.8%). Nevertheless, when totalled, the percentage of households in the Baka communities confirmed the collection of NTFPs is now more challenging than for households in the Ejagham communities (see Table 6.1).

Table 7.2: The use and sale of NTFPs in response to shocks and stressors

	Ejagham communities (n = 170)			**Baka communities (n = 70)**		
	Male with female (n=125)	**Female only (n=20)**	**Female with male (n=25)**	**Male with female (n=50)**	**Female only (n=12)**	**Female with male (n=8)**
Sold NTFPs as a response to food shortages in the household (%)	52.0	75.0	76.0	66.0	58.0	75.0
Perception that it is harder getting NTFPs now than in the past years (%)	64.8	50.0	44.0	66.0	75.0	62.5
Women allowed to hunt bush meat in the household (%)	6.4	0.0	0.0	8.0	8.3	0.0
Restrictions on women regarding the harvesting of NTFPs (%)	17.6	5.0	4.0	16.0	16.7	12.5

	Ejagham communities (n = 170)				**Baka communities (n = 70)**			
	Strongly disagree	**Disagree**	**Agree**	**Strongly agree**	**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**
Women support one another in the collection of NTFPs through a women's group (%)	4.1	18.8	11.8	65.3	2.9	12.9	45.7	38.6

An excerpt from an interview with a male head of the house in the Baka community in the presence of a household elder presents the experience of sourcing forest areas and forest products as a household's source of livelihood. His experience, which reflected that of others, has been captured in **Vignette 7.2.** He expressed that it is harder to collect forest products in the Baka communities following the impacts of deforestation.

VIGNETTE 7.2: SHARED EXPERIENCES ON FOREST PRODUCTS AND CHALLENGES AROUND HUNTING BUSHMEAT WITHIN THE BAKA COMMUNITIES (V7.2)

I am glad you came on a day that my mother is even at home. She knows a lot about that. She can confirm this with you too. When we were growing, the first thing I noticed was that we did not have to go far from the house to harvest any kind of thing from the forest. We were in the heart of the forest and were surrounded by everything. We will never lack food too (mother nods head in agreement). There were so many animals that you do not have to go far to hunt. I do not even know how we got to this level that I am now struggling to give food to my family. Imagine, then, that our women will go a few steps away and will have rivers everywhere to fish. I will tell them I am coming, and before they know it, I am back with meat. Hmmm, but not so today. Where is the river? Even bush meat, I can go two weeks deep into the forest and come back empty.

When asked if the forest is now empty, he replies that:

Exactly! Everything has gone. We had these sweet caterpillars that were a delicacy in almost every house. Today our children barely know it as they have grown not to see it … My mother used to say it is because they used to love living in very cold and wet places under trees, but we do not have many trees again, so the sun is driving them away. I remember how our wild yams were everywhere you go, but today we even plant, and very little comes out. We used to make lots of money from selling Bush mango, wild honey now we barely consider selling them again. If we have enough to feed ourselves, we are delighted. Imagine how hot it is, and we had expected rains in February or March, but it only came late May and June.

He further explains how they go about hunting as a primary activity:

What can I say, now we go about 20 km deeper than we used to do in the past? I have even started trying to buy meat from others who hunt from other villages too, and then I supply and sell in my village. Nevertheless, I mostly sell this at a higher price to these timber contractors working here. At least I know they can afford to pay for it, so that is what I do. This thing that we almost do not have our thick forest is affecting all of us.

In both communities, women create support groups for the collection of NTFPs, sharing both the harvesting and safety burden, but also as an opportunity for reinforcing friendships and building trust. About 65.3% of respondents from the Ejagham communities strongly agreed that women support one another in the collection of NTFPs through groups. In the Baka communities, 45.7% of the Baka communities agreed that their ability to collect NTFPs was

made possible through their women's group. There was a general affirmation that women were getting support from other women when it comes to NTFP collection.

In terms of forest-based responses, some cultural norms may act as a barrier to women adopting specific responses. For example, women hunting bushmeat is generally low according to prevailing cultural norms. Still, more female-only households (8.3%) in the Baka communities are involved in the hunting of bushmeat, suggestive of the need to diversify livelihood options as a coping strategy. Households in the Baka communities recorded more agreement amongst female-headed households regarding restrictions to NTFP access for women than in the Ejagham communities, where it was men who mentioned restrictions. Female-only households (16.7%) in the Baka communities confirmed there were restrictions on women when it concerned NTFP harvesting, as compared to 5% within the Ejagham communities. There were no major differences between responses within male-headed households across both communities. Nevertheless, not everyone responded to this question as some were not quite sure about the rules on NTFP harvesting for women. So, while there may be some restrictions on women regarding the harvesting of NTFPs, these are not widely known.

7.4. DISCUSSION

Local coping and adaptive responses within the Baka and the Ejagham communities are limited. They have few options to overcome shocks and stressors and adapt to climate change. The most common responses that households adopt to cope with shocks and stressors are primarily based on available assets or resources from family members from afar, but also include the sale of forest products, and various types of support, i.e., harvesting assistance from communities' members. Though households also sold their assets, this was often done as a last option when stretched. The different local responses highlight again the importance of having multiple coping strategies as a way of improving the adaptive capacity of households and reducing vulnerability.

7.4.1. Local Responses to Shocks and Stressors via Social Safety Nets, Social Networks, and the Sale of Assets

Poor households are more exposed and vulnerable to multiple shocks and stressors, and often have limited options to respond (Jerneck, 2018; Shackleton et al., 2014). The support they receive from family, friends from far and near and social networks can help them cope with existing challenges (Clarke, 2012). The findings suggest that gifts and remittances make up 50% of what households rely on, and it helps them cope with immediate shocks and stressors. Although respondents in this study have confirmed receiving gifts and remittances from family

members who have migrated, this does not hold for all households as not all families have members who would have migrated.

Furthermore, with limited or no skills, those who migrate to bigger cities or other countries are most likely to struggle to secure a lucrative job, thereby being unable to offer gifts or remittances to family members back home or only be able to do this on an infrequent basis. This is likely something particularly relevant to the Baka. Bredtmann and colleagues (2019) investigated the effect of migrants' education on their remittance behaviour, and the finding showed that this has no impact on the likelihood of sending remittances, but has a positive effect on the amount of money sent, conditional on remitting (Bredtmann et al., 2019). Migration to other cities, therefore, is not the only factor that determines if families will receive gifts, but also the skills migrants offer potential employers. Given the low educational status of the Baka communities (see Chapters 3 and 5), this would disproportionally affect the remittances that the Baka may receive, reducing their coping capacity and increasing vulnerability when compared to the Ejagham communities.

There is evidence from the results in Chapter 6, as well as other studies (e.g., Paumgarten et al., 2020; Ragie et al., 2020; Mishi & Mudziwapasi, 2014), that during disasters, and when faced with other non-climatic shocks like political instability and inflation, households tend to depend on remittances to navigate the shocks which impact their lives. For example, in Lucas and Stark's (1985) influential study of remittances in Botswana, these were shown to assist households whose incomes are sensitive to drought, through times of severe drought (de Sherbinin et al., 2008). Similarly, Ellyne and Mahlalela's (2017) study in the Gambia and Lesotho showed that about 20% and 20.9% of the GDP was from remittance flow, respectively, with direct impacts on households' health, education, and physical capital (Ellyne & Mahlalela, 2017).

The results from the Gambia and Lesotho reflects a similar trend to that in Zimbabwe, where socio-economic challenges have led to a dependency on employed migrant family members who continue to sustain the livelihoods of relatives back home through remittances (Mishi & Mudziwapasi, 2014). A recent study done in the Bushbuckridge communities in South Africa on the rural livelihood's portfolio, revealed that respondent's off-farm cash income derived from primarily migrant labour remittances (73.1%), social grants (84.2%), and savings and loans (82%) was far higher than previous studies had suggested in the area (Ragie et al., 2020). Households across SSA have been shown to use remittances over time as an off-farm strategy to cope with unanticipated shocks such as health-related shocks and food insecurity while

striving to improve household welfare (Ajaero et al., 2017; Paumgarten et al., 2020; Sulemana et al., 2018).

Some households have been shown to cope by borrowing household items and money from neighbours and friends, and lending similar items to others when in need. Borrowing is often possible when households have built trust with one another and have extra to share, based on their shared cultural values (see Vignette 7.1 for details). However, in as much as borrowing money and other household items have shown to be a means of support to households, it can also increase household vulnerability (Cordero-Ahiman et al., 2018). For instance, across both study communities, all female-headed households were more likely to borrow money to cope with challenges than male-headed households. While borrowing can help meet immediate needs, it can further plunge households into debt (in this case, more female-headed households), leaving them more vulnerable.

Pervasive indebtedness – whether to formal institutions or to kin/neighbours - has been found to be an important ultimate cause of vulnerability, and in the context of climate change adaptation, disallows any creativity in adaptation responses (Ramprasad, 2019). About 60% of households were in debt after the 1998 floods in Bangladesh, as shown in a study by Hallegatte et al. (2016), leaving households with long-term negative consequences (Hallegatte et al., 2016). (Ojong, 2018)[22] presents a nuanced perspective on the financial cost of 'owing' and how that may cause vulnerability by showing that borrowing goes beyond credit arrangements to being rooted in complex social and cultural forces - hence challenging the narrative that attempts to separate credit from cultural norms.

A study across four regions in rural Ethiopia, where 1632 households were randomly surveyed by Debebe and colleagues (2013) investigated which shock triggered what coping responses of households and why. The findings indicated that coping with idiosyncratic shocks, such as health-related events was met by a greater reliance on borrowing compared to other shocks (Debebe et al., 2013). Other work done in Uganda to assess the primary coping strategies of households when hit by disasters showed that of the 3000 households that were surveyed in the Oyam and Kapchurwa communities, about 19% would resort to borrowing food (Helgeson et al., 2013). Borrowing money or food as a form of coping response, from the above examples, indicates that households are likely to receive less assistance from one another in the

[22] A disclaimer to say the author Ojong is not me, hence this is not my work, but a coincidence of name.

communities. Given that fewer households had savings (see Chapter 5), this could result in people becoming reluctant to assist others when they are already penniless and vulnerable.

The results in Chapter 5 showed that households (particularly female-headed households) were unable to make meaningful savings within the informal saving institutions with almost no one being able to save in banks and credit unions. Savings is therefore not an option for most households to rely on during crises as the high cost of living, and high inflation, makes it even more difficult for them to save for lean times. While households have the goodwill to assist one another, they might not have the 'extra' (time and funds) to offer when households are in need, and with covariate shocks, as they themselves are often at the limit of their coping capacity (as evidenced by the results on the selling of assets).

The findings suggest that the social, income and savings assets that households have is not sufficient for them to withstand or overcome shocks, and this may force them to sell household items, mainly when affected with multiple shocks simultaneously. Households from the Baka communities, especially female-only headed households, are more likely to sell their household items when faced with hardship. The result of households, especially those within the Baka communities, selling household items, suggests a lack of alternative options for households in this marginalised group to lean on during a crisis, as compared to those in the Ejagham communities.

Statements from respondents reinforce the need sometimes to sell assets, although this is a last resort when no other options remain (see Vignette 7.1). The sale of household assets used as a strategy is likely to increase vulnerability, now, and in the future. Although this is a coping strategy and not an adaptive one, it can constitute maladaption as it erodes households' adaptive capacity. Being able to turn to such non-farm activities during lean seasons can reduce household vulnerability. In Chapter 5, I presented quotes from a male head of the house on how he builds his adaptive capacity by engaging in non-farm activities. I repeat it here to reinforce the importance of diverse livelihood portfolios for coping, e.g. Niehof (2004) and Ragie et al. (2020).

"I am a farmer, but once I plant crops and have little to do on the farm than just waiting for the harvest season, I use that time to make chairs, beds, and cupboards for people in and around my village. I often lack money during the planting season, and the little I have is all invested in the farms, and this is when my carpentry business pays off as the income, I make from it survives my household while we wait to harvest and sell crops."

Livelihood diversification is differently motivated. Diversification is often associated with one's ability to reduce risk and escape poverty as described by Loison in a study conducted across selected districts in the Central and Western parts of Kenya (Loison, 2019). Helmy (2020) carried out a study on the evolution of livelihood diversification in Egypt, around the rural-urban divides on wealth, using the Egypt Labour Market Panel data from 2000 – 2018. The outcome revealed that poor rural households were dependent on informal livelihood strategies due to high entry barriers to formal employment (Helmy, 2020). In South Africa, Abongile and Taruvinga also noted a low on-farm diversification among rural households in the Intsika local municipality in the East Cape, where households are likely to be involved in non-farm activities based on the gender of the household head, level of education, household size, and number of livestock units owned (Tyenjana & Taruvinga, 2019).

While households may seek to diversify their livelihood streams, what a household or community may consider as its primary activities, others may engage in those activities as a diversification option for livelihood purposes. The choice of primary versus alternative diversification options are something that is conditional based on gender, age, education, available time, or land (i.e., generally existing assets). As mentioned by Tyenjana and Taruvinga (2019), it is more likely that a combination of these factors would influence the choice of livelihood diversification and even livelihood options for households. With regards diversification to include forest products, for example, a study by Shackleton (2004) in the Bushbuckridge area of Limpopo, South Africa found that due to economic hardship, rural people were increasingly turning to the use of natural resources. One such product was the production of a traditional alcoholic beverage brewed from the fruits of *Scerocarya birrea* (marula), especially by women, which provided an increase in household income and the provision of a safety net.

7.4.2. Using Forest Products (NTFPs) as a Safety Nets in Responding to Shocks and Stressors

Households often sold forest products to get income to make up for what they may have lost during poor yields and sometimes to augment income, or to cope with periods of food shortages. The use and sale of NTFPs is also considered a diversification strategy, as discussed in the example by Shackleton (2004) and in some of the findings from my study (Chapter 5, section 5.5.3). Similarly, a study by Paumgarten and colleagues, among two rural communities in Limpopo, South Africa on wild foods, showed that there was widespread consumption of these, such as bushmeat, fruits and herbs by households (Paumgarten et al., 2018). Female-

only households across both communities confirmed selling more products from the forests than the male-headed households. Selling more NTFPs would suggest they are more dependent on these products than those within the male-headed households, who are often presented with other livelihood options such as ownership and access to land for cultivation and migrating to other areas for job opportunities. This is not unexpected, considering the unique challenges faced by women and female-headed households in terms of land ownership, access, and control (Malleson et al., 2014).

Findings from the Poverty Environment Network (PEN) project, coordinated by CIFOR across 24 countries in Africa, Asia, and Latin America, explored some of the gendered perceptions of forest use. The results from Africa on the PEN project showed that the share value of unprocessed forest products collected by women was higher compared to that of men (Sunderland et al., 2014). Similarly, Shackleton and colleagues conducted a study in Lesseyton and Gatyana (East province of South Africa) across three household types. The results indicated that the dependence of women-only households, particularly on forest products, was very evident in times of crisis, with female-headed households recording perceived food security through NTFP collection (Shackleton et al., 2014).

However, these findings are contrary to those of Suleiman and colleagues (2017) in Nigeria. Their results suggested that male-headed households were more dependent on forest resources than female-headed households, owing to the cultural and religious norms in most communities in northern Nigeria, which restrict women from entering the forest, as well as participating in physical outdoor activities (Suleiman et al., 2017). Yet, while it is necessary to highlight women's dependence on forest products, it is somewhat challenging to fully assess how far a given gender can be dependent on these products. Nevertheless, highlighting the contributions, use and sale of forest products by gender differentiation is essential (Sunderland et al., 2014). The distinct roles of men and women in the collection of forest products often play a significant role in the access and control of such products (Pla Julián & Guevara de Molina, 2013). In the quest of households to use forest products as a response strategy, issues around access to such resources may arise among different household types, and women in particular, as explored in the FPE discourses raised in Chapter 2 (Chiwona-Karltun et al., 2017).

Women in both study communities form women's support groups for collecting such products as Bush mango, njangsa, and eru (see Table 7.2). Women explained that it was easier to increase products collected when taking turns to support one another. Drawing from results in Chapter 5 on social capital (see section 5.4.2), 33.3 % of female-only heads of the house in the

Baka communities were part of groups related to the collection of NTFPs. Brown and Sonwa also conducted a study in Cameroon to understand the community's resilience to climate change while depending on the forest and its resources. The study which sampled 232 people from 13 villages across three regions in Cameroon (Central, East, and South West regions) showed that 63.9% of respondents were part of collecting/growing/marketing groups in the East region of Cameroon, and about 34.7% of respondents were in similar groups in the Southwest region of Cameroon (Brown & Sonwa, 2015).

While fishing remains a predominant activity for women within the Baka communities, as raised in Chapter 3, there was no support group/association of women linked to fishing, something found similarly in other work (e.g., Brown and Sonwa, 2015). Men formed hunting groups, especially within the Baka communities as drawn from qualitative results in this study (see Chapter 5, Table 5.4). In-depth interviews expanded how such hunting groups supported men who sometimes spent up to two weeks in the forest, with their survival achieved by looking out for one another. The idea that robust support systems (social networks) have the potential to increase households' and the community's adaptive capacity (Hayashi, 2008) and give them a sense of belonging, explains why social groups in these communities thrive. Besides women's support groups for the collection of NTFPs, they are not culturally allowed to hunt, although the Baka households seemed to demonstrate more disagreement with this and as a result, hunting support groups were primarily those of male-headed households (see Table 7.2).

However, the prevalence of *some* women in hunting groups and a perceived relaxation of permission around participating in hunting groups suggest changing cultural practices in response to a livelihood need and/or opportunity. In some pastoral communities in Kenya, Ethiopia, and Uganda, changes in land use over the years has led to increasing interest in commercial investments in rangelands by governments. Pastoral livelihood activities, that were predominantly done by men, have witnessed the influx of women, forming new social organisations for livestock production, processing and accessing of fodder for income generation (Flintan, 2011). While changes in land use and livelihood activities created avenues for women to generate an income, in cases where there was a shift to agriculture meant that women would support the men for herding and still take up the extra agricultural activities (Flintan, 2011). Nevertheless, the survival activity of hunting has often met with challenges related to land pressure (logging, mining) and the decline in bush meat, which most households, especially in the Baka communities, would rely on primarily for food, as explored way back in work by Beauclerk (1994).

7.4.3. The Implications of Local Coping Responses for Future Livelihood Trajectories

In Figure 7.1, I have summarised the key local coping, and adaptive responses households in the study communities have used over the years; I then explore possible implications of these for future livelihood trajectories. I mainly focus on what the different responses mean for the different communities and household types.

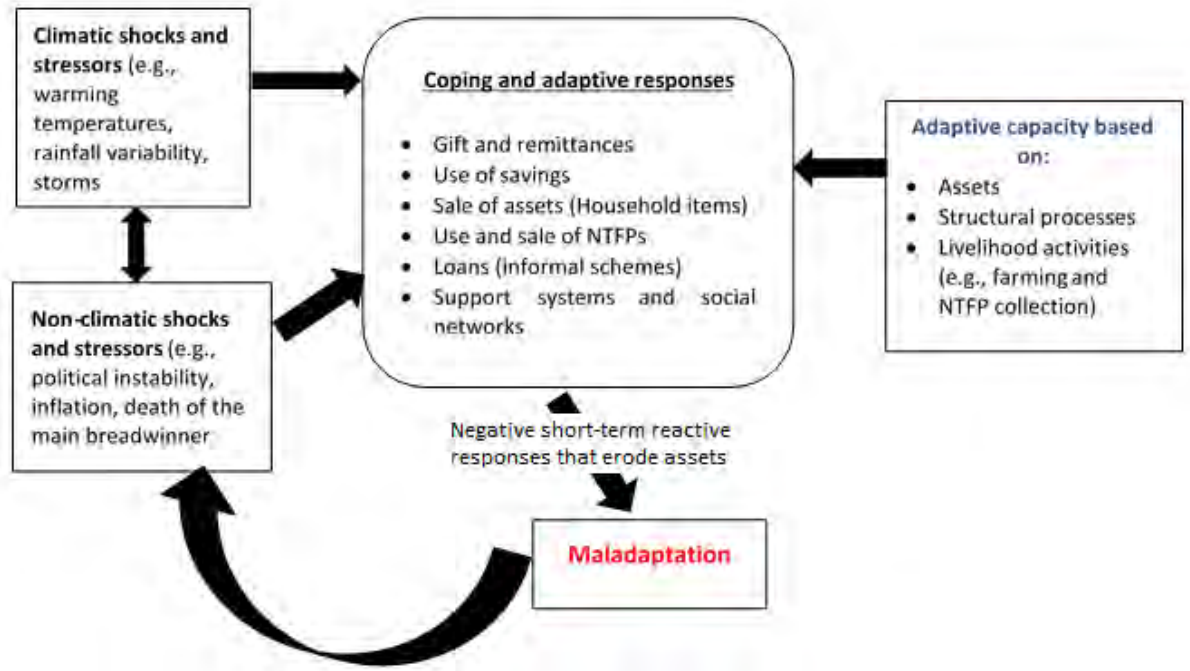


Figure 7.1: Key local coping/adaptive responses used by households with direct effects on their adaptive capacity.

The figure describes what households in the Baka and the Ejagham communities experience (from Chapter 6) and what it means for their livelihood outcomes. Climatic and non-climatic shocks and stressors work together to leave differentiated exposure and impacts on households. Mitigating the different impacts is achieved by various coping and adaptive responses by households as options to reduce vulnerability. Households in the study communities have been shown to rely on some key local responses, such as relying on their social networks as support systems, receiving gifts and remittances from families, use of savings, and in extreme cases, the sale of assets. Their ability to respond is often based on their adaptive capacity (assets, structural processes, and livelihood activities) which can be influenced by the starting context. In seeking to mitigate multiple shocks and stressors, certain responses may be harmful to the environment and further expose households to more shocks. Such exposures and sensitivity can push communities to consider livelihood diversification activities, which in the case of the study communities, often means the use of forest products.

While communities are, and may want to, diversify their livelihood options by engaging in non-farm/forest activities and migrating to urban areas, households in the Baka communities would remain more vulnerable as they often lack the needed skills to compete for jobs based on their level of education. Such a limitation takes them back to the already degraded forest where forest products such as bush meat, medicinal plants and wild fruits are lost due to commercial forest exploitation, leaving them trapped with limited options going forward. For example, the Baka communities indicated that it is harder to collect forest products now than in the past years (Table 7.2). The high responses (number of respondents) from all households could be a function of the decline in forest products in the Baka communities but more importantly, is likely based on the type of products that men and women generally focus on such as wild fruits, condiments, hunting and honey beer. These products are perceived as in a steady decline due to deforestation in both communities, impacting forest products that are critical for livelihoods.

The large percentage of Baka households indicating that it is not easy to gain access to forest products, as compared to the Ejagham communities, is also an indication that they are traditionally forest-dwellers who have exploited forest resources over the years (see Table 7.2), and thus arguably, are more perceptive of changes in availability. The difficulty of accessing forest products in the study communities, in the absence of a declining demand and need for these products, could increase household vulnerability, as evidenced in work by Shackleton and Shackleton (2012) on human and ecosystem vulnerability in Southern Africa. Their work suggests that high levels of human vulnerability are driving increased dependency on ecosystem services, which in turn, along with other stressors, renders ecosystems more vulnerable and impacts back on resource users (Shackleton & Shackleton, 2012).

While forest products have remained safety nets for many poor rural households, one could question how much longer communities, especially forest-dwelling communities, can rely on this option, given the increasing extreme climate events and declining availability. Paumgarten and colleagues (2018) raised this same concern in their study in South Africa. They presented nuanced perspectives around NTFPs as safety nets and the danger of such reliance becoming a poverty trap amongst those who primarily depend on such products. Given the constraints of availability that household's encounter when it comes to exploiting NTFPs, it may not always act as a safety net for them in the long-term. Therefore, one can draw from Paumgarten et al.'s discussion that safety nets themselves can become poverty traps, especially when the availability of such products becomes a problem in the long run for households that depend on

them during a food shortage. In this respect, households need to be aware of the dangers of relying primarily on forest products (NTFPs) that are steadily diminishing, as a coping strategy. However, owing to limited options and other forms of support, e.g social grants, simply 'being aware' of the declining availability of such products without other safety net options, may prevent households from making the necessary adjustments around harvesting NTFPs.

One critical emerging theme from this study is how cultural practices reflect the values and beliefs of people in the communities and how this shapes their livelihood/coping activities and responses. For instance, the findings of this chapter suggest that hunting is generally done by men across both study communities, except for a few women. However, in coping with multiple shocks, especially that of poor crop yields, some female-headed households in the Baka communities are seeking alternative livelihood streams and are venturing into hunting, despite the risk of violating cultural norms. Early research work on the 'Pygmy' (Baka) suggests that women participated in "gaming" and were very much involved in the early stages of training younger boys on how to hunt (Beauclerk, 1994). Women's involvement in the training of young boys suggests that the current perceived cultural, gendered restriction on women hunting may be a recent emergence, and current pressure may mean the resurgence of this ancient practice.

A significant concern with the different coping and adaptive responses has been that while they assist households in the short term, they do not increase their capacity to withstand future shocks and stressors. For instance, households may be forced to resort to the selling of assets when all other options fail, especially female-only headed households in the Baka communities. As the situation becomes worse, assets sold will become increasingly difficult to replace. The inability to replace assets could leave households more vulnerable, often with nothing to sell when exposed to another crisis. As such, marginalised and minority groups like the Baka communities, with already few assets, may become more vulnerable than households in the Ejagham communities.

The above findings on the sale of assets as a last option corroborate the work of Helgeson and colleagues (2013) in rural Uganda on coping responses by households when subjected to weather disasters. The results showed that the disposal and sale of productive assets such as land and household items was just 3% and 10% respectively (Helgeson et al., 2013). The low percentage of respondents in Helgeson's study who are willing to sell land or household items as an immediate response strategy shows that most households would likely turn to such options only when other options have been exhausted. The erosion of assets is bad for adaptive

capacity. It increases vulnerability as emphasised in a paper by Masunungure and Shackleton (2018) where they investigated the drivers and dynamics of livelihood and landscape change across two communities in Zimbabwe (Marwendo) and South Africa (Tshivuhulani). The paper reported an increase in the sale of physical assets (40%) during hardship in Marwendo, compared to just 8% in Tshivuhulani (where households have the social security of pensions and child grants), contributing significantly to asset erosion for households in Marwendo (Masunungure & Shackleton, 2018).

Both the Ejagham and Baka communities rely on remittances and gifts as a way of overcoming multiple stressors in the short term. However, their livelihood activities play a significant role in the kind of assets households would want to consider for coping during a crisis. For example, reliance on the support from one another seems to be one of the primary forms of coping during a crisis, which households across both study communities have demonstrated. The fact that their way of life is centred on reciprocity could enable them to render non-cash support to other households, especially in the Baka communities where savings are generally low. However, with everyone becoming more vulnerable to multiple, covariate shocks due to climate change, it may become even harder for households across communities to support and assist one another.

The findings from the study communities corroborate the work done by Clarke across two communities (Lesseyton and Willowvale) in South Africa on households' responses to stressors. Her findings showed that about 70% of respondents across both communities confirmed supporting one another and forming a collective safety net for households. However, the challenge was that it was difficult for lending households to get their loans paid back (Clarke, 2012). The inability for people to pay debts means more people will be unable to help others when in need. In an editorial introduction on vulnerability, coping, and policy, Chambers (2006) reflects on a trend in declining support from external family members in the Gambia due to the already vulnerable nature of most households. The inability for families to reach out to other members further weakens households' obligations towards one another and exposes them to other shocks (Chambers, 2006; Ojong, 2018).

In the event of a natural disaster such as floods, storms, or droughts, other forms of protection may be needed for poor communities such as social protection schemes (e.g. subsidies for farming or seedlings, social grants, flood relief subsidies etc.) to help communities recover from shocks (Hallegatte et al., 2016). Such social protection strategies are particularly beneficial to the study communities given that they already appear to be living at the reserves

of their coping strategies, as evidenced by the selling of assets and dependence on gifts, and remittances. Both social protection and climate change adptatation seek to support poor people from falling deeper into poverty; however, such support mechanisms are missing in many local communities (Davies et al., 2008). Drawing from the European Report on Development (ERD) (2010), there are several ways to target poverty and vulnerability through social protection. Such options range from insurance (such as disability, unemployment, work injury, health), child support grants, old age pensions, emergency relief (food aid, drought, and flood relief), self-insurance (savings and credits) ERD, 2010), and small loans. Many of the mentioned social protection mechanisms are lacking within the study communities, with most households having to rely on savings and credits from informal institutions which in most cases are not sufficient to help them cope during a crisis.

