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Developing climate-resilient sustainable livelihoods and adaptive co-development in Namibia's Kavango East Region

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Author's declaration

No portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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ABSTRACT OF THESIS submitted by:
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To assist and implement policy creation effective for those who are most severely and significantly affected by climate change today, this study aims to explore vulnerability and adaptive capacity to climate change using a livelihoods approach and participatory vulnerability assessment at the community level. Using concepts of climate justice and fairness to justify the link between capabilities unearthed through the examination of vulnerability and adaptive capacity, this study aims to explore the issues that two livelihood groups in northeast Namibia face in the context of climate change and other stressors. Conducting a qualitative assessment with semi-structured interviews, participants were asked to analyze and articulate their own needs and vulnerabilities in their environment of stressors and community stakeholders were consulted for reinforcement of emergent themes. A new framework specific to the livelihood groups of this study was created to understand vulnerability via access and use of different forms of capital and influence from climate and other external factors to constrain or expand adaptation options. Within each livelihood, the practical application described by Smit and Wandel, was used to "investigate the adaptive capacity and adaptive needs in a particular region or community in order to identify means of implementing adaptation initiatives or enhance[e] adaptive capacity" (2009: 285). Understanding adaptive capacities and gaps that create further vulnerability loops is particularly important at the local scale where adaptation interventions can be implemented for the creation of resilience and conclusions about capability limitations can be taken to higher policy and governance levels to inform change.

Keywords: vulnerability, adaptive capacity, resilience, livelihoods, climate change, natural resource management, indigenous, sustainability, resilient livelihoods, CBNRM, adaptive co-management, adaptive co-development, sustainable adaptive co-development

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Table of Contents

List of Tables

List of Figures

Main Text

Appendices

List of Abbreviations

BNP	Bwabwata National Park
CBNRM	Community-based natural resource management
CRDP	Climate resilient development pathways
CRIDF	Climate Resilient Infrastructure Development Facility
CRSL	Climate Resilient Sustainable Livelihoods
FAO	Food and Agriculture Organization of the United Nations
GCF	Global Climate Fund
HWC	Human-Wildlife Conflict
IRDNC	Integrated Rural Development and Nature Conservation
KA	Kyaramacan Association
KAZA TFCA	Kavango Zambezi Transfrontier Conservation Area
LAC	Local adaptive capacity
MAWF	Ministry of Agriculture, Water and Forestry
MET	Ministry of Environment and Tourism
MWCT	Ministry of Wildlife, Conservation and Tourism
NDF	National Defense Force
NDP	National Development Plan
OKACOM	Permanent Okavango River Basin Water Commission
ORB	Okavango River Basin
SADF	South African Defence Force
SWAPO	South West Africa People's Organization
TA	Traditional authority
TDA	Transboundary diagnostic assessment
TEKOA	Traditional Environmental Knowledge and Outreach Academy
TK/TEK	Traditional knowledge/traditional ecological knowledge

Thesis Statement

This research study uses a combination of methods and modes of analysis to understand local stressors and responses within the context of ecological, political, economic, and cultural changes and availability and access to livelihood options in the locality of Divundu and Bwabwata National Park in Kavango region Namibia. Analysis of available resources and access to such resources for livelihoods within this context illustrates levels of vulnerability to climate change and other stressors through identified adaptive capacity gaps.

The thesis will be built upon a thorough investigation of the recent literature on vulnerability, adaptation and resilience from the climate change field, capturing essential elements of the various shifts in understanding of these terms and various methodologies and angles to approach the topic. Characterizing such shifts and emerging elements for the consideration of social and socio-ecological vulnerability from the livelihoods perspective, concepts of inequality and justice are incorporated to the understanding of vulnerability and resilience assessment in this research as a basis for action and engagement of other stakeholders who influence these 'vulnerable' livelihoods. A review of this literature can be found in Appendix I.

The CRSL Framework used to structure the research will be introduced and explained with these elements from the literature as explained in Chapter I. Particular emphasis on these structural and relational dynamics that occur outside of the immediate scope of livelihood availability and access to assets will be considered within the CRSL Framework's assessment of livelihood adaptive capacity. The degree and nature of adaptive capacity from the livelihoods in this study will be assessed using the four steps from Reed et al. (2013)'s framework (Chapter III), adapted to include regional and global influences into this assessment of vulnerability and adaptive capacity. Important mechanisms for the adaptation to stressors and formation of livelihood resilience, community-level empowerment through participatory development approaches and incorporation of traditional, indigenous or other forms of community knowledge and innovation are included in the framework for analysis and are assessed in the research through the manifestation of resilient livelihood options available to people of the study area. Building capacity from the 'bottom-up' is an integral part of the CRSL Framework. The livelihoods

encountered in the course of this study are assessed for their ability to build adaptive capacity through iterative learning processes and their ability to cause deliberative transformability of a socio-ecological system, finding solutions to main drivers of social–ecological vulnerability they experience.

Chapter II will give a brief introduction and contextualization of the study area and associated issues with a methodology for the research presented in Chapter III.

Chapter IV will present the findings from this research that support the claim that climate change vulnerability should be considered both at the livelihood level of analysis, considered alongside power ecologies and structural systemic elements which influence livelihood adaptive capacities. Using mixed methods to analyze dynamics between 'multiple stressors' (Rasanen et al. 2016) from the local level upward, starting at the main actors and agents of change themselves, the CRSL Framework will analyze within Chapter IV the surrounding structural forces to influence the adaptive capacity of the SES and the livelihood options available to people, as these are options are critical for the understanding of overall vulnerability, prior to any assessment of climate change-specific vulnerability. Specific structural themes concerning political ecologies, development and power discourses, government structures, institutions, participation of traditional, indigenous and marginalized groups and local communities, and understanding of previous resilience-aimed failures are drawn from the research to understand the specific livelihood resilience of the Mbukushu natural resource-dependent farmers and the Khwe natural resource-dependent hunter gatherers.

Analysis and discussion of adaptive capacity gaps and vulnerability loops will be the nature of Chapter V. Recommendations for resilient livelihoods and pathways to resiliency are made for the livelihoods specific to the Kavango region study area in the final chapter and conclusion, Chapter VI, with the intention to better inform climate policies which may more specifically cater to individual populations and target their most important and immediate needs in the interest of creating resilience to a future with projected climate change.

Study Rationale

Vulnerable Groups

Intergovernmental Panel on Climate Change (IPCC) assessments have shown that vulnerability to climate change is not distributed uniformly around the globe (IPCC 2007). According to the IPCC, Africa is considered to be 'highly vulnerable' to future climate change (Boko et al. 2007) and sub-Saharan countries the most vulnerable of these due to an overall low adaptive capacity to manage multiple stresses and shocks (Boko et al. 2007; IPCC, 2007b). Additionally, at a landscape level, the IPCC has declared the understanding of climate change impacts on drylands and the subsequent impacts of those changes on livelihoods to be a top priority (Barker 2007).

Those in developing countries are also considered to be more vulnerable to climate change (Mertz et al. 2009), receiving disproportionate impact from climate changes, particularly within the poorest communities (Smith et al., 2003) where livelihoods are unable to adapt quickly enough to absorb shocks and regime shifts. Impacted at the systemic level as well, developing countries also tend to have more fragile and 'climate sensitive' economies (Parry et al, 2009) with higher adaptation deficits (Noble et al. 2014, 839) than more developed countries.

The effect of future climate change, universally, on the world's poor is also a significant concern. Developing a 'new poor' between now and 2100, Olsson et al. (2014) mention the further polarizing effect of climate change in unequal societies, both in developed and developing countries. Those in high mountain states, sea bordering countries, and countries with indigenous peoples will feel the effects of changes most immediately it is proposed. Some of the most severe impacts of climate change— with a medium confidence, based on medium evidence, and with medium agreement from the IPCC— will be on some rural regions in sub-Saharan Africa and Southeast Asia (Olsson et al. 2014).

As one of the countries with these rural regions, many of these predictions about future climate changes and sensitive groups are particularly relevant for Namibia, a developing country with a majority of its population living natural resource dependent livelihoods. With a total population in Namibia according to the 2011 Namibian census at 2,113,077, a very low country population

density of 2.6 people per square kilometer[1] in the most populated region of Khomas has a tendency to concentrate development resources in urban centers, leaving natural resource dependent livelihoods to develop natural resilience techniques for immediate climate change impacts. A noticeable trend in the country's growing urban centers, 49.7% between 2001 and 2011, the accumulation of resources and sustained attraction to resources to the country's cities from people in the rural environment seems the trajectory for the future of the population as well.

Justifiably is this the case. A study from Reid et al. (2008) on climate change in Namibia found that a worst case climate scenario would result in half of the population losing livelihoods due to climate impacts, yet, highlighting a difficulty to quantify such changes in economic terms, the same scenario was predicted to result in only a minor 5% fall in GDP. Where economic resources and the market economy protect many in the urban environment from the immediate desperation of no food to eat, few buffers are available to natural-resource managers and livelihoods where the most basic needs for survival are directly contingent upon consistent and reliable weather patterns.

The focus, therefore, of this research is on those most vulnerable groups of vulnerable groups to climate change; the natural resource-dependent livelihoods of the developing world. This group, as a coalescence of vulnerability profiles, is considered to be of the highest risk for suffering climate change impacts (Adger et al. 2003; Kates 2000). The Namibian Government's Third National Report to the UNFCCC notes that it's indigenous groups such as the San are particularly susceptible to further stress from climate impacts as they are inadequately represented or included in decision-making, have insecure rights to land, limited access to health care due to economic constraints, and are often educationally disadvantaged in a variety of ways (Namibian Government 2015). Of the two natural resource dependent livelihoods captured in this study, the particular vulnerability of the Khwe hunter-gatherers, one of the indigenous San groups of the region, will be the reason for an intensified and greater focus on vulnerability-inducing factors in their case which deserve greater magnification under the scrutiny of the larger climate-action community.

[1] See Appendix III for population density map (The World Bank, 2017)

Vulnerability Research

From the 'first generation' of climate change research a substantial amount of data and 'impacts literature' on the biophysical reactions to climate change has been produced (Burton et al. 2002). Less apparent, however, has been the focus on the social elements and reactions to climate change, due also, partially, to a simultaneous and parallel shift in focus occurring at the global level for climate change research. From climate change literature on three 'hotspots' of climate change— one of which from sub-Saharan Africa— one analysis shows the research bias toward the focus on biophysical factors over socio-economic, or human-focused (Berrang-Ford et al. 2015), factors (Tucker et al. 2014). This tendency, which has favored the emergence of methodologies that review biophysical impacts of the climate change (Kilroy 2015) has left little explored the human dimension of climate impacts. Knowledge gaps also appear in the literature where the dynamics and interactions between biophysical systems, socio-economic trajectories and adaptive capabilities toward resilience are understood (Tucker et al., 2014). Understood in this representative ecosystemic way, Sub-Saharan countries are, furthermore, particularly understudied in this respect (Kilroy et al. 2015).

The development of robust methodologies to understand climate impacts on livelihoods and address socio-ecological factors and the corresponding adaptation strategies is therefore much needed (Tucker et al. 2014). Jones et al. (2010) comment on the evaluation of adaptive capacity responses to climate change impacts in the past that have been primarily focused at the national level through the use of indicators, leaving key understandings of how vulnerability is experienced at the community level unaddressed (Mcdowell et al. 2016). One of eight major research gaps for observed and projected impacts of climate change and responses from people, the fifth IPCC report highlights this gap in understanding of vulnerability at the household level: "insufficient work assesses the distribution of poverty at the level of households, spatial and temporal shifts, critical thresholds that plunge some transient poor into chronic poverty, and poverty traps, in the context of climatic and non-climatic stressors" (Olsson et al. 2014, 818–819). The 'explicit analysis of livelihood dynamics' is also identified by the IPCC as a gap in research and important ingredient to a livelihoods perspective approach for understanding climate change human response.