In Mozambique, for example, different shocks particularly floods, cyclones and droughts have been recurrent in the last decade, with cyclone Idai causing substantial damage with effects expected to last until 2020 (UNOCHA, 2020). Different social protection responses, both national and external, have been used to help communities cope with shocks in Mozambique with familiar responses to floods and cyclones. Support has been limited to in-kind support such as food parcels, and households receiving subsidies for economic shocks, but people have received no social protection response for armed political violence (Kardan et al., 2017). External social protection support mechanisms can make a difference when physical assets are destroyed, and households sustain financial losses, especially in the study communities, where a means of saving is limited (Aleksandrova, 2019). Again, natural assets such as land can be degraded, and social assets can be undermined. The absence of social protection schemes such as cash transfer programmes, subsidies for farming or seeds and seedling packages, and social grants policies for vulnerable and poor households within the study communities could make it difficult for them to improve on their adaptive capacity (Hallegatte et al., 2016).

Reports from other countries highlight how integrating social protection interventions to climate change, disaster risk reduction, and adaption have helped communities significantly to bounce back when affected (Aleksandrova, 2019; Davies et al., 2008; Ulrichs, 2016). However, such interventions would need to tackle structural processes that breed inequality in order to deal with causes of vulnerability (Tenzing, 2020). While social protection mechanisms have been applauded, some have indicated that such mechanisms can be unaffordable and unsustainable with no lasting contribution to poverty reduction (Devereux & Sabates-Wheeler,

2004; Dorward et al., 2014), with Doward and colleagues reflecting on the case of Malawi around the complexities of implementing social protection strategies.

In a World Food Programme Report (2019), lack of capacity, political will, and coordination between agencies were noted as some of the main barriers to greater integration of social protection and climate change adaptation approaches by governments (Solórzano & Cárdenes, 2019). For instance, in Cameroon, Aziz pointed out that social assistance geared to supporting students are often limited to outstanding students as motivation packages with the poor orphans often left out (Aziz, 2019). The implications then for marginalised communities like the Baka, are significant. Thus, altering the structure and policies that disadvantage communities and promoting collaborative development efforts (such as adaptive collaborative management or similar bottom-up efforts) can improve adaptation (Patino, 2010; UNDP, 2010).

Chapter 2 (section 2.4) and the findings in this chapter show how responses used by households to cope with existing shocks and stressors could become maladaptive. For instance, the constant exploitation of timber and mining activities in the quest to promote job creation by the government in the East region encourages the relocation of the Baka from the forests, thereby eroding their cultural identity. The long-term impact of such activities can also erode natural capital and increase environmental degradation for local people. In a study by Jones et al. (2015), it was noted that in northern Burkina Faso, many former pastoralists were encouraged to diversify livelihoods because of persistent drought. Besides the material losses, many of these former herdsmen feel they lost their cultural identity as a result of adapting their livelihood practices (Jones et al., 2015). Hence, the adaptation strategy became maladaptive as it negatively impacts on their collective wellbeing. Some of the responses drawn from my study have been shown to be coping and not adaptation strategies. This is the reason why it becomes difficult to provide clear examples of maladaptation that emerged from my work. However, the negative short-term reactive responses that tended to dominate the responses identified can ultimately undermine future adaptation, and thus could be considered maladaptive as suggested by Schipper (2020)

Disruptions and negative impacts from climate change, political instability (especially in the Ejagham communities), and now the COVID-19 crisis, are expected to put more pressure on forest products (Mitsugi, 2020). In a discussion paper by The Food and Land Use Coalition (2020), evidence across African countries during this COVID-19 pandemic following the planting and harvesting seasons presents two broad patterns with impacts on households:

- Countries such as the Southern part of Tanzania, Mozambique, Malawi, Zambia, and Zimbabwe that harvest crops between March and May could see short-term impacts due to the lockdown and border closures, disrupting the sale of crops.
- Countries such as Nigeria, Mali, Ghana, and other similar geographies (Cameroon included) planting in June and July could see long-term food production impacts due to access to inputs and services (The Food and Land Use Coalition, 2020).

The above evidence suggests that the shortage of food might drive most people to seek alternative options for food. Communities might, therefore, convert more forests to farmlands in a bid to respond to the urgent need for food security without considering how such negative responses may further impact on their livelihoods and adaptive capacity in general (Mitsugi, 2020). Sen and Singer (2020) further highlight that while the COVID crisis has affected over 160 million people worldwide, the impact will, however, be intense on indigenous people whose livelihoods rotate around forest and forest resources (Sen & Singer, 2020). Anderson further contextualises the impact on indigenous communities in an article in Time Magazine where he recounts how many indigenous peoples in the Amazon communities are coping with the pandemic by retreating more profoundly into the forest for food (Anderson, 2020).

7.5. CONCLUSION

Coping and adaptive responses used across households in the study communities are mainly local and based on forest and social safety nets. The responses, which are often short-term, centre around support for one another and the sale of forest products. However, some households do have family members working elsewhere who send gifts and remittances home. However, the current results suggest that relying on forest products is a risky strategy and may leave households more vulnerable and unlikely to adapt and cope with future climatic and non-climatic shocks and stressors, including the COVID-19 pandemic. Increasing levels of vulnerabilities will potentially place food security at risk and amplify existing gender inequalities between households (Mitsugi, 2020; Flatø et al., 2017). Continuous interactions of multiple shocks and stressors would leave households even more uncertain about their livelihoods in the future, and when coupled with climate variability which is difficult to predict will further impact on their adaptive capacity (Berkes, 2017; Preiser et al., 2018); this is particularly so for the Baka communities.

PART III: SYNTHESIS, IMPLICATIONS AND CONCLUSIONS

CHAPTER 8: SYNTHESIS, IMPLICATIONS AND CONCLUSIONS

APPRECIATING HOW CULTURE AND GENDER INTERSECT TO INFLUENCE COPING, ADAPTATION AND FUTURE LIVELIHOODS WITHIN THE FOREST-CLIMATE CHANGE NEXUS.

"There are no completely safe places. There are only places of varying risks and vulnerabilities, and people's capacity to prepare and adapt." – Jose Bernado Gochoco

This picture was taken during one of the workshops with the Ejagham communities (South West region) where participants took part in different games and exercises to explore concepts of climate change, vulnerability, and responses to understand differentiated impacts on household types differently.

8.1 CHAPTER OVERVIEW

This chapter sets out to develop an integrated understanding of the complex, socially differentiated dimensions of vulnerability and adaptation across household types and sites and explore the implications for more climate secure and equitable livelihoods. It brings together the findings from the results to answer the question: *how will climate change and other related shocks and stressors impact household types across sites in the future drawing from the current findings*? Specifically, I seek to consider how households, especially vulnerable women-headed households, can build adaptive capacity and better respond to multiple shocks and stressors for a more sustainable climate secure livelihood. I consider the implications of the findings within the current discourses and debates on social differentiation through an intersectional lens. I start by reflecting on how my theoretical, conceptual, and methodological framings/approaches (i.e., Chapters 1, 2 and 4) contributed to achieving the results in this thesis (section 8.2). I further summarise the key empirical findings (Chapters 5, 6, and 7) in relation to the theoretical and conceptual discussions raised in Chapters 1 and 2 to explore the broader implications of gendered vulnerability based on differentiated assets, livelihood activities, and

coping responses. This has been presented in the form of key take-home messages which unpack more nuanced interpretations of the problems of climate change, social differentiation, and vulnerability with the need for more practical action (see section 8.3). This broad synthesis will provide the context to explore policy and practical approaches towards more climate-resilient and equitable livelihoods for poorer households. Finally, the last part of this chapter (section 8.4) concludes and raises the question of: how do the key messages from this work relate to building adaptive capacity, reducing vulnerability, and improving future livelihoods of socially differentiated people?

8.2 REFLECTIONS ON THEORETICAL AND METHODOLOGICAL APPROACHES

In this section, I reflect on the theoretical and methodological approaches integrated into my thesis and how this contributes to new perspectives for knowledge and practice. In Chapter 2, I discuss the main philosophical and theoretical frameworks (SES, SJ, FPE, and the SLF) that guided my work to better explore the complex linkages between climate change, vulnerability, forestry resources and social differentiation (Chapter 2, section 2.1). The guiding lenses enabled me to follow a feminist methodological approach using the Moser and Harvard analytical tools to understand the intersectionality of gender and ethnicity (section 4.1). My reflections further draw on some of the limitations of using one framework in understanding and questioning multiple and complex stressors that affect people, especially in marginalised communities.

Firstly, my work contributes new perspectives on gender and differentiated vulnerabilities from an intersectional lens and the linkages to livelihood activities, including forest-based activities. In Chapters 1 and 2, I discuss how climate change and other stressors affect people differently. However, to understand these different levels of vulnerability, it was important to draw on a framework that looks at the interactions between people and the environment. The social-ecological systems lens was, therefore, a useful lens to unpack the complexities around resource use and allocation and what this means for adaptation by different groups. Also, it was helpful in gaining new perspectives of differential vulnerability in the study contexts, especially in relation to local environments and resources. When combined with the Moser framework, the social-ecological framework has helped me to make a novel contribution in recognising how different needs for men and women can shape different levels of vulnerability in their quest to control and use resources (Sida, 2015; Pagano et al., 2012). Table 8.2 further highlights emerging findings from my work, noting that any gender can be vulnerable and

privileged at the same time because of the complex social-ecological interactions that potentially affect communities and people in different ways (Preiser et al., 2018; Colfer et al., 2018).

Secondly, using multiple theoretical and methodological framings contributed to paying attention to the concept of power and inequity, which are often the root cause of unequal resource allocation and marginalisation. The SJ and FPE lenses allowed me to unpack social differentiation, and issues connected to power dynamics as discussed in Chapter 2, especially within the forest context (Collard et al., 2018; Sultana, 2014). However, there were other frameworks that would have allowed me better to unpack the concept of intersectionality as a central theme of my work. Reflecting on what I could have done differently, Hankivsky (2014) suggested seven principles (intersecting categories, multi-level analysis, power, reflexivity, time and space, diverse knowledge, and social justice and equity) to unpack intersectionality (Hankivsky, 2014). These principles, if all explored, would have added richness and depth to my research on climate change impacts across communities.

The Harvard analytical framework, together with the SJ lens provided a practical approach to understanding people's socio-economic context and power dynamics (who has control or access to the resource). More realistically the framework allowed me to understand how inequalities and marginalisation can birth differential vulnerabilities, as well as influence the livelihoods of poor people (Carr, 2020; section 2.2.4 on the SLF). The Moser framework also contributed to broadening the discussion on power as it allowed me to unpack how gender roles shape responsibilities, access, and control of resources and can potentially reinforce power dynamics (see Table 4.1; Figure 4.1 & Table 8.2). Using the Moser and Harvard frameworks allowed me to map out activities for men and women based on their roles and what emerged was the identification of a role shift particularly for women (section 6.4.4 and Table 8.2) resulting in a potential increase in vulnerability (Moser, 2014; Buvinic et al., 2013; Carr, 2020).

In addition, my PhD research has also contributed to navigating challenging and complex spaces for research through the triangulation of research methods. I used creative ways such as generating resource maps, stories from respondents, and games during focus group discussions to co-develop the understanding needed to unpack climate and non-climate related events affecting communities. As the nature of my research was on power, gender and climate change impacts, it was necessary to seek creative ways for feedback. Some of the data I generated from participant observations was presented in my thesis through pictures and quotes at the

beginning of each chapter to allow readers to have a deeper understanding of the study contexts, particularly the Baka communities.

In Chapter 4 (section 4.6), I highlight some research assumptions and limitations of my study - from constraints at the field level such as the political instability in the Ejagham communities (still ongoing in the South West region) to inaccessible terrains in the Baka communities (East region). Other external constraining factors like limited funding affected the duration of my time in the field. Reflecting on what I would have done differently if given the opportunity, I would follow a more participatory approach and spend more time within the study communities. Realistically, more time spent within a research community builds mutual trust and transparency (Morris, 2015). That would have allowed me to unpack more organically emerging themes from the fieldwork and provide more in-depth knowledge of climatic and non-climatic shocks and stressors and responses.

8.3 KEY TAKE-HOME MESSAGES: EMBEDDING AREAS OF PRIORITY FOR POLICY OR PRACTICE

Section 8.3 is structured around several key take-home messages, namely, social differentiation is an essential lens in understanding vulnerability in relation to assets and livelihood activities; responses to change are complex, primarily coping, and dependent on local safety nets especially for marginalised groups; building adaptive capacity can reduce livelihood vulnerability to multiple shocks and stressors; and the local situation is complex and more nuanced than the literature suggests. Section 8.3.1 deals with social differentiation as a fundamental lens for understanding vulnerability in relation to assets and livelihood activities. Section 8.3.2 looks at responses that are often complex, primarily 'coping', and dependent on local safety nets, while section 8.3.3 deals with reducing livelihood vulnerability to multiple shocks and stressors by building robust adaptive capacity. The last key message in section 8.3.4 pulls together the emerging insights from my study as I discuss them in the context of current mainstream narratives and approaches within the climate change discourse.

8.3.1 KEY MESSAGE 1: SOCIAL DIFFERENTIATION IS AN ESSENTIAL LENS IN UNDERSTANDING VULNERABILITY IN RELATION TO ASSETS AND LIVELIHOOD ACTIVITIES

This study has been positioned to explore climate change and other shocks and stressors through the lens of social differentiation with a focus on gender and culture (ethnicity) as intersectional identities that influence coping and adaptation. In Chapter 1, I present a set of

research propositions which capture intersectionality as a core entry point focusing on gender and ethnicity, and that have shaped this study, that is:

- Climate change and non-climatic shocks and stressors leave diverse impacts on different individuals and households, increasing their levels of vulnerability.
- Individuals and households respond by making use of assets, including forest products, to cope and adapt to multiple shocks and stressors.
- The use and access of resources to cope with multiple stressors has differential impacts on households and raises issues around gender equity and power relations within and between households.
- Coping and adaptive responses can sometimes become unsustainable, generating negative feedbacks to the environment on which people depend for survival.

The findings from this study confirm that the statements made above are mostly correct, noting there are complexities around each statement as different categories (specifically, gender and culture) intersect. These intersecting categories often affect an individual's, or a group of people's capabilities as discussed by Colfer and colleagues (Colfer et al., 2018), but more importantly, such intersecting categories can influence a household's coping, adaptation and future livelihoods amidst climate change.

My study, from an intersectional perspective, shows that people belong to more than one category at the same time[23]. For example, a female head of the household can be vulnerable when it comes to issues of land rights (based on her gender) and at the same time experience marginalisation for being a Baka (based on her ethnicity). Similarly, women in some cases can have a better starting context than men, such as making decisions over the construction of houses in the Baka communities. This emphasises that oppression and vulnerability are not isolated based on a particular category but can be experienced from intersecting categories at the same time, as discussed by Hankivsky (2014). Given that the starting context varies across households and communities, people would experience varying levels of vulnerabilities, producing different outcomes.

[23]. There are different categories that people belong to, and these categories such as age, ethnicity, race, class, and gender, intersect and leave people either privileged or oppressed in each situation or context. My study is aware of such situations where a given category (e.g., male-headed household) could be privileged in terms of financial assets thus building a better adaptive capacity compared to other categories (female-only headed household) across and within different ethnic groups.

Evidence from this study supports the view that power dynamics, access to assets, being in leadership positions, and equitable distribution of resources inform the kind of livelihood activities households and communities will generally undertake, or inform the common livelihood strategies and their responses to shocks and stressors (Chapter 5; Baumann, 2002; Osborne, 2017). Female-headed households in both communities had less ownership over land as a resource, with many limited to land access only, mostly through a male relative (Chapter 5, Table 5.7, and Box 3). Indeed, the lack of complete ownership of land as a critical factor of production, particularly for women (and both men and women in the Baka communities), can reduce their capabilities to pursue key livelihood activities, hence reducing their ability to respond to shocks and stressors.

Equitable access to productive resources, especially land and forest resources, is not contested at the household level only, but rather also within communities and across cultures (Fonjong et al., 2013; Fonjong et al., 2010). The absence of enabling factors such as gender-sensitive policies and planned adaptation that mainstreams people's culture, knowledge and livelihoods tend to breed tensions and contestations where a situation of 'privileged versus the oppressed' can be created across different social categories (Chapter 3, section 3.3.3; Colfer et al., 2018). For instance, a female head of the house can experience oppression and marginalisation when it comes to land ownership and control, but in another situation, within the same community, she has the decision-making power on the construction of a house over males, as shown in the Baka communities. Such experiences may vary in a different cultural context such as the Ejagham communities. Hence, power dynamics occur differently across socially differentiated groups of people where they can experience privilege and oppression simultaneously, depending on the given situation or specific context they are in (Hankivsky, 2014). In some cases, both communities can experience oppression and marginalisation at the same time. For example, land dispossession to companies were imposed across both communities by the government, although the impact may vary across communities and households.

Asset accumulation, especially, was shown to be challenging as economic hardship often pushes poor households and individuals to seek assets that can support and meet their immediate needs and survival. For example, social capital was highly utilised by households across both communities as they were members of different social groups such as farming, hunting and forest gathering, and saving societies. A proportion of households acknowledged that such social networks offered them an opportunity to lend and receive support from one another, as well as enhance cultural ties and affiliations (Chapter 5, section 5.4.2). For example,

about 29% of respondents confirmed social cohesion was promoted during a crisis such as death, as revealed in a study conducted within local community groups in East Uganda (Mutebi et al., 2017). The findings in Uganda reflected those of collective groups and burial societies (‘*iddir’*) in Ethiopia, helping households deal with the impact of illness and other related shocks (Hoddinott & Krishnan, 2008). In my research, although more female household heads were involved with social groups such as saving societies, the general results showed that more men were involved in decision-making and leadership positions within these groups, with variations across study communities. Decision-making norms can prevent people, particularly women, from making informed decisions on the kind of livelihood activities they can engage in and how to build their capacity to adapt when affected by stressors (Pavanello et al., 2016).

Social capital seems to be what is readily available for households to rely on, and for the most part physical and financial capital was visibly low with variations across communities and household types (Chapter 5, section 5.4.4, and Table 5.6). Items such as chainsaws were primarily found within male-headed households, while a few Baka households with a male presence had rifles. In the Ejagham communities, owning fabrics was common compared to the Baka, especially within the female-headed households. Owning fabrics served as a form of savings as households could sell them when in need of money. This is an indication that culture and gender roles can define the livelihood portfolio of people and their coping and adaptation options. That said, how much a household can secure in terms of household items, and agricultural and business equipment is intricately linked to the amount of money and employment opportunities that can guarantee an increase in household income.

The argument so far is that availability and access to assets in all their forms determine the starting context of households and inherently influence their livelihood activities and adaptive capacity (Chapters 2 and 5). In both study communities, different livelihood activities are prioritised based on what individuals and households have as assets. For example, the study indicated that there were differences in the types of crops cultivated, livestock reared, and forest products collected, though these differences were not noticeable. Notwithstanding, livelihood choices are often rooted in the cultural practices of households and communities. However, multiple shocks and stressors have been shown to play a central role in eroding household assets over time, amplifying the risks households and communities face in ensuring sustainable livelihoods. Other factors, such as the absence of state pensions, structural and policy issues and other social security for households within the study communities, have also contributed to increasing households’ vulnerability.

Some households indicated they earned additional income from the sale of crops, livestock, and forest products (Chapter 5, Table 5.8 & 5.9, Box 4), that allowed them to send their children to school and provide food for their homes. These were further indications that their livelihood activities yielded some benefits (e.g. Meinhold & Darr, 2019). Some people have been able to improve their lives through the sale of NTFPs and crops to buyers from neighbouring towns such as the sale of Bush mango, eru, njangsang, cassava, plantains, yams and other produce from the farms and forests. However, most income earned by households through different livelihood activities is minimal and largely not sufficient to take them out of poverty. Savings were often very small with high levels of debts particularly for female-headed households (Chapter 5, section 5.4.3, Table 5.5). For example, widows tended to use informal loans for economic investments more than married women, which speaks to an inherent vulnerability and the need to access these credit sources. as also described in a study in the North West region of Cameroon (Ojong, 2018). High levels of poverty across communities and households make it harder for them to respond to shocks and stressors, as available assets are often stretched beyond their limit. In addition to poverty as a potential barrier, inequalities, power relations, and institutional barriers can further expose households to stressors and increase vulnerabilities which do not guarantee equitable climate-resilient livelihoods (Tschakert, 2015).

As argued by Carr (2020), the framing of livelihoods from the sustainable livelihood approach elevates research that seeks to see the social in livelihoods analysis. Thus resilient and equitable livelihoods shift the focus from potential drivers of change (climatic and non-climatic stressors) to stability and continuity, even in the face of such pressures. I have tried to highlight such sources that allow communities and households to observe continuity and stability in this thesis, some of which are livelihood diversification, social protection and safety net options, and other economic resources such as land and equipment. The different drivers of change occurring (Chapter 6, Table 6.1 & 6.4) create role shifts across genders, an indication that culture and gender roles remain fluid and are bound to birth new roles of meaning, social differences, agency, and power with varied implications on the rural poor (see more in Carr, 2020).

For instance, I discuss in Chapter 6 how political instability was among one of the non-climatic stressors households in the Ejagham communities continue to experience, resulting in diverse impacts on their livelihoods. Further reports have shown that women in the Anglophone regions (the Ejagham communities inclused) now engage in the digging of graves to bury war

victims (BBC Pidgin News, 2018)[24], previously a male-dominated activity. Similarly, Mcaulay et al. (2019) report examples of women digging graves with ploughs, assets usually reserved for farm work. In the Baka communities, women are also seen shifting into hunting, an activity traditionally reserved for men (see section 7.4.2, Table 7.2). Hence reducing vulnerability, especially for women, given the mentioned fluidity in 'acceptable' activities and/or livelihoods, policies would need to consider a gender transformative approach that seeks to address material stress, as well as risk reduction.

In the context of the study communities, approaches that seek to solve and end the Anglophone crisis could reduce women's additional tasks. Indeed, as rightly put by Eakin and colleagues (2014), vulnerable populations are typically exposed to several stressors, one of them being unstable political regimes as is the case with households in the Ejagham communities (Eakin et al., 2014). Existing structures of authorities may focus on why roles and responsibilities are changing, i.e. the ultimate causes of the changes observed, as well as the specific changes that need to be redefined to prepare all for an equitable livelihood outcome (e.g. Carr, 2020; Colfer et al., 2018). This can create room for further discussions on rights to resources (especially now with COVID-19 as an additional stressor) when drafting laws and policies that have a direct effect on rural communities.

Summarily, this study has revealed that an individual's starting context greatly influences the assets households have which are often affected by power relations, inequalities, and institutional dynamics across intersecting categories; an indication that people's livelihood choices and coping responses are based on the kind of assets they have and can access. The different assets that people depend on for their daily survival suggests the limited possibility of lifting them out of poverty (Chapter 5), leaving them less able to cope, and adapt to, multiple shocks and stressors in the future.

8.3.2 KEY MESSAGE 2: RESPONSES TO CHANGE ARE COMPLEX, PRIMARILY COPING, AND DEPENDENT ON LOCAL SAFETY NETS ESPECIALLY FOR MARGINALISED GROUPS

In Chapter 1, I provide evidence from the literature how climate change and extreme weather events had a direct effect on crop cultivation and forest products (Bele et al., 2014; Sango &

[24] There are several news reports out there on the Anglophone crisis detailing diverse impacts on those within these regions. This particular news article by BBC Pidgin News of 18th July 2018 elaborates how the traditional role of men assigned to the digging of graves is changing with women picking up this additional task. See details of news here: https://www.bbc.com/pidgin/tori-44890764.

Godwell, 2015). Chapter 2 further elaborates how the ecosystem is under constant pressure from activities such as timber exploitation, mining and other human activities (Gardner et al., 2013). Much of these discussions align with the findings in this study on the different climatic and non-climatic shocks households continue to experience (Chapter 6, Table 6.1 & 6.4). The question, therefore, is what do the different shocks and stressors mean for people's adaptive capacity and vulnerability? The question raised is central to unpacking households' ability to respond to multiple shocks and stressors, given that particular livelihood activities can lead to diverse exposure to shocks and stressors. However, response options used by households in the study communities are often 'coping' and not necessarily long-term climate change adaptation.

8.3.2.1 Coping Through Using Diverse Social Safety Nets

Different communities and households respond differently to shocks and stressors, and much of this is based on the previously mentioned factors – culture, gender, assets, and livelihood activities. Nevertheless, when responses become more reactive in meeting immediate needs instead of creating long term adaptation measures, people may remain trapped in poverty. In the case of the study communities, the findings show that households predominantly relied on social networks, gifts/remittances, the sale of household assets, and the sale and use of forest and land resources as livelihood and coping responses (Chapter 7, Table 7.1, Chapter 5, Table 5.4, Box 2). Support groups within the study communities demonstrated how households offered and received assistance from one another. For example, borrowing money to meet immediate needs, providing on-farm/forest labour support, and assisting neighbours, families, and friends with household items when in need are all ways households were shown in this study to cope with stressors. Wunder and colleagues (2014) discussed a similar trend from the findings in the PEN project regarding how rural communities organise themselves into social groups that allow them to pool risks (i.e., both *ex-post* and *ex-ante* coping strategies). Their coping strategy choice is based on the type of shock, among other factors (Wunder et al., 2014).

Evidence from this work further reveals that households would offer support based on the shared cultural values and affiliations they have with one another; this was more pronounced in the Baka communities (Chapter 7, Vignette 7) compared to the Ejagham. At the same time, a communities' culture may expect people to support one another (i.e. Ubuntu[25]), but the inability to reciprocate such gestures because the means are not there, or the social and

[25] Ubuntu is a Nguni Bantu concept demonstrating *togetherness* or *oneness*. Thus, people believe they are developed and empowered when they can share whatever they have in the spirit of "leave no one behind". In the Ejagham communities, Ubuntu is commonly referred to as 'Bechoko'.

embedded ‘pressure’ to help others even when people cannot afford to do so, may increase household vulnerability (Cordero-Ahiman et al., 2018). With people becoming more financially and emotionally stressed due to multiple experiences that affect their wellbeing, poverty remains on the rise and the capacity to adapt, further undermined. While some may seek employment opportunities in urban areas, others may receive support through gifts and remittances from family members who are in the diaspora and within neighbouring towns. For those that may look for jobs both internally and externally, given the levels of unemployment in Cameroon, and levels of education for most household heads, choices will be limited, especially for the Baka (Chapter 5, Table 5.3).

In the Ejagham communities, households expressed their dissatisfaction with the government’s failure to promote different cooperatives within their local communities as it provided jobs for them in the past (Chapter 5, Box 1). Although jobs may be limited, some households are not prepared for formal jobs given their level of formal education. For instance, there was generally a lower number of female heads of households who had acquired higher levels of tertiary education (Chapter 5, Table 5.3). Gender roles can further contribute to placing women in a disadvantaged position when it comes to job security given their roles to care for the elderly, sick persons and children, thereby widening their vulnerability (Castel et al., 2010).

When households respond to change, they expect that the decisions and choices they make from amongst different options should enable them to cope, adapt and even transform their livelihoods. Unfortunately, when all options have been exhausted, some people resort to selling household assets as a way of coping with shocks and stressors. The Baka communities were shown to be more likely to sell household assets compared to the Ejagham communities. Replacing assets sold becomes even more difficult given the poor financial state in which most households find themselves. Other intersecting factors such as access to resources, power imbalances, and inequalities, i.e., occupying (or not) leadership roles, may make it harder to sell or replace household assets for female head of households, especially those in the Baka communities who are already marginalised based on their ethnicity.

In the context of this study, the absence of other external social safety nets further deepens household vulnerabilities. For example, farmers are already experiencing low yields due to multiple stressors (e.g. Bangura et al., 2013) and the lack of government support through incentives (e.g. subsidies for farming), insurance schemes, and cash transfer programmes. While these are noticeably lacking in most parts of the country, social grants and other social protection mechanisms have assisted households in other regions globally to make the

necessary adjustments (Hallegatte et al., 2016; Kardan et al., 2017). For such safety nets to be put in place, the government may need to ensure an enabling environment in terms of policies that support adaptation for local communities. This could require giving preference in terms of control (or shared control) of forest areas to Baka 'owners'. Discussions raised in this section suggest that when households and individuals are presented with limited response options, like the case of both the Baka and the Ejagham people, hunger and poverty will send them seeking alternative options from the forest and forest resources.

8.3.2.2 Coping Through the Use of Land and Forest Resources

The livelihoods literature has indicated how vital forests and forest resources are for rural communities particularly those within poor households and for women (Nerfa et al., 2020; Pemunta, 2019b; Paumgarten, 2005; Shackleton & Shackleton, 2004). Forests remain a safety net source allowing millions of households to cope with shocks (Paumgarten, 2005). For instance, all households interviewed indicated they were engaged in the collection and sale of about 24 forest products for their daily survival (Chapter 5, Table 5.9). However, there was far more collection of certain products in the Baka communities, suggesting that culture, and in some cases, gender interplay in defining a community's livelihood choices (Pemunta, 2019a; Toda, 2014).

People sometimes find forest resources more valuable as a coping response than savings and access to credit, as their financial situation does not often allow them to make use of credit sources (Wunder et al., 2014; Chapter 5, Table 5.5). Even borrowing money was difficult as some in the Baka communities had to depend on buyers who advanced money to them when in need, and in return, these buyers received different NTFPs as payments (Chapter 5, section 5.4.3). As a result, the buyers could then determine the (low) price for, or value of, such goods. The absence of formal credit institutions such as loan sharks, credit unions and banks where people could have turned to has made it difficult for households to cope when in a crisis. However, those who chose to travel where such services are found, the rigorous process to access loans such as providing collateral security was a significant setback. This was especially the case for women whose land ownership rights are culturally contested. In Chapter 5, Box 3, a narration of what women, especially widows and single women in the Ejagham communities, experience following their quest for land ownership shows that it is often met with contestation and conflict given the cultural norms around women and land rights.

Equitable access to productive resources, especially land and forest resources is often not contested at the household level only but also between marginalised communities, agro-

industrial companies, government authorities (through the creation of protected areas), and in the private sector with logging and mining companies (e.g. Permunta, 2013; Pyhälä, 2012). In the case of the Baka, constant relocation of people to other areas due to logging, mining exploitation and Bantu-run plantations has been recorded (CED, 2008). Such exploitation has been shown to go beyond land exploitation to financial and sexual exploitation, as discussed in Chapter 3 (Pyhälä, 2012). Issues around power imbalances and equity, however, affect people and communities differently, mostly when related to resource allocation. In the case of land allocation, women are likely to be affected on both fronts - at the household level and the community level, resulting in increased vulnerabilities.

The current situation indicates that forest resources are being eroded as many have ventured into the harvesting of NTFPs during lean seasons and following other climate-related impacts (Chapter 6, Table 6.1). Both communities confirmed that sourcing NTFPs now is more challenging than it was in the past, and this may be worse for women and female-headed households owing to greater dependency (Chapter 7, Table 7.2 & Vignette 7.2). Coping and adaptation responses sometimes increase forest dependence. Where these resources are already affected by climate change, deforestation (logging, mining), and the transformation of forest land for crop productivity, this may lead to increased vulnerability.

The continuous collection of forest products given the climate challenges and large-scale deforestation within communities can become a poverty trap to people whose livelihoods depend primarily on forest resources for safety nets (Paumgarten et al., 2018). In addition to this, future climate projections, as presented in Chapter 3, already show that average temperatures will continue to rise with the possibility of increasing by 2^{o}C in both the East and SouthWest regions. The livelihoods of people could worsen given that households rely on rain-fed agriculture and forest resources that may dwindle with future climate change. Already, evidence from the study suggests that above 80% of respondents confirm that warming temperatures are being experienced with subsequent effects on crop yields. For women and female heads of households with issues of land ownership, cultivation of crops can become more complicated as limited access to land may constrain their ability to diversify crops, particularly crops with sprawling growth forms that require more space (see Chapter 5, Box 3; 5.6.5).

Given the limited livelihood options within the study communities, many would still turn to the exploitation of forest resources for survival, undermining how their responses become

maladaptive (Chapter 7, section 7.5.3) with future livelihood implications (Bele et al., 2011; Work et al., 2019). However, one can also see the 'turning' to forest resources as a returning to traditional practices, as other powerful actors like the agro-industrial plantations, mining and timber companies' activities in these communities constrain them. Thus, coping through land and forest resources may no longer be possible as a safety net option for households moving into the future. A successful attempt at adaptation would require change in the behaviour of big actors (miners, timber companies, and agro-industrial plantations) on resource exploitation.

Drawing from the different coping and adaptation responses to multiple shocks and stressors in the study communities, I then raise the question: how do we move forward from 'coping' responses to adaptation response options in building robust adaptive capacity for vulnerable households? As a long-term adaptation strategy, livelihood diversification remains essential in building robust adaptive capacity for vulnerable households. Livelihood diversification should be considered within rural communities especially in a context where many depend on agriculture, livestock, and forest resources for their daily survival, due to the complex reality that specific responses can become maladaptive (Shackleton & Shackleton, 2012). Therefore, there is a need to diversify to other non-farm and non-forest activities as a livelihood strategy. Within the context of the study communities, this already exists, although households do not predominantly practise it, compared to farming and forest-related activities. For example, the study has shown that some individuals and households in the Ejagham communities are venturing into activities such as carpentry, tailoring, petty trading, driving, etc (Chapter 5, section 5.3.8). However, for most in the Baka communities, non-farm activities are mostly limited to craftsmanship due to limited market access and low employability.

That notwithstanding, non-farm activities still demonstrate considerable potential and opportunities for rural households like the Baka and Ejagham communities that are both positioned with neighbouring countries like Nigeria, the Central African Republic, and Congo for trade opportunities (see Figure 3.1; section 3.3.1, 3.4.1). Nishad and Wayid (2015) in work done in Bangladesh, however, indicated that the potential of non-rural non-farm activities such as tailoring, tea sellers, and shop keepers to contribute substantially to household incomes was very much based on factors such as household size and specific occupation. It would, therefore, mean that for rural households to engage in such activities, aside from household size, skills may act as a significant determinant in the case of the study communities where illiteracy is high and limited opportunities for upskilling exists (see Chapter 5, section 5.5.1). In conclusion, there is a need to understand safety nets from a broader perspective knowing that households

and communities will turn to what is readily available. If resources such as forest products and other forms of social capital, as used in the context of the study communities, are not well managed, then their future adaptive capacity livelihood security cannot be guaranteed.

8.3.3 KEY MESSAGE 3: BUILDING ROBUST ADAPTIVE CAPACITY CAN REDUCE LIVELIHOOD VULNERABILITY TO MULTIPLE SHOCKS AND STRESSORS

The vulnerability and livelihoods of rural people are complex and dynamic, as raised in the early 2000s by Shackleton and colleagues (Shackleton et al., 2001), with varied gendered implications across socially differentiated communities. The findings from this study show that people are coping, but they are not necessarily *adapting*, given that a multiplicity of factors underlie and undermine their adaptive capacity. What is evident is that households in rural communities need to use their assets and capabilities to provide ways to build more robust adaptive capacities but often this is not possible (Chapter 7, Rai, 2019). Based on the findings from this study, the coping responses used by households need further strengthening, and at the same time, there is a need to introduce other ways to then build the adaptive capacity of rural communities in Cameroon, particularly so in the context of the study communities, especially the Baka, who are already the most marginalised in the country.

Response options such as technology and infrastructure, institutions, markets, and credit facilities, among others, would therefore be worth exploring and investing in for improved adaptive capacity and sustainable livelihood outcomes that can guarantee long-term adaptation and reduce livelihood vulnerability (Chapter 7). Adaptive capacity is generally context-specific based on the available assets; therefore, responses in one community can be maladaptive in another. Coping and adaptation are developed together with communities' specific landscape scenarios, livelihoods, institutions, culture, and beliefs (Goldman & Riosmena, 2013). However, as culture, institutional processes, livelihoods, and landscapes change over time, so too do the coping responses, which means that in building people's adaptive capacity, different responses are necessary, or existing coping mechanisms need to be modified to reduce a community's risks and vulnerabilities (Gallopín, 2007).

When complex dynamics (e.g., related to shock and stressors) are understood, specific approaches that focus on vulnerability reduction should be considered to create space for local transformation, as suggested by Carr (2020). This, therefore, means that the focus on asset accumulation to build adaptive capacity is paramount as assets can allow communities to be more innovative. Hence the question here is: what does a robust adaptive capacity entail if

communities are to go beyond 'coping' to long-term adaptation options that can guarantee future livelihoods? I try to answer this question under this section by covering the different assets (capital) that are crucial resources in the local context within the study communities in moving towards sustainable livelihoods for poorer households (Figure 8.1).

Figure 8.1: Factors contributing to building a robust adaptive capacity based on access and equity.

Unpacking adaptive capacity here builds from the findings of this study that it is: (i) tied to all forms of assets but mostly natural capital (specifically, NTFPs) in the context of this study and (ii) intricately linked to social networks. Nevertheless, other factors such as human development, economic resources, technology, infrastructure, and knowledge acquisition contribute to a robust adaptive capacity if well-developed, particularly within the context of access and equity as will be unpacked here.

8.3.3.1 Building Financial Capital Through Economic Resources Can Assist in Building Robust Adaptive Capacity

Economic resources ranging from income, savings and access to credit can be used by households in building their capacity to cope with multiple stressors (Frank & Buckley, 2012). Whether it is access to credit, receiving remittances or having the ability to diversify income sources, all of these have lasting benefits and can contribute towards more sustainable livelihoods for rural households. For instance, the ability to diversify income and access credit

can allow households to spend more money on mitigating crop loss through increased use of fertiliser, buying improved seedlings/varieties, trialling new crops, as well as increasing plots for cultivations (Ajaero et al., 2017; Ramprasad, 2019; Sulemana et al., 2018; Goldman & Riosmena, 2013). This increases households' returns in investments thereby leaving them better prepared to accommodate health-related shocks, expenses associated with cultural events, inflation, curb debts and other climate-related shocks (Chapter 6; Sujakhu et al., 2019).

Access to credit has been mentioned many times in this thesis, especially in Chapters 2, 5, 7 as a prerequisite in building robust adaptive capacity and reducing the vulnerability of the rural poor. Other studies have further stressed that households with more sources of income and ability to access credit are more likely to adapt better and withstand shocks (Sujakhu et al., 2019; Goldman & Roismena, 2013). Notwithstanding, the universality of households with more sources of income likely being able to adapt better, as held by some authors, can be questioned. Individual families may withstand shocks better, but whether their road to adaptation will benefit their surroundings is not at all ensured. Many potential investments (chainsaws, heavy equipment, more transport) have been shown often to adversely affect forests. In the study communities, like most rural areas in Cameroon, credit sources are often limited to informal institutions as very few formal banking and credit institutions are located within rural communities (Chapter 5). However, it does not mean that the provision of services will be void of challenges, such as having defaulters. Thus, informal saving societies ('njangi' and 'tontin') could be strengthened to provide more services to those in the communities as their rules often align to communities accepted norms, values, and expectations.

The need for open and functional markets can enhance the adaptive capacity of households. For example, in the Baka communities, key NTFPs such as bush meat, wild honey, Bush mango and other wild fruits top the list of products traded with buyers. In the Ejagham communities, NTFPs such as eru, njangsang, Bush mango, and snails, as well as agricultural products (egusi, cassava, plantains), and cash crops such as cocoa and coffee, are among highly sourced products. These are all indications that forest products and farm produce have the potential of going beyond local markets as their uses are global (LaCerva, 2016; Neumann & Hirsch, 2000).

Investing in markets can increase the value placed on multiple products rather than focusing only on timber, as has often been the case when it comes to the valuation of forest products (e.g., Sunderland & Ndoye, 2004). Such local products have been able to support rural households for their day-to-day survival, going beyond only financial benefits (e.g., Rai, 2019). The opening of well-coordinated markets could also build a sense of agency for poor people

who cannot currently determine the market price for their products, due to the limited attention given to these sectors and rural communities, as well as reduce the debt bondage so many appear to be involved in, particularly in the Baka communities. Given that the NTFP trade is a sector that requires limited capital, and thus has a low entry barrier, many people are already involved in it. As earlier discussed in Chapter 1 (see section 1.2.2), boosting markets, both locally and externally could have considerable rewards for rural households (Fisher et al., 2010; Neumann & Hirsch, 2000).

For example, in South Africa, Meat Naturally[26], working in partnership with local NGOs, provide mobile abattoirs for local farmers in rural livestock communities and this has given local livestock owners more agency and power in the process. However, there is a need to be mindful and conscious of the gendered dynamics within the complete value chains that can further trigger income inequality across a socially differentiated group of people (Makoudjou et al., 2017). For example, certain products collected primarily by men, such as honey beer and the hunting of bush meat, has shown to have greater income compared to condiments which are generally collected by women. This, therefore, implies that there would be increasing income disparity between men and women with the latter more vulnerable in terms of livelihood outcomes.

8.3.3.2 Building Social Capital Through Social Networks, Institutions and Knowledge Sharing Can Assist in Building Robust Adaptive Capacity

Smith and Wandel (2006) emphasised that adaptive measures or practices must be tailored to the needs of that community. The goal in this respect should always be to document the community's changing experiences to provide better means of improving adaptive capacity (Smit & Wandel, 2006). For example, in the Baka and Ejagham communities, different support groups for hunting, forest product collection, and farming activities have aided people to learn new skills and techniques that can impact on their livelihoods. Similarly, in the Ejagham communities, saving societies have been shown to support one another for diverse purposes, one of which includes burial ceremonies. The presence of saving groups has the potential to expand their activities to other non-cash-based services such as providing seedlings, fertilisers, and other equipment for farming and NTFP related activities, given the absence of government subsidies within most rural communities in Cameroon.

[26] The Meat Naturally initiative in the northern East Cape of South Africa has been driven by Conservation SA in partnership with local NGOs (LIMA, INR and ERS), as a collective under the Umzimvubu Catchment Partnership since 2013. The initiative links small-scale farmers and commercial buyers, while motivating them to invest in restoring rangelands and wetlands. More details on the webpage: https://www.meatnaturallyafrica.com/

Social groups have sometimes gone beyond providing financial support as some come together as recreational groups for activities related to ritual performances, traditional marriages etc. (Chapter 5, Table 5.4 and Chapter 7, Table 7.1). In building their capacity, the groups have shown to improve trust for one another as it seems to enable them to build lasting relationships (Chapter 7, Vignette 7.1). Indeed, social connections are one of the oldest strategies people in rural communities use to support one another when faced with challenges and should be encouraged based on its potential to assist households to mitigate shocks and stressors (Phuong et al., 2017; Rockenbauch & Sakdapolrak, 2017). For example, the creation of groups could be utilised for people to access labour and make informed decisions based on climate information. In this way mobilising adaptive capacity through social groups is a social learning process which allows communities to gain new knowledge on how best to build their coping and adaption strategies (Abdul-Razak & Kruse, 2017; Phuong et al., 2017).

While these social groups are important, issues around governance have shown to dictate how resources are managed by local traditional institutions. For example, although the numbers were relatively low, some respondents confirmed cultural norms placed certain restrictions on women regarding the harvesting of certain NTFPs and hunting bush meat (Chapter 7, Table 7.2). Such restrictions, if backed by local institutions, could hinder women's capacity to respond to shocks given the context in which they find themselves, where forest products constitute a significant safety net. Informal institutions, therefore, have the potential of defining social norms, rules, relations, and cultural practices but can also hinder household's adaptive capacity if they do not fall in line with the stated rules, cultural practices, or norms. As Goldman & Roismena (2013: pp589) argues, "institutions shape the orientation of responses to climate risks in a given social and ecological context toward individual or collective responses." Thus, fostering the linkages between government institutions with local community institutions can help create awareness on issues related to climate change adaptation and identify marginalised groups and people for specific interventions (e.g. Colfer et al., 2018; Brown & Sonwa, 2015). Creating the linkages with key local institutions may allow local communities' needs to be prioritised when looking at climate change adaptation.

Supporting sustainable livelihoods of rural people would therefore demand recognising the need to provide and improve on existing social safety nets, especially within impoverished communities. Support to these communities can be increased by providing subsidies (mainly farming), cash transfer programmes, and social grants, as well as different insurance options noting that socially differentiated groups of people are affected in diverse ways (Hallegatte et

al., 2016). Such social protection mechanisms have been used across other African countries and have shown to assist the very poor whose existing assets are already being depleted because of a combination of climatic and non-climatic factors (Aleksandrova, 2019; Davies et al., 2008; Kardan et al., 2017; Ulrichs, 2016). The fundamental point is for governments to see that interventions can enhance the coping capacities of the poorest and most vulnerable as many are already living in the reserves of their coping strategies.

8.3.3.3 Building Human Capital Can Assist in Building Robust Adaptive Capacity

Researchers have argued that it is essential for every society and community to enhance human capabilities by improving levels of education, productive skills, knowledge, and competencies of people (Dulal et al., 2010). In the study, it was found that a community's human capital is not well developed nor fully maximised to reduce individual and community vulnerability. For example, less than half of the household heads across both study sites had attained secondary education, with almost none completing graduate levels of education. Only a few individuals within the male-headed households in the Ejagham communities had any education beyond secondary school and many household heads could neither read nor write. Higher levels of illiteracy increase a population's vulnerability given that their inability to read can exclude them from formal jobs across sectors. More schools need to be created within rural communities, given the existing challenges raised in Chapter 5 about the absence of schools within these communities.

The downside of not considering strengthening adaptive capacity, through specific improvements to education, leaves gendered implications that can increase vulnerability, especially women and female-headed households already affected because of their low level of education and ascribed gender roles. A study conducted in El Salvador and Brazil by Wamsler and colleagues (2012) on improving education as a way of building adaptive capacity highlighted that there was a strong indicator that formal education, as well as gender equality in education play a central role in determining people's level of risk (Wamsler et al., 2012). The outcome was that those with formal education used it as a 'conscious strategy' in overcoming risk such as being more aware and understanding different risks, accessing the information on risk reduction, and using institutional support when making informed decisions (Wamsler et al., 2012).

Although formal education and utilising qualifications acquired through schools and other educational structures has gained traction over time, it is not the only form of knowledge acquisition, especially for rural households (SLYCAN TRUST, 2020). For instance, while

many in the study communities may be considered as illiterate, they have informal knowledge which allows them to adapt to changes in their environment and directly impacts their daily livelihood activities. The findings from this study showed that households always relied on handing down knowledge and skills as well as building competence by teaching one another. For example, women in the Baka communities engage in fish bailing and this knowledge is transferred to the younger generation; similarly with hunting and the collection of forest products (Hayashi, 2008; Chapter 3). In the Ejagham communities, farming techniques are learnt informally which has been ongoing for generations. Thus, the capturing of indigenous knowledge, which may provide insights into adaptation could also serve as a mechanism for raising the prestige of the Baka and other forest dwellers.

Therefore, while education remains essential as a form of human capital, different systems of knowledge acquisition need to be accepted, especially informal education. This can be done through the integration of informal education within formal learning programmes to better understand indigenous approaches to adaptation (Matambo, 2018)and to avoid cultural tensions that result when one form of learning (formal learning in most cases) is prioritised over the other (Segadimo, 2018). As mentioned in section 8.3.3.2, households can also leverage existing social groups, and close-knit communities to learn new skills and acquire knowledge through informal education. In the process of coming together, groups can share ways on how better to adjust to environmental and social changes. Such groups have been shown to provide labour as a form of support to one another while learning and gaining new skills in the process.

8.3.3.4 Building Physical Capital Can Assist in Building Robust Adaptive Capacity

As discussed in section 8.3.3.1, a combination of assets, especially financial capital, can enable households and communities to build upon technology and infrastructure to mitigate risks related to crops and their homes. Although physical assets were relatively low in the study communities, just like other rural communities in Cameroon, items such as hoes and cutlasses were present in almost all homes. However, lifestyle, culture and gender roles have an influence on the availability of other household items (Chapter 5, Table 5.6) raising the possibility of households or communities with more material assets having a higher capacity to cope with climate change and other crises.

The persistent increase in temperature as discussed in Chapter 6 can affect available water sources. However, only a quarter of households interviewed in the Baka communities had water storage facilities (e.g., water drums) which was far less than the Ejagham communities. Greater

availability of storage containers in any given household would enable them to adjust better to uncertain water sources, as most sources are reportedly becoming inadequate. Having access to other forms of capitals, such as social, natural, and human capital in rural households provides an enabling environment to increase physical capital (Bailey et al., 2019). For example, the construction of houses in the Baka communities primarily depends on natural resources from the forests (such as indigenous poles, reeds for weaving and construction, wood for carvings etc.). This will also enable households to transition from the traditionally constructed huts (Mulongo) to more storm resilient houses while still using local materials from the forest.

Physical capital and other assets that promote the dissemination of knowledge and information, as well as equipment for the cultivation of crops, are critical in ensuring adaptive capacity and enabling local transformations. Physical capital provides the opportunity for people to make informed decisions based on information that can guide them on how best to invest in farming and forest-related activities while seeking ways of improving seedlings, rain harvesting techniques for irrigation, and better ways of transforming products. This notion was quite central in Clay and Zimmerer's (2020) work carried out in Rwanda on how technology and management of infrastructure can help create sustainable intensification of smart climate agriculture. Hence, mobile technology and equipment for infrastructural development have shown to be significant players that governments can leverage in disseminating climate-related information and building infrastructure to help people manage risks. That may explain why households within the study communities with household items such as phones, TVs, and radios, chainsaws, water drums, and generators found it hard to sell these when in crisis and only considered doing so after all other options had been exhausted (Chapters 5 and 7; Yohannis et al., 2019).

Appropriate infrastructure and technology will be needed for people to venture into what works best, especially as gender roles across different intersecting identities tend to shape people's needs and aspirations. The findings from this study, especially participant observation, noted that necessary infrastructure such as roads, water, electricity that can enhance agricultural and forest product transformation and marketing are visibly lacking (Chapters 3 and 5). The hope is that both public and private actors can provide water supply services for irrigation purposes, to support livestock, as well as design other water harvesting techniques (Kayaga et al., 2020; Shiferaw et al., 2014).

The aim is to support more impoverished communities to make more informed decisions given the frequent changes in weather patterns with temperatures heading towards an increase of 1.5 – 2ºC in the next decade (Chapter 3). The risk of providing infrastructure is also that it may escalate deforestation and land cover change of previously inaccessible areas by now providing this infrastructural access to commercial and illegal logging. Examples drawn from the remote forests of the Brazil and Ecuadorian Amazon show consequences for indigenous forest livelihoods (Barber et al., 2014; Mena et al., 2017).

With the concept of a "New Green Revolution for Africa" being championed, governments and policy practitioners could engage in and exploit such initiatives to make agriculture and forest-related activities within rural communities climate-smart for more resilient livelihoods (Patel, 2013; Campbell, 2020; Clay & Zimmerer, 2020). However, for this to be enhanced, enabling policies must take a central stage in order for communities to move from coping to long-term adaptation.

8.3.3.5 Building Natural Capital Can Assist in Building Robust Adaptive Capacity

Social and natural capital are essential assets rural communities depend on for their livelihoods and even more critical, as raised by Frank & Buckley (2012) and seen in this study, is the need to improve households' abilities to respond to multiple shocks and stressors by using these assets. This study has shown that natural resources were the most accessed form of capital in responding to shocks and stressors. For example, those who owned or had access to land were able to farm on them with many households cultivating as many as five or more crops on their lands. All the households interviewed across both communities confirmed being involved in agriculture, despite the varied challenges they faced.

The issue of ownership, access, and equity, however, cannot be ignored when looking at land as a critical resource within rural communities. The findings from this study further showed that less than half of those in the female-headed households across both communities owned land, although a more substantial proportion (>70%) confirmed having access to land. Crops mainly cultivated were maize, cassava, plantains, cocoyam, and groundnut. However in-depth interviews revealed that some staple crops such as cocoyam and cassava were increasingly being affected by pests and diseases, although many could not determine the exact cause for the constant decline and low yields over the last ten years.

Although natural capital stands out to be the asset most used within the study communities, long-term adaptation strategies show that households would need a diverse pool of capital for

a more robust adaptive capacity. For instance, Bailey and colleagues, in a study exploring the role of capital in drought adaptation in rural communities in Eswatini (also known as Swaziland),confirmed that considering adaptation strategies such as planting drought-resistant crops would require access to physical capital (tractors), and natural (land and seeds), social or human (labour) knowledge and skills on alternative crops (Bailey et al., 2019). Although the linkages between various forms of capital are very complex and context-specific, there is evidence that suggests the dependence on natural resources intensifies when households lose human and social capital through death and migration, as similarly found by de Sherbinin and colleagues in the Amazonia (de Sherbinin et al., 2008).

As communities that are heavily dependent on forests and forest resources, evidence for this study showed that all households were very involved in the collection of forest products, especially fuelwood and wild fruits for home consumption and sale. Households have used a combination of different forest products for livelihood diversification. Some households indicated that their engagement in non-farm activities were based on natural capital availability, using poles, reeds for construction, and wood for carving to produce art and other useful household items that were sold to augment income. However, cultural norms and gender roles around the collection of certain products posed diverse challenges, especially for women and female-headed households when it came to livelihood diversification as an adaptation option.

While households and communities in rural areas can usually cope, chronic poverty is often beyond the control of individual households to deal with and requires adaptive responses at a broader scale. Lade et al.'s (2017) study on multidimensional poverty traps showed that certain interventions that ignore nature and culture can reinforce poverty (particularly in agro-biodiverse landscapes) (Lade et al., 2017). Their work further provides response options that might be suitable for poverty alleviation at the local scale within farming communities. Such options consider a more nuanced range of poverty alleviation pathways that go beyond conventional asset inputs (i.e., combining conventional agricultural inputs with traditional practice), to create pathways for new developments and poverty alleviation (Lade et al., 2017). Nevertheless, since poverty levels are not homogenous, attention needs to be paid to who is more vulnerable and susceptible to risks (Rai, 2019).

The economic benefits from forest products and crops cannot be over-emphasised as the transformation of products can create livelihood diversification, with households able to spread both risks and profits from their livelihood activities. However, the forest continues to receive

immense pressure from activities like logging, mining, and increased opening of land for agriculture, especially problematic for households in the Baka communities (see Chapters 3, 6, and 7). Thirteen years after Cameroon signed onto the UN Declaration on the Rights of Indigenous Peoples (2007), there is still evidence of contestations between the Baka 'pygmy' and other private forest concessionaires operating within their territories, leading to the dispossession of their lands and natural resources (Permunta, 2019; Pyhälä, 2012; Freudenthal et al., 2011; Permunta, 2013; Schwartz & Cotula, 2017). Findings from this study further confirm evidence from previous studies that households in the Baka communities are still discontented with the current rate of deforestation caused by logging and mining companies and its impact on their livelihoods (Chapter 6).

Indigenous people's traditional resource management strategies are time-tested and have shown to play an essential role in sustaining ecosystem services, preserving cultural identities, livelihoods and knowledge systems (FAO, 2019). In other communities, like in the Brazilian Amazon, evidence suggests that steps are being taken to ensure indigenous people the right to their ancestral land with positive outcomes for deforestation. For example, studies were conducted to examine the relationship between indigenous control and stewardship of lands and deforestation rates and their findings indicated lower deforestation rates with indigenous lands compared to those with other governance forms, as reported by Benyishay et al. (2016). In Indonesia, a study reported that claims for land rights by indigenous communities are settled not merely based on law, but also on the basis of the relative bargaining positions and the character of relationships between communities, their mediators and local authorities (Muur, 2018). Similar outcomes have been recorded in the Baka communities, which has led to indigenous groups signing a declaration calling for respect and recognition of their land rights in 2017 (Cultural Survival, 2018).

All these drivers, coupled with climate change, will demand a careful sustainable management approach while seeking ways to transform certain products for improving future livelihoods. The introduction of agroecology and agroforestry could yield significant benefits to those in forest communities where in the past large corporations and locals have remained consistent in the exploitation of forest resources without consideration to growing such products (Hughes et al., 2020). While both approaches may seem to be relatively new and geared towards improving the livelihoods of the poor, many in these rural communities are already engaged in such practices using local knowledge and skills. For instance, cassava (*Manihot esculenta*), a stable food locally cultivated within the study communities, is planted even within the forest and

transformed using traditional knowledge into flour products (locally known as ‘garri’ and ‘fufu’). Similarly, maize cultivated in the North West region of Cameroon is locally brewed and transformed into a traditional corn beer called 'Shah', thereby securing the livelihoods of many.