In the pursuit of underlying factors creating vulnerability and predisposing people to high impact situations, these larger structural forces have been identified from livelihood analyses and are, as of recently, being digested by the climate change research community. As Tschakert et al. (2013, 345) well articulate, "the overemphasis on human, physical, natural, social and financial resource deprivation among urban slum residents, mountain dwellers, subsistence farmers and poor women distracts from the larger structural and relational drivers that keep the balance tipped towards persistent marginalization." Recent IPCC assessments agree on this point to say that *"few studies examine how structural inequalities, power imbalances, and intersecting axes of privilege and marginalization shape differential vulnerabilities to climate change*" (Olsson et al. 2014, 818). As is particularly relevant for the livelihoods of this study, the understanding of 'simultaneous and intersecting inequalities' (ibid.) are able to identify root drivers of vulnerability and show drivers compared against other similar contexts.

Although the level of detail granted from the livelihood perspective gives great insight to vulnerability, Tschakert et al. (2013) aptly point out the importance of including larger underlying and structural inequalities that drive livelihood poverty and vulnerability. Wide and broad international or regional stressors that are shaped by ecologies of power and influence must be addressed in a vulnerability analysis in order to understand root causes of vulnerability throughout the system. Conventional vulnerability assessments do not properly address these power ecologies and, through vulnerability maps and indicators, give a false certitude and stagnant picture of true capacity of the magnified impacted unit to withstand regime shift or develop resilience into it (Tschakert et al. 2013, 343). As such, a focus on the status-quo and 'what is' leaves little discussion and information collection about what the effects of proactive adaptation to reduce vulnerability can be (Smith et al. 2009).

Broader understanding of what and how countries have been responding to climate change through their national development strategies and the implications of such strategies for the communities is also an area of research understated in the literature on climate change, impacts and resilience creation (Tucker et al. 2014). As a part of these, the IPCC identifies another major research gap in the lack of in-depth research on climate-related policies and 'insurance on livelihoods, poverty, and inequality' that have the capability of removing structural barriers for

climate adaptation (Olsson et al. 2014, 818–819). Termed in the climate change literature as the development of ‘adaptation pathways’ and ‘pathways thinking’, leadership from national governments to facilitate genuinely sustainable development to allow socio-ecological systems the space to adapt (Wise et al. 2014) is a critical component of livelihood resilience as well. These themes are explicitly addressed in this research through a detailed exploration of Namibia’s CBNRM program.

Study Aims

This study will expand the conventional scope of a climate change vulnerability assessment to include the structural forces that undermine adaptive capacity through a lens of fairness and rights and the capacities for transformative change, as has been identified as being overlooked in the literature (Tschakert et al. 2013, 341) and which is crucial to the development of climate-resilient sustainable livelihoods. It will seek to understand the granular experience of climate change from the rural natural-resource-dependent individual through the perspective of their livelihood and forms of capital available to them. Conclusions about where vulnerabilities lie and therefore where to begin with climate change mitigation that can be effective and useful for the most directly impacted groups will be a product of this research. The goal of this research is to contribute to literature that can influence policy creation at the national and regional levels that prioritizes land, water, and natural resource needs for the most vulnerable populations so as to provide the best chance for climate-resilient sustainable livelihoods going forward.

Main Research Aim

The main aim of this research is to identify which stressors are inhibiting adaptive capacity toward resilient livelihoods for the people of Divundu and Bwabwata West (the west part of Bwabwata National Park) and how these relevant stressors are constrained or assisted by larger systemic forces of change. The adaptations discovered as a tangible response to the impacts of such stressors will provide a gauge of adaptive capacity. The capacity and necessary installments for the creation of adaptive development will be assessed by the level of resilience such adaptations have reached and what elements lie in the adaptive deficit.

Research Questions:

1) *Using the CRSL Framework's understanding of exposure and sensitivity of livelihoods, what are the most relevant climate change and other forces of change which create the most vulnerability for people in the study area?*
2) *Using the CRSL Framework's understanding of adaptive capacity, how are resources conceptualized and used in the context of the livelihoods in the study area and do resources provide grounds for adaptive capacity?*

3) *Based on the adaptive capacities of livelihoods found, is resilience being created—understood as adaptive development through adaptive co-management? Are the livelihoods 'climate-resilient' and 'sustainable'?*

Chapter One: Building the Climate-Resilient Sustainable Livelihoods Framework

1.1 CRSL Framework

As explained in Appendix I on vulnerability, the necessary framework will build off of the structuring of vulnerability as a function of exposure, sensitivity and adaptive capacity (IPCC 2001; 2007) which is 'doubly exposed' (O'Brien & Leichenko 2000) to also consider non-climate changes at the economic and institutional level that may influence or predispose an SES[2] to vulnerability (O'Brien et al. 2004). From the vantage point of each livelihood, exposure is defined as 'the extent to which a given system is exposed to climate change-related hazards' (IPCC 2007), and further modified by the sensitivity of a livelihood to 'the degree to which a system is affected, either adversely or beneficially, by climate variability or climate change' (ibid.).

Using the Sustainable Livelihoods (SL) Framework (DFID 1999) and the integrated livelihoods framework from Reed et al. (2013) as a basis, Turner *et al.'s* (2003) understanding of double exposures in the form of multi-scalar and interacting stresses was framed around the SL framework to create the Climate-Resilient Sustainable Livelihoods (CRSL) Framework for this research. This framework evaluates livelihood vulnerability to climate change from a specific place, with a livelihood's specific access to resources, while also considering influence from global processes and larger macro-scalar elements which contribute to or detract from the ability of an SES to develop adaptive mechanisms and resilience. Livelihood options are created, as they are within the SL framework, as a result of availability and access to resources and the corresponding ability therein to withstand shocks. These options, as has been referenced previously as those 'structural' influences, are further influenced by structures in the public and private sectors (such as NGOs, government, business), processes (power relations, norms, globalization, general rule of law, culture, policies, legislation, and institutions as the 'rules' and their uses that create belief systems, behaviors and organized society (Ostrom 2005)), and historical legacies throughout the adaptation process. The specific perspective of these from a livelihood is an optimal vantage point to view human agency and empowerment as central forces

[2] See Appendix I for full description of an SES for this research

for the development of livelihood resilience where the people are the 'main actors' set within the dynamic and interacting schema of politics and power relations, ideologies, risk perception, values and rights (Tanner et al. 2014).

Thomas & Twyman (2005) cite the importance of past colonial influence and policies in a general inclusion of historical context and it's palimpsest on the adaptation possibilities of the future. This is also a particularly important inclusion for the framing of this research from a part of Africa subject to various colonial powers and their policies and is included as a regional influence for the CRSL Framework.

To summarize, the CRSL Framework takes these other elements into account in the understanding and assessment of vulnerability to produce results true to a resilience for the livelihoods approach, as dictated by the agents of change themselves; the people with the livelihoods options. The non-climate factors relevant in this local bottom-up investigation are included in the framework as structures, processes, norms, institutions and global trends that determine adaptive capacity to further vulnerability or combine to create a context for sustainable-resilient livelihoods.

1.1.1. Understanding Climate Change-Related Stress and Variability within the CRSL Framework

Delving a bit further into what climate change means in the context of vulnerability, this study has broken down the unwieldy term 'climate change' into more manageable parts.

The IPCC (2007) defines climate change as:

> *"…a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity. This usage differs from that in the United Nations Framework Convention on Climate Change (UNFCCC),*

where climate change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods."

This definition and the World Meteorological Organization's delineation of climate as a period of at least 30 years of weather, will be what is meant in the context of this research. Climate change will be thematically grouped within the CRSL Framework based on the CRIDF CCRA methodology categories of precipitation variability, temperature variability, extreme events, agriculture and food impacts and health (CRIDF 2016). So as to provide precise understandings of the themes and types of questions which were posed to those interviewed for this study, Table 1 shows the specific sub-categories that the questions were broken down into within each of these themes. Participants were asked to assess and give individualized perceptions about climate change as per these themes and sub-categories.

Table 1: Climate Change Thematic Groupings and Sub-sections

Thematic Group	Thematic Sub-categories
Precipitation variability	rainfall events (annual total, seasonality, intensity, precipitation source), humidity/cloudiness, river systems, aquatic ecosystems/aquaculture, groundwater, water security, water supply and variability
Temperature variability	heatwaves, seasonal temperature ranges, frost, wildfires, aridity
Extreme events	Floods, droughts
Agriculture and food systems	food production, food security, land degradation/soil erosion, ecosystems/biodiversity; pest impacts
Health	disease epidemiology, air/water pollution, biohazards, nutrition, sanitation

1.1.2. Understanding Adaptive Capacity as a Measure of Vulnerability for Livelihoods within the CRSLF

1.1.2.1. Defining Adaptive Capacity and Adaptation

Adaptive capacity, an attribute of vulnerability, is an attribute also shared with resilience. The connection between the two is only recently emerging in the scientific literature, but this more cyclical and therefore holistic understanding of these processes lend to a better picture of how to

reach desirable states for an SES by understanding the 'adaptation deficit' (Noble et al. 2014, 839). Within the CRSL Framework, the role of adaptive capacity and adaptations to link vulnerable states with resilient ones is a critical point of engagement for policy-making and intervention. Therefore, clearly defining the characteristics of adaptive capacity so as to understand and interpret it in the context of the livelihoods for this study will be captured through the CRSL Framework's understanding of adaptive capacity and adaptations to target resilience, as explained in this sub-section.

Using the IPCC's fifth report definition for adaptive capacity as *"the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences"* (IPCC 2014, 118), this research will elaborate on that definition for livelihoods to mean the whole of capabilities, resources, institutions, and entitlements available and accessible for adaptation.

Unlike the IPCC's fifth report which takes the aspect of exposure and classifies it within 'risk'—leaving vulnerability to mean sensitivity and capacity only—, this research groups the domains of exposure and sensitivity together conceptually and pairs it with adaptive capacity to then conceptualize vulnerability (see Figure 1 (Smit & Wandel 2006, 286)). The move toward resilient SESs lies predominantly in the domain of adaptive capacity ('adaptability') to conduct adaptations and adaptive management to allow an SES 'transformability'. These latter concepts will be discussed in greater detail in the following section 1.1.3.

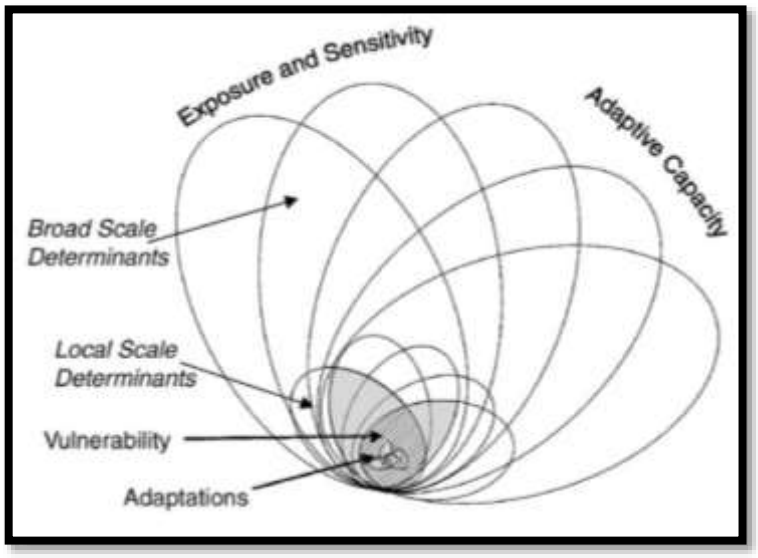

Figure 1: Situating adaptations within vulnerability, as modeled in Smit and Wandel 2006

Adaptations are manifestations of adaptive capacity (Smit and Wandel 2006, 287). Within the CRSL framework the length of time to reach resilient stasis is considered in terms of the kinds of

adaptations made as well. The climate change literature distinguishes between the two types of adaptations; one which occurs in the short to medium term as incremental adaptation, or 'coping', and a second longer-termed process of slower variables to create transformational adaptation, which also requires the building and strengthening of institutional support (Folke et al. 2002). These processes of adaptation are referred to in the resilience literature as a range between 'large and slow' variables that are typically larger systemic changes and the 'small and fast' (Folke 2006; Walker et al. 2004) variables that tend to change quickly and concern people (Carpenter & Gunderson 2001). Understanding both of these kinds of adaptations and interactions between the two from both the top-down and bottom-up perspectives, as this study will try to do for the context of livelihoods examined, will also shed light on how 'transformability' can be managed within an SES (Folke et al. 2011).