There is considerable documentation[27] by different partners working in close partnerships with governments and other actors across Africa, emphasising that forests are a place for agroecology. For example, the CGIAR’s programme on Forests, Trees and Agroforestry (FTA) led by CIFOR has prioritised the sustainable management of natural resources. Priority areas focus on improving the value of trees and NTFPs (market-based agroforestry) as well as agriculture transformation (agroecology) within the context of climate change (Bourne et al., 2020). Cameroon can build stronger partnerships with organisations to strengthen the local transformation of forest products such as Bush mango and njangsang, which to date, remain some of the most sort after NTFPs within the study communities and beyond.

In summary, section 8.3provides evidence of what households in the study communities have used over time as coping and adaptation strategies to respond to multiple shocks and stressors. However, findings point to the fact that most responses are coping and not adaptive or transformative strategies. Hence, there is a need to build more robust adaptive capacity for communities to go beyond coping responses to long-term adaptation options for sustainable future livelihoods. I have presented possible solutions in Table 8.1 - I also acknowledge there might be some overlap in the different solutions provided given that assets are intricately linked, and one cannot be used in isolation from the other.

[27] The CGIAR platform provides documents and resources that show their involvement in varied projects on agroecology and agroforestry and their partnership with different countries to enhance natural resource use sustainably. See more details here: https://www.foreststreesagroforestry.org/what-is-fta/.
Friends of the Earth International have also provided resources on their work in agroecology within forest communities across the globe https://www.foei.org/resources/publications.
CIFOR, working closely with other partners, have provided useful publications on best ways to sustainably manage forest resources and enhance agroecology across different project landscapes. Publications can be found here: https://www.cifor.org/knowledge/publications/.

Table 8.1: Key solutions for building robust adaptive capacity based on assets (capitals).

Assets (Capital)	Building robust adaptive capacity
Financial capital	Improve access to credit for households (particularly for women with limited collateral such as land) to expand on other investment opportunities.
	Support local saving groups with subsidies for farming and other cash-based incentives.
	Provide functional and well-established markets to strengthen existing local markets with potential buyers from neighbouring countries.
Social capital	Create and provide training and learning forums on climate-related information through local social groups targeting women and youths.
	Provide gender-transformative programmes through existing social groups on issues related to gender roles and land rights.
	Encourage political activities or social mobilisation to counter the power of the outside actors (e.g., forestry companies) that may undermine adaptative capacity and adaptation options.
Human capital	Improve access to education by building schools within communities, especially for higher and tertiary education.
	Improve access to other social amenities like hospitals, local clinics, roads, and public taps.
	Encourage and set up informal learning centres for easy integration and development of local skills and competence.
Physical capital	Improve access to technology for easy flow of information by broadcasting climate-related information at local radio stations using indigenous languages, sending out messages via phones about weather patterns and other details like market prices related to farming and forest products.
	Develop infrastructure and provide training on irrigation techniques, water harvesting, and construction of resilient houses using local materials and integrating agroecology and agroforestry designs within livelihood activities.
Natural capital	Improve existing water sources, especially for household and other uses.
	Ensure through policies the sustainable exploitation of forest resources and curb deforestation.
	Ensure equitable access to forest resources and land tenure rights, especially policies around indigenous people's land rights.
	Support the transformation of agricultural and forest products for livelihood diversification as well as improve on the value chain of products within the communities.

8.3.4 KEY MESSAGE 4: THE LOCAL SITUATION IS COMPLEX AND MORE NUANCED THAN THE LITERATURE SUGGESTS

The evidence from my findings confirms that households' local experiences in relation to multiple shocks and stressors are complex and varied across different types of gendered households and cultures with different implications for long-term sustainability. The emerging insights from this research can be seen alongside mainstream views and approaches in Table 8.2.

One of the emerging findings from this study shows that any given gender, whether men or women, can be both privileged and vulnerable at the same time. For example, in the Baka communities, women can make decisions regarding the construction of their houses, and this gives them a strong agency over men in terms of adapting to more resilient homes. However, the task of building houses may add another layer of vulnerability on women who may continuously have to rebuild their homes given the frequency of storms experienced in the area (See Chapter 6, Table 6.1). Similarly, across both communities, female-headed households have shown to have more reliance on social groups such as NTFP collection and saving groups (Chapter 5, Table 5.4). Women who are members of these groups are privileged to leverage one another's support when in need. Women who cannot join the different social groups, or women within male-headed households, with no ability to make decisions around joining or saving in groups may become more vulnerable. Therefore, these examples are a reflection that the portrayal of a particular group of people as either vulnerable or privileged, but not both at the same time, may overlook vulnerabilities and inequalities (Colfer et al., 2018; Hankivsky, 2014).

This study further shows that households in rural communities generally value indigenous knowledge and practices and pass them on from one generation to the next. However, human capital is often seen only in relation to formal schooling, even within rural communities like the Baka, whose culture has remained critical to their daily survival (Permunta, 2013). The Baka's reliance on traditional knowledge in adapting to climate change is seen through activities like fish bailing, hunting, and changing farming techniques, as well as in the construction of their houses (see section 8.3.3.4; Chapter 3, section 3.3.4; Matambo, 2018). Therefore, scientific/empirical knowledge must be more integrated with indigenous knowledge to avoid social and cultural tensions between different knowledge systems when adaptation interventions are being implemented in rural communities (Segadima, 2018).

Table 8.2: Emerging insights from current research versus mainstream discourses and narratives

Emerging insights from current research	Mainstream discourses and narratives
It is possible for a given category, e.g., men in the Baka community, to be privileged and vulnerable (oppressed) at the same time. This can make it difficult to say, 'who is most vulnerable'.	Studies often portray people as either vulnerable or privileged but not both at the same time depending on the lens used and the stressor experienced (Niang et al., 2014; Bunce & Ford, 2015; Serdeczny et al., 2017).
The value attached to traditional knowledge is considered a preferred way to gain skills and hand down knowledge to the next generation while embracing and interacting with other forms of knowledge, e.g., the motivation to gain new knowledge/skills is received by its ability to preserve cultural values.	Western education and science are often seen as the dominant and primary expertise for people to embrace when initiating rural community interventions (Prowse & Snielsveit, 2010; Nikitas et al., 2019).
People have traditional or indigenous ways of dealing with climatic shocks, and adaptation options are not necessarily externally driven knowledge.	Empirical knowledge in climate change adaptation dominates the discourse with the perspective of teaching rural communities how best to adapt (Ramprasad, 2019; Sunderland & Ndoye, 2004).
Many people do not necessarily consider migrating to urban areas as the means is rarely available for people to relocate, and others choose not to.	The rural-urban exodus is often seen as a preferred option taken by rural people to move into urban areas for economic stability and escape climate change impacts on agriculture and other rural lifestyles (Lohnert, 2017; Mlambo, 2018; Amrevurayire & Ojeh, 2016).
Land and forests are often viewed based on their value, place (sense of place and belonging) and meaning they bring to the local people.	Land and forests are often viewed from the lens of their economic value (Brown, 2011; Makoudjou et al., 2017; Pak et al., 2010; De Maria, 2019).
Power, decision making, and agency are socially differentiated, raising conflicts and contestations from the point of 'privilege' and 'oppression'.	Power is portrayed from the angle of elites, government authorities, and community leaders (Muur, 2018; De Maria, 2019; Krozer & de México, 2020).
Role shifts continue to occur in different livelihood activities because of the multiple stressors people must respond to. For example, women are assuming male-related responsibilities such as the digging of graves due to the political instability in the Southwest region. There is also evidence of women hunting, fishing, trading in neighbouring towns, gaining formal employment, working away from home etc.	Women are often still portrayed in the traditionally assigned roles as caregivers and, nurturers (reproductive roles) (Smith 2005; Durowaiye & Khan, 2017; Matsolo et al., 2018).

Chapter 7 (section 7.4.3) presented key local (informal) coping and adaptive responses that rural households consider in responding to shocks and stressors. Amongst the different response options, migration was not listed as an everyday option that people would consider when responding to multiple shocks and stressors. The findings, therefore, reveal that although mainstream literature often presents migration as a primary option for the rural poor seeking economic stability and escaping the impact of climate change (e.g., Lohnert, 2017; Mlambo, 2018), not many consider this as an option. Alternative livelihood options and diversification are sometimes sought from within the communities as some may choose not to migrate to bigger towns and instead engage in the collection of forest products (Tyenjana & Taruvinga, 2019; Shackleton, 2004).

The quest for land for expansive large-scale farming, plantations, mining, and logging by companies leads to the portrayal of land mainly from the perspective of its economic value (Permunta, 2019b). However, findings also note that the quest to secure and protect land by the community is also based on the land's cultural value. For example, the Baka hold a strong sense of place related to their ancestral land. Thus, they are in constant disagreement with the government over relocation policies due to expanding mining and timber activities within the region (Phyhala, 2012; Permunta, 2013). Similarly, in the Ejagham communities, the need to secure large pieces of land as individuals and the dying trend of 'family' land are an indication that land as a resource is valued more from an economic view rather than the cultural value ascribed. This can impact women and female heads of the household whose land-based activities are generally for food security and home consumption.

Issues around power and agency have affected access and ownership of resources, mostly natural resources in rural communities. For example, the findings from this study suggest that land access and ownership have shown to create conflicts and contestations between the Baka on the one hand, and the mining, logging, and other large scale plantation companies on the other (Permunta, 2013; 2019; Pyhälä, 2012; Freudenthal et al., 2011). Cases resulting from forest and land rights have often been treated based on the bargaining positions between the government and large corporations, with severe impacts on poor and marginalised households and communities (Muur, 2018; Benyishay et al., 2016).

My study also found that the pressures of a rapidly changing climate and an increase in non-climatic shocks (conflict, disease) are resulting in a shift in gendered roles and responsibilities

(see section 8.2). For instance, political instability in the Anglophone regions has led to additional roles and responsibilities for women. Women, especially those in female-headed households, have assumed the responsibilities of digging graves, a role that was primarily done by men (see section 6.5.4).

The different factors illustrated in Table 8.2 are what restrains people and creates a complex set of preconditions under which households tend to experience varying levels of vulnerability, with differential abilities in responding to shocks (see Sultana, 2014; Ravera et al., 2016; Djoudi et al., 2016; Shackleton & Shackleton, 2012). The above discussion and Table 8.2 have illustrated those mechanisms and interventions to support adaptation, adaptive capacity and resilience needed to take local contexts and knowledge into account, the changing roles of women and men, the differentiated vulnerability of households, and the dangers of a single perspective (e.g., on land and the economy) when addressing issues related to sustainable livelihoods.

8.4 CONCLUDING REMARKS

This thesis set out to explore how different types of gendered households, amongst two ethnically diverse communities, cope and adapt to climate change and other related stressors. The study aimed to better understand the vulnerability and livelihood outcomes of these different household types as influenced by gender and ethnicity. The work has demonstrated that households are affected differently based on varied intersecting identities and that, being agricultural and forest-based communities, households coping, and adaptation options, were often limited to informal social and forest safety nets. This work has helped to contribute to knowledge on multiple shocks and stressors, social differentiation and response options that go beyond the traditional dichotomy of men versus women and that considers gender and ethnicity as two forms of marginalisation. On this basis, some of the emerging findings from my study diverge from some of the mainstream narratives, discourses, and perspectives (Table 8.2) on the intersection between gender, culture, and climate change adaptation.

In ending this work, I offer a quote on intersectionality by Olena Hankivsky (2014: p3 & p17) where she explains that:

“Human lives cannot be explained by taking into account single categories, such as gender, race, and socio-economic status. People’s lives are multi-dimensional and complex. Lived realities are shaped by different factors and social dynamics operating together." She further states: "In reality, the situation is far more complex. From an intersectionality perspective, what

makes people vulnerable to climate change, or alternatively how they experience adaptation and mitigation strategies is the result of multiple factors and processes that are linked together within systems of power. Not only does intersectionality lead to multi-level analysis of intersecting factors, processes and structures impacting climate change experiences, but its principles lead to questions regarding how climate change problems are framed and understood."

In my thesis, I have been able to explore many of the points made by Hankivsky and have shown how social differentiation presents complex dynamics across intersecting identities. Based on this thesis's finding, I hope that development and environment practitioners will be able to adopt a more nuanced approach to adaptation in the future that recognises varying vulnerabilities and adaptive capacities amongst differentiated groups of people.

REFERENCES AND PERSONAL COMMUNICATIONS

REFERENCES

Abdul-Razak, M., & Kruse, S. (2017). Climate Risk Management The adaptive capacity of smallholder farmers to climate change in the Northern Region of Ghana. *Climate Risk Management*, *17*, 104–122. https://doi.org/10.1016/j.crm.2017.06.001

Abeysekera, S. (2007). *Shifting Feminisms: From Intersectionality to Political Ecology* (Women in Action No. 2). *Talking Points*.

Acaps. (2012). *Qualitative and Quantitative Research Techniques for Humanitarian Needs Assessment*. Retrieved from http://reliefweb.int/report/world/qualitative-and-quantitative-research-techniques-humanitarian-needs-assessment

Adato, M., Ahmed, A., & Lund, F. (2004). *Linking safety nets, social protection, and poverty reduction*. *Issue briefs*. Washington, DC.

Adger, W., Brown, K., Nelson, D. R., Berkes, F., Eakin, H., Folke, C., … Tompkins, E. L. (2011). Resilience implications of policy responses to climate change. *Wiley Interdisciplinary Reviews: Climate Change*, *2*(5), 757–766. https://doi.org/10.1002/wcc.133

Adger, W. N. (2003). Social Capital, Collective Action, and Adaptation to Climate Change. *Economic Geography*, *74*(4), 387–404. https://doi.org/10.1007/978-3-531-92258-4_19

Adger, W. N. (2006). Vulnerability. *Global Environmental Change*, *16*(3), 268–281. https://doi.org/10.1016/j.gloenvcha.2006.02.006

Adger, W. N., Barnett, J., Brown, K., Marshall, N., & O'Brien, K. (2013). Cultural dimensions of climate change impacts and adaptation. *Nature Climate Change*, *3*(2), 112–117. https://doi.org/10.1038/nclimate1666

Adjimoti, G. O., & Kwadzo, T.-M. G. (2018). Crop diversification and household food security status : evidence from rural Benin. *Agriculture & Food Security*, *7*(82), 1–12. https://doi.org/10.1186/s40066-018-0233-x

African Union Commission. (2003). *Protocol To the African Charter on Human and People's Rights on the Rights of Women in Africa*.

Agrawal, A., Kononen, M., & Perrin, N. (2009). *The Role of Local Institutions in Adaptation to Climate Chnage*. *Social Development Papers: Social Dimensions of Climate Change* (Vol. 118).

Aguilar, L., Araujo, A., & Quesada-aguilar, A. (2007). *Gender and Climate Change*. Retrieved from www.genderandenvironment.org

Agwanda, B., Nyadera, I. N., & Asal, U. Y. (2020). Cameroon and the Anglophone Crisis. In *The Palgrave Encyclopedia of Peace and Conflict Studies* (pp. 1–12). Springer Nature Switzerland. https://doi.org/10.1007/978-3-030-11795-5

Ajaero, C. K., Nzeadibe, C. T., Obisie-nmehielle, N., & Ike, C. C. (2017). The linkages between international migration, remittances and household welfare in Nigeria. *Migration and Development*, *2324*(April), 1–15. https://doi.org/10.1080/21632324.2017.1322171

Akoyoko, A. B. (2014). *Integrating Gender Aspects in Natural Resource Management: Ensuring the Sustainability of Environmental Projects in Senegal*. Uppsala University.

Alam, G. M. M. (2017). Livelihood Cycle and Vulnerability of Rural Households to Climate Change and Hazards in Bangladesh. *Environmental Management*, *59*(January 2017), 777–791. https://doi.org/10.1007/s00267-017-0826-3

Aleksandrova, M. (2019). *Social Protection as a Tool to Address Slow Onset Climate Events Emerging issues for research and policy* (2019 No. 16). https://doi.org/10.23661/dp16.2019

Amrevurayire, O. E., & Ojeh, V. N. (2016). Consequences of rural-urban migration on the source region of ughievwen clan delta state Nigeria. *European Journal of Geography*, *7 (3)*(September), 41–56.

Anderson, M. (2020, April 25). "Go Make Camps Deeper in the Forest." How the Amazon's Indigenous People are Handling the Threat of the Coronavirus. *TIME*. Retrieved from https://time.com/5826188/amazons-indigenous-people-coronavirus/

Annecke, W. (2010). *Gender and climate change adaptation: Lessons learnt from the Community Based Adaptation in Africa (CBAA)* (No. 04). *Adaptation and Beyond*. Retrieved from www.indigo-dc.org

Arendse, A., & Crane, T. A. (2010). *Impacts of Climate Change on Smallh older Farmers in Africa and their Adaptation Strategies: What are the roles for research?* (No. 221). Retrieved from www.ciat.cgiar.org

Arntzen, B. (2015). *Attention to Gender and Climate Change: Transformation of Gender Roles and Adaptive Capacity of Rural Women in Twon Villages in Meatu District Tanzania*. Norwegian University of Life Sciences.

Arora-Jonsson, S. (2011). Virtue and vulnerability: Discourses on women, gender and climate change. *Global Environmental Change*, *21*(2), 744–751. https://doi.org/10.1016/j.gloenvcha.2011.01.005

Asfaw, S., & Maggio, G. (2018). Gender, Weather Shocks and Welfare: Evidence from Malawi. *Journal of Development Studies*, *54*(2), 271–291. https://doi.org/10.1080/00220388.2017.1283016

Auma, J. O., Lagat, J. K., & Ngigi, M. (2010). A Comparison of Male-Female Household Headship and Agricultural Production in Marginal Areas of Rachuonyo and Homa Bay District , Kenya Auma , J . O . 1 , A Comparison of Male-Female Household Headship and Agricultural Production in Marginal Areas of Rach. *Jordan Journal of Agricultural Sciences*, *6*(4), 1–17.

Azam, S., & Imai, K. S. (2012). *Measuring Households ' Vulnerability to Idiosyncratic and Covariate Shocks – the case of Bangladesh* (Discussion Paper Series No. DP2012- 02).

Aziz, E. M. (2019). *Social Protection in Cameroon's Education and Health Sectors*. Yaounde.

Babugura, A., Mtshali, N., & Mtshali, M. (2010). *Gender and climate change: South Africa case study*. *Heinrich Böll Stiftung Southern*. Retrieved from https://www.boell.de/assets/boell.de/images/download_de/ecology/south_africa.pdf

Bachofen, C., & Cameron, E. (2010). *Vulnerability - exposure, sensitivity and adaptive capacity*. Retrieved from worldbank.org/sdcc

Bachuchet, S. (2014). Cultural Diversity of African Pygmies. In B. S. Hewlett (Ed.), *Hunter-Gatherers of the Congo Basin: Cultures, Histories, and Biology of African Pygmies* (pp. 1–384). New Jersey: Transaction Publishers.

Bailey, K. M., Mccleery, R. A., & Barnes, G. (2019). The role of capital in drought adaptation among rural communities in Eswatini. *Journal of Ecology and Society*, *24*(3), 1–29. https://doi.org/10.5751/ES-10981-240308

Balsiger, P., & Lambelet, A. (2014). *Participant Observation*.

Bandiaky-Badji, S., Ntamag-Ndjebet, C. N., Weah, J. T. ., & Meyers, J. (2016). Women and Tenure in Liberia and Cameroon. In Carol J. P. Colfer, B. S. Basnett, & M. Elias (Eds.), *Gender and Forests: Climate Change, Tenure, Value Chains and Emerging Issues* (pp. 171–185). London: Earthscan/Routledge. https://doi.org/10.4324/9781315666624

Bangura, K. S., Lynch, K., & Binns, J. A. (2013). Coping with the impacts of weather changes in rural Sierra Leone. *International Journal of Sustainable Development and World Ecology*, *20*(1), 20–31. https://doi.org/10.1080/13504509.2012.740511

Barber, C. P., Cochrane, M. A., Souza, C. M., & Laurance, W. F. (2014). Roads , deforestation , and the mitigating effect of protected areas in the Amazon. *Biological Conservation*, *177*(2014), 203–209.

Batool, H., Ali, W., Manzoor, R., & Mahmood, N. (2018). Women's Perception of Climate Change and Coping Strategies in Pakistan: An Empirical Evidence. *Earth Systems and Environment*, *2*(3), 609–619. https://doi.org/10.1007/s41748-018-0073-7

Baumann, P. (2002). *Improving access to natural resources for the rural poor: A critical analysis of central concepts and emerging trends from a sustainable livelihoods perspective* (LSP Working Paper 1 No. 1). *The Livelihood Support Programme*.

Bazeley, P., & Jackson, K. (2013). *Qualitative Data Analysis With Nvivo*. (J. Seaman, Ed.) (2 Edition). SAGE Publications, Inc.

BBC Pidgin News. (2018). Anglophone crisis deh make women break taboo for Cameroon. Retrieved November 19, 2019, from https://www.bbc.com/pidgin/tori-44890764

Beauclerk, J. (1994). *Hunters and Gatherers in Central Africa : On the Margins of Development*. Oxford: Oxfam GB.

Bele, Mekou Y., Sonwa, D. J., & Tiani, A. M. (2014). Local Communities Vulnerability to Climate Change and Adaptation Strategies in Bukavu in DR Congo. *The Journal of*

Environment & Development, *23*(3), 331–357. https://doi.org/10.1177/1070496514536395

Bele, Mekou Youssoufa, Somorin, O., Sonwa, D. J., Nkem, J. N., & Locatelli, B. (2011). Forests and climate change adaptation policies in Cameroon. *Miti Adapt Strateg Glob Change*, *16*, 369–385. https://doi.org/10.1007/s11027-010-9264-8

Benyishay, A., Heuser, S., Runfola, D., & Trichler, R. (2016). *Indigenous Land Rights and Deforestation : Evidence from the Brazilian Amazon Abstract : Indigenous Land Rights and Deforestation : Evidence from the Brazilian Amazon* (No. 22).

Berkes, F. (2017). Environmental governance for the anthropocene? Social-ecological systems, resilience, and collaborative learning. *Sustainability (Switzerland)*, *9*(7). https://doi.org/10.3390/su9071232

Berkes, F., Ibarra, M. A., Armitage, D., Charles, T., Loucks, L., Makino, M., … Abraham, J. (2014). *Guidelines for Analysis of Social-Ecological Systems* (September 2014). *Community Conservation Research Network*. Retrieved from http://www.communityconservation.net/wp-content/uploads/2016/01/FINAL_CCRN-Guidelines-for-Analysis-of-Social-Ecological-Systems-September-2014.pdf

Bishop-Sambrook, C. (2016). *Reducing rural women ' s domestic workload through labour-saving technologies and practices: Gender, targeting and social inclusion*. Rome. Retrieved from www.ifad.org

Bloom, D., & Canning, D. (2003). Health as Human Capital and its Impact on Economic Performance. *The International Associstion for the Study of Insurance Economics*, *28*(2), 304–315.

Bodegom, V. J. A., Savenije, H., & Wit, M. (2009). *Forests and Climate Change: adaptation and mitigation*. (A. J. van Bodegom, H. Savenije, & M. Wit, Eds.) (2009th ed.). Wageningen: Tropenbos International. Retrieved from www.etfrn.org

Boedhihartono, A. K., Endamana, D., Ruiz-perez, M., & Sayer, J. (2015). Landscape scenarios visualized by Baka and Aka Pygmies in the Congo Basin. *International Journal of Sustainable Development & World Ecology*, (May), 1–15. https://doi.org/10.1080/13504509.2015.1039094

Boillat, S., & Berkes, F. (2013). Perception and Interpretation of Climate Change among Quechua Farmers of Bolivia: Indigenous Knowledge as a Resource for Adaptive Capacity. *Ecology & Society*, *18*(4), 21. https://doi.org/10.5751/ES-05894-180421

Boissière, M., Locatelli, B., Sheil, D., Padmanaba, M., & Sadjudin, E. (2013). Local perceptions of climate variability and change in tropical forests of Papua, Indonesia. *Ecology and Society*, *18*(4). https://doi.org/10.5751/ES-05822-180413

Bourne, M. C., Wardell, S. DA, & Mehmood-Ul-Hassan. (2020). *Capacity Needs Assessment of CIFOR, ICRAF and their partners for the implementation of the CGIAR Research Program on Forestry, Trees and Agroforestry (FTA): Phase II, 2017-2021*. Bogor. https://doi.org/10.17528/cifor/007706

Bran, F. (2010). Non-Linear behavior of social-ecological systems. *Air and Water*

Components of the Environment, 516–522. Retrieved from http://aerapa.conference.ubbcluj.ro/2010/pdf/FlorinaBran.pdf

Bredtmann, J., Flores, F. M., Otten, S., Bredtmann, J., & Flores, F. M. (2019). Remittances and the Brain Drain : Evidence from Microdata for Sub-Saharan Africa Remittances and the Brain Drain : Evidence from Microdata for Sub-Saharan Africa. *The Journal of Development Studies*, *55*(7), 1–23. https://doi.org/10.1080/00220388.2018.1443208

Bronfenbrenner, U. (1979). *The Ecology of Human Development: Experiments By Nature and Design*. Cambridge, MA: Harvard University Press.

Brooks, N. (2003). Vulnerability ,risk and adaptation : A conceptual framework. *Tyndall Centre for Climate Change Research*, *38*(November), 20. https://doi.org/Yes

Brown, H. Carolyn Peach, & Sonwa, D. J. (2015). Rural local institutions and climate change adaptation in forest communities in Cameroon. *Ecology and Society*, *20*(2). https://doi.org/10.5751/ES-07327-200206

Brown, H C Peach. (2011). Gender , climate change and REDD + in the Congo Basin forests of Central Africa. *International Forestry Review*, *13*(2), 163–176.

Brown, K., & Lapuyade, S. (2001). Brown and Lapuyade 2001 Changing gender relationships and forest use. In Carol J.Pierce Colfer (Ed.), *The Equitable Forest: Diversity, Community, and Resource Management* (1st ed., pp. 90–111). Washington, DC: Routledge.

Bryan, E., Deressa, T. T., Gbetibouo, G. A., & Ringler, C. (2009). Adaptation to climate change in Ethiopia and South Africa: options and constraints. *Environmental Science and Policy*, *12*(4), 413–426. https://doi.org/10.1016/j.envsci.2008.11.002

Bunce, A., & Ford, J. (2015). How is adaptation, resilience, and vulnerability research engaging with gender? *Environmental Research Letters*, *10*(12), 1–12. https://doi.org/10.1088/1748-9326/10/12/123003

Buvinic, M., Gupta, M. Das, Casabonne, U., & Verwimp, P. (2013). *Violent Conflict and Gender Inequality* (6371).

Calow, R., MacDonald, A., Nicol, A., Robins, N., & Kebede, S. (2002). *The Struggle for water: Drought, water security and rural livelihoods*. Northingam.

Campbell, J. . (2020). Food Security in Small Island States. In J. Cornel & K. Lowitt (Eds.), *Food Security in Small Island States* (pp. 39–56). Springer Nature, Singapore. https://doi.org/10.1007/978-981-13-8256-7_3

Candida, M., Ines, S., & Maitrayee, M. (1999). *A Guide to Gender- Analysis Frameworks* (First Edit). Oxford: Oxfam GB. Retrieved from www.ofam.org.uk/publications

Caputo, R. K. (2002). Social justice, the ethics of care, and market economies. *Families in Society*, *83*(4), 355–364. https://doi.org/10.1606/1044-3894.10

Cardona, O. D., Aalst, M. Van, Birkmann, J., & Fordham, M. (2012). *Determinants of risk: exposure and vulnerability*. New York.

CARE. (2014). *2015 and beyond: Action for a just, gender-equitable and sustainable future*. *CARE Climate Change*.

Carr, E. R. (2008). Men's Crops and Women's Crops: The Importance of Gender to the Understanding of Agricultural and Development Outcomes in Ghana's Central Region. *World Development*, *36*(5), 900–915. https://doi.org/10.1016/j.worlddev.2007.05.009

Carr, E. R. (2020). Resilient livelihoods in an era of global transformation. *Global Environmental Change*, *64*(February), 102155. https://doi.org/10.1016/j.gloenvcha.2020.102155

Cassels, A., Gwatkin, D., Lovelace, C., Martin, J., Woodward, D., & Wieslander, A. (2001). *Dying for Change*.

Castel, V., Phiri, M., & Stampini, M. (2010). *Education and Employment in Malawi* (No. 110). Tunis. Retrieved from http:/www.afdb.org/

CED. (2008). *The Indigenous Forest Peoples and Protected Areas in Cameroon: A review of Cameroon's implementation of the CBD Programme of Work on Protected Areas*.

Cella, W., Baia-da-silva, D. C., Melo, G. C. De, Tadei, W. P., Sampio, V. de S., Pimenta, P., … Monteiro, W. M. (2019). Mini Review Do climate changes alter the distribution and transmission of malaria ? Evidence assessment and recommendations for future studies. *Journal of the Brazilian Society of Tropical Medicine*, *52*(November), 1–9. https://doi.org/10.1590/0037-8682-0308-2019

Chai, S. K. (2005). Predicting ethnic boundaries. *European Sociological Review*, *21*(4), 375–391. https://doi.org/10.1093/esr/jci026

Chambers, R. (2006). *Vulnerability, Coping and Policy (Editorial Introduction)* (Vol. 20).

Chambers, R., & Conway, G. (1992). Sustainable rural livelihoods: practical concepts for the 21st century. *Discussion Paper*, *296*(January 1992), 1–34.

Chan, K. M. A., Gould, R. K., Pascual, U., Chan, K. M. A., & Gould, R. K. (2018). ScienceDirect Editorial overview: Relational values: what are they, and what's the fuss about? *Current Opinion in Environmental Sustainability*, *35*, A1–A7. https://doi.org/10.1016/j.cosust.2018.11.003

Chandio, A. A., Jiang, Y., Wei, F., Rehman, A., & Liu, D. (2017). Famers' access to credit: Does collateral matter or cash flow matter?—Evidence from Sindh, Pakistan. *Cogent Economics & Finance*, *5*(1), 1–13. https://doi.org/10.1080/23322039.2017.1369383

Chechi, A. (2014). The Cultural Dimension of Climate Change: Some Remarks on the Interface between Cultural Heritage and Climate Change Law. In S. von Schorlemer & S. Maus (Eds.), *Climate Change as a Threat to Peace: Impacts on Cultural Heritage and Cultural Diversity* (pp. 161–197). Peter Lang AG.

Chia, E. L., Somorin, O., Sonwa, D., & Tiani, A. M. (2013). Local vulnerability , Forest communities and Forest- carbon conservation : case of southern Cameroon. *International Journal of Biodiversity and Conservation*, *5*(8), 498–507. https://doi.org/10.5897/IJBC2012.0533

Chiwona-Karltun, L., Kimanzu, N., Clendenning, J., Lodin, J. B., Ellingson, C., Lidestav, G., … Sartas, M. (2017). What is the evidence that gender affects access to and use of forest assets for food security? A systematic map protocol. *Environmental Evidence*, *6*(2), 1–10. https://doi.org/10.1186/s13750-016-0080-9

Christopher, P., Weinthal, E., Bellemare, M., & Jeuland, M. (1994). Social Capital, Trust, and Adaptation to Climate Change: Evidence from Rural Ethiopia.

Clarke, C. L. (2012). *Responses to the Linked Stressors of Climate Change and HIV/AIDS Amongst Vulnerable Rural Households in the East Cape, South Africa*. Rhodes University.

Clay, N., & Zimmerer, K. S. (2020). Land Use Policy Who is resilient in Africa's Green Revolution? Sustainable intensification and Climate Smart Agriculture in Rwanda. *Land Use Policy*, *97*(February), 104558. https://doi.org/10.1016/j.landusepol.2020.104558

CLGF. (2019). *Country Profile 2019: The Local Government System in Cameroon*. Retrieved from www.clgf.org.uk/cameroon

Colfer, Carol J. Pierce, Basnett, B. S., & Ihalainen, M. (2018). *Making sense of ' intersectionality ' A manual for lovers of people and forests* (Occasional Paper No. 184). Bogor. https://doi.org/10.17528/cifor/006793 Colfer

Collard, R.-C., Harris, L. M., Heynen, N., & Mehta, L. (2018). The antinomies of nature and space. *Environment and Planning E: Nature and Space*, *1*(1–2), 3–24. https://doi.org/10.1177/2514848618777162

Coninck, J. de, Culp, J., & Taylor, V. (2013). *African Perspectives on Social Justice*. (S. Tangen & R. O. Surratt, Eds.). Friedrich-Ebert-Stiftung.

Corden, A., Hirst, M., & Nice, K. (2008). *Financial Implications of Death of a Partner* (2288 No. 12). Heslington. Retrieved from www.york.ac.uk/spru%0APaper

Cordero-Ahiman, O. V., Santellano-Estrada, E., & Garrido, A. (2018). Food access and coping strategies adopted by households to fight hunger among indigenous communities of Sierra Tarahumara in Mexico. *Sustainability (Switzerland)*, *10*(2), 1–14. https://doi.org/10.3390/su10020473

Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. (V. Knight, J. Young, B. Bauhaus, & M. Markanich, Eds.) (4th ed.). SAGE Publications, Inc.

Cultural Survival. (2018). *Observations on the State of Indigenous Human Rights in Cameroon Prepared for: The 30th Session of the United Nations Human Rights Council Universal Periodic Review May 2018* (Vol. 1).

Dasgupta, P., Morton, J. F., Dodman, D., Karapinar, B., Meza, F., Rivera-Ferre, M. G., … Broecker, H. (2015). Rural areas. In C. . Field, V. R. Barros, D. . Dokken, K. . Mach, M. . Mastrndrea, T. . Billir, … P. . Mastrandrea (Eds.), *Climate Change 2014: Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects* (pp. 613–658). New York: Cambridge University Press. https://doi.org/10.1017/CBO9781107415379.014

Dauda, S., Mensah, A. C., & Nutsugbodo, R. (2014). Urban Poverty in Northern Ghana: Tracing the Livelihood Strategies of Women in the Shea Butter Industry. *Journal of Human and Social Science Research*, *3*(March), 15–25.

Davies, M., Guenther, B., Leavy, J., Mitchell, T., & Tanner, T. (2008). *'Adaptive Social Protection': Synergies for Poverty Reduction* (Vol. 39).

De Maria, M. (2019). Understanding land in the context of large-scale land acquisitions: A brief history of land in economics. *Land*, *8*(1), 1–14. https://doi.org/10.3390/land8010015

de Sherbinin, A., VanWey, L. K., McSweeney, K., Aggarwal, R., Barbieri, A., Henry, S., … Walker, R. (2008). Rural household demographics, livelihoods and the environment. *Global Environmental Change*, *18*(1), 38–53. https://doi.org/10.1016/j.gloenvcha.2007.05.005

de Smith, M. (2018). *Statistical Analysis Handbook: A Comprehensive Handbook of Statistical Concepts, Techniques and Software Tools* (2018 Editi). Edinburg: Winchelsea Press, Drumlin Security Ltd.

Debebe, Z. Y., Mebratie, A., Sparrow, R., Abebaw, D., Dekker, M., Alemu, G., & Bedi, A. S. (2013). *Coping with shocks in rural Ethiopia* (May 2013 No. ASC Working Paper 110/2013). Leiden.

Delacote, P. (2008). *The Safety-net Use of Non Timber Forest Products* (2008 No. 04).

Devereux, S., & Sabates-wheeler, R. (2004). *Transformative social protection* (October 2004 No. 232). Sussex.

Devisscher, T., Bharwani, S., Tiani, A. M., Pavageau, C., Kwack, N. E., & Taylor, R. (2013). *Current vulnerability in the Tri-National de la Sangha Landscape, Cameroon* (No. 107). *CIFOR Working Paper*. https://doi.org/10.17528/cifor/004084

Di Falco, S., & Chavas, J.-P. (2015). Rainfall Shocks, Resilience, and the Effects of Crop Biodiversity on Agroecosystem Productivity. *Land Economics*, *84*(1), 83–96. https://doi.org/10.3368/le.84.1.83

Diaz, S., Settele, J., Brondizio, E., Ngo, H. T., Gueze, M., Agard, J., … Zayas, C. (2019). *Summary for policymakers of the global assessment report on biodiversity and ecosystem services*. *Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - Advance Unedited Version*. Bonn. Retrieved from https://www.ipbes.net/news/ipbes/ipbes-global-assessment-summary-policymakers-pdf

Djoudi, H., Locatelli, B., Vaast, C., Asher, K., Brockhaus, M., & Sijapati, B. B. (2016). Beyond dichotomies : Gender and intersecting inequalities in climate change studies. *Ambio*, *45*(s3), 248–262. https://doi.org/10.1007/s13280-016-0825-2

Djurfeldt, A. A. (2020). Gendered land rights , legal reform and social norms in the context of land fragmentation - A review of the literature for Kenya , Rwanda and Uganda Land Use Policy Gendered land rights , legal reform and social norms in the context of land fragmentation. *Land Use Policy*, *90*, 104305. https://doi.org/10.1016/j.landusepol.2019.104305

Dorward, A., Guenther, B., & Sabates-wheeler, R. (2014). *Agriculture and Social Protection in Malawi* (Growth and Social Protection Working Paper No. 02).

Doss, C. (2011). *If women hold up half the sky, how much of the world's food do they produce?* (4 No. 11). Retrieved from www.fao.org/economic/esa

Dounias, E., & Colfer, C. J. P. (2008). Sociocultural dimensions of diet and health in forest-dwellers' systems. In C. J. P. Colfer (Ed.), *Human Health and Forests: A Global Overview of Issues, Practice and Policy* (pp. 279–296). London: Earthscan/CIFOR. https://doi.org/10.4324/9781849771627

Dubihlela, D., & Sekhampu, T. J. (2014). Among Poor Households In A South. *International Business & Economics Research Journal*, *13*(May/June), 1–13. https://doi.org/10.19030/iber.v13i3.8586

Dulal, H. B., Brodnig, G., Onoriose, C. G., & Thakur, H. K. (2010). *Capitalizing on Assets: Vulnerability and Adaptation to Climate Change in Nepal* (Social Development Papers No. 121). Washington.

Durowaiye, B. E., & Khan, S. (2017). THE RELATIVITY OF SOCIO-CULTURAL FACTORS ON YOUNG PEOPLE'S ACCESS TO HIGHER EDUCATION IN AFRICA. *South African Journal of Higher Education*, *31*(5), 31–48. https://doi.org/10.28535/31-5-904

Eakin, H. C., Lemos, M. C., & Nelson, D. R. (2014). Differentiating capacities as a means to sustainable climate change adaptation. *Global Environmental Change*, *27*, 1–8. https://doi.org/10.1016/j.gloenvcha.2014.04.013

Easterling, W. E., Hurd, B. H., & Smith, J. B. (2004). *Coping with global climate change: The role of adaptation in the United States*. *Occupational medicine (Oxford, England)* (Vol. 61). https://doi.org/10.1093/occmed/kqr050

Edokpayi, J. N., Rogawski, E. T., Kahler, D. M., Hill, C. L., Reynolds, C., Nyathi, E., … Dillingham, R. (2018). Challenges to Sustainable Safe Drinking Water : A Case Study of Water Quality and Use across Seasons in Rural Communities in Limpopo. *Water*, *10*(159), 1–18. https://doi.org/10.3390/w10020159

Ellis, F. (1999). Rural Livelihood Diversity in Developing Countries : Evidence and Policy Implications. *Natural Resource Perspectives*, *40*(40), 1–10. https://doi.org/xx

Ellyne, M., & Mahlalela, N. (2017). The Impact of Remittances on Poverty in Africa: A Cross-Country Empirical Analysis. In *The 14th African Finance Journal Conference* (pp. 1–37). Victoria Fall.

Elmhirst, R. (2011). Introducing new feminist political ecologies. *Geoforum*, *42*(2), 129–132. https://doi.org/10.1016/j.geoforum.2011.01.006

Enokenwa, O. (2014). *Women's Constraints in the Exploitation of Non-Timber Forest Products: The Case of Selected Villages in the Ejagham Community*. University of Buea.

European Report on Development. (2010). *Social Protection For Inclusive Development: A*

New Perspective in EU-Co-operation with Africa. San Domenico di Fiesole.

Eyumojock Council. (2011). *Eyumojock Council Development Plan*.

Fallon, M. (2016). *Writing up Quantitative Research in the Social and Behavioral Sciences*. (P. Leavy, Ed.) (Volume 6). Connecticut: Sense Publishers. Retrieved from https://www.sensepublishers.com/

Fankhauser, S. (2016). Adaptation to Climate Change. *Centre for Climate Change Economics and Policy Working Paper*, *No. 287*(287), 36. https://doi.org/10.1080/01944363.2010.502047

FAO-IFAD. (2010). *Basic Concepts of Gender*. Retrieved from http://www.fao.org/docrep/012/k8472e/k8472e00.pdf,%0ATOOLKIT

FAO. (2007). *Livelihoods Assessment and Analysis Lesson 2: Assessing Livelihoods-Learner's Notes*.

FAO. (2011). The state of food and agriculture: Women in agriculture. *Lancet*, *2*(7929), 160. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/24897208%5Cnhttp://www.fao.org/catalog/inter-e.htm

FAO. (2012). *Gender Inequalities in Rural Employment in Ghana: An Overview*. Rome.

FAO. (2019). *FAO ' s work with indigenous peoples in forestry*. Rome.

FAO and ECA. (2018). *Regional Overview of Food Security and Nutrition: Addressing the threat from climate variability and extremes for food security and nutrition*. Accra.

Farrington, J., Ramasut, T., & Walker, J. (2002). *Sustainable Livelihoods Approaches in Urban Areas: General Lessons, with Illustrations from Indian Cases* (March 2002 No. 162). London.

Fernández, J., Quiroga, M. Á., Escorial, S., & Privado, J. (2016). The gendered division of housework. *Psicothema*, *28*(2), 130–136. https://doi.org/10.7334/psicothema2015.169

Fikadu, Z. (2019). The Contribution of Managed Honey Bees to Crop Pollination , Food Security , and Economic Stability : Case of Ethiopia. *The Open Agricultural Journal*, *13*, 175–181. https://doi.org/10.2174/1874331501913010175

Fisher, M., Chaudhury, M., & Mccusker, B. (2010). Do Forests Help Rural Households Adapt to Climate Variability ? Evidence from Southern Malawi. *World Development*, *38*(9), 1241–1250. https://doi.org/10.1016/j.worlddev.2010.03.005

Fisher, M., Chaudhury, M., & McCusker, B. (2010). Do forests help rural households adapt to climate variability? Evidence from Southern Malawi. *World Development*, *38*(9), 1241–1250. https://doi.org/10.1016/j.worlddev.2010.03.005

Flatø, M., Muttarak, R., & Pelser, A. (2017). Women, Weather, and Woes: The Triangular Dynamics of Female-Headed Households, Economic Vulnerability, and Climate Variability in South Africa. *World Development*, *90*(179552), 41–62.

https://doi.org/10.1016/j.worlddev.2016.08.015

Fletschner, D., & Kenney, L. (2011). *Rural women's access to financial services: Credit, savings and insurance* (07 No. 11). Rome.

Flintan, F. (2011). *Changing Nature of Gender Roles in the Drylands of the Horn and East Africa: Implications for DRR Programming*.

Fon, D. E. (2011). Access to Arable Land by Rural Women in Cameroon. *Tropicultura*, *29*(2), 65–69.

Fonjong, L., Fombe, L., & Sama-Lang, I. (2013). The paradox of gender discrimination in land ownership and women's contribution to poverty reduction in Anglophone Cameroon. *GeoJournal*, *78*(3), 575–589. https://doi.org/10.1007/s10708-012-9452-z

Fonjong, Lotsmart, Sama-Lang, I., & Fombe, L. F. (2010). An Assessment of the Evolution of Land Tenure System in Cameroon and its Eff ects on Women ' s Land Rights and Food Security. *Perspectives on Global Development and Technology*, *9*(March), 154–169. https://doi.org/10.1163/156914910X487979

Forsyth, T. (2005). The Political Ecology of the Ecosystem Approach for Forests pp. 165-176 in Sayer, J. and Maginnis, S. (eds). *Forestry*, 165–176.

Frank, J., & Buckley, C. P. (2012). *Sustainable Markets Small-scale farmers and climate change How can farmer organisations and Fairtrade build the adaptive capacity of smallholders ?* London. Retrieved from http://pubs.iied.org/16518IIED.htm

Freudenthal, E., Nnah, S., & Kenrick, J. (2011). *REDD and Rights in Cameroon* (Vol. 44). Retrieved from http://www.forestpeoples.org/sites/fpp/files/publication/2011/02/reddandrightscameroon effeb2011englowres_0.pdf

Froment, A. (2008a). Biodiversity, Environment and Health among Rainforeset Dwellers: An Evolutionary Perspective. In Carol J Pierce Colfer (Ed.), *In Human Health and Forests: A Global Overview of Issues, Practice and Policy,* (pp. 259–274). London: Earthscan. Retrieved from https://static1.squarespace.com/static/5ca2d827aadd343de55a408b/t/5f1dd7fd2189c2206f540888/1595791367844/2008_Human+Health+and+Forests.+A+Global+Overview+of+Issues%2C+Practice+and+Policy.pdf

Froment, A. (2008b). Biodiversity, Environment and Health among Rainforeset Dwellers: An Evolutionary Perspective. In Carol J Pierce Colfer (Ed.), *In Human Health and Forests: A Global Overview of Issues, Practice and Policy,* (pp. 259–274). London: Earthscan.

Fuente, A. de la. (2008). *Shocks and their Impact on Assets: Human Development Report 2007/2008* (Fighting climate change: Human Solidarity in a divided world No. 23). *Occasional Paper*.

Füssel, H. M. (2007). Vulnerability: A generally applicable conceptual framework for climate change research. *Global Environmental Change*, *17*(2), 155–167. https://doi.org/10.1016/j.gloenvcha.2006.05.002

Gabbert, W. (2006). Concepts of Ethnicity. *Latin American and Caribbean Ethnic Studies*, *1*(1), 85–103. https://doi.org/10.1080/17486830500510034

Galafassi, D., Daw, T. M. ., Munyi, L., Brown, K., Barnaud, C., & Fazey, I. (2017). Learning about social-ecological trade-offs. *Ecology & Society*, *22*(1), 730–756. https://doi.org/10.5751/ES-08920-220102

Gallois, S., & Duda, R. (2016). Beyond productivity: The socio-cultural role of fishing among the Baka of southEast Cameroon. *Revue d'ethnoécologie*, (10), 0–27. https://doi.org/10.4000/ethnoecologie.2818

Gallopín, G. (2007). Linkages Between Vulnerability, Resilience, and Adaptive Capacity (pp. 1–55). Potsdam.

Gallopín, G. C. (2006). Linkages between vulnerability, resilience, and adaptive capacity. *Global Environmental Change*, *16*(3), 293–303. https://doi.org/10.1016/j.gloenvcha.2006.02.004

Gardner, T. A., Ferreira, J., Barlow, J., Lees, A. C., Parry, L., Vieira, I. C. G., … Zuanon, J. (2013). A social and ecological assessment of tropical land uses at multiple scales: the Sustainable Amazon Network. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *368*(1619), 20120166–20120166. https://doi.org/10.1098/rstb.2012.0166

Garmestani, A. S. (2013). Sustainability science: Accounting for nonlinear dynamics in policy and social-ecological systems. *Clean Technologies and Environmental Policy*, *16*(4), 731–738. https://doi.org/10.1007/s10098-013-0682-7

Garutsa, T. C., Mubaya, C. P., & Zhou, L. (2020). Gendered differentials in climate change adaptation amongst the Shona ethnic group in Marondera Rural District, Zimbabwe: A social inclusions lens. [version 1; peer review: 2 approved with reservations]. *AAS Open Research*, *1*(14), 1–18. https://doi.org/10.12688/aasopenres.12826.1

Geere, J., & Moa, C. (2017). Who Carries the Weight of Water? Fetching Water in Rural and Urban Areas and the Implications for Water Security. *Water Alternatives*, *10*(2), 513–540.

Geertz, C. (1963). The integrative revolution: primordial sentiments and politics in the new states. *Old Societies and New States: The Quest for Modernity in Asia and Africa*, 105–157.

Gender Empowerment and Development. (2010). *Beijing+15: The Reality of Cameroon and the Unfinished Business*.

Gezimu, G., Hiroshi, G., Dil, I., & Rahut, B. (2019). Gender differences in agricultural productivity : evidence from maize farm households in southern Ethiopia. *GeoJournal*, *0123456789*, 1–22. https://doi.org/10.1007/s10708-019-10098-y

Glantz, M., Gommes, R., & Ramasamy, S. (2009). *Coping with a changing climate : considerations for adaptation and mitigation in agriculture*. *Food and Agriculture Organization of the United Nations*. Rome. Retrieved from http://www.fao.org/docrep/012/i1315e/i1315e.pdf

Goldman, M. J., & Riosmena, F. (2013). Adaptive capacity in Tanzanian Maasailand: Changing strategies to cope with drought in fragmented landscapes. *Global Environmental Change*, *23*(3), 588–597. https://doi.org/10.1016/j.gloenvcha.2013.02.010

Gonda, N. (2015). Revealing the patriarchal sides of climate chenge through feminist critical discourse: a case study from Nicaragu. In *10th International Conference in Interpretive Policy Analysis* (pp. 1–9). Lille, France.

Graham, J. P., Hirai, M., & Kim, S. (2016). An Analysis of Water Collection Labor among Women and Children in 24 Sub-Saharan African Countries. *PLoS ONE*, *11(6)*(June), 1–14. https://doi.org/10.1371/journal.pone.0155981

Gyapong, A. P. M., & Colfer, C. J. P. (2008). The Gender Agenda and Tropical Forest Diseases. In Carol J.Pierce Colfer (Ed.), *Human Health and Forests: A Global Overview of Issues, Practice and Policy* (pp. 135–160). London: Eathscan.

Haggard, D. R. (1994). [Book Review] Justice and the Politics of Difference . We Gotta Get Out of This Place : Popular Conservatism and Postmodern Culture . *A Journal of Social Theory*, *3*. https://doi.org/DOI: https://doi.org/10.13023/DISCLOSURE.03.18 Available

Hallegatte, S., Bangalore, M., Bonzanigo, L., Fay, M., Kane, T., Narloch, U., … Vogt-Schilb, A. (2016). *Shock Waves: Managing the Impacts of Climate Change on Poverty* (Vol. 59). Washington, DC. https://doi.org/10.1017/S0022112081001535

Hamer, N., & Shackleton, S. (2015). *Local safety nets help people cope with shocks and stressors and prevent the deepening of poverty and vulnerability* (No. 13). Grahamstown. https://doi.org/10.1177/0022146513479002

Hammer, B., Fletcher, F., & Hibbert, A. (2017). Participant Observation: Enhancing the Impact Measurement in Community Based Participatory Research. *The Qualitative Report*, *22*(2), 439–455. Retrieved from https://nsuworks.nova.edu/tqr/vol22/iss2/6

Hankivsky, O. (2014). *Intersectionality 101*. The Institute for Intersectionality Research & Policy. https://doi.org/10.1509/jppm.12.044

Hayashi, K. (2008). Hunting Activities in Forest Camps Among the Baka Hunter-gatherers of SouthEast Cameroon. *African Study Monographs*, *29*(July), 73–92.

Helgeson, J. F., Dietz, S., & Hochrainer-stigler, S. (2013). Vulnerability to Weather Disasters : the Choice of Coping Strategies in Rural Uganda. *Ecology & Society*, *18*(2), 1–13. https://doi.org/10.5751/ ES-05390-180202

Helmy, I. (2020). *Livelihood Diversification Strategies: Resisting Vulnerability in Egypt* (GLO Discussion Paper No. 441). Essen.

Herrero, M., Grace, D., Njuki, J., Johnson, N., Enahoro, D., Silvestri, S., & Rufino, M. C. (2013). The roles of livestock in developing countries. *Animal*, *7*(1), 3–18. https://doi.org/10.1017/S1751731112001954

Himes, A., & Muraca, B. (2018). ScienceDirect Relational values : the key to pluralistic valuation of ecosystem services. *Current Opinion in Environmental Sustainability*, *35*,

1–7. https://doi.org/10.1016/j.cosust.2018.09.005

Hoddinott, J., & Krishnan, P. (2008). Collective Action and Vulnerability: Burial Societies in Rural Ethiopia. In E. Mwangi, H. Markelova, & R. Meinzen-Dick (Eds.), *Collective Action and Property Rights for Poverty Reduction: Lessons from a Global Research Project* (pp. 171–174). Washington, DC: International Food Policy Research Institute.

Holmgren, S., & Arora-Jonsson, S. (2016). The Forest Kingdom and Values: Climate change and gender equality in a contested forest policy context. In Carol J.Pierce Colfer & M. Elias (Eds.), *Gender and Forests: Climate Change, Tenure, Value Chains and Emerging Issues* (pp. 53–67). London: Earthscan/ Routledge.

Hughes, K., Morgan, S., Baylis, K., Oduol, J., Smith-dumont, E., Vågen, T., & Kegode, H. (2020). Assessing the downstream socioeconomic impacts of agroforestry in Kenya. *World Development*, *128*, 104835. https://doi.org/10.1016/j.worlddev.2019.104835

Hummelbrunner, R., & Jones, H. (2013). A Guide to Managing in the Face of Complexity. *Ba*, (October), 1–31. Retrieved from odi.org

IPCC. (2007). *Mitigation of climate change: Contribution of working group III to the fourth assessment report of the Intergovernmental Panel on Climate Change*. *Intergovernmental Panel on Climate Change*. https://doi.org/http://www.ipcc.ch/publications_and_data/.htm

IPCC. (2012). Managing the risks of extreme events and disasters to advance climate change adaptation. In and P. M. M. Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor (Ed.), *A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change* (pp. 1–594). New York: Cambridge University Press.

IPCC. (2014). Summary for Policymakers. In and L. L. W. Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. WhiteField, C.B., V.R. Barros, D.J. Dokken, K.J (Ed.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 1–32). Cambridge and New York: Cambridge University Press. https://doi.org/10.1017/cbo9780511976988.002

IPCC. (2019). *Forty-Ninth Session of the IPCC Kyoto, Japan: Report from the IPCC Task Group on Gender* (Vol. 10).

Isajiw, W. W. (1992). Definition and Dimensions of Ethnicity: A Theoretical Framework. *Challenges of Measuring an Ethnic World: Science, Politics and Reality*, *26*(2), 1–24.

Ishizawa, O. A., & Miranda, J. J. (2016). *Weathering Storms Understanding the Impact of Natural Disasters on the Poor in Central America* (7692).

Islam, M., Kashem, S., Morshed, S., Rahman, M., & Das, A. (2019). Dynamics of Seasonal Migration of Rural Livelihood ; Capital Formation Dynamics of Seasonal Migration of Rural Livelihood ; Capital Formation Perspective. *Advanced Journal of Social Science*, *5*(1), 81–92. https://doi.org/10.21467/ajss.5.1.81-92

Jackson, B. (2005). The Conceptual History of Social Justice. *Political Studies Review*, *3*(3), 356–373. https://doi.org/10.1111/j.1478-9299.2005.00028.x

Jarosz, L. (2001). Feminist Political Ecology. *The International Encyclopedia of Geography*. Retrieved from https://www.researchgate.net/publication/280741205

Jayne, T., Yeboah, K. F., and Carla, H. (2017). *The future of work in African agriculture : Trends and drivers of change* (December 2017 No. 25). *ILO Research Department Working Paper No.25*.

Jelassi, S., & Brown, A. (2011). *UNRWA Gender Analysis Manual*.

Jerneck, A. (2018). Taking gender seriously in climate change adaptation and sustainability science research: views from feminist debates and sub-Saharan small-scale agriculture. *Sustainability Science*, *13*(2), 403–416. https://doi.org/10.1007/s11625-017-0464-y

Jhaveri, N. . J. (2020). *Forest tenure pathways to gender equality: A practitioner's guide*. (I. Monterroso & A. M. Larson, Eds.), *Forest tenure pathways to gender equality: A practitioner's guide*. Bogor, Indonesia: Center for International Forestry Research. https://doi.org/10.17528/cifor/007909

Jones, L., Carabine, E., & Schipper, E. L. F. (2015). *(Re) conceptualising maladaptation in policy and practice: towards an evaluative framework*. Retrieved from https://www.webarchive.org.uk/wayback/archive/20180902113617/http:/prise.odi.org/

Jones, L., Ludi, E., & Simone, L. (2010). *Towards a characterisation of adaptive capacity: a framework for analysing adaptive capacity at the local level*. Retrieved from www.odi.org.uk

Jorgensen, D. L. (2015). Participant Observation. In R. Scott & S. Kosslyn (Eds.), *Emerging Trends in the Social and Behavioral Sciences* (pp. 1–15). John Wiley & Sons Ltd.

Jouanjean, M., Tucker, J., & Willem, D. (2014). *Understanding the effects of resource degradation on socio - economic outcomes in developing countries*. London.