1.1.2.2. The Importance of Social Capital for Adaptive Capacity using the LAC Framework

Social capital is an important tenet for the understanding of adaptive capacity within the CRSL Framework. Defined as the *"features of social organization, such as networks, norms, and trust that facilitate coordination and cooperation for mutual benefit"* (Putnam 1993, 35), social capital provides the building blocks for bottom-up adaptation to take place.

Social capital appears in three different forms; bonding, bridging (Larsen et al. 2004), and linking (Kizos et al. 2014). Bonding capital, the most important bottom-up process toward empowerment at the livelihood level, occurs between individuals in a community in the form of relationships and trust (Larsen et al. 2004, 65). Bridging capital is formed when members of one group form bonds with members of another group to support, provide access, or share information (ibid., 66). A product of bridging capital is collective action. Larsen et al. (2004) make the connection between bonding and bridging forms of capital through a study of eight Phoenix, Arizona, neighborhoods. The study found that individuals with strong social bonds were more likely to engage collectively in problem-solving for the community and create bridging capital through collective action. For both bonding and bridging capital Eriksen & Lind (2009) find that social networks and relations between people can bolster adaptive capacity in the

face of environmental hardship and conflict and strong bonds can serve as an asset for innovation (Tucker et al. (2014). The last form of capital, 'linking' capital, consists of the *"relations among individuals and groups that occupy different positions in social hierarchies"* (Kizos et al. 2014). Understanding the types and changes in the types of social capital are important considerations (Kizos et al. 2014) for the development of resilience.

Building off of the vulnerabilities-threshold-first paradigm[3], a paradigm which understands adaptive capacity from the 'bottom-up', the CRSL Framework takes after the Local Adaptive Capacity (LAC) Framework's (Jones et al. 2010) focus on the characteristics of adaptive capacity and the development of the intangible processes and functions at the local level through social capital bonds. Furthermore, the CRSL Framework bolsters the development of individual agency by fostering local innovation and decision-making with the future in mind; allowing for experimentation and opportunity exploitation; and structuring institutions and entitlements into all of this in order to empower communities and overturn a paradigm of development as an opaque way for development actors to influence how local people use their assets, information and opportunities (Levine et al. 2011).

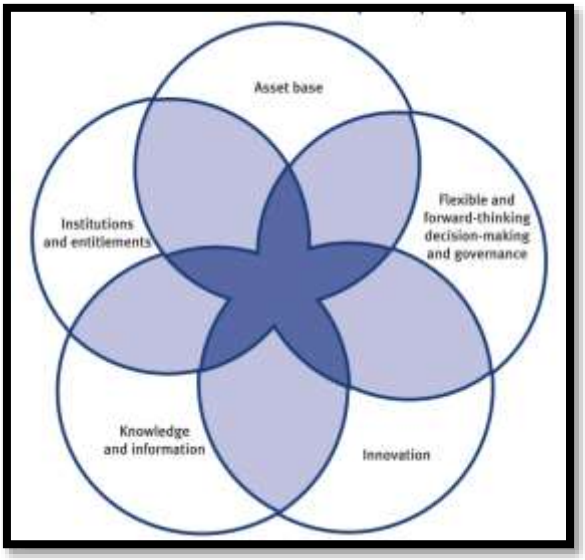

Figure 2: The LAC Framework: relationships between characteristics of adaptive capacity at the local level (Jones et al. 2010, 4)

Chambers (1993, 11) defines 'empowerment' as a "*process by which people, especially poor people, are enabled to take more control over their own lives and secure a better livelihood with ownership of productive assets as one key element".* Tschakert *et al.'s* (2013) analysis on the state of vulnerability assessments makes the point that one of the most significant improvements that could be made to these would be structuring them with a participatory approach that builds capacities at the human level so as to formulate from there sustainable and immediately applicable solutions to issues. A methodology for analyzing adaptive capacity in this manner

[3] See Appendix I for further explanation of this paradigm (IPCC 2012)

(Smit & Wandel 2006) within this study's CRSL is given in Chapter IV. Watkiss and Cimato (2016) found a strong need for technical assistance and capacity building as key for successful mainstreaming of climate adaptation into development agendas, providing illustrations of how it can be done at various levels. Since adaptation and the creation of resilience is a process, proper organizational features from the bottom-up must be in place to work synergistically with energy and empowerment at the livelihood level.

"Adaptability", now defined more precisely within an SES, is defined as 'the collective capacity of the human actors in the system to manage resilience' (Walker et al. 2004, 11; Folke et al. 2006, 262); or, *"the capacity of an SES to adjust its responses to changing external drivers and internal processes and thereby allow for development within the current stability domain, along the current trajectory"* (Folke et al. 2010, 27). The IPCC interprets adaptive capacity through the following categories: *(1) economic resources, (2) technology, (3) information and skills, (4) infrastructure, (5) institutions and (6) equity* (IPCC, 2001). Combining the IPCC's physical resources into 'assets', and equity within 'institutions and entitlements', the remaining three categories of 'information and knowledge', 'innovation', and 'forward-looking governance and decision-making' create the Local Adaptive Capacity (LAC) Framework's (Jones et al. 2010) definition of adaptive capacity used within the CRSL Framework.

The LAC framework was first piloted in a field research and analysis project (Levine et al. 2011) which brought about important considerations for the practical application of climate change adaptation in developing regions. This project, the Africa Climate Change Resilience Alliance (ACCRA) project, an alliance of five development partners: Oxfam GB, the Overseas Development Institute, Save the Children, World Vision International and Care International, was created with a goal to understand how development interventions may enable adaptive capacity at the household level to then feed such information back into development partners to facilitate greater adaptive capacity to climate change and other developmental pressures (Levine et al. 2011, vii). In support of the double exposure approach to climate change, Levine *et al.'s* (2011) piloting of the LAC framework in the ACCRA project observes that individuals do not experience climate change pressures separate from general development pressures; adaptation for both causes should be considered jointly; and that adaptive capacity should be considered more

holistically as an ability to adapt to general change. Adaptation does not happen in response to climate change alone (Smit & Wandel 2006). Meeting another nebulous and ever-evolving concept, Levine et al. (2011) note an important non-climate factor and paradigm that has not been fully integrated into climate change adaptation and mitigation discussion, particularly for developing countries, to achieve truly climate-resilient sustainable livelihoods; the domain of sustainable development.

1.1.2.3. Integrating Climate Change Adaptation with the larger Sustainable Development Paradigm within the CRSL Framework

Sustainable development, 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED, 1987) is not a new concept but seems to still be seen separately from climate change adaptation. Conducting a systematic assessment of multilateral development agency project portfolios, Klein et al. (2007) conclude that the field of development has much space to expand focus and integrate climate change into development projects, identifying a still noticeable separation between the two disciplines. In response to the question: 'how must development strategies under climate change differ from earlier attempts to develop?' the growing emphasis on the need to 'mainstream' climate concerns into development paradigms and policies (Watkiss & Cimato 2016, 2-4, Smit and Wandel 2006, 285-6) in the form of 'adaptive development' (Agrawal & Lemos 2015, 186), or 'sustainable adaptation' (Sherman et al. 2016), is needed to answer these questions. Jones et al. (2010, 3) refer to the fusion of climate adaptation and development goals simply as 'good development'. The application of the LAC framework in the ACCRA project identified this need to fuse development priorities with adaptation or risk failure for both objectives—reducing poverty and reducing vulnerability to climate change impacts—if the two goals are not seen together and development actors continue to overlook the potentials for adaptive capacity because they do not 'see it' (Levine et al. 2011). Particularly is this the case where sub-Saharan countries are concerned as many have failed to incorporate medium to long term climate information to national development processes, likely as a result of poor climate information, social, economic and political interferences, and future climate uncertainties (Jones et al. 2015).

On this point, Bizikova et al. (2015) note the large and important impact of achieving national adaptation priorities that comes from the top-down processes in the form of initiatives supported by international agencies. Research from Amartya Sen on concepts of endowments, entitlements, and rights from the perspective of local social vulnerability argues that institutions can also play an important role in reproducing vulnerability (Sen 1981; Sen 1991). Pivotal to the CRSL Framework and themes encountered in this research, however, is also the focus of Sen's work on a variety of social and economic rights that can provide a basis for development built around such understandings that also provide opportunities for social action and adaptation. These rights, particularly a right to fairness and climate justice, are foundations to this research and its findings.

Determining the elements of resilience so as to apply adaptive co-development strategies and form adaptive co-management schemes will be discussed in the sections that follow (sections 1.1.2.4. and 1.1.3). The theoretical underpinnings that pit conservation priorities against development priorities will be presented in section 2.1.2. This discussion is essential to frame the broad boundaries for adaptation in a 'context of competing sustainable development objectives' (Adger et al. 2003, 179). As one of the main findings of this research, adaptive capacities of the study livelihoods, curtailed by systemic issues of fairness and rights from the conservation versus development narrative, will be discussed in Chapter V.

1.1.2.4. Underpinning the CRSL Framework with the value of Fairness

Sen's concepts of endowments, entitlements and rights are the underpinnings to a livelihoods approach where human agency is the critical ingredient toward transformative change. As Eakin & Luers (2006) specify for vulnerability assessments, the need to make explicit the values that that define the system is integral to its success. Basic human rights which supersede the purview of sovereign nation states is essential to challenging power structures (Tanner et al. 2014) and other systemic stressors as they provide a basis for legal accountability and administration of justice to correct unfairness. Unfairness, as opposed to inequality, is the value that rights aim to rectify through this understanding of the livelihoods approach. Humans are less concerned about inequality as a stand-alone concept, actually preferring unequal situations, as the ideal of fairness

is shown to be much more important and not directly correlated with inequality (Starmans et al. 2017). Considerations of inequality such as adverse social consequences, poverty, erosion of concepts of democracy and unfairness cause adverse reactions that not only demotivate (Starmans et al. 2017, 4–5) the main actors of adaptation, the humans, but also thereby decrease an SESs ability to reach resiliency. Furthermore, such an approach built on fairness and its conceptualization through rights and entitlements, connects top-down approaches as governments become responsible to uphold justice for the benefit of its citizens.

The existence of a political order based off of fairness and justice as the governing mechanism to enforce the ideal has roots in ancient Greece through the constitutional reforms of Solon in 593 B.C.E. Solon understood justice as difference; the distribution of shares proportionate to merit of the people who receive them, instead of notions of justice as purely equality. As Plato and others agree in *The Republic*, justice is the most important and most essential thing (540e) as a means of upholding the ideal of fairness, that also anchors the most righteous political order. Justice ensures that each "does one's own work" (433a) and contends that a society lacking justice breeds injustice: "Injustice causes civil war, hatred, and fighting, while justice brings friendship and a sense of common purpose" (351d). Plato's successor, Aristotle, conceptualized justice also in terms of proportional equality, 'equals should be treated equally and unequals unequally.'

Clearly a political order based on fairness and its products of beneficent interaction and cooperation among people and institutions is rooted in the very earliest conceptions of democracy. Social injustices, unjust power relations and governance unable to provide these basic securities are seen as the key obstacles for overcoming livelihood vulnerability to climate change (Tschakert et al. 2013). The existence of these inequalities and rights failures reproduce the social marginalities that expose indigenous groups and local communities to structural inequality based on gender, race, class, ethnicity, disabilities and produce the socially differentiated vulnerability (IPCC, 2012) that is so important and nuanced that it is understood best at the individual livelihood level. Tschakert et al. (2013, 341) call for methodologies which properly address structural drivers of vulnerability that arise from inequality, marginalization, poverty and other systemic fairness-based issues which inhibit adaptive capacity. Eakin & Luers (2006) determine that the creation of vulnerability is relative to issues of social justice, equity,

and opportunity. A careful distinction between, however, fairness and equality, as often the contemporary political discourses conflate the two, is needed to emphasize fairness and it's mechanism of justice over the imprecise measure of fairness through equality (Starmans et al. 2017). This research will examine the model of bottom-up empowerment for adaptive capacity off of these structural pillars of fairness, as conceptualized by rights and enforced by justice.

1.1.2.4.1. Fairness as Rights and Entitlements

Empowering local communities through the provision of fairness through entitlements and rights provides an important complement and link to the bonding and bridging forms of social capital discussed in previous sub-sections. Adger et al. (2005, 82–83) discuss the importance of fairness in the context of vulnerability to note that, *"the fairness of the rules by which decisions are made is fundamentally determined by the underlying distributions of power within the institutions that manage resources and often create vulnerabilities".* As a way to secure the provision of fairness, then, power must be granted at different scales of resource management in what Berkes et al. (2007) call 'pluralistic approaches', where authority is granted across multiple institutions, thus engaging communities directly. Communities need to be engaged through democratic participation and recognition, given control over their environment and given the ability to map their own vulnerabilities and design their own adaptation policies around them (Schlosberg 2012, 458).

This authority, (discussed in section 1.1.3.2) as 'adaptive governance', granted as a right and entitlement of an SES over the land the livelihoods within it, provides the 'linking' form of social capital. This is discussed as the relations among groups in different positions within the social hierarchy (Kizos et al. 2014) within the CRSL Framework. It is the undermining of this relationship between the people and their place that threatens needs and rights of communities causing the 'status injury faced by vulnerable communities' (Schlosberg 2012, 451). Both of these intangible assets together, rights and entitlements and social capital, therefore, provide the critical components for the building of human agency and empowerment fundamental to the creation of climate-resilient sustainable livelihoods. Summarized by Adger et al. (2011, 21)

"communities require processes that give them some locus of control over their destinies as part of a recognition of identity and place."

1.1.2.4.2. Rights and entitlements administered via 'Justice' for adaptive governance

Rights and entitlements alone, however, do not necessarily amount to 'fairness'. Thomas & Twyman (2005) discuss Botswana's Financial Assistance Program (FAP) from 1982 to 2001 that awarded business initiatives financial support of an amount up to 90% of what was asked for. Their analysis of the FAP program found that those applications which most frequently received grant money were most strongly associated with those who could simply prove that the corresponding 10% contribution could be paid. Remote villages were also entitled to apply, but were found to be significantly deterred by the financial barriers imposed by distant submit points for applications and bank services. This example gives a clear illustration of vulnerabilities that are perpetuated if the principle of fairness is not complemented with and enforced by the concept of justice. The existence of entitlements alone cannot spontaneously generate access and use of those entitlements for those entitled.

In response to this identified gap, a discussion of climate justice as a 'rights-based' way to secure fairness through access to rights and entitlements at the livelihood level and tether governments to international agreements on climate change mitigation (Adger 2004), has emerged turbulently into the development paradigm. The consideration of 'rights' evokes many complicated issues that are difficult to resolve, particularly in the realms of adaptive development to climate change and other shaping development forces. Rights-based approaches to climate justice evolved from environmental justice theory (Schlosberg 2013) and bring to the forefront some of these complicated issues related to adaptive capacities. Within the paradigm of vulnerability assessment it is possible to integrate and advance climate justice goals in a 'justice-vulnerability perspective' (Popke et al. 2016) with a right to development. Notions of climate justice must engage with the other justice theory developments (i.e. human rights, environmental rights) and must be specific about what rights are protected, how and why such rights are not being secured, why it is the responsibility of a just society to protect such rights, and how governments may address such needs in light of climate change adaptation (Schlosberg 2012, 449). These points

are critical to address as, historically, when rights frameworks of sovereign states are pitted against human rights, the rights of sovereign states have more frequently won out (Adger et al. 2011, 18).

Climate justice within the development paradigm has come to mean that indigenous and resource-dependent peoples have the right to land (Boudreaux & Nelson 2011) and the right to their ways of life as a means of adaptation to climate change and its effects. This stance has developed in practice into what is called 'community-based natural resource management' (CBNRM) and 'community-based conservation' (CBC), where users enjoy exclusive rights to a resource and are actively involved in its management. These kinds of management are deemed more likely to be effective for conservation than top-down processes (Berkes 2007) as they couple rights with traditional ecological knowledge (TEK) and how to utilize such entitlements a the way the community sees fit, thereby bypassing bureaucratic and institutional barriers from top-down distribution of the same. Berkes et al. (2000, 1252) calls this coupling where an SES is connected via the management of its peoples a 'knowledge–practice–belief complex' and is what is inherently associated with TEK. Traditional Ecological Knowledge, they define, is:

> *"…a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment… [it] is an attribute of societies with historical continuity in resource use practice... By and large, these are nonindustrial or less technologically advanced societies, many but not all of them indigenous or tribal."*

Adger (2004), however, argues that the provision of rights-based justice in the form of universal human rights— fairness, I argue— such as the right to a safe environment, makes it impossible for policy to continue to ignore foundational tenets of vulnerability for many marginalized and discriminated against groups (Adger 2004). Schlosberg (2012) gives approaches and essential elements to consider when evaluating how to apply the 'ideal and abstract notions of climate justice theory' to the 'reality and necessity of adaptation' (445). He argues that the adoption of a 'capabilities approach' enables climate justice to be actualized through policy-making for

adaptation. This study does this through its focus on the capabilities of the livelihoods in question, outlining which policies must be created, changed, or altered in order to bring about climate justice. I define 'justice' as a concept encompassing of the rights-based justice frameworks which precede it (Schlosberg 2012, 445), with an additional distinction and emphasis on the role of justice to enforce fairness over 'equality'. An interpretation of Scholsberg's (2012) capabilities approach for adaptation in the context of development means adaptive development.

1.1.3. Assembling the Components of 'Adaptive Development': Building Resilience for Livelihoods within the CRSL Framework

1.1.3.1. Adaptive Management

Although many of the global climate concerns we have are borne out of a mentality to see ecological systems as a utility for human survival, turning this mentality on its head with an 'ecological justice approach' could theoretically address the issue head on but for a number of reasons is not feasible. By Schlosberg's (2012, 456) capabilities approach, however, *"the kind of community-based process for determining and prioritizing threats to individual and community capabilities and functioning for human beings would begin to address the status of the functioning of the non-human realm as well."* A focus on the vulnerable groups of society which manage resources may subvert attitudes about a natural world that exists only to be exploited. This approach, which focuses on and upholds the rights and powers of the communities which manage the resources directly, provides the basis for the concept of adaptive management and governance and adaptive development.

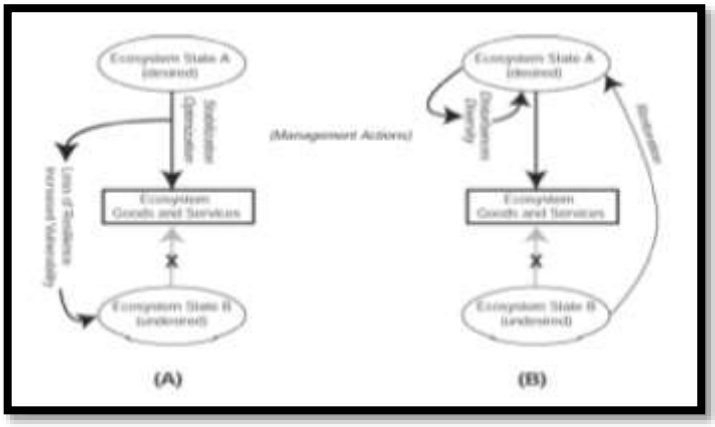

Figure 3: Conventional command-and-control management (right) versus adaptive management (left), adapted from Folke et al. (2002, 43)

Adaptive management (Holling 1978) requires sensitivity to what works in practice via the process of experimentation and pluralism of power. It recognizes that system uncertainties are certain (an

understanding integrated into Folke et al. (2002)'s understanding of adaptive management in Figure 3) and uses a similar feedback-awareness approach to understand which changes induce positive feedbacks in the direction of resilience. As Martin (2000) defines it, *"adaptive management is characterized by feedback loops at all stages and a willingness to adjust goals, hypotheses, objectives and management actions."* It requires monitoring, ecological understanding and the institutional capacity to assess and respond to environmental feedback instead of seeking to reduce or diminish feedbacks (Folke et al. 2002, 45). As presented in section 1.1.2.4 through foundations in fairness and rights, the political will to allow this form of management is a necessary component from processes at the 'top' to allow management to happen at the 'bottom'.

1.1.3.2. Adaptive Governance

This corollary to adaptive management, adaptive governance (Folke et al. 2005), grants adaptive management the 'head room' (Tompkins & Adger 2004, 3) for transformation (Walker et al. 2004, 12; Folke 2006). Adger et al. (2011, 20), notes that it is the role of institutions and political processes that "*create the space and mechanisms by which values in identity and sense of place can be incorporated into the calculus of climate change,"* insisting that the securement of rights alone cannot provide tangible benefits for people but must be incorporated into policies and development agendas. Adaptive governance requires the formation of 'linking' capital (Kizos et al. 2014) through the institutional capacity and capital building for livelihoods in an SES (Folke et al. 2005).

The goal of adaptive management and governance, referring back to the creation of resilience, is to create transformative adaptation. The fifth IPCC assessment report defines transformation adaptation as:

> *"change[s] [in] the fundamental attributes of systems in response to actual or expected climate and its effects, often at a scale and ambition greater than incremental activities. It includes changes in activities, such as changing livelihoods from cropping to livestock or by migrating to take up a livelihood elsewhere, and also changes in our perceptions*

> *and paradigms about the nature of climate change, adaptation, and their relationship to other natural and human systems"* (Noble et al. 2014, 839).

Deliberative transformation requires resilience thinking. The larger politics or socio-political interactions are important to creating deliberative transformation as all patterns of change will have a type of politics associated—a pattern of relations between authorities and their subjectivities exist which underlie a change (Manuel-Navarrete & Pelling 2015). As previously stated, these larger systemic relations and processes are as essential in the process of resilience creation as they are to understanding and conceptualizing vulnerability.

This evolving concept of adaptive governance is also actively being experimented with through conventional resource management plans. Adaptive governance consists of at least four essential parts; understanding ecosystem dynamics; developing management practices that combines different ecological knowledge system to interpret and respond to ecosystem feedback and continuously learn; building adaptive capacity to deal with uncertainty and surprise including external drivers; and supporting flexible institutions and social networks in multi-level governance systems (Folke et al. 2005). These are the elements of a form of governance that supports and sustains the human agency and empowerment intangibles rising from the bottom up.

To summarize, what is needed at the levels above local communities, then, is the procedural justice to empower local actions through the creation of 'head room' (Tompkins & Adger 2004, 3) within which local actions can develop 'social resilience' (Tompkins & Adger 2004). For the case of Namibia, the experimentation process currently looks like the CBNRM Program.