Juhola, S., Glaas, E., Linnér, B., & Neset, T. S. (2016). Redefining maladaptation. *Environmental Science and Policy*, *55*(1), 135–140. https://doi.org/10.1016/j.envsci.2015.09.014

Kaijser, A., & Kronsell, A. (2013). Climate Change through the Lens of Intersectionality Climate change through the lens of intersectionality. *Environmental Politics*, *0*(0), 1–20. https://doi.org/10.1080/09644016.2013.835203

Kameri-Mbote, P. (2013). Climate Change and Gender Justice. *International Environmental Law Research Centre*, 23. Retrieved from http://www.wedo.org/wp-content/uploads/roundtable-final-report-6-nov

Kardan, A., Bailey, S., Solorzano, A., & Fidalgo, L. (2017). *Shock-Responsive Social Protection Systems Research: Case study—Mozambique*. Oxford. Retrieved from https://www.opml.co.uk/files/Publications/a0408-shock-responsive-social-protection-systems/opm-case-study-2017-srsp-mozambique.pdf?8add1b45c3

Kawulich, B. B. (2005). Participant Observation as a Data Collection Method. *Forum: Qualitative Research*, *6*(May 2005), 1–29.

Kayaga, S. M., Amankwaa, E. F., Gough, K. V., Wilby, R. L., Abarike, M. A., Codjoe, S. N. A., … Griffiths, P. (2020). Cities and extreme weather events: impacts of flooding and extreme heat on water and electricity services in Ghana. *Environment and Urbanization*, (4), 1–20. https://doi.org/10.1177/0956247820952030

Kekeunou, S., Agrippine, Y.-F., Wescancellas, Y., Didier, M. A., Cyril, H., Frankline, Y., & Cristophe, P. (2014). Life cycle of Zonocerus variegatus (Orthoptera: Pyrgomorphidae) in the areas of equatorial climate of Cameroon with uni- and bimodal distribution of rainfall. *Academic Journal of Entomology*, *7*(3), 88–101. https://doi.org/10.5829/idosi.aje.2014.7.3.84258

Kitanishi, K. (2003). Cultivation by the Baka Hunter-Gatherers in the Tropial Rain Forest of Central Africa. *African Study Monographs*, *Suppl. 28*, 143–157.

Klarer, A. J. (2014). *The Evolution and Expansion of Cacao Farming in South West Cameroon and its Effects on Local Livelihoods*. Copenhagen University.

Klink, B. Van, Rossum, H. Van, Vries, B. De, & Thomas, M. S. (2019). Teaching Sociolegal Research Methodology: Participant Observation T. *Boom Juridisch*, (January), 1–17.

Konings, P., & Nyamnjoh, F. (1997). The Anglophone Problem in Cameroon. *The Journal of Modern African Studies*, *35*(2), 207–229.

Kotir, J. H. (2011). Climate change and variability in Sub-Saharan Africa: A review of current and future trends and impacts on agriculture and food security. *Environment, Development and Sustainability*, *13*(3), 587–605. https://doi.org/10.1007/s10668-010-9278-0

Kristjanson, P., Bryan, E., Bernier, Q., Twyman, J., Kieran, C., Ringler, C., … Addressing, C. D. (2017). Addressing gender in agricultural research for development in the face of a changing climate : where are we and where should we be going ? *International Journal of Agricultural Sustainability*, *15*(5), 482–500. https://doi.org/10.1080/14735903.2017.1336411

Krozer, A., & de México, E. C. de. (2020). *Seeing Inequality?: Relative Affluence and Elite Perceptions in Mexico* (Overcoming Inequalities in a Fractured World: Between No. 8). *Occasional Paper*.

Kwekudee. (2013). Trip down memory lane. Retrieved November 13, 2018, from https://kwekudee-tripdownmemorylane.blogspot.com/2013/06/ekoi-ejagham-people-originators-of.html

LaCerva, G. (2016). Untamed and Rare: Access and Power in DRC's Emerging Luxury Bushmeat Trade. In Carol J Pierce Colfer, B. S. Basnett, & M. Elias (Eds.), *Gender and Forests: Climate Change, Tenure, Value Chains, and Emerging Issues* (pp. 243–260). London: Earthscan/Routledge.

Lade, S. J., Haider, L. J., Engström, G., & Schlüter, M. (2017). Resilience offers escape from trapped thinking on poverty alleviation. *Science Advances*, *3*(May), 1–12.

Landau, S., & Brian, E. S. (2004). *A Handbook of Statistical Analyses using SPSS*. Washington, DC: A CRC Press Company.

Lastarria-Cornhiel, S. (2005). *GENDER AND PROPERTY RIGHTS WITHIN POSTCONFLICT SITUATIONS* (Issue Paper No 12 No. PN-ADB-672).

Lavell, A., Oppenheimer, M., Diop, C., Hess, J., Lempert, R., Li, J., … Weber, E. (2012). Climate change: New dimensions in disaster risk, exposure, vulnerability, and resilience. In and P. M. M. Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor (Ed.), *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: Special Report of the Intergovernmental Panel on Climate Change* (Vol. 9781107025, pp. 25–64). New York: Cambridge University Press. https://doi.org/10.1017/CBO9781139177245.004

Leach, M., Reyers, B., Bai, X., Brondizio, E. S., Cook, C., Díaz, S., … Scobie, M. (2019). Equity and sustainability in the Anthropocene: a social – ecological systems perspective on their intertwined futures. *Global Sustainability*, *1*(e13), 1–13. https://doi.org/https://doi.org/10.1016/j.cosust.2018.11.003

Leavy, P. (2017). *Research Design: Quantitative, Qualitative, Mixed Methods, Arts-Based, and Community-Based Participatory Research Approaches*. (D. Laughton, Ed.). New York: The Guildford Press.

Leslie, H. M., Basurto, X., Nenadovic, M., Sievanen, L., Cavanaugh, K. C., Cota-Nieto, J. J., … Aburto-Oropeza, O. (2015). Operationalizing the social-ecological systems framework to assess sustainability. *Proceedings of the National Academy of Sciences*, *112*(19), 5979–5984. https://doi.org/10.1073/pnas.1414640112

Levin, S., Xepapadeas, T., Cr??pin, A. S., Norberg, J., De Zeeuw, A., Folke, C., … Walker, B. (2013). Social-ecological systems as complex adaptive systems: Modeling and policy implications. *Environment and Development Economics*, *18*(2), 111–132. https://doi.org/10.1017/S1355770X12000460

Levina, E., & Tirpak, D. (2006). Adaptation to Climate Change: Key Terms. *Organisation for Economic Co-Operation and Development*, (1), 1–25. Retrieved from http://www.oecd.org/env/cc/

Lewis, J. (2004). Whose forest is it anyway? Mbendjele Yaka Pygmies, the Ndoki forest and the wider world. In T. Widlok & W. . Tadesse (Eds.), *Property and Equality: Encapsulation, Commercialisation, Discrimination* (Volume 2, pp. 56–78). Oxford: Berghahn Books.

Lewis, M., & Lockheed, M. (2008). Inexcusable absence – Why 60 million girls still aren't in school and what to do about it. *Compare: A Journal of Comparative and International Education*, *38*(5), 654–656. https://doi.org/10.1080/03057920802383138

Lockwood, M., Raymond, C. M., Oczkowski, E., & Morrison, M. (2015). Measuring the dimensions of adaptive capacity : a psychometric approach. *Ecology & Society*, *20*(1), 1–13. https://doi.org/http://dx.doi.org/10.5751/ES-07203-200137

Lohnert, B. (2017). *Migration and the Rural-Urban Transition in Sub-Saharan Africa* (SLE

Discussion Paper 05/2017 - EN No. 05). Berli.

Loison, A. S. (2019). Household livelihood diversi fi cation and gender : Panel evidence from rural Kenya. *Journal of Rural Studies*, *69*(February), 156–172. https://doi.org/10.1016/j.jrurstud.2019.03.001

Loury, G. C. (2000). *Social Exclusion and Ethnic Groups: The Challenge to Economics*. *Annual World Bank Conference on Development Economics*.

Ludgate, N. (2016). *Moser Gender Analysis Framework*. *Feed the Future*. Florida. Retrieved from creativecommons.org/licenses/by/3.0/

Lusiba, G. S., Kibwika, P., & Kyazze, F. B. (2017). Intra-household gender division of labour and decision-making on rice postharvest handling practices: A case of East Uganda. *Cogent Social Sciences*, *3*(1), 1–14. https://doi.org/10.1080/23311886.2017.1296323

Macgregor, S. (2010). 'Gender and climate change': from impacts to discourses. *Journal of the Indian Ocean Region*, *6*(2), 223–238. https://doi.org/10.1080/19480881.2010.536669

Magnan, A. (2014). Avoiding maladaptation to climate change: towards guiding principles. *S.a.P.I.E.N.S*, *7*(1), 1–11. Retrieved from http://sapiens.revues.org/1680

Makoudjou, A., Levang, P., & Tieguhong, J. C. (2017). The role of forest resources in income inequality in Cameroon. *Forests Trees and Livelihoods*, (March), 1–15. https://doi.org/10.1080/14728028.2017.1297258

Malleson, R., Asaha, S., Egot, M., Kshatriya, M., Marshall, E., Obeng-Okrah, & Sunderland, T. (2014). Non-timber forest products income from forest landscapes of Cameroon , Ghana and Nigeria – an incidental or integral contribution to sustaining rural livelihoods ? *International Forestry Review*, *16*(3), 261–277.

Masika, R., & Joekes, S. (1996). *Employment and sustainable livelihoods: A gender perspective*. Brighton.

Massey, M. J. (2020). *Climate Change , Culture and Cultural Rights Memo / Expanded Outline*. California.

Masunungure, C., & Shackleton, S. E. (2018). Exploring Long-Term Livelihood and Landscape in Two Semi-Arid Sites in Southern Africa: Drivers and Consequences for Social-Ecological Vulnerability. *Land*, *7*(50), 1–23. https://doi.org/10.3390/land7020050

Matambo.E. (2018). Formal Against Indigenous and Informal Education in Sub-Saharan Africa: The Battles without Winners. *Indilinga*, *17*(1), 1–13.

Matsolo, M. J., Ningpuanyeh, W. C., & Susuman, S. A. (2018). Factors Affecting the Enrolment Rate of Students in Higher Education Institutions in the Gauteng province, South Africa. *Journal of Asian and African Studies*, *53*(1), 64–80. https://doi.org/10.1177/0021909616657369

Mcaulay, J., Ndeunyema, N., & Philosophy, P. (2019). *Human Rights Abuses in the Cameroon Anglophone Crisis A Submission of Evidence to UK Parliament*. Oxford.

McCarthy, J. J., Canziani, O. F., Leary, N. ., Dokken, D. J., & White, K. S. (2001). *Climate change 2001: Impacts, Adaptation, and Vulnerability*. *Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change*. https://doi.org/10.1002/joc.775

McDowell, J. Z., & Hess, J. J. (2012). Accessing adaptation: Multiple stressors on livelihoods in the Bolivian highlands under a changing climate. *Global Environmental Change*, *22*(2), 342–352. https://doi.org/10.1016/j.gloenvcha.2011.11.002

Meinhold, K., & Darr, D. (2019). The processing of non-timber forest products through small and medium enterprises-A review of enabling and constraining factors. *Forests*, *10*(11). https://doi.org/10.3390/f10111026

Mena, C. F., Laso, F., Martinez, P., Sampedro, C., Mena, C. F., Laso, F., … Sampedro, C. (2017). Modeling road building, deforestation and carbon emissions due deforestation in the Ecuadorian Amazon: the potential impact of oil frontier growth. *Journal of Land Use Science*, *12*(6), 477–492. https://doi.org/10.1080/1747423X.2017.1404648

Mercandalli, S., & Losch, B. (2017). *Rural Africa in motion: Dynamics and drivers of migration South of the Sahara* (2017th ed.). Rome.

Milkoreit, M., Hodbod, J., Baggio, J., Benessaiah, K., Calderon Contreras, R., Donges, J. F., … Werners, S. (2018). Defining tipping points for social-ecological systems scholarship – an interdisciplinary literature review. *Environmental Research Letters*, (13), 1–13. https://doi.org/10.1088/1748-9326/aaaa75

MINEPDED. (2012). *National Biodiversity Strategy and Action Plan Version II (NBSAP II)*. Retrieved from www.minep.gov.cm

Mishi, S., & Mudziwapasi, L. (2014). *Remittances and sustainability of family livelihoods in Zimbabwe : Case Study of Remittances and sustainability of family livelihoods in Zimbabwe : Case Study of Chegutu Town* (No. 440).

Mitchell, T., & Harris, K. (2012). *Resilience: A risk management approach*. London. Retrieved from www.odi.org.uk

Mitsugi, H. (2020). *The impacts of COVID-19 on the forest sector : How to respond ?* https://doi.org/10.4060/ca8844en

Mlambo, V. H. (2018). An overview of rural-urban migration in South Africa: its causes and implications. *Archives of Business Research*, *6(4)*(April), 63–70. https://doi.org/10.14738/abr.64.4407

Molua, E. L., & Lambi, C. M. (2006). *Climate, Hydrology, and Water Resources*. https://doi.org/10.1007/978-94-009-0207-7_1

Molua, E. L., & Lambi, C. M. (2007). *The Economic Impact of Climate Change on Agriculture in Cameroon* (4364 No. 17). Pretoria.

Mordecai, E. A., Ryan, S. J., Caldwell, J. M., Shah, M. M., & Labeaud, A. D. (2020). Personal View Climate change could shift disease burden from malaria to arboviruses in Africa. *The Lancet Planetary Health*, *4*(9), e416–e423. https://doi.org/10.1016/S2542-

5196(20)30178-9

Morris, N. (2015). Providing ethical guidance for collaborative research in developing countries. *Research Ethics*, *11*(4), 211–235. https://doi.org/10.1177/1747016115586759

Moser, A., & Korstjens, I. (2018). Series: Practical guidance to qualitative research. Part 3: Sampling, data collection and analysis. *European Journal of General Practice*, *24*(1), 9–18. https://doi.org/10.1080/13814788.2017.1375091

Moser, C. O. N. (1989). Gender planning in the third world: Meeting practical and strategic gender needs. *World Development*, *17*(11), 1799–1825. https://doi.org/10.1016/0305-750X(89)90201-5

Moser, C. O. N. (2014). *Gender planning and development : Revisiting , deconstructing and reflecting* (No. 60). London. Retrieved from www.bartlett.ucl.ac.uk/dpu

Mosnier, A., Obersteiner, M., & Fritz, S. (2014). Modeling Impact of Development Trajectories and a Global Agreement on Reducing Emissions from Deforestation on Congo Basin Forests by 2030. *Environ Resource Econ*, *57*(March), 1–22. https://doi.org/10.1007/s10640-012-9618-7

Mukasa, J., Olaka, L., & Yahya Said, M. (2020). Drought and households' adaptive capacity to water scarcity in Kasali, Uganda. *Journal of Water and Climate Change*, 1–16. https://doi.org/10.2166/wcc.2020.012

Müller, C., Cramer, W., Hare, W. L., & Lotze-campen, H. (2011). Climate change risks for African agriculture. *Agricultural Sciences, PNAS*, *208*, 4313–4315. https://doi.org/10.1073/pnas.1015078108

Munanura, I., Backman, K., DeWayne, M., Jeffrey, H., & Powell, R. B. (2014). Household Poverty Dimensions Influencing Forest Dependence at Volcanoes National Park, Rwanda: An Application of the Sustainable Livelihoods Framework. *Natural Resources*, *05*(16), 1031–1047. https://doi.org/10.4236/nr.2014.516087

Mutebi, A., Kananura, R. M., Ekirapa-kiracho, E., Bua, J., Kiwanuka, S. N., Nammazi, G., … Tetui, M. (2017). Characteristics of community savings groups in rural East Uganda : opportunities for improving access to maternal health services Characteristics of community savings groups in rural East Uganda : opportunities for improving access to maternal healt. *Global Health Action*, *10*(4), 1–11. https://doi.org/10.1080/16549716.2017.1347363

Muur, W. Van Der. (2018). Forest conflicts and the informal nature of realizing indigenous land rights in Indonesia. *Citizenship Studies*, *22*(2), 160–174. https://doi.org/10.1080/13621025.2018.1445495

Nasrin, N., & Wahid, T. (2015). Contribution of Rural Non-farm Activities in Household Income Generation: A Study on Khulna Region. *IOSR Journal Of Humanities And Social Science*, *20*(10), 1–12. https://doi.org/10.9790/0837-201010112

Ndip, E. A., Agyingi, C., Nton, M., & Oladunjoye, M. (2018). Review of the geology of mamfe sedimentary basin, SW Cameroon, Central Africa. *Journal of Oil, Gas and Petrochemical Sciences*, *1*(1), 35–40. https://doi.org/10.30881/jogps.00008

Nerfa, L., Rhemtulla, J. M., & Zerriffi, H. (2020). Forest dependence is more than forest income: Development of a new index of forest product collection and livelihood resources. *World Development*, *125*, 104689. https://doi.org/10.1016/j.worlddev.2019.104689

Neumann, R. p., & Hirsch, E. (2000). *Commercialisation of non-timber forest products: review and analysis of research*. *Commercialisation of non-timber forest products: review and analysis of research*. Indonesia: Center for International Forestry Research. https://doi.org/10.17528/cifor/000723

Niang, I., Ruppel, O. C., Abdrabo, M. A., Essel, A., Lennard, C., Padgham, J., & Urquhart, P. (2014). Africa. In: In and L. L. W. Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea (Ed.), *Climate Change 2014: Impacts, Adaptation and Vulnerability - Contributions of the Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* (pp. 1199–1265). United Kingdom and New York: Cambridge University Press. https://doi.org/10.1017/CBO9781107415386.002

Niehof, A. (2004). The significance of diversification for rural livelihood systems. *Food Policy*, *29*, 321–338. https://doi.org/10.1016/j.foodpol.2004.07.009

Nikitas, G., Bhattachrya, S., Vimalan, N., Demirci, H. E., Nikitas, N., & Kumar, P. (2019). Wind power: A sustainable way to limit climate change. *Managing Global Warming*, 333–362. https://doi.org/10.1016/B978-0-12-81404-5.00010-7

Njiei, A. F., & Asongu, N. A. (2015). Development Challenges Amongst the Baka People of the EEast Region of Cameroon: An Anthropological Perspective. *International Journal of Innovation and Applied Studies*, *12*(2), 440–446. Retrieved from http://www.ijias.issr-journals.org/

Nkondjio, A., Nkondjio, C. A., Ndo, C., Njiokou, F., Bigoga, J. D., Ambene, P. A., … Wondji, C. S. (2019). Review of malaria situation in Cameroon: technical viewpoint on challenges and prospects for disease elimination. *Parasites & Vectors*, *12*(501), 1–23. https://doi.org/10.1186/s13071-019-3753-8

Nkwatoh, A. F., Popoola, L., Iyasa, S. M., & Nkwatoh, F. W. (2010). Trade on Non-Timber Forest Products (NTFPS) Between South West Cameroon and Nigeria. *Global Journal of Pure and Applied Sciences*, *16*(2), 219–225. Retrieved from www.globaljournalseries.com

Noble, I. R., Huq, S., Anokhin, Y. A., Carmin, J. A., Goudou, D., Lansigan, F. P., … Chu, E. (2015). *Adaptation needs and options, In: Climate Change 2014 Impacts, Adaptation and Vulnerability: Part A: Global and Sectoral Aspects*. https://doi.org/10.1017/CBO9781107415379.019

Ntie-kang, F., Lifongo, L. L., Meva, L., Ekwelle, N., Owono, L. C. O., Megnassan, E., … Efange, S. M. N. (2013). Cameroonian medicinal plants : a bioactivity versus ethnobotanical survey and chemotaxonomic classification. *BMC Complementary and Alternative Medicine*, *13*(1), 1. https://doi.org/10.1186/1472-6882-13-147

Nunes, A. R. (2016). *Assets for health: linking vulnerability, resilience and adaptation to climate change* (No. 163).

Odilon, B., & Lokonon, K. (2017). *Farmers' Vulnerability to Climate Shocks: Insights from the Niger Basin of Benin* (January No. 248). Retrieved from www.afdb.org/

Odinioha, J. M. (2014). Social Justice (SJ) and Sustainable National Development in Nigeria : A Theoritical Discourse. *International Journal of Advanced Research Statistics, Management and Finance*, *2*(1), 135–143. Retrieved from http://www.internationalpolicybrief.org/stats-mgt-fin-vol2-no-1

Odusola, A., Cornia, G. A., & Bhorat, H. (2017). *Income Inequality Trends in sub-Saharan Africa Edited by*. (A. Odusola, G. Cornia, H. Bhorat, & P. Conceicao, Eds.). New York: United Nations Development Programme.

OHCHR. (2019). *Office of the United Nations High Commissioner for Human Rights (OHCHR) submission to the UNFCCC on Gender and Climate Change*.

Ojong, N. (2018). Informal borrowing sources and uses: insights from the North West Region, Cameroon. *Third World Quarterly*, *6597*, 1–20. https://doi.org/10.1080/01436597.2018.1460201

Olsen, W. (2004). Triangulation in Social Research: Qualitative and Quantitative Methods Can Really Be Mixed. *Developments in Sociology*, (10–12), 30. https://doi.org/10.1016/j.newar.2008.03.024

Omarova, A., Tussupova, K., Hjorth, P., Kalishev, M., & Dosmagambetova, R. (2019). Water supply challenges in rural areas: A case study from central Kazakhstan. *International Journal of Environmental Research and Public Health*, *16*(5). https://doi.org/10.3390/ijerph16050688

Orock, F. T. (2014). Protected Areas, Ecotourism, and Livelihood Sustenance: Conflicting Triological Paradigm in the Ejagham Forest Reserve (Forest Management Unit 11-005), Cameroon. *Journal of International Wildlife Law & Policy*, *0292*(17:187-196), 1–11. https://doi.org/10.1080/13880292.2014.956651

Osborne, N. (2015). Intersectionality and kyriarchy: A framework for approaching power and social justice in planning and climate change adaptation. *Planning Theory*, *14*(2), 130–151. https://doi.org/10.1177/1473095213516443

Osborne, T. (2017). Public Political Ecology: A community of praxis for earth stewardship. *Journal of Political Ecology*, *24*. Retrieved from http://jpe.library.arizona.edu/volume_24/Osborne.pdf

Ostrom, E. (2007). A diagnostic approach for going beyond panaceas. *Proceedings of the National Academy of Sciences*, *104*(39), 15181–15187. https://doi.org/10.1073/pnas.0702288104

Ostrom, E., Janssen, M. A., & Anderies, J. M. (2007). Going beyond panaceas. *Proceedings of the National Academy of Sciences*, *104*(39), 15176–15178. https://doi.org/10.1073/pnas.0701886104

Oyono, P. R. (2005). From Diversity to Exclusion for Forest Minorities in Cameroon. In Carol J.Pierce Colfer (Ed.), *The Equitable Forest: Diversity, Community, and Resource Management* (1st Editio, pp. 113–130). Washington, DC: Resources for the & Center for International Forestry Research.

Pagano, C., Mazzotti, M., Beida, R., Saify, L., Lomiri, F., & Sway, B. (2012). *Participatory Gender Analysis and Strategic Planning*. Jerusalem. Retrieved from file:///C:/Users/Anita Bake/AppData/Local/Mendeley Ltd./Mendeley Desktop/Downloaded/Jibon - Unknown - PARTICIPATORY GENDER ANALYSIS REPORT.pdf

Paitoonpong, S., Abe, S., & Puopongsakorn, N. (2008). The meaning of "social safety nets." *Journal of Asian Economics*, *19*(5–6), 467–473. https://doi.org/10.1016/j.asieco.2008.09.011

Pak, M., Türker, M. F., & Öztürk, A. (2010). Total economic value of forest resources in Turkey. *African Journal of Agricultural Research*, *5*(15), 1908–1916. https://doi.org/10.5897/AJAR10.018

Pamo, E. T. (2008). Country Pasture Forage Resource Profile. Retrieved September 15, 2018, from http://www.fao.org/ag/AGP/AGPC/doc/counprof/regions/index.htm

Parvin, P. (2018). Institutional Repository Theories of social justice : New problems , new approaches. *Global Social Justice*, 31.

Patel, R. (2013). The Long Green Revolution. *The Journal of Peasant Studies*, *40*(1), 1–63. https://doi.org/10.1080/03066150.2012.719224

Patino, L. (2010). *Change Adaptation and Adaptive Capacity*.

Pauli, J., & Dawids, F. (2017). The struggle for marriage: elite and non-elite weddings in rural Namibia. *Anthropology Southern Africa*, *40*(1), 1–15. https://doi.org/10.1080/23323256.2016.1237296

Paumgarten, F, Locatelli, B., & Witkowski, E. T. . (2018). Wild Foods : Safety Net or Poverty Trap ? A South African Case Study. *Human Ecology*, *46*(February), 183–195. https://doi.org/doi.org/10.1007/s10745-018-9984-z Wild

Paumgarten, Fiona. (2005). The role of non-timber forest products as safety-nets: A review of evidence with a focus on South Africa. *GeoJournal*, *64*(3), 189–197. https://doi.org/10.1007/s10708-005-5647-x

Paumgarten, Fiona, Locatelli, B., Witkowski, E. T. F., & Vogel, C. (2020). Prepare for the unanticipated: Portfolios of coping strategies of rural households facing diverse shocks. *Journal of Rural Studies*, *80*(January), 91–100. https://doi.org/10.1016/j.jrurstud.2020.05.013

Pavanello, S., Pozarny, P., De La, A. P., Campos, O., & Warring, N. (2016). *Research on rural women's economic empowerment and social protection. The impacts of Rwanda's Vision 2020 Umurenge Programme (VUP)*. Rome. Retrieved from http://www.fao.org/economic/ptop

Pedneault, J., & Bede, S. (2018). *"These Killings Can Be Stopped": Governemnt and Separatist Groups Abuses in Cameroon's Anglophone Regions*. Human Rights Watch. Retrieved from hrw.org

Pemunta, N. V. (2013). The governance of nature as development and the erasure of the Pygmies of Cameroon. *GeoJournal*, *78*(2), 353–371. https://doi.org/10.1007/s10708-011-9441-7

Pemunta, N. V. (2019a). Factors Impeding Social Service Delivery among the Baka Pygmies of Cameroon. *Journal of Progressive Human Services*, *30*(3), 211–238. https://doi.org/10.1080/10428232.2019.1581041

Pemunta, N. V. (2019b). Fortress conservation, wildlife legislation and the Baka Pygmies of southeast Cameroon. *GeoJournal*, *84*(4), 1035–1055. https://doi.org/10.1007/s10708-018-9906-z

Pereira, L. (2017). Climate Change Impacts on Agriculture across Africa. In *Oxford Research Encyclopedia of Environmental Science* (pp. 1–35). Oxford University Press. https://doi.org/10.1093/acrefore/9780199389414.013.292

Permunta, N. (2013). The governance of nature as development and the erasure of the Pygmies of Cameroon. *GeoJournal*, *78*(2), 353–371. https://doi.org/10.1007/s10708-011-9441-7

Pettengell, C. (2010). *Climate Change Adaptation: Enabling people living in poverty to adapt*. *Oxfam International Research*. https://doi.org/10.1038/sj.bdj.2011.680

Phuong, L. T. H., Biesbroek, G. R., & Wals, A. E. J. (2017). NJAS - Wageningen Journal of Life Sciences The interplay between social learning and adaptive capacity in climate change adaptation : A systematic review. *NJAS - Wageningen Journal of Life Sciences*, *82*(June), 1–9. https://doi.org/10.1016/j.njas.2017.05.001

Pla Julián, I., & Guevara de Molina, S. (2013). Towards an integrative approach to sustainability : exploring potential synergies between gender and environment. *Cepal Review*, (110), 49–65. Retrieved from http://www.cepal.org/cgi-bin/getProd.asp?xml=/revista/noticias/articuloCEPAL/0/51560/P51560.xml&xsl=/revista/tpl-i/p39f.xsl&base=/tpl/top-bottom.xslt

Porro, R., Tiani, A. M., Tchikangwa, B., Sardjono, M. A., Salim, A., Colfer, C. J. P., & Brocklesby, M. A. (2001). Access to resources in forest-rich and forest-poor contexts. In Carol J.Pierce Colfer & Y. Byron (Eds.), *People Managing Forests: The Links Between Human Well-Being and Sustainability* (1st Editio, pp. 250–273). Routledge.