Chapter Two: Introduction

2. 1. Applying the Framework

2.1.1. Assessing Namibia's Community-Based National Resource Management (CBNRM) Program in Kavango East

A commonly built upon definition from Western and Wright (1994, 7) of community-based conservation is *"community-based conservation reverses top-down, center-driven conservation by focusing on the people who bear the costs of conservation. In the broadest sense, then, community-based conservation includes natural resources or biodiversity protection by, for and with the local community,"* and, *''the coexistence of people and nature, as distinct from protectionism and the segregation of people and nature''* (Western and Wright 1994, 8). Berkes (2007, 15188) describes it as 'governance that starts from the ground up', linking various levels of organization on the way up in a pluralistic and inclusive view of conservation.

As a complement to government and traditional authority forms of governance, and as a mechanism to enhance rural livelihoods while simultaneously creating local management bases for conservation, Namibia has created the Community Based National Resource Management (CBNRM) Program as a solid starting point for implementing further rights for indigenous people and local communities.

First conceived in Namibia in 1967 through the Nature Conservation Ordinance 31, and later reinforced by codification in the Nature Conservation Ordinance Number 4 of 1975 (Weaver et al. 2009, 102), the modern CBNRM model in Namibia was implemented at the national level in 2006 after introduction of legislation for the concept in 1996 under the Nature Conservation Amendment Act (No. 5 of 1996). Consistent in coverage of the majority of the country, CBNRM operates in 11 of the 13 regions of Namibia with 82 registered conservancies (communal conservancies), across 158,247km2 (19% of the total area of Namibia)— 52% of all communal land in the country—, providing direct benefit to 250,000 Namibians (Namibian Government 2015; MET 2016: 20).

Funded by NGOs and the foreign governments of the U.S. (Nelson and Agrawal 2008, 565) and Germany, the CBNRM Program operates on the premise that the management of natural

resources and tourism opportunities can be entrusted to local communities through the formation of a 'conservancy', which stands as an institutionalized structure that represents and provides a voice for the people of the community, directly, set apart from the traditional leadership or government authority structures. Defined by the ministry that is now the Ministry of Environment and Tourism (MET), a conservancy is "*a group of farms on which neighboring landowners have pooled their resources for the purpose of conserving and utilizing wildlife on their combine properties"* (MWCT 1992). A conservancy in its most commonly used context refers to 'communal conservancies', but due to the diversity of natural resources and therefore the diverse management needs required for them, the CBNRM Program includes communal conservancies, community forests and other community conservation associations to manage resources by and for the local communities which inhabit the land. Through all of these fora, the purpose of a conservancy to be 'operated and managed by the members of the conservancy themselves with absolute minimal interference from the MWCT or any other ministry' (MWCT 1992) must be upheld.

Conservancies in the CBNRM program stand as officially registered groups with formal registered members who carry legal rights to the management and access and shared benefit of these lands. In exchange for the stewardship of the resources, conservancy members are able to apply for concessions, granted by the Namibian central government overseeing body, MET, to allow for specified uses and activities to be carried out in these areas, sometimes with partnership through tendered contracts for high interest activities or uses.

A concession is a mechanism which *"allows a community, conservancy or privately owned tourism business to operate a business on state land. A concession is a legal and binding contract between State and a concessionaire for rights to undertake commercial activities in protected areas"* (MET, n.d., 2). It can be awarded by MET in one of three ways (MET 2007);

1. Direct award process where previously disadvantaged communities living in or around protected areas are allowed to operate concessions or seek a joint-venture partner for assistance

2. Tender process, where concession is identified by MET and a tender process to select one of many interested operators is conducted fairly and for the best results for all stakeholders
3. Concession awarded to an applicant, unsolicited, for 'highly innovative' and with a 'high degree of intellectual property' activities[4]

Concessions are granted with the intention to *"explicitly target such empowerment through tourism development and wildlife utilization based on public assets*" (MET 2007, 2). As stipulated by MET under the Nature Conservation Ordinance 1975 (Ordinance 4 of 1975) and as amended by Nature Conservation Amendment Act (Act 5 of 1996), communities may manage their own resources in the form of a conservancy with conditional rights and ownership over huntable game and use rights. This provision is allowed in State lands. Furthermore, MET has the authority to *"authorize other parties to provide services on behalf of the State within proclaimed protected areas, including the provision of tourism services in proclaimed protected areas through concessions*" (MET 2007, 2) and more explicitly stated in the Ordinance in Section 17(2) paragraph (j) to "*authorize any person to carry on, subject to conditions and the payment of such charges as it may deem fit, any activities which may be carried on by the Minister".* This policy, however, only explicitly mentions the involvement of Traditional Authorities in compliance with the Communal Land Reform Act (Act 5 of 2002) if outside of protected areas.

As will be particularly pertinent for this study, the Ordinance's oversight to detail what rights and capacities traditional authorities have within national parks will be particularly important for the analysis of adaptive capacity of one of the two livelihoods captured in this research. The proposed Parks and Wildlife Management Bill supposedly outlines the proper framework for concessions in proclaimed protected areas and other state land, but details and status of this bill could not be located. Without the important and explicit rights given to the local authorities, local communities have, essentially, no authority or sovereignty to develop resilient sustainable livelihoods.

[4] TEKOA, for example. See discussion of TEKOA within Chapter VI

2.1.2. Adaptive Development and Conservation; Climate justice and Biodiversity Preservation—Can they be Compatible?

These concepts, however, where rights of individual humans have taken precedence over the rights of sovereign nations, has yet to come to terms with the right of humanity as a collective species to observe, enjoy and aesthetically harvest the fruits of the remaining 'wild' spaces left on the planet. Broad narratives of development grind up against narratives on conservation, bulwarking the progress of both. While not all community-based management is suitable for the likes of tourism consumers, those communities most in need of adaptive development also tend to be those areas most appealing for the conventional application of conservation.

It is important to note that part of the reason that theses interests have been pitted against one another is due to an unclear foundation for the concept of climate justice within the UNFCCC, the international framework of the UN. While the UNCBD and the UNDRIP acknowledge and uphold links of culture to its environment to create a sense of identity for people, the UNFCCC does not as clearly do so (Scholsberg 2012, 451). This will be discussed in greater detail in terms of the rights of indigenous groups to 'self-determination' in the context of Namibia specifically in Chapter IV. Nevertheless, *"adaptation strategies and measures create their own winners and losers"* (Adger et al., 2006: 4), and as a study done in Kenya on adaptation concludes, conflict is part of adaptation as there are those who must do better than others when adaptation is needed (Eriksen and Lind 2009). As adaptation needs tend to happen at the local scale (ibid.), this necessarily means that these larger discourses must also occur at the community level.

Before vulnerability and adaptive capacity can be assessed for the livelihoods of this study to understand how structural elements such as the CBNRM program facilitate or deter a pathway toward resilience, some discussion, then, on the dialogue of conservation versus development must be had.

2.1.2.1. Dialogues on Conservation and Approaches

The understanding of conservation is included under the general theory of the 'commons' (Hardin 1968) and common shared resources put forth by Ostrom *et al*. (1999). Common resources were determined to be those which had the specific understanding that it is costly to exclude beneficiaries through physical and institutional means and exploitation by one single user would have a negative effect on the availability of that same resource for others. Due to the nature of commons as shared resources which are impacted by the use of various actors, the rules or institutions which determine these uses are of utmost importance (Ostrom 2005).

A protected area is defined by the IUCN as: *"A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values"* (Dudley et al. 2008, 8). While the point of what these areas are being protected *from* is left to one's imagination by this definition, the mechanism to provide such protections is detailed in the various conservation practices and management prescriptions attached to these lands.

Baldus (2009, 16-18) and (Brown 2002) offer a dichotomy of these new conservation approaches that have emerged since the 1980s, detailing the accession of benefits to local communities from none in 'top-down' structures, to conservation 'by' the local communities in its opposite 'bottom-up' structures. The model that Baldus (2009) terms the 'Conservation Against the People' approach at one end of this spectrum, was common in the 1980s and before, and meant removal by force of the people from their lands in the interest of 'nature conservation' (McNeely and Miller 1984; Western and Wright 1994). By this approach, local livelihoods were assumed to be in conflict with the goals of conservation and out of this strict borders were erected that people were barred from crossing (Salafsky & Wollenberg 2000).

Today's IUCN guidelines (IUCN & UNEP-WCMC 2014) for protected area management still reflect a mentality that de-emphasizes people. Out of six categories of protected areas, four designate that land either explicitly or generally exclude the presence of people; (Ia) Strict Nature Reserve and (Ib) Wilderness Area, (II) National Park, (III) National Monument, and (IV) Habitat/Species Management Area. From the definition of the Strict Nature Reserve, an area *"free of significant direct intervention by modern humans that would compromise the specified*

conservation objectives for the area, which usually implies limiting access by people and excluding settlement" (Dudley et al. 2008, 13), the concept that humans are a threat to conservation is clearly stated within these categories. The Wilderness Area (1b) and National Park (II) categories grant indigenous communities the ability to 'subsist'; *"enable indigenous communities to maintain their traditional wilderness-based lifestyle and customs, living at low density…"* (Dudley et al. 2008, 14), and, *"to take into account the needs of indigenous people and local communities, including subsistence resource use…"* (Dudley et al. 2008, 16), respectively. Wildlife and 'nature' values are prioritized well and above humans within these definitions as well.

Although these forms of conservation should be critically evaluated for application to any new protected areas, this latent bias from international conservation organizations to favor 'people-less' protected areas drives larger trends of emotionally driven sentiments from distanced Western countries and ambiguous motivations from large conservation organizations to continue to pursue 'nature-first' conservation efforts that exclude people. Some of these sentiments, in the context of animal welfare concerns, are presented in Baldus (2009, 19):

> *"There is a strong movement, mainly in the Western world, which disapproves of any kind of wildlife use, and the killing of animals in particular. This is based on emotions, beliefs and ideologies and often focuses on the "right" of the individual animal to live, even if it is at the expense of the survival or wellbeing of the species."*

In almost all southern African countries, and as a part of the global trend to systematically displace local peoples as a park of the creation of a worldwide network of protected area (Bryant et al. 2011; Adams & Hutton 2007), the general practice with this approach in the past has been to remove local communities from land that is to be designated as State Protected Area (Martin, 2000). Etosha National Park's Hai//om San tribe, now informally living in Oshivelo, is an example of this practice in Namibia's case, yet is also engaged in an ongoing legal case for the indigenous people of the park to get the land they were forcibly moved off of back (pers. comm. LAC 2017 and Anaya 2012) . The continuation of this paradigm of 'blueprint conservation' (Berkes 2007), people-less protected areas; 'coercive conservation' (Peluso 1993), 'imposed

wilderness' (Neumann 1998), or, what could also be seen as 'land grabs for conservation', has consequences that continue today for indigenous groups like the San communities of the Central Kalahari Game Reserve in Botswana, the semi-nomadic hunter gatherer Pygmy peoples of Virunga National Park (FDAPYD et al., 2014) and Namibia's Topnaar people of Namib-Naukluft Park and San Khwe people in the West Caprivi Strip (Corbett and Jones 2000, 19). Many of these groups struggle to find new livelihoods after being forcibly removed from their ancestral lands. Most importantly, for the local communities and indigenous groups who inhabit land set aside for animal-centered conservation, rights to development— sustainable or otherwise— are inherently stripped away under such schemes.

A paradigm shift for conventional conservation, however, may be on the horizon. Of the six IUCN protected area categories (1994) two bring people back into the picture. The Protected Landscape/Seascape, category (V), includes people *"to provide a framework to underpin active involvement by the community in the management of valued landscapes or seascapes and the natural and cultural heritage that they contain*" (Dudley et al. 2008, 20). The Managed Resource Protected Area, category (VI), aims *"to contribute to sustainable development at national, regional and local levels*" (in the last case mainly to local communities and/or indigenous peoples depending on the protected natural resources), and, *"to collaborate in the delivery of benefits to people, mostly local communities, living in or near to the designated protected area"* (Dudley et al. 2008, 22). It is within the last category, category (VI), where the concept of CBNRM has been evolving.

The origin of community-engineered conservation as a means to biodiversity protection was first seen in the 1980s with the rise of Integrated Conservation and Development Projects (ICDPs or ICADs) that aimed to link conservation and livelihood objectives and reinforced the idea that the economic incentives gleaned from biodiversity protection would be a positive for conservation in the long term (Salafsky & Wollenberg 2000). From this 'people-oriented conservation' to what evolved in the 1990s as 'people-based conservation' and 'use it or lose it' use of wildlife resources, as a means to rights for communities through access and benefit sharing (Brown 2002), a shift in central focus was required.

Though there is support to say that people-less 'fortress conservation' (Murphree 2002) is slowly evolving to into more people-centered models that utilize humans as managers of the land (Murphree and Mazambani 2002), the implementation of these models has been met with some difficulties. One of the largest difficulties and main reasons for the ultimate failure of CBNRM models stems from governments' reluctance to shift to a 'devolutionist stance' (Murphree and Mazambani, 2002, 55), fully divulging power and authority of lands over to its people into a true bottom-up conservation approach (Murphree 2000, 6; Brown 2002), a phenomenon Murphree (2000) and (Corbett & Jones 2000) call 'aborted devolution'. Here, in a state of aborted devolution, the State prescribes policies to allow a handover to the people but is seen to be unwilling to surrender resources in the end.

2.1.2.2. 'Aborted Devolution'

There are several undesirable outcomes from aborted devolution, as seen manifested through some real world examples. Many examples of CBNRM programs in various stages of partial, or 'aborted', devolution from Sub-Saharan Africa show a government that has instituted policies and programs to effectively hand over control of resources to communities, but has been unable to implement the policies in reality. One of the first examples was the Communal Areas Management Program for Indigenous Resources (CAMPFIRE) Program in Zimbabwe that gained acceptance through popular appeal in 1980 (Murphree and Mazambani 2002, 68). This project ultimately stalemated before reaching the communities at the level of Rural District Councils (Corbett and Jones 2000, 14), having been blocked from the politico-economic center (Murphree and Mazambani 2002, 68).

The Southern Luangwa Valley Integrated Resource Development Project (LIRDEP), also from the 1980s, and now called the Administrative Management Design for Wildlife Management Areas (ADMADE) in Zambia; the 1987 Selous Conservation Program (SCP), now the Wildlife Management Area Approach in Tanzania; and various initiatives in Botswana and Mozambique join the list of CBNRM programs Baldus (2009, 16-18) refers to as 'Conservation For the People' and 'Conservation With the People' models. In these partial-devolution staged CBNRMs, one allows communities to stay on the land and tolerate wildlife or protected areas,

prohibited from the active management of such resources, and sharing little if any of the benefits from them. This is the Conservation For the People' model. The 'Conservation With the People' model (also Murphee 2001) allows local communities to level up through their involvement in the planning, management, and monitoring of the resources, supplemented as needed with technical assistance from external partners. Benefits in this second model are shared, but full devolved management of the land is not given with a focus on the people. In essence, this approach is still a 'top-down' one where government is controlling resources at the bottom from their perspective at the top.

In programs like these where responsibility over resources is not materialized in the form of rights to authority and entitlements, communities often become dis-incentivized to continue to protect the resources as a rhetoric of ownership doesn't match the clear observed reality that says it is the State who has true control over the resources in question. Intentions of programs that involve local communities with the purpose of conservation are thinly guised as methods to assuage local resistance (Berkes 2007, 15189) and are co-optive and consultative instead of empowering active agents from within (Murphree and Mazambani 2002, 53; Brown 2002, 11). In such situations communities are left without the motivation or ability to carry out conservation policies as the common property resources are held 'hostage to larger politico-economic realities' (Murphree and Mazambani 2002, 40). A tendency for communities to feel deceived by false rights can also result in a reversion to further resource exploitation (Corbett and Jones 2000, 14) as the critical rules-in-use for the common pool resources are defunct and undermine the integrity of the whole SES (Ostrom 2005).

Baldus writes that any of these top-down governance approaches are destined for failure (2009, 23). Authority is a pre-requisite for responsible management (Murphree and Mazambani 2002, 58). Additionally, and as the literature on CBNRM notes, a primary focus on conservation and biodiversity protection goals has been the cause of most CBNRM failures (Abensperg-Traun et al. 2011, 42). These conclusions indicate that despite moderate progress made to reach such a point, ultimately, without a focus on the communities themselves managing the resources, CBNRM projects will be unsustainable and insufficient for either wildlife conservation or

community development, thus also thwarting both the adaptive capacities of the people and preservation of the biodiversity.

2.1.2.3. Successful Devolution

Devolving responsibility of government to its people is a theme that has been grappled with by many different political ideologies. It is not the purpose of this paper to discuss wider application of devolution themes, as one of the four guiding criteria for assessment of adaptive capacity within the CRSL Framework specifically notes possible incoherence for 'scaling-up' (Smit & Wandel 2006). What is important to recognize, however, despite any politico-bureaucratic establishment objection to handing over control to citizens, that what is being promoted through such an approach is not an either/or of control between the local agents and government entities. Murphree and Mazambani (2002, 55) provide clarification on this point to indicate that successful devolution is merely *"the assignment of appropriate and complementary jurisdictions across a scale of ecological and functional management requirements."*

Murphree and Mazambani (2009, 53) give a definition of successful devolution as, *"the creation of relatively autonomous realms of authority, responsibility and entitlement, with a primary accountability to their own constituencies,"* citing further this reluctance from government to relinquish control:

> *"Devolution is an approach which faces strong and entrenched opposition. The State, its private sector allies and its bureaucracies have their own appropriative interests in local resources and the State is loath to legitimate local jurisdictions in ways that diminish their ability to claim the benefits of these resources."*

In practice, of the three moderately successful examples of local level institutional development in natural resource governance in southern Africa, Murphree and Mazambani (2002, 58) remark that all three had de facto authority over their land, concluding that 'clearly defined rights and responsibilities' are the critical ingredients of successful local management and resource governance schemes. This is unsurprising as it is also known that community-based conservation

is more likely to work if *"the users enjoy exclusive rights to the resource and have a stake in conserving the resource*" (Berkes 2007, 15191).

2.1.3. Bringing it all Together: CBNRM as 'Adaptive Co-development'

Bringing devolved rights to community-based conservation, Berkes (2007, 15193) supports Baldus's (2009) 'Conservation By the People' model as a sustainable fusion of coexisting development and conservation goals, advocating a change to Western and Wright's seminal 1994 definition of community-based conservation that includes bottom-up framing and linkages across scales:

> *"community-based conservation needs to be extended so that it includes natural resources or biodiversity protection by, for, and with the local community, taking into account drivers, institutional linkages at the local level, and multiple levels of organization that impact and shape institutions at the local level."*

The result, a learning-by-doing (Armitage et al. 2007) kind of 'adaptive co-management' (Folke et al. 2002, 49) of resources that evolves, is based at the community level and emulates ecological systems. Furthermore, by granting all stakeholders access and rights, such management can be determined 'pluralistic' (Berkes 2007) to achieve conservation goals and connect to 'commons' theory's model of successful management as "nested institutions at varying scales" (Ostrom et al. 1999, 278).

Identifying the adaptive capacity of CBNRM programs and their ability to contribute to the capacity building toward resilient livelihoods through their measure as an adaptive co-management program, Armitage (2005) identifies three main factors of successful CBNRM programs which, idealistically, are tasked with carrying out adaptive co-management; (1) Focus: goals and trajectory for the programs are clear and actionable; (2) Capabilities: the program is able to accomplish goals with the skills and capabilities of participants; and (3) Will: the community has the motivation and commitment to the protection and preservation of their natural resources to see to it that sustainable practices are carried out. These three main factors

are understood here to be building off of the aforementioned aspects of adaptive capacity; availability and access to resources, rights as entitlements enforced by justice, and devolved authority from the State for governance.

For this study, Bwabwata National Park's (BNP) Kyaramacan Association (KA), the association with the role of acting as a conservancy within the national park, will be assessed for its ability to help BNP residents adapt to various climate and other vulnerability-inducing negative impacts on livelihoods, and its potential to produce a sustainable and successful Community-Based Monitoring-Tourism (CBM-T) program (Miller et al. 2012). Community-Based Monitoring of tourism resources is specifically examined in the case of BNP because tourism, due to the park's designation as a protected area, is one of the few permitted livelihood beneficiation schemes available to residents within the park's multiple-use area boundaries. In accordance with international instruments such as the UNCBD and its Aichi Biodiversity Targets (CBD 2010), which include the involvement of local communities and indigenous groups and the use of their traditional knowledge (Target 18) for the protection of ecosystem services (Target 14), a preliminary global study and categorization of CBM approaches identified successful CBM-T programs to have an additional three criteria which echo Armitage (2005)'s general main factors for successful CBNRM. Those three factors are: (1) Presence of an active community organization, (2) Community motivation to be involved in resource management and monitoring, and (3) Multiple stakeholder involvement and coordination at different levels of organization (Miller et al. 2012). Miller et al. (2012)'s criteria will be used to assess whether or not this form of CBNRM is producing adaptive co-management as the connection of bottom-up forces meeting top-down ones for the hunter-gatherer livelihoods. The other livelihood discovered in this study, the farmers, were not found to have access to any CBNRM conservancy nearby, and as such, local governance will be assessed for its ability to enable adaptive co-management in other ways, but using Armitage's (2005) criteria as a standard for assessing effectiveness of such interaction toward farmer livelihood resilience.

There can, however, also, be many reasons for failure of a devolved community-based conservation program. Berkes writes that any bottom-up community-based conservation must do the following to be effective (2007, 15192): *"(1) find strategies to strengthen existing commons*

institutions; (2) build linkages horizontally and vertically; (3) engage in capacity building, trust building, and mutual learning; and (4) invest sufficient time and resources to achieve these objectives." Furthermore, collective performance under any circumstances, as Murphree and Mazambani (2002, 57) indicate, *"depends on the presence or absence of social capital, social energy and collective will. It also requires training, and devolutionist policy must provide for this."* Where the former essentialities are needed from the agents themselves, the training and policy are the elements of adaptive government which facilitates transformational adaptation to allow communities to possess all the necessary tools and resources for the construction of resilient livelihoods.

Having experimented with exclusionary state policies for some decades only to find that these same lands are failing to conserve the very biological diversity they are tasked to defend, clearly this model for protected areas does not seem to be working in Africa (Martin 2000; Counsell, pers. comm. 2017), making the case for the ushering in of a new ethos for conservation. As a model that has not been tried wholeheartedly by any government in Africa and perhaps globally as well, 'Conservation By the People' (Baldus 2009, 17-18), a conservation that brings people to the center of the equation, may harbinger a new age of conservation that harkens back to a model that, could be argued, has worked for centuries. The parallels between adaptive co-management and local and indigenous management systems that respond to environmental feedback are, afterall, not accidental (Berkes et al. 2000).

Chapter Three: Methodology

3.1. Interview Structure and Application of the CRSL Framework

3.1.1. Stakeholder Mapping:

Use of a stakeholder mapping tool (Murray-Webster & Simon 2006) to systematically consider which stakeholders should be included in the interview process was used to help show justification for the inclusion of other stakeholders and to understand livelihoods in context.