Pouokam, B. G., & Lemnyuy, A. W. B. (2012). *Climate Compatible Development in Africa : Cameroon Case study*. Yaounde. https://doi.org/10.13140/RG.2.1.2202.0326

Pour, D. M., Barati, A. A., Azadi, H., & Scheffran, J. (2018). Revealing the role of livelihood assets in livelihood strategies: Towards enhancing conservation and livelihood development in the Hara Biosphere. *Journal of Ecological Indicators*, *94*(May), 336–347. https://doi.org/10.1016/j.ecolind.2018.05.074

Powers, M. (2014). Social Justice. *Bioethics*, *6*(June 2013), 2966–2973.

https://doi.org/10.1111/j.1365-2648.2011.05856.x

Pradhan, K. C., & Mukherjee, S. (2018). Covariate and Idiosyncratic Shocks and Coping Strategies for Poor and Non-poor Rural Households in. *Journal of Quantitative Economics*, *16*(1), 101–127. https://doi.org/10.1007/s40953-017-0073-8

Preiser, R., Biggs, R., Vos, A. De, & Folke, C. (2018). Social-ecological systems as complex adaptive systems : organizing principles for advancing research methods and approaches. *Ecology and Society*, *23*(4), 1–15. https://doi.org/10.5751/ES-10558-230446

Prowse, M., & Snielsveit, B. (2010). Impact evaluation and interventions to address climate change: a scoping study. *Journal of Development Effectiveness*, *2(2)*, 228–262. https://doi.org/10.1080/19439341003786729

Pyhälä, A. (2012). *What Future For The Baka?Indigenous Peoples' Rights And Livelihood Opportunities In South-East Cameroon*. Copengagen. Retrieved from www.iwgia.org

Ragie, F. H., Olivier, D. W., Hunter, L. M., Erasmus, B. F. ., Vogel, C., Collinson, M., & Twine, W. (2020). A portfolio perspective of rural livelihoods in. *South African Journal of Science*, *116*(9/10), 1–8. https://doi.org/10.17159/sajs.2020/7522 1

Rai, J. (2019). Poverty, Vulnerability, Non-timber Forest Products and Rural Livelihood: An Indian Experience. *Journal of Geography, Environment and Earth Science International*, *21*(2), 1–10. https://doi.org/10.9734/jgeesi/2019/v21i230124

Ramprasad, V. (2019). Debt and vulnerability: indebtedness, institutions and smallholder agriculture in South India. *The Journal of Peasant Studies*, *0*(0), 1–22. https://doi.org/10.1080/03066150.2018.1460597

Rao, N., Singh, C., Solomon, D., Camfield, L., Sidiki, R., Angula, M., … Lawson, E. T. (2020). Managing risk, changing aspirations and household dynamics: Implications for wellbeing and adaptation in semi-arid Africa and India. *World Development*, *125*, 104667. https://doi.org/10.1016/j.worlddev.2019.104667

Ravera, F., Martín-López, B., Pascual, U., & Drucker, A. (2016). The diversity of gendered adaptation strategies to climate change of Indian farmers: A feminist intersectional approach. *Ambio*, *45*(s3), 335–351. https://doi.org/10.1007/s13280-016-0833-2

Ravera, F., Martın-Lopez, B., Pascual, U., & Drucker, A. (2016). The diversity of gendered adaptation strategies to climate change of Indian farmers: A feminist intersectional approach. *Ambio*, *45*(s3), 335–351. https://doi.org/10.1007/s13280-016-0833-2

Rawls, J. (1999). *A theory of justice*. *A theory of justice* (Revised ed). Massachusetts: the belknap press of harvard university press cambridge, massachusetts. https://doi.org/10.1007/s13398-014-0173-7.2

Raworth, K. (2012). *A safe and just space for humanity: Can We Live Within The Doughnut?* (Oxfam Discussion Papers). Oxford. Retrieved from www.ofam.org/grow

Reed, M. G. (2008). Reproducing the gender order in Canadian forestry: The role of statistical representation statistical representation. *Scandinavian Journal of Forest Research*, *23*(1), 78–91. https://doi.org/10.1080/02827580701745778

Reser, P. J., & Swim, K. J. (2011). of Climate Change. *American Psychological Association*, *66*(May), 277–289. https://doi.org/10.1037/a0023412

Ripple, W. J., Wolf, C., Newsome, T. M., Galetti, M., Alamgir, M., Crist, E., … Laurance, W. F. (2017). World Scientists' Warning to Humanity: A Second Notice. *Bioscience*, *XX*(X), 1–9. https://doi.org/10.1093/biosci/bix125/4605229

Robbins, P. (2012). *Political Ecology: A Critical Introduction* (2nd ed). West Sussex: John Wiley & Sons Ltd.

Robinson, E. J. Z., & Kajembe, G. C. (2015). *Changing Access to Forest Resources in Tanzania* (Environment for Development Discussion Paper Series No. EfD DP 09-10).

Rocheleau, D. E. (2008). Political ecology in the key of policy: From chains of explanation to webs of relation. *Geoforum*, *39*(2), 716–727. https://doi.org/10.1016/j.geoforum.2007.02.005

Rocheleau, D., Thomas-Slayter, B., & Wangari, E. (1996). *Gender and Environment: A Feminist Political Ecology Perspective", in Feminist Political Ecology: Global Issues and Local Experiences*. (D. Rocheleau, B. Thomas-Slayter, & E. Wangari, Eds.). New York: Routledge.

Rockenbauch, T., & Sakdapolrak, P. (2017). Social networks and the resilience of rural communities in the Global South : *Ecology and SocietySociety*, *22*(1), 1–32. https://doi.org/10.5751/ES-09009-220110 Synthesis

Rohwerder, B. (2017). *Conflict and gender dynamics in Yemen*. Retrieved from https://gsdrc.org/publications/conflict-and-gender-dynamics-in-yemen/

Ross, H., & Berkes, F. (2014). Research Approaches for Understanding, Enhancing, and Monitoring Community Resilience. *Society and Natural Resources*, *27*(8), 787–804. https://doi.org/10.1080/08941920.2014.905668

Rupiya, R. M., & Ramdeen, M. (2020, November 4). COVID-19 and African indigenous peoples: Cameroon's Pygmies, Mbororo and Kirdii. *ACCORD*. Retrieved from https://www.accord.org.za/analysis/covid-19-and-african-indigenous-peoples-cameroons-pygmies-mbororo-and-kirdii/

Samson, J., Berteaux, D., Mcgill, B. J., & Humphries, M. M. (2011). Geographic disparities and moral hazards in the predicted impacts of climate change on human populations. *Global Ecology and Biogeography*, 1–13. https://doi.org/10.1111/j.1466-8238.2010.00632.x

Sango, I., & Godwell, N. (2015). Climate change trends and environmental impacts in the Makonde Communal lands, Zimbabwe. *South African Journal of Science*, *111*(7–8), 1–6. https://doi.org/10.17159/sajs.2015/20140266

Schipper, E. L. F. (2020). Primer Maladaptation: When Adaptation to Climate Change Goes Very Wrong. *One Earth*, *3*(4), 409–414. https://doi.org/10.1016/j.oneear.2020.09.014

Schlüter, M., Haider, L. J., Lade, S. J., Lindkvist, E., Orach, K., Wijermans, N., & Folke, C. (2019). Capturing emergent phenomena in social-ecological systems: an analytical

framework. *Ecology and Society*, *24*(3), 1–27.

Schmidt-Soltau, K. (2003). *Indigenous People ("pygmy") Development Plan for the Forest and Environment Sector Programme*.

Schwartz, B., & Cotula, L. (2017). *Indigenous peoples' land rights in Cameroon: progress to date and possible futures*. Retrieved from http://pubs.iied.org/17448IIED

Scoones, I. (2009). Livelihoods Perspectives and Rural Development. *Journal of Peasant Studies*, *36*(January), 1–27. https://doi.org/10.1080/03066150902820503

Scott, J. (2010). Quantitative methods and gender inequalities. *International Journal of Social Research Methodology*, *13*(3), 223–236. https://doi.org/10.1080/13645579.2010.482258

Segadimo, G. (2018). *IMPACTS OF TERTIARY EDUCATION ON THE SOCIAL STATUS OF WOMEN, IN RELATION TO LOCAL SOCIAL OBLIGATIONS AND EXPECTATIONS: A case study from Mababe, Botswana —*. The Artic University of Norway.

Segnestam, L. (2017). Gendered Experiences of Adaptation to Drought: Patterns of Change in El Sauce, Nicaragua. *Latin American Research Review*, *52*(5), 807–823.

Sellers, S. (2016). *Gender and Climate Change: A Closer Look at Existing Evidence*.

Sen, A. (1995). Introduction Questions and Themes. *Inequality Reexamined*, (1). https://doi.org/10.1093/0198289286.003.0001

Sen, M., & Singer, B. (2020). *Forests: at the heart of a green recovery from the COVID-19 pandemic* (Policy Brief No. 80).

Seneviratne, S., Nicholls, N., Easterling, D., Goodess, C., Kanae, S., Kossin, J., … Zhang, X. (2012). *Changes in climate extremes and their impacts on the natural physical environment*. *Managing the Risk of Extreme Events and Disasters to Advance Climate Change Adaptation.* https://doi.org/10.1017/CBO9781139177245.006

Serdeczny, O., Adams, S., Baarsch, F., Coumou, D., Robinson, A., Hare, W., … Reinhardt, J. (2017). Climate change impacts in Sub-Saharan Africa: from physical changes to their social repercussions. *Regional Environmental Change*, *17*(6), 1585–1600. https://doi.org/10.1007/s10113-015-0910-2

Shabaya, J., & Agyemang, K. K. (2010). Unequal access, unequal participation: some spatial and socio-economic dimensions of the gender gap in education in Africa with special reference to Ghana, Zimbabwe and Kenya. *Compare: A Journal of Comparative and International Education*, *34*(4), 395–424. https://doi.org/10.1080/0305792042000294805

Shackleton, C. M., & Shackleton, S. E. (2006). Household wealth status and natural resource use in the Kat River valley, South Africa. *Ecological Economics*, *57*(2), 306–317. https://doi.org/10.1016/j.ecolecon.2005.04.011

Shackleton, C., & Shackleton, S. (2004). The importance of non-timber forest products in

rural livelihood security and as safety nets: A review of evidence from South Africa. *South African Journal of Science*, *100*(11–12), 658–664.

Shackleton, S, Cobban, L., & Cundill, G. (2014). A gendered perspective of vulnerability to multiple stressors, including climate change, in the rural East Cape, South Africa. *Agenda*, *28*(3), 73–89. https://doi.org/10.1080/10130950.2014.932560

Shackleton, S, Paumgarten, F., Kassa, H., Husselman, M., & Zida, M. (2011). Opportunities for enhancing poor women ' s socio- economic empowerment in the value chains of three African non-timber forest products (NTFPs). *International Forestry Review*, *13*(2), 136–151.

Shackleton, S, & Shackleton, C. (2012). Linking poverty , HIV / AIDS and climate change to human and ecosystem vulnerability in southern Africa : consequences for livelihoods and sustainable ecosystem management. *International Journal of Sustainable Development and World Ecology*, *19*(3), 275–286. https://doi.org/10.1080/13504509.2011.641039

Shackleton, Sheona. (2004). Livelihood benefits from the local level commercialization of savanna resources: a case study of the new and expanding trade in marula (Sclerocarya birrea) beer in Bushbuckridge, South Africa. *South African Journal of Science*, *100*(December), 651–658.

Shackleton, Sheona, Paumgarten, F., Kassa, H., Husselman, M., & Zida, M. (2012). *Forests Gender and value chains* (February 2012 No. 49).

Shackleton, Sheona, Shackleton, C., & Cousins, B. (2001). The role of land-based strategies in rural livelihoods: The contribution of arable production, animal husbandry and natural resource harvesting in communal areas in South Africa. *Development Southern Africa*, (December), 1–5. https://doi.org/10.1080/03768350120097441

Shahbaz, B., Vinod, C. P., Geiser, U., Sadaf, T., Schärer, L., & Müller-Böker, U. (2015). Access to Livelihood Assets: Insights from South Asia on How Institutions Work. *Global Change and Sustainable Development*, 283–297.

Shanley, P., Pierce, A. R., Laird, S. A., Lo, C., & Guariguata, M. R. (2014). *From Lifelines to Livelihoods: Non-timber Forest Products into the Twenty-First Century*. (L. Pancel & M. Kohl, Eds.), *Tropical Forestry Handbook*. Hieldelberg: Springer-Verlag Berlin. https://doi.org/10.1007/978-3-642-41554-8

Shiferaw, B., Tesfaye, K., Kassie, M., Abate, T., Prasanna, B. M., & Menkir, A. (2014). Managing vulnerability to drought and enhancing livelihood resilience in Sub-Saharan Africa: Technological, institutional and policy options. *Weather and Climate Extremes*, *3*(June), 67–79. https://doi.org/10.1016/j.wace.2014.04.004

Sida. (2015). *Preventing and Responding to Gender-Based Violence: Expressions and Strategies*.

Sigle-rushton, W. (2018). Intersectionality. In M. Evans & W. Carolyn (Eds.), *Gender: The Key Concepts* (pp. 1–10). Abingdon: Routledge.

Sinha, S., & Lipton, M. (1999). *Damaging Fluctuations, Risk and Poverty: A Review*.

Brighton.

SLYCAN TRUST. (2020). *Integration of Climate Change Adaptation into National Education Processes*. Retrieved from tep-a.org

Smit, B., & Wandel, J. (2006). Adaptation, adaptive capacity and vulnerability. *Global Environmental Change*, *16*(3), 282–292. https://doi.org/10.1016/j.gloenvcha.2006.03.008

Smith, A., Stirling, A., Schoon, M. L., Cox, M. E., Ottino, J. M., Ostrom, E., … Norberg, J. (2007). A Management Perspective on Social Ecological Systems: A generic system model and its application to a case study from Peru. *Science (New York, N.Y.)*, *18*(1), 1–18. https://doi.org/10.1007/s10021-001-0101-5

Smith, D. J. (2005). *FINDING POWER: GENDER AND WOMEN'S POLITICAL PARTICIPATION IN RURAL RAJASTHAN, INDIA*. University of London.

Solórzano, A., & Cárdenes, I. (2019). *Social protection and climate change: WFP Regional Bureau for Latin America and the Caribbean's vision to advance climate change adaptation through social protection".* (November 2019 No. 26).

Sonwa, D. J., Somorin, O. A., Jum, C., Bele, M. Y., & Nkem, J. N. (2012). Vulnerability, forest-related sectors and climate change adaptation: The case of Cameroon. *Forest Policy and Economics*, *23*, 1–9. https://doi.org/10.1016/j.forpol.2012.06.009

Stack, J. F. (1986). *The Primordial Challenge: Ethnicity in the Contemporary World*. (J. Stack, John F., Ed.). ABC-CLIO. Retrieved from https://www.abebooks.co.uk/servlet/BookDetailsPL?bi=5810519796

Stager, C. J., Alton, K., Martin, C. H., King, D. T., Petruny, L. W., Wiltse, B., & Livingstone, D. A. (2018). On the Age and Origin of Lake Ejagham, Cameroon, and Its Endemic Fishes. *Quaternary Research (United States)*, *89*(1), 21–32. https://doi.org/10.1017/qua.2017.37

Steneck, N. H. (2012). *Introduction to the Responsible Conduct of Research* (August 200). Washington, DC: U.S Government Printing Office.

Stifel, D. (2015). The rural non-farm economy , livelihood strategies and household welfare. *African Journal of Agricultural and Resource Economics*, *4*(1), 1–29.

Stojanovic, T., McNae, H. M., Tett, P., Potts, T. W., Reis, J., Smith, H. D., & Dillingham, I. (2016). The "social" aspect of social-ecological systems: A critique of analytical frameworks and findings from a multisite study of coastal sustainability. *Ecology and Society*, *21*(3). https://doi.org/10.5751/ES-08633-210315

Storchi, S. (2018). *Impact Evaluation of Savings Groups and Stokvels in South Africa The economic and social value of group-based financial inclusion October 2018*. Pietermaritzburg. Retrieved from www.saveact.org.za

Sujakhu, N. M., Ranjitkar, S., He, J., Schmidt-vogt, D., Yufang, S., & Jianchu, X. (2019). Assessing the Livelihood Vulnerability of Rural Indigenous Households to Climate Changes in Central Nepal , Himalaya. *Journal of Sustainability*, *11,*(2977), 1–18.

https://doi.org/10.3390/su11102977

Suleiman, M. S., Wasonga, V. O., Mbau, J. S., Suleiman, A., & Elhadi, Y. A. (2017). Non-timber forest products and their contribution to households income around Falgore Game Reserve in Kano, Nigeria. *Ecological Processes*, *6*(1). https://doi.org/10.1186/s13717-017-0090-8

Sulemana, I., Anarfo, E. B., & Quartey, P. (2018). International remittances and household food security in Sub-Saharan Africa. *Migration and Development*, *8*(2), 264–280. https://doi.org/10.1080/21632324.2018.1560926

Sultana, F. (2014). Gendering Climate Change: Geographical Insights. *Professional Geographer*, *66*(3), 372–381. https://doi.org/10.1080/00330124.2013.821730

Sunderland, T., Achdiawan, R., Angelsen, A., Babigumira, R., Ickowitz, A., Paumgarten, F., … Shively, G. (2014). Challenging Perceptions about Men, Women, and Forest Product Use: A Global Comparative Study. *World Development*, 1–11. https://doi.org/10.1016/j.worlddev.2014.03.003

Sunderland, T., & Ndoye, O. (2004). *Forest Products, Livelihoods and Conservation: Case Studies of Non-Timber Forest Product Systems*. (T. Sunderland & O. Ndoye, Eds.) (Vol. 2). Jakarta, Indonesia.

Swyngedouw, E. (1999). Modernity and hybridity: Nature, regeneracionismo, and the production of the Spanish waterscape, 1890-1930. *Annals of the Association of American Geographers*, *89*(3), 443–465. https://doi.org/10.1111/0004-5608.00157

Takon, N. N. (2016). A Research on Moninkim Dance of the Ejagham People of Nigeria and Cameroon. Retrieved October 28, 2018, from http://moninkim.blogspot.com/2016/06/a-research-on-moninkim-dance-of-ejagham.html

Temgoua, L. F., Momo Solefack, M. C., Nguimdo Voufo, V., Tagne Belibi, C., & Tanougong, A. (2018). Spatial and temporal dynamic of land-cover/land-use and carbon stocks in East Cameroon: A case study of the teaching and research forest of the University of Dschang. *Forest Science and Technology*, *14*(4), 181–191. https://doi.org/10.1080/21580103.2018.1520743

Tenzing, J. D. (2020). Integrating social protection and climate change adaptation : A review. *WIRE's Climate Change*, (March 2019), 1–16. https://doi.org/10.1002/wcc.626

Terver, T. N., Tyonzughul, O. J., & Aondoaseer, B. J. (2014). Prioritization and cost and returns analyses of selected non-timber forest products in Yobe State, Nigeria. *Journal of Development and Agricultural Economics*, *6*(12), 481–489. https://doi.org/10.5897/JDAE2014.0568

Thakur, S. (2018). Saving for Marriage Expenses and the Nutrition of Children in Early Childhood: Evidence from India, 1–34.

The Food and Land Use Coalition. (2020). *Sub-Saharan Africa's Food Systems and COVID-19: Emerging Evidence* (Discussion Paper: 22 May 2020 No. 1).

Thompson-Hall, M., Carr, E. R., & Pascual, U. (2016). Enhancing and expanding

intersectional research for climate change adaptation in agrarian settings. *Ambio*, *45*(s3), 373–382. https://doi.org/10.1007/s13280-016-0827-0

Thornton, P. K., van de Steeg, J., Notenbaert, A., & Herrero, M. (2009). The impacts of climate change on livestock and livestock systems in developing countries: A review of what we know and what we need to know. *Agricultural Systems*, *101*(3), 113–127. https://doi.org/10.1016/j.agsy.2009.05.002

Tiani, A. M., Akwah, G., & Nguiébouri, J. (2005). Women in Campo-Ma'an National Park: Uncertainties and Adaptations in Cameroon. In Carol J. Pierce Colfer (Ed.), *The Equitable Forest: Diversity, Community and Natural Resources* (pp. 131–149). Washington, DC: RFF/CIFOR.

Tibesigwa, B., Visser, M., Collinson, M., & Twine, W. (2016). Investigating the sensitivity of household food security to agriculture-related shocks and the implication of social and natural capital. *Sustainability Science*, *11*(2), 193–214. https://doi.org/10.1007/s11625-015-0332-6

Tieguhong, J. C., & Nkamgnia, E. M. (2012). Household Dependence on Forests around Lobeke National Park, Cameroon. *International Forestry Review*, *14*(2), 196–212.

Tirivayi, N., & Rodriguez, O. (2017). *Social protection for building the resilience of forest-dependent people: Evidence, linkages, practices and potential applications* (Social Protection and Forestry Paper No. 1).

Toda, M. (2014). People and Social Organizations in Gribe, SouthEast Cameroon. *African Study Monographs. Supplementary Issue*, *49*(August), 139–168.

Tschakert, P. (2007). Views from the vulnerable: Understanding climatic and other stressors in the Sahel. *Global Environmental Change*, *17*(2007), 381–396. https://doi.org/10.1016/j.gloenvcha.2006.11.008

Tschakert, P. (2015). *The Ability of the Poor to Cope*. Retrieved from https://www.worldbank.org/content/dam/Worldbank/document/Climate/Climate and Poverty Conference/D2S2_Tschakert_WB_CC&P_Feb10_pt3.pdf

Tschakert, P., Machado, M., Tschakert, P., & Machado, M. (2012). Gender Justice and Rights in Climate Change Adaptation: Opportunities and Pitfalls. *Ethics and Social Welfare*, (July), 37–41. https://doi.org/10.1080/17496535.2012.704929

Tsuru, D. (1998). Divesity of Ritual Spirit Performances Among The Baka Pygmies in SouthEast Cameroon. *African Study Monographs. Supplementary Issue*, *25*(March), 47–84.

Turner, Kasperson, R. E., Matson, P. A., Mccarthy, J. J., Corell, R. W., Lindsey, C., … Schiller, A. (2003). A framework for vulnerability analysis in sustainability science. *Elements*, *100*(14).

Twisa, S., & Buchroithner, M. F. (2019). Seasonal and Annual Rainfall Variability and Their. *Water*, *11*(2055), 1–18. Retrieved from www.mdpi.com/journal/water

Tyenjana, A., & Taruvinga, A. (2019). Determinants of Rural on-farm Livelihoods

Diversification: The Case of Intsika Yethu Local Municipality, Eatern Cape, South Africa. *Journal of Agribusiness and Rural Development*, *4*(54), 373–384. https://doi.org/10.17306/J.JARD.2019.01200

Ulrichs, M. (2016). *Increasing people ' s resilience through social protection*. Retrieved from www.braced.org

UNDP. (2010). *Designing Climate Change Adaptation Initiatives: A UNDP Toolkit for Practitioners*.

UNEP. (2012). *Sangha Trinational Cameroon, Central African Republic & Congo*.

United Nations Climate Change Secretariat. (2018). *Considerations regarding vulnerable groups, communities and ecosystems in the context of the national adaptation plans*. Bonn: United Nations Climate Change Secretariat.

UNOCHA. (2020). *Humanitarian Response Plan (2018-20200*.

Van Wyk, M. M. (2017). Stokvels as a Cmmunity-based Saving Club Aimed at Eradicating Poverty: A Case of South African Rural Women. *The International Journal of Community Diversity*, *17*(2), 1–18. https://doi.org/10.18848/2327-0004/CGP/v17i02/13-26

WACameroon. (2011). *Cameroon - Women Call For Land & Inheritance Rights*. Retrieved from http://www.wunrn.com

Walby, S., Armstrong, J., & Strid, S. (2012). Intersectionality: Multiple inequalities in social theory. *Sociology*, *46*(2), 224–240. https://doi.org/10.1177/0038038511416164

Wamsler, C., Brink, E., & Rentala, O. (2012). Climate Change , Adaptation , and Formal Education: the Role of Schooling for Increasing Societies' Adaptive Capacities in El Salvador and Brazil. *Ecology and Society*, *17*(2), 1–20. https://doi.org/10.5751/ES-04645-170202

Wei, B., Su, G., Qi, W., & Sun, L. (2016). The Livelihood Vulnerability of Rural Households in Earthquake-Stricken Areas — A Case Study of Ning 'er, Yunnan Province. *Journal of Sustainability*, *8*(566), 1–16. https://doi.org/10.3390/su8060566

Work, C., Rong, V., Song, D., & Scheidel, A. (2019). Maladaptation and development as usual? Investigating climate change mitigation and adaptation projects in Cambodia. *Climate Policy*, *19:sup1*(47–62), 1–17. https://doi.org/10.1080/14693062.2018.1527677

World Bank. (2009). Gender and Natural Resources Management. *Gender in Agriculture Sourcebook*, 423–474. https://doi.org/10.1017/CBO9781107415324.004

World Population Review. (2020). Cameroon Population. Retrieved October 20, 2020, from https://worldpopulationreview.com/country-rankings/countries-in-africa

Wunder, S., Börner, J., Shively, G., & Wyman, M. (2014). Safety Nets, Gap Filling and Forests: A Global-Comparative Perspective. *World Development*, *64*(S1), S29–S42. https://doi.org/10.1016/j.worlddev.2014.03.005

Wunder, S., Shively, G., & Wyman, M. (2014). Safety Nets, Gap Filling and Forests: A Global-Comparative Perspective. *World Development*, 1–14. https://doi.org/10.1016/j.worlddev.2014.03.005

Wyk, van. R. B., & Dlamini, C. S. (2018). The impact of food prices on the welfare of households in South Africa. *South African Journal of Economics and Management Sciences*, *21*(1), 1–9. Retrieved from http://www.sajems.org

Yasuoka, H., Hirai, M., Kamgaing, T. O. W., Dzefack, Z. C. B., Kamdoum, E. C., & Bobo, K. S. (2015). Changes in the composition of hunting catches in southEast cameroon: A promising approach for collaborative wildlife management between ecologists and local hunters. *Ecology and Society*, *20*(4), 1–12. https://doi.org/10.5751/ES-08041-200425

Yohannis, M., Wausi, A., Waema, T., & Hutchinson, M. (2019). The Role of ICT Tools in the Access of Climate Information by Rural Communities. *Journal of Sustainability , Environment and Peace*, *1*(2), 32–38. https://doi.org/10.23919/ISTAFRICA.2019.8764875

Ziervogel, G., & Calder, R. (2003). Climate variability and rural livelihoods: assessing the impact of seasonal climate forecasts in Lesotho. *Area*, *35*, 403–417. https://doi.org/10.1111/j.0004-0894.2003.00190.x

Žurovec, O., & Vedeld, P. O. (2019). Rural Livelihoods and Climate Change Adaptation in Laggard Transitional Economies : A Case from Bosnia and Herzegovina. *Sustainability*, *11*(6079), 1–27. https://doi.org/10.3390/su11216079

PERSONAL COMMUNICATIONS

1. Ms. Charlotte Ako, REDD+ and Climate Change Project Officer, IUCN-Yaounde, Cameroon.
2. Mr. Gerard Sindemo, Project Coordinator, CIFED, Cameroon.
3. Mr. Priestly Ojong Ashu (late), former 2nd Deputy Mayor of Mamfe Council, Manyu Division, South West region, Cameroon.
4. Mr. Kisito Mewadibolo, Traditional authority, Baka community, East region, Cameroon.
5. Mr. Mathias Ako, Vice Chairman, Traditional Council, Ossing village, Ejagham community, South West region, Cameroon.
6. Mr. Joseph Etengeneng Tabe, Vice Chairman, Traditional Council, Kembong village, Ejagham community, South West region, Cameroon.
7. Mr. Henry Takang Agbor, Chief of Mfuni village, Ejagham community, South West region, Cameroon.

APPENDICES

APPENDIX 1: HOUSEHOLD SURVEY – EJAGHAM COMMUNITIES

Task	Date(s)	Person responsible	Status Ok? If not give comments
Interview			
Checking questionnaire			
Coding questionnaire			
Entering data			
Checking and approving data entry			
Checking and approving data entry			

INTERVIEW SCHEDULE

GENERAL INFORMATION

1. VILLAGE _____
2. NAME _____

PID (of primary respondent) _____

SECTION A – HOUSEHOLD COMPOSITION AND HUMAN CAPITAL

Please give details of anyone living in the household

Name of household member (mark household head)	Gender of hh/respondent Female = 0 Male = 1	Marital status [1]	Relationship to head of house[2]	Age	Level of education[3]	Employment status (can have more than one, list in order of importance)[4]	Other formal or informal training or skills. (Probe-employment or self-employment skills, e.g., welding, artisan etc.)