Identifying the proper scale and persons to interview was an important preparatory step in order to identify who would be the most critical persons to interview for this research. In order to determine this, a simple stakeholder mapping tool was used with 'power', 'interest', and 'attitude' criteria considered (Murray-Webster & Simon 2006). This tool was used as a way to identify relevant institutions, social groups and decision-makers to the study within Divundu and BNP. As power ecologies were so central to the discussion of adaptive capacity and development of resilience, power using this tool was understood as the weight of influence in a social and economic context, contrasted with interest, as the level of engagement—high or low— and attitude in favor or against developing adaptive behaviors and strategies in the face of impacts and risks. This tool, in a broad but organized and replicable way, was able to identify who to interview for the study and justifies the inclusion of other stakeholders in the community (such as local NGO representatives, local government leaders, OKACOM representatives).
From the basin-wide perspective, the stakeholder analysis from Namibia's NAP (OKACOM 2011b)[5] was used at the outset to further refine stakeholder categories. Attending a three-day workshop on the topic of the creation of Climate Resilient Development Pathways (CRDP) in the Namibian capital of Windhoek, information was gathered from stakeholders at the regional and national levels working for the Permanent Okavango River Basin Water Commission (OKACOM), parastatals and government officials from the three countries. Viewpoints from OKACOM and the Namibian Ministry of Environment and Tourism (MET) were captured in the form of group discussions on livelihoods and resilience creation in the three member countries during the course of this workshop.

[5] refer to Namibian NAP (OKACOM 2011b) stakeholder analysis categories from Appendix III

As seen in Adger (2000), two primary sets of data were collected in the course of this research; one from the livelihoods in the study area, and the other from stakeholders relevant to contextualize the livelihoods in the study area. For the inclusion of local NGOs, government civil service workers, local business and traditional authorities, assessments were done from the field as to which stakeholders should be consulted, based on which of these had the most direct interactions with the livelihoods of this study. These stakeholders were contacted during the course of the fieldwork as they were identified from interactions with people in the community. Of these other community stakeholders, the local NGO Integrated Rural Development and Nature Conservation (IRDNC), local government and traditional leaders, government agriculture extension, health, environmental health and social workers, and an academic researcher were interviewed as those local stakeholders relevant to the livelihoods interviewed. Chapter IV, which reviews livelihood sensitivity to stressors will assess any interventions or areas of interaction between the livelihoods of the study and these other stakeholders in the community. Understanding how these other stakeholders have contributed to vulnerability or resilience of livelihoods in the study area will be evaluated in Chapters V and VI.

3.1.2. Individual Interviews

3.1.2.1. Interview Sampling Technique

The snowball sampling method (Atkinson and Flint 2001) was used to find the more difficult to locate Khwe hunter-gatherers of this study and cluster sampling in the different villages in and around Divundu was used as a methodology to find Mbukushu farmers to speak to. It was necessary to use snowball sampling for the Khwe as this more vulnerable group is only found in pockets of the study area. Greater flexibility was possible for the Mbukushu interviews as a designated Mbukushu translator, Mr. Gregor Kupepa, was available for these interviews. No designated translator was used for the Khwe hunter-gatherer interviews. For the Khwe interviews local English-speaking Khwe were identified to assist with translation.

In total, from the livelihood group of interviewees, 15 Mbukushu farmers were interviewed; 5 Khwe hunter-gatherers and 13 other stakeholders in the community using the one-on-one, in

person, open-ended and discussion-based interview style. Each interview lasted from 60 to 120 minutes. Each interview was recorded on a voice recording device and then transcribed into text. The recorded findings were concluded from a simple coding system based on CRSL Framework categories and key themes were extracted as they emerged. Based on the interview framework and questions and an emergent themes analysis, findings sought to understand key vulnerabilities, adaptive capacity gaps, and areas of existing resilience for the two livelihoods of this study. Of the natural resource-dependent persons interviewed 8 of these were male and 12 female and 13 of 20 were of pension age, as will be specific for the results of this study. An average of 9.6 people were found to live in each household with an average of 1 person living outside of the household. Thirteen of the 20 interviewed reported to be from the area where they reported to be living. Elderly persons living in the study area were targeted not only to achieve a 30 year period of climate assessment, but also to include, for the Khwe livelihoods, proper ages to assess impacts of the transition from hunter-gathering times prior to SADF occupation and the changes thereafter.

Questionnaire questions used in these individual interviews were adapted from templates for interviews with stakeholders from vulnerability assessment toolkits developed by The World Bank, Climate Resilient Infrastructure Development Facility (CRIDF) and the Food and Agriculture Organization of the United Nations (FAO) (Ashwill et al. 2011; CRIDF 2015; Ulrichs et al. 2015). These templates were significantly adapted to fit the purposes of this study. The rough guide for individual interviews with resource- dependent livelihoods of this study is included in Appendix II.

3.1.2.2. Focus Group Discussions

Three ‘group’ discussions were included in this study; 1 Khwe tourism-centered livelihood group, 1 group of Khwe with resource dependent livelihoods in Mutc’iku village, and 1 regional and national group in the form of a 3-day workshop, as previously mentioned. The first two of these group discussions followed, roughly, the interview guide from Appendix II. The regional and national workshop materials are under review for an on-going project.

3.1.3. Other Stakeholder Interviews

Of the 'other' stakeholders interviewed, the following persons and groups were included in this study: collective opinion samples taken from the 3 day workshop in Windhoek, interviews conducted locally with 2 traditional leaders (1 Khwe senior traditional headman and 1 Mbukushu traditional headman), 1 local NGO Integrated Rural Development and Nature Conservation (IRDNC) practician, 2 local government representatives, 2 government agriculture extension workers, 1 local government health staff, 1 local government environmental health staff, 2 district social workers, 1 academic researcher and 1 Windhoek-based NGO (NNF).

3.1.4. Methods for Applying the Framework

As was described at length in Chapter II, the CRSL Framework was applied in the following steps for the purposes of this research:

1) ***Literature review conducted to understand previous vulnerability, adaptive capacity and resilience approaches***
2) ***3-day Okavango River Basin regional workshop attended in Windhoek to understand regional viewpoints on existing vulnerability, adaptive capacity, and resilience***
3) ***One month of fieldwork conducted with the following objectives:***
    a. *Study area boundaries detailed*
    b. *Relevant stakeholders identified with the help of stakeholder mapping*
    c. *Identified existing livelihood strategies; most common were named and targeted for research (Khwe hunter-gatherers, Mbukushu subsistence farmers).*
4) ***Results interpreted:***
    The CRSL Framework described in Chapter II was applied to the SES of Bwabwata West and Divundu and this area's corresponding livelihood strategies of the Mbukushu resource-dependent farmers and Khwe resource-dependent hunter gatherers was applied by the following steps:
    a. *CRSL Framework used to assess vulnerability by analyzing SES and livelihood sensitivity and the dynamics of interaction with that SES and external factors*

b. *CRSL Framework used to understand exposure of an SES to multiple stressors*
c. *Identified and analyzed, through emergent themes analysis, the adaptive capacity gaps between sensitivity and exposure to stresses, capacity and capability of an SES to generate resilient strategies in the face of climate change and other stressors, locating those most significant barriers to adaptation in the course of this analysis*
d. *Using the CRSL Framework's understanding of resilience, identified any existing adaption techniques and if adaptive co-development and management themes between livelihoods and other stakeholders were present*
e. *Using the CRSL Framework's understanding of resilience, analyzed and discussed levels of livelihood resilience and how opportunities to create livelihood resilience could be best integrated to facilitate better climate change adaptation*
f. *Discussion of findings to understand whether or not climate-resilient sustainable livelihoods are being reproduced through the interpretation of results, identifying how and in what ways— if resilience is not being created at the livelihood level— resilient adaptation techniques and strategies could be facilitated in the context of future climate change projections with adaptive co-development strategies.*

3.1.4.1. Determining Adaptive Capacity

Relative wealth or poverty cannot directly predict adaptive capacity, as Erikson and Lind (2009) point out in research from other areas of rural Africa where pastoralism was shown to be subject in

Assessing Adaptive Capacity in the CRSL framework			
Understands adaptive capacity according to the respondants as they see relevant to their community; not pre-concieved notions of vulnerability as based on researcher judgement	Utilizes and incorporates 'traditional' knowledge and experience regarding climate change perceptions	Works with a 'bottom-up' approach to integrate effective adaptation strategies into pre-existing institutions, policies, norms and processes.	Is place-specific in that it may be unrealistic to expect the possibility to 'scale-up' approaches or results, though studies can be compared

Table 2: Criteria for the practical application of understanding adaptive capacity from the perspective of a specific livelihood within the CRSL Framework, based on Smit and Wandel 2006

equal measure to structural inequalities and political processes happening above the village level and were therefore inaccessible to village influence. In order to assess adaptive capacity, the CRSL Framework uses Smit and Wandel (2006)'s practical application approach as a basis for methodological inquiry into adaptive capacity for a specific livelihood, identifying characteristics of the necessary approach (see Table 2). These characteristics are then combined in the CRSL Framework's application with Reed *et al.'s (*2003) Integrated Analytical framework and its four broad steps for identifying adaptive capacity in a broad sense (see Table 3).

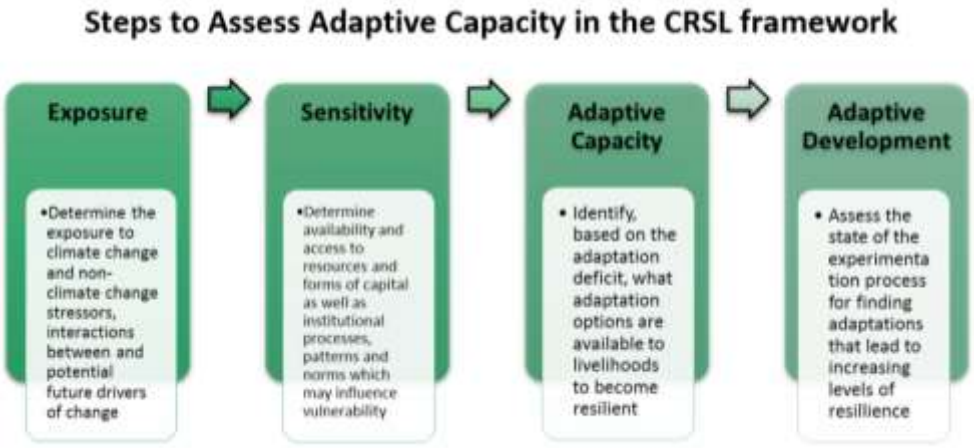

Table 6: Steps to understand adaptive capacity for livelihoods within the CRSL Framework, as based on Reed et al. (2013)

The Climate-Resilient Sustainable Livelihoods Framework takes many elements into account in the understanding and assessment of vulnerability, to produce results true to a resilience for the livelihoods approach. For these reasons, climate change and non-climate change exposure and impacts, sensitivity and adaptive capacity are identified and assessed by the participants themselves.

3.1.5. Research Limitations

Some significant research limitations should be noted in the collection of the data during the field season for this research. Although a translator was used for Mbukushu subsistence farmer interviews, language barriers should be noted in the translation and interpretation of the information back to English. So as to try to mitigate misunderstandings, one full day was devoted with the translator, discussing research themes and intentions, as well as content of

questions and desired data from interviewees. Translator comprehension of questions was checked via interpretation of interview guide questions and consistency of data was verified for all Mbukushu interviews as the same template and understandings of these questions were used for each of these interviews. Difficulty in finding a Khwedem translator meant that the interviews with the Khwe hunter-gatherers were either done in English[6] or with the help of a volunteer translator in the community who spoke both languages and was available to translate.

A second significant limitation of this research pertains to the literacy rates of the respondents of this study. As many interviewed practiced only spoken forms of communication, it is difficult to assess accuracy of climate perceptions, as is often the case with qualitative data from subjective human participants. While many participants were able to give significant climate events or shocks from the past, it is difficult to know whether or not results concerning the intensified climate impacts in the last five years are truly more impactful, or whether these are simply the most remembered due to attentional biases and ease of remembering the most recent events.