Codes: 1) Married = 1; Single = 2; Widow(er) =3; Divorced = 4

2) Head of household = HH; Wife = W; Sister = S; Brother = B; Children = CH; Other = O

3) Illiterate = 1; Literate without formal schooling = 2; Primary = 3; Secondary = 4; High school = 5; Graduate = 6; Post graduate = 4.

4) Employed full time = 1; employed part time = 2; self-employed (farmers, NTFPs collectors in this category) = 3; unemployed = 4; in school or some form of training (apprentice, course) = 5; retired = 6; doesn't work or goes to school (e.g. disabled or too young) = 7

SECTION B – HUMAN AND SOCIAL CAPITAL

	SECTION B – HUMAN AND SOCIAL CAPITAL	POSSIBLE RESPONSES	TICK	SKIP
B1	Are there presently any chronically ill/injured person of the household?	Yes No	☐ ☐	If no, skip next
B2	Are they receiving medicines from the clinic?	Yes No	☐ ☐	If yes, answer B3
B3	Are there any receiving medicines from medicinal plants?	Yes No	☐ ☐	If no, skip next
B4	How does the household obtain the medicinal plants?	Collect them ourselves from the forest Purchase at market or from local seller Visit traditional healer for treatment	☐ ☐ ☐	
B5	Does your household now spend more or less time on getting medicinal plant than five years ago?	Yes No		If no, skip next
B6	What could be the possible reason for this?			
B7	If a household member is ill/injured, has it affected their ability to work (either in their jobs or around the house/livestock?	Yes No	☐ ☐	If no, skip next B5, B6
B8	If yes, what was their contribution to the household?			
B9	How does the household cope without this contribution?			
B10	Are household members now healthy more than in the past?	Yes No		

B11	What could be the possible reason for this change?			
B12	Can young people get more employment opportunities now than in the past?	Yes No		
B13	What could be the possible reason for this change?			
B14	Are there more educated people now in the community than in the past?	Yes No		

B15) Do household members participate in any groups in the community? If yes, ask details of groups/ organization. If more than one person from the household ids a member of the same group, write down all their names

Type of group	**Name of group**	**Who in the household is part of the group? List the name**	**Time devoted by household member to the group (hrs./week/month)**	**Is the household member part of the decision-making body of the group? List name if yes**
Church				
Savings				
Farming				
Volunteer				
Sports/ dance/ music				
Healthcare or support				
Men's group				
Women's group				
School group				
Lobbying				
Development/ income generating				

Groups for NTFPs collection				
Other (specify)				
Other (specify)				

B16	People around here are willing to help their neighbours	Strongly disagree Disagree Agree Strongly agree	☐ ☐ ☐ ☐	
B17	This is a close-knit or 'tight' neighbourhood where people generally know one another	Strongly disagree Disagree Agree Strongly agree	☐ ☐ ☐ ☐	
B18	If I had to borrow CFA2000 in an emergency, I could borrow it from a neighbour.	Strongly disagree Disagree Agree Strongly agree	☐ ☐ ☐ ☐	
B19	People in this neighbourhood can be trusted	Strongly disagree Disagree Agree Strongly agree	☐ ☐ ☐ ☐	
B20	If I were sick I could count on my neighbours to shop for groceries for me	Strongly disagree Disagree Agree Strongly agree	☐ ☐ ☐ ☐	
B21	People in this neighbourhood share the same beliefs, culture and values	Strongly disagree Disagree Agree Strongly agree	☐ ☐ ☐ ☐	
B22	Women in this community do have a voice	Strongly disagree Disagree Agree	☐ ☐ ☐	

		Strongly agree	☐	
B23	Relationships between people in the community are as strong as in the past	Strongly disagree Disagree Agree Strongly agree	☐ ☐ ☐ ☐	
B24	Women support one another by going to the forest together for NTFP collection	Strongly disagree Disagree Agree Strongly agree	☐ ☐ ☐ ☐	
B25	Over time have women become more involved in village affairs?	Yes No Remain the same	☐ ☐ ☐	
B26	Do you think the men in the village now see women as their equals?	Yes No Remain the same	☐ ☐ ☐	
B27	Compared with other households in the village (or community), how well-off is your household?	Better off Worse off About average	☐ ☐ ☐	
B28	Has Ubuntu (Bechohoh) decreased than it used to be in the past?	Yes No	☐ ☐	If no, skip next
B29	What could be the reason for the change in togetherness?			

SECTION C – FINANCIAL CAPITAL

	SECTION C – FINANCIAL CAPITAL	POSSIBLE RESPONSES	TICK	SKIP
C1	Does this household have any savings in banks or credit associations/insurance?	Yes No	☐ ☐	If yes, don't skip next
C2	How much does the household have in savings?			

C3	Does this household have any savings in burial societies or saving clubs?	Yes No	☐ ☐	If no, skip next
C4	How much does the household have in savings?			
C5	Is the household currently saving more or less as compared to ten years ago?	Less The same More than	☐ ☐ ☐	
C6	Is it easier for a man to save money?	Yes No	☐ ☐	If yes, skip next
C7	What could be the reasons for not saving easily?			
C8	Is it easier for a woman to save money?	Yes No		If yes, skip next
C9	What could be the reasons for not saving easily?			
C10	Could the household access credit for a farming or self-employment venture if it needed to?	Yes No Don't know	☐ ☐ ☐	If yes, don't skip
C11	From whom will you get such credit?	Neighbour or friend Loan sharks Savings club Bank or formal credit institution Family Other	☐ ☐ ☐ ☐ ☐ ☐	
C12	Has anyone in the household accessed credit in the last ten years?	Yes No	☐ ☐	
C13	Is it very easy for a woman to get loans?	Yes No	☐ ☐	
C14	Do you owe money to anyone?	Yes No	☐ ☐	If no, skip next

C15	Who do you owe?	Neighbour or friend Loan sharks Savings club Bank or formal credit institution Family Other	☐ ☐ ☐ ☐ ☐ ☐	
C16	How much do you owe?	CFA		
C17	What can a household use as collateral to get loans from credit institutions?			
C18	Is the household currently having more or less debts as compared to ten years ago?	Less The same More	☐ ☐ ☐	
C19	Would it be easier for a man to pay back a loan than a woman?	Yes No	☐ ☐	If yes, skip next
C20	What will be the reasons for a woman to find it hard to pay back a loan?			
C21	How soon will it take the HH to be able to pay back a debt?	1 month 4 months 8 months 1 year Above 1year	☐ ☐ ☐ ☐ ☐	
C22	In the event where the HH fails to pay your debt within the time frame, what are the consequences you will have to face?			
C23	Does anyone in the household receive grant/pension or any other form of income?	Social insurance scheme Government pension Other	☐ ☐ ☐ ☐	

SECTION D – ASSETS

	PHYSICAL ASSETS	POSSIBLE RESPONSES	TICK	SKIP
D1	Does anyone in the household own any of the following assets: **Household Assets**	Car/truck Motorcycle Bicycle Phone TV Radio Cassette/CD/ VHS/VCD/DVD/ player Stove for cooking (gas, paraffin or electric only) Refrigerator/freezer Generator Jewelry Fabric Water capture drums Solar panels Bed/s Sewing machine Wheelbarrow Hoe Cutlass Fences Chainsaw Shotgun/rifle Axe Others (worth more than approx. CFA20.000 purchasing price)	☐ ☐	
D2	Has the household had to sell any of the above asset(s) to cover expenses in the last five years?	Yes No	☐ ☐	If no skip next
D3	Name the assets that were sold			

			☐	
D4	Give reasons for why they were sold			
D5	Does the household have more assets now than in the past?	Yes No		
D6	What could be the reason for the increase or decrease?			
	NATURAL ASSETS			
D7	Do you have complete ownership of a piece of land (land tenure rights)?	Yes No	☐ ☐	If yes, skip next
D8	Do you have access to a piece of land (land that does not necessarily belong to you?	Yes No	☐ ☐	
D9	What is the use of this land?	Garden on homestead Fields for cultivation Grazing land belonging to household Community grazing land	☐ ☐ ☐ ☐	
D10	Is it used by the household?	Yes No Partly	☐ ☐ ☐	
D11	Who uses and make decisions over the use of land?	Male Female Both	☐ ☐ ☐	
D12	Is it very difficult for women to own land?	Yes No	☐ ☐	If no, skip the next
D13	Why is it so difficult?			
D14	Are there cultural norms that prohibit women from accessing their own land?	Yes No	☐ ☐	If no, skip next
D15	What are some of those cultural norms?			

D16	Do women often have conflicts with men on land related issues?	Yes No	☐ ☐	
D17	Over the past ten years, would you say land is becoming more of an individual property than a communal one?	Yes No	☐ ☐	
D18	What could be the reason for such change?			
	FOREST / COMMUNAL RESOURCES			
D19	Where does the household get most of its water from?	Rainwater tank owned/purchased by household Tap on property Community taps Borehole Dam River Other	☐ ☐ ☐ ☐ ☐ ☐ ☐	
D20	Who in the house is responsible for carrying water?	Men Women Children	☐ ☐ ☐	
D21	Is this source ever inadequate for all the household's need?	Yes No	☐ ☐	
D22	Does the household have access to alternative sources of water?	Rainwater Tap water Community taps Borehole Dam River Other	☐ ☐ ☐ ☐ ☐ ☐ ☐	
D23	Would you say it is easier now to get water without having to trek for long distances than in the past?	Yes No	☐ ☐	

D24	Who is responsible for making decisions when it comes to farming practices in the household?	Husband is making the decision alone Husband/wife making the decisions together Husband, wife, children, and other household members are making the decisions together Woman makes decision alone	☐ ☐ ☐ ☐ ☐	
D25	Who is responsible for making decisions when it comes to livestock rearing in the household?	Husband is making the decision alone Husband/wife making the decisions together Husband, wife, children, and other household members are making the decisions together Women make decision alone	☐ ☐ ☐ ☐	
D26	Who is responsible for making decisions when it comes to NTFPs harvesting in the household?	Husband is making the decision alone Husband/wife making the decisions together Husband, wife, children, and other household members are making the decisions together Woman makes decision alone	☐ ☐ ☐ ☐ ☐	
D27	Over the last ten years does the household currently use more, less or the same amount of the NTFPs?	More Less The same	☐ ☐ ☐	
D28	If more or less, why the change?			
D29	Are there any law (either formal or informal) regulating the harvesting and use of NTFPs in the forest?	Yes No Do not know	☐ ☐ ☐	If no, skip next
D29	If yes, who predominantly makes the rule regarding the harvesting of NTFPs?	Village head Customary Institution/ community forest association Government forest department Private landowner Other	☐ ☐ ☐ ☐ ☐	
D30	Do households require any permission to harvest NTFPs in the forest?	Yes No	☐ ☐	

D31	Do young people now migrate more to urban areas than in the past?	Yes No	☐ ☐	
D32	Does this movement affect labour availability for NTFPs collection?	Yes No	☐ ☐	If no, skip next
D33	Has the quality of agricultural land worsened or stayed the same compared to ten years ago?	Worsened Stayed the same Improved	☐ ☐ ☐	
D34	If it has improved or worsened, why the change?			
D35	Can women harvest NTFPs in the forest without any restrictions?	Yes No	☐ ☐	If yes, skip next
D36	What are some of those restrictions?			
D37	Can women also do hunt like the men?	Yes No	☐ ☐	If yes skip next
D38	What prevents them from doing so?			
D39	Would you say hunting has remained profitable for your household over the past ten years?	Yes No	☐ ☐	
D40	Would you say it is easier to get bush meat from the forest without having to go deep into the forest?	Yes No	☐ ☐	If yes, skip next
D41	Why the long distance now?			

SECTION E – LIVELIHOODS STRATEGIES

E1 Do you cultivate any of the following agricultural products?

Types of Agricultural products	**Y/N**	**Top 5 crops grown**	**Household consumption (Y/N)**	**Income from crops sold purpose (state yearly income made in CFA)**	**Both for household consumption and commercial**
Cabbage					
Plantains					
Cocoyams					
Maize					
Tomatoes					

Beans					
Sweet potatoes					
Pumpkins					
Onions					
Carrots					
Pepper					
Yams					
Vegetables					
Groundnuts					
Others (specify)					
Others (specify)					
Others (specify)					
Others (specify)					
Others (specify)					
Others (specify)					
Total income from crop sales	//	//	// //		// //

E2 Does your household collect any of the following NTFPs?

Types of forest products	**Y/N**	**Who collects from the forest (Male? female)**	**Top five products collected**	**Household consumption (Y/N)**	**Income from sale of NTFPs (state seasonal income made in CFA)**	**Both for household consumption and commercial**
Fuelwood						
Charcoal						
Medicinal plants						
Condiments (spices)						
Bush meat						
Raffia						
Honey beer						
Rabbits						
Wild fruits						

Wood for carvings						
Insects for food						
Weaving reeds						
Reeds for construction						
Mushroom						
Traditional beer						
Wood for hh items such as spoons, axe etc						
Indigenous poles						
Country onions						
Eru						
Canda stick						
Njangsang						
Other						
Total income from sale of NTFP						

E3 Does your household have any of the following livestock?

Types of livestock	**Y/N**	**Top 3 animals reared**	**Household consumption (Y/N)**	**Income from livestock (state yearly income made in CFA)**	**Both for household consumption and commercial**
Cattles					
Donkey					
Goats					
Sheep					
Pigs					
Chickens					
Ducks					
Rabbits					
Other					
Other					

Total income from sale of livestock	//	//	// //		// //

E4	Does the household rely more on agricultural products (crops/livestock) or forest products (NTFPs)?	Crops Livestock Forest products All	☐ ☐ ☐ ☐	
E5	For how long you have been farming?			
E6	For how long you have been keeping livestock?			
E7	For how long you have been harvesting forest products?			
E8	Do you receive gifts/remittances from other family members and friends?	Yes No	☐ ☐	
	WELFARE/LIVELIHOOD PERCEPTION			
E9	All things considered, how satisfied are you with your life over the past 12 months?	Satisfied Unsatisfied Neither satisfied nor unsatisfied	☐ ☐ ☐	
E10	Do you feel the household's situation is better, worse or about the same today than it was ten years ago?	Better off now Worse off now Still the same	☐ ☐ ☐	
E11	Has the household's food production and income over the past 12 months been sufficient to cover what you consider to be the needs of the household?	Yes No	☐ ☐	

SECTION F- SHOCKS, STRESSORS, CLIMATE CHANGE AND COPING RESPONSES

		SHOCKS/STRESSORS	Severity * 0, 1, 2, 3	TICK	SKIP
F1	How would you rate the following non-climatic shocks on your household during the last 5-10years?	Death of main breadwinner Death of household member Job loss Loss of assets Land loss Loss of grazing land Fire accidents of houses Other Other (Code- **Severity*: 0= no crisis; 1= minor; 2= moderate; 3= severe)**		☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	
F2	How would you rate the following non-climatic stressors on your household during the last 5-10years?	Inflation- increase in cost of food, paraffin Human illness or injury of household member Unemployment Expensive events – weddings, funeral, traditional ceremonies, Easter		☐ ☐ ☐ ☐ ☐ ☐ ☐	
F3	Have you experienced the following shocks and stressors over the last 5-10years?	Storms Less rainfall Warming temperature (more of acute dry season) Droughts Floods		☐ ☐ ☐ ☐ ☐	
F4	Have these weather events resulted in any of the following on your household during the last 5-10 years?	Decline in water for the household Reduced food security Decrease in soil fertility and crop productivity Rainfall variability and uncertainty Soil erosion/ degradation		☐ ☐ ☐ ☐ ☐	

		Decline in livestock Decline in forest products Decline in water for livestock and crops Other		☐ ☐ ☐ ☐	
F5	In the last one year, have you been faced with a situation when you did not have enough food to feed the household?	Yes No		☐ ☐	
F6	What was the cause or reason for the above situation?				
F7	How many months in the past one year did you not have enough food to feed the household?				
F8	During the critical months when you did not have enough food to feed the household, did your household consume or use forest and wild products (NTFPs) to meet food need?	Yes No		☐ ☐	
F9	Please indicate up to three forest products that the household used more during the period when there not enough food?	1. 2. 3.			
F10	Did the household sell any of these products during the crisis period?	Yes No	☐ ☐	☐ ☐	If no, skip next
F11	How did the sale of forest products improve household situation?				

F12) Would the household find it easier to collect NTFPs now more than five years ago? Yes No

F13) How does the household cope when labour for NTFPs collection become scare? _____

_____

F14) Answer the following questions on the table below

Shocks and stressors	**Y/N?**	**How severe? 0 = no crisis 1 = yes, moderate crisis 2 = yes, severe crisis**	**How did you survive with the different shocks/stressors**	**Name the most important 2 responses**
Shocks reduced crop yields due to climate change				
Reduced crop yields due to pest outbreak				
Storms and floods				
Job loss				
Death of main Breadwinner				
Fire accidents of houses				
Stressors Political instability				
Inflation				
Decline in water for household				

APPENDIX 2: RESEARCH ETHICS AND INFORMED CONSENT FORMS

RHODES UNIVERSITY
Where leaders learn

Grahamstown ●6140 ●South Africa

Consent form for Participation in a Research Study

Project title: Culture, Gender and Forest: Social Differentiation in Coping and Adapting to Climate Change and Other Stressors in the South West and East Regions of Cameroon

Name and affiliation:

Student researcher: Ojongetakah Enokenwa. PhD student at Rhodes University: Department of Environmental Science.

Supervisor: Prof. Sheona Shackleton. Head of Department, Department of Environmental Science at Rhodes University:

1. Project Information:

This project is conducting research on the cultural and gendered differentiated use of forest resources as a coping/adaptive response to climate change and other related shocks and stressors in the East and South West regions of Cameroon. It includes surveys that will be done in your households. There are words you may not be versed with or understand clearly but as we go along, please feel free to ask me as we go ahead, and I will take time to be more explicit.

The purpose of the research is to contribute to an understanding of the different impacts gender households face in coping with climate change as well as the role of NTFPs as a safety net. The hope is that the research will be useful to scientists and practitioners involved in climate change, gender, and vulnerability discourse.

2. What is expected from participants:

I expect you to participate in the survey by providing answers to questions. The survey has both closed-ended open-ended questions and should take 45 minutes to an hour. Please I urge you as a participant to please answer the questions as openly and accurately as possible.

3. Risks and discomforts:

The researcher feels there may be some risk associated with participating in this research, but I assure you that this will be avoided as much as possible. And I also welcome any solutions from you that will make you comfortable during your participation.

4. Rights of participants:

As a participant, your participation in this research study is voluntary. You are free to withdraw from the research at any time without penalty or reason. You will not be penalized in any way you decide not to take part or withdraw from this study. You therefore have the right to anonymity and confidentiality as the information you give during this study will not be shared and your identity will not be revealed.

Responsibility and commitments of the researcher:

I commit to respecting participants' confidentiality and anonymity and will not reveal your names in any public use of the research results. I will not disclose your identity to anyone except to my supervisor. Your information that you give during this research will remain confidential as far as this study is concerned.

I also commit to being open and honest to participants about the nature of the research. I will ensure that feedback about these research findings is shared with you all who participated in the research

5. Declaration about the researchers' role:

"I see myself as both a researcher, policy proposer and a knowledge contributor. Thus, I have a particular 'agenda' which I must be open about. My personal wish for this project is that it brings about positive change in the way in which households that are vulnerable to climate change and other related stressors get a better way to adapt and cope with such impacts without undermining any gender. I hope that the research brings about a better understanding of how natural resources can be used to improve on households' livelihoods." (Ojong Enokenwa)

6. Contact details:

Please feel free to contact the student researcher or supervisor at any time if you have questions or concerns about this research:

Student: Ojongetakah Enokenwa: enokenwao@yahoo.com | Cell: +27(0)73 9379 416

Supervisor: Sheona Shackleton: s.shackleton@ru.ac.za| Office: +27 46 603 7009

7. Declaration of informed consent by the participant:

I have read this document and understand the implications of participating in this research. I am willing to participate and do so of my own free will.

_____	_____	_____
Full Name	Signature	Date

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Information to participate in a focus group discussion

My name is Ojongetakah Enokenwa. I am a student at Rhodes University, Grahamstown and I am doing research on how households use forest resources to cope with the impact of climate change and other stressors.

You are invited to be part of a focus group discussion for this research. This research is about how climate change and other stressors have affected households. We would be discussing different aspects and will need approximately an hour to 2 hours of your time.

Any information you discuss here will be held confidential, in that your identity will not be linked in any way to any of the discussion points. Please know that you are free to leave at any time and let me know if the discussion moves into an area in which you do not feel comfortable. If you do not want to answer a question you do not need to.

The discussion will be recorded but I will be the only one using these recordings and only for research purposes.

I agree to participate in this research.

Sign_____

(any form of acknowledgement)

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Formulaire de consentement à la participation à une étude de recherche

Titre du projet: 'Culture, genre et forêt: Différenciation sociale pour faire face et s'adapter aux changements climatiques et à d'autres facteurs de stress dans les régions du Sud-Ouest et de l'Est du Cameroun'

Nom et affiliation:

Etudiant chercheur: Ojongetakah Enokenwa. Doctorant à l'Université de Rhodes: Département des sciences environnementales

Superviseur: Prof. Sheona Shackleton. Head du Département, Département des sciences environnementales de l'Université de Rhodes:

1. Informations sur le projet: Ce projet mène des recherches sur l'utilisation des ressources naturelles par la différenciation entre les sexes en tant que réponse à l'adaptation au changement climatique et aux autres facteurs de stress dans les régions Est et Sud-ouest du Cameroun. L'espoir est que la recherche sera utile aux scientifiques et praticiens impliqués la considération du genre et de la vulnérabilité dans les changements climatiques.

2. Ce qui est attendu des participants: j'aimerais que vous participiez en fournissant des réponses aux questions. Les questions prendront entre 45 minutes et une heure.

3. Droits des participants: en tant que participant, votre participation à cette étude de recherche est volontaire et vous pouvez vous retirer de la recherche à tout moment.

4. Responsabilité et engagements du chercheur: Je m'engage à respecter la confidentialité et l'anonymat des participants et je ne révélerai pas vos noms dans une utilisation publique des résultats de la recherche. Je m'engage également à être ouvert et honnête aux participants quant à la nature de la recherche. Je vais veiller à ce que les commentaires sur ces résultats de recherche soient partagés avec vous tous qui avez participé à la recherche.

5. Déclaration sur le rôle du chercheur: Je me considère comme un chercheur, un auteur de proposition et un contributeur au politique. Ainsi, j'ai un agenda sur lequel je dois être ouvert. Je dois donc pouvoir vous aider à comprendre ces rôles" (Ojong Enokenwa).

6. Contacts: N'hésitez pas à contacter l'étudiant chercheur ou le superviseur à tout moment si vous avez des questions ou des préoccupations au sujet de cette recherche:

Etudiant: Ojongetakah Enokenwa: enokenwao@yahoo.com | Cell: +27(0)73 9379 416
Superviseur: Prof. Sheona Shackleton: s.shackleton@ru.ac.za| Office: +27 46 603 7009

7. Déclaration du consentement éclairé par le participant:

J'ai lu ce document et compris les implications de participer à cette recherche. Je suis prêt à participer et à le faire de ma propre volonté.

_____ _____ _____

Nom complet Signature Date

(Optionnel) (Autre reconnaissancet)

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Information aux participants pour les groupes de discussion

Je m'appelle Ojongetakah Enokenwa. Je suis étudiant à l'Université de Rhodes, Grahamstown et je fais des recherches sur l'utilisation culturelle et différenciée selon le sexe des ressources forestières comme réponse d'adaptation au changement climatique et à d'autres chocs et facteurs de stress connexes dans les régions de l'Est et du Sud-Ouest du Cameroun.

Vous êtes conviés à faire partie d'une discussion de groupes pour cette recherche. Cette recherche porte sur la façon dont le changement climatique et d'autres facteurs de stress ont affecté les ménages. Nous discuterions de différents aspects et aurons besoin d'environ une heure à 2 heures de votre temps.

Toutes informations récoltées ici resteront confidentielles, en ce sens, votre identité ne sera liée d'aucune façon à aucun des points de la discussion. Sachez que vous êtes libre de partir à tout moment et de me faire savoir si la discussion se déplace dans une zone où vous ne vous sentez pas à l'aise. Si vous ne souhaitez pas répondre à une question, ne répondez simplement pas.

La discussion sera enregistrée mais je serai la seule à utiliser ces enregistrements et uniquement à des fins de recherche.

J'accepte de participer à cette recherche.

Signature _____

(Toute forme de reconnaissance)

APPENDIX 3: FULL LIST OF CROPS CULTIVATED AND FOREST PRODUCTS COLLECTED BY HOUSEHOLDS ACROSS STUDY COMMUNITIES

Types of crops cultivated by households across study communities

Crops cultivated by households	Ejagham communities n = 170			Baka communities n = 70		
	Male with female (n=125)	Female only (n=20)	Female with male (n=25)	Male with female (n=50)	Female only (n=12)	Female with male (n=8)
Plantains	93.6	100.0	96.0	98.0	83.3	100.0
Cocoyam	97.6	100.0	100.0	98.0	75.0	100.0
Maize	99.2	100.0	100.0	100.0	91.7	87.5
Cassava	94.4	100.0	92.0	96.0	100.0	97.1
Groundnuts	81.6	85.0	76.0	96.0	91.7	100.0
Beans	35.2	40.0	32.0	8.0	16.7	12.5
Sweet potatoes	15.2	15.0	8.0	62.0	50.0	75.0
Pumpkins	60.0	85.0	56.0	2.0	16.7	0.0
Pepper	86.4	90.0	72.0	90.0	91.7	100.0
Yams	92.0	80.0	88.0	50.0	33.3	50.0
Vegetables	92.0	95.0	96.0	66.0	75.0	68.6
Okra	57.6	75.0	64.0	50.0	33.3	75.0
Egusi	88.0	90.0	92.0	40.0	50.0	62.5

Types of forest products by households across study sites

Types of forest products collected by households	Ejagham communities n = 170			Baka communities n = 70		
	Male with female (n=125)	Female only (n=20)	Female with male (n=25)	Male with female (n=50)	Female only (n=12)	Female with male (n=8)
Firewood	99.2	95.0	100.0	100.0	91.7	100.0
Medicinal plant	24.0	30.0	16.0	100.0	91.7	100.0
Condiments	41.6	45.0	40.0	96.0	83.3	87.5
Wild fruits	47.2	55.0	40.0	98.0	75.0	100.0
Mushroom	55.2	65.0	56.0	78.0	83.3	62.5
Eru (*Gnetum spp)*	68.8	70.0	68.0	96.0	75.0	100.0
Njangsa (*Ricinodendron heudelotii)*	84.0	75.0	64.0	98.0	100.0	87.5
Bush Mango (*Irvingia spp)*	76.8	75.0	84.0	92.0	75.0	87.5
Snails	37.6	50.0	40.0	22.0	16.7	25.0

Country onions (*Afrostyrax lepidophyllus)*	68.8	65.0	56.0	64.0	83.3	62.5
Charcoal	5.6	10.0	12.0	0.0	16.7	0.0
Bushmeat	4.0	0.0	0.0	80.0	50.0	25.0
Raffia	3.2	0.0	0.0	74.0	25.0	25.0
Honey beer	0.8	5.0	0.0	76.0	41.7	50.0
Wood for carving	3.2	5.0	0.0	24.0	0.0	0.0
Insects for food	12.8	15.0	12.0	56.0	66.7	50.0
Reeds for weaving	0.0	0.0	0.0	62.0	50.0	0.0
Reeds for construction	5.6	5.0	0.0	76.0	41.7	62.5
Traditional beer	24.8	0.0	20.0	18.0	16.7	25.0
Collection of wood for household items	4.8	0.0	12.0	72.0	33.3	62.5
Collection of indigenous poles	9.6	5.0	4.0	68.0	25.0	62.5
Country onions	68.8	65.0	56.0	64.0	83.3	62.5
Canda stick	20.0	15.0	8.0	62.0	75.0	62.5
Bitter kola	38.4	25.0	28.0	18.0	16.7	37.5
Wild yams	3.2	5.0	4.0	32.0	16.7	25.0
Collection of other NTFPs	16.8	15.0	0.0	20.0	16.7	25.0

The French version for the household survey will be made available upon request to anyone who needs it.