A limitation in sampling should also be noted as the majority of those interviewed were those found to be available upon encounter as the researcher went out into the field. It is acknowledged that those who were engaged in formal employment or who were actively working in the field may not have been included in this sample, and therefore results, however reflective of the community despite the omission of these potential perspectives, should be taken thusly.

Due to permitting only from Namibia's MET, in-depth interviews with Ministry of Health government workers was barred without proof of official documentation. Documentation to receive permitting from MET took 3 months. As such, upon encountering such barriers with government health workers, time restraints would not allow desired information about climate and health to be gathered officially from these government workers. An interview with an environmental health technician reflects this.

3.2. Interview Site Description

[6] Traditional Scientist Thaddeus Chadeu was interviewed in English

The definition of community from (Smit & Wandel 2006) will be used in this research to mean a congregation of households within the envelope of the study area boundaries that are 'interconnected', share broad characteristics and interact regularly. Community is important to establish as it is shown that groups of people who can identify one another will be more likely to limit use through the creation of norms based on trust, reciprocity, and reputation (Ostrom et al. 1999, 279), and will be more likely to take civic action based on strong social bonds (Larsen et al. 2004). Adger (2001) argues that climate change adaptive capacity is bound in the ability to act collectively which is defined by factors of social capital and social cohesion.

At the local level and within the bonding form of social capital, as identified by Larsen et al. (2004), Adger (2001) outlines networking social capital as integral to building understanding of how different community members experience vulnerability, and bonding social capital as those networks of reciprocity that are important assets for communities to draw upon in the face of climatic stresses or shocks, though may not be effective for true adaptation in the long term. For the purposes of this research, community will be interpreted as and used interchangeably with 'village'. The villages of Indongo, Mushashane, Mutc'iku, Divundu Central, Omega I, and Divundu West, were the villages where the interviews with the natural resource-dependent Mbukushu farmers were conducted, set out here in descending order of number of participants interviewed. The natural resource-dependent hunter-gatherer Khwe interviewed were sampled from the villages of Mutc'iku, Mushashane and Omega I, in descending order of number of participants interviewed. Village locations within the study area are depicted in Figure 4.

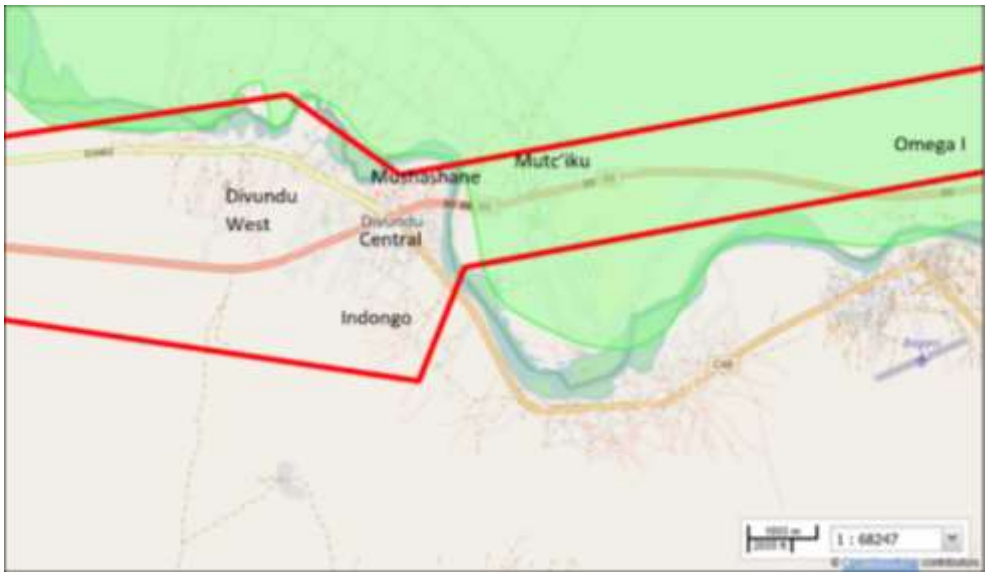

Figure 4: Villages of the study area. Boundaries of the national park is also shown by the green overlay (from UNEP Global Risk Data Platform (UNEP, 2017)

Figure 5: Study area as the area within the red outline (image from Google Earth)

The town of Divundu and the national park region of Bwabwata West are the significant stretches of land used as the boundaries of this study (as seen within the red outline of Figure 5). These regions lie next to each other, separated by the Okavango River, within the Kavango East region of Namibia's Mukwe constituency district. According to the 2011 Namibian census, the border of the town of Divundu stretches from Divava up to Shamdambo (Maghumbo pers. comm. 2017), all in 'communal' land subject to tribal authority. The neighboring area of Bwabwata West lies within the protected area of Bwabwata National Park, as seen by the green overlay in Figure 4. This study focuses on the western part of BNP, Bwabwata West's multiple use zone where people are allowed to reside within the national park. The villages of Mushashane and Mutc'iku are the largest settlements (Dieckmann et al. 2014: 366) in Bwabwata West. Omega I, the largest establishment in Bwabwata's central region, was also included in this study. The national park, based within the State's jurisdiction and therefore under the authority of the corresponding government ministry, the Ministry of Environment and Tourism (MET), occupies an area of 6,274km2 (IRDNC and NASCO 2016) in West Caprivi (or Caprivi Strip) in the Caprivi and Kavango regions of Namibia. The park is bordered by Angola in the north, Botswana in the south, the Okavango River in the west, and the Kwando River in the east.

Chapter Four: Applying the CRSL Framework in Divundu and Bwabwata West

4.1. Assessing Vulnerability of the SES through Sensitivity

4.1.1. Capital within the Socio-Ecological System

4.1.1.1. Ecological Resources: The Okavango River Basin Ecosystem

4.1.1.1.1. The Land

The Okavango River Basin (ORB), the 'Kavango' River and region which it lies in, as it is termed in Namibia, is the fourth longest river system in the world at a length of 1,600 km from the Angolan headwaters to the Botswanan Delta. As one of the largest endorheic river basins in the world, the whole of the Kavango covers roughly 700,000 km2 (OKACOM 2011a) and is significant for its cultural and ecosystem wealth. As an essential 'lifeline' for human and ecosystem species populations living in and around the basin (Mendelsohn and Obeid, 2004), the water of this semi-arid region of Southern Africa supports a large ecosystem along its perennial rivers the Cuando Cubango (Okavango) River and the Cubango and Cuito Rivers which proceed it. From the Cuito and Cubango River headwaters in the Angolan highlands to the 'Okavango' River, wide winding channels, oxbow lakes, and shallow basins characterize the ORB's low topography and culminate after narrowing into the Namibian Caprivi Strip panhandle at the Okavango Delta in Botswana. Part of the shallow and larger area of the Makgadikgadi basin, the flat and fanning Delta at the Basin's endpoint is composed of permanently or temporarily flooded marshes and floodplains. The aeolian Kalahari sands of the ORB are deep with a low nutrient load (Brown and Jones 1994, 1). The sands of the West Caprivi Strip are acidic and poor in critical agricultural nutrients such as phosphorus. Nevertheless, these soils are considered to be at a 'medium' level of suitability for relative crop production potential and a general human relationship with the land characterized as 'agro-pastoral' socio-economically, both according to the 2011 Namibian census. These human relationships where people are stewards of the land Blaikie and Brookfield's (1987, 9) call 'landesque' capital and can be defined as 'any investment in land with an anticipated life well beyond that of the present crop, or crop cycle'. Globally recognized as recognized for its importance as the world's 1000th world heritage site by UNESCO in June 2014 and the Okavango Delta as a RAMSAR site on 4 April, 1997, the ORB has high landesque capital through the relationship between the land and its human inhabitants. An important relationship for the nature and functionality of the land, Blaikie and Brookfield

(1987, 28) note that *"periods of population decline have often been periods of severe damage to the land",* thus creating an important point of reference for the livelihoods and relationships of these livelihoods to the land in this study.

4.1.1.1.1.1. *Defining Current Land-use Capacities*

Today, important land-use definitions are central to the spectrum of livelihood options available to those in Divundu and Bwabwata National Park. While the land in Divundu is classified as 'communal land', there are several different classifications for the land of BNP (Figure 6). Core conservation areas— of which there are three of in Bwabwata National Park— are designated for special protection and controlled tourism. These three are the Kwando (1,345km2), Buffalo (629km2), and Mahango (245km2) Core Areas. By the Bwabwata National Park Management Plan, specific areas where schools, clinics, shops, petrol stations, intensive agriculture, etc. are located are designated by the definition of development areas or 'multiple use' areas. An assessment by Brown and Jones from 1994 (63) gives a definition of a 'multiple-use resource area' as an area where *"people would live and move freely about in this area, grow their maize, [mahangu], and vegetables, keep domestic livestock and collect veld food and other necessary natural resources. People would have the right to pursue their own development in*

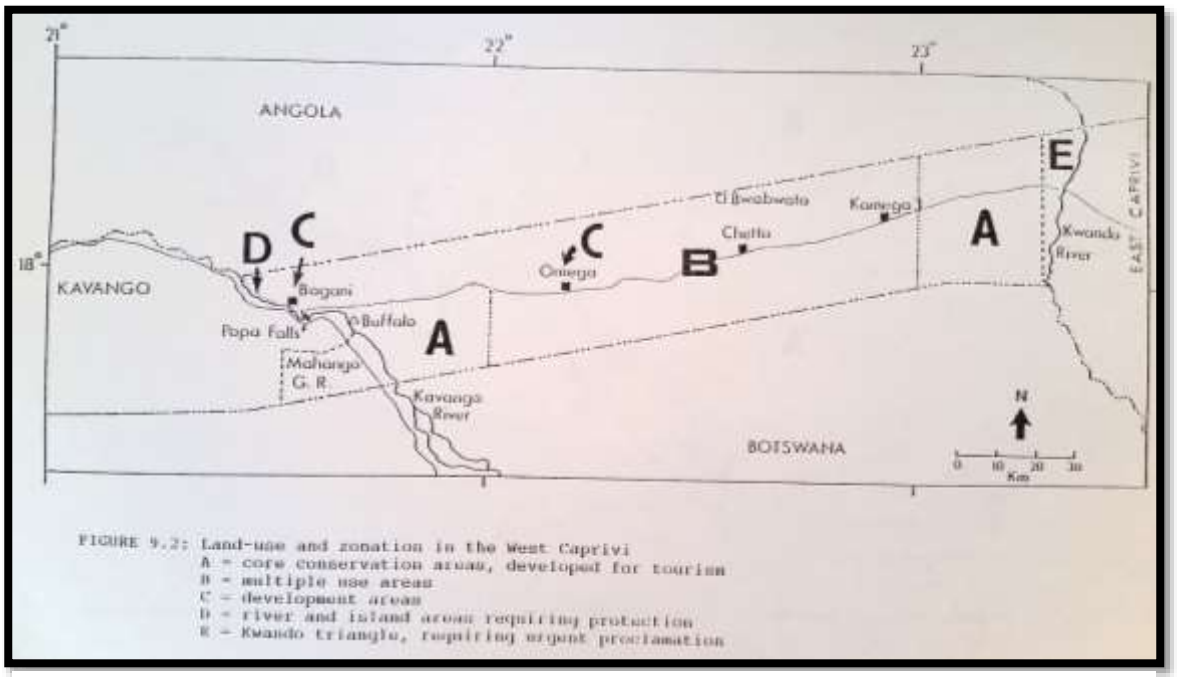

Figure 6: Bwabwata National Park land use areas from Brown and Jones (1994: 63)

accordance with their aspirations", asserting further that the greater part of West Caprivi should be dedicated to this.

In Bwabwata National Park there is one 'multiple use area' of 4,055km2 that is unique for a national park as only a few national parks in the world share this kind of shared conception of people living out livelihoods within a national park. According to the Bwabwata Management Plan, this area is considered to be a zone for *"community-based tourism, trophy hunting, human settlement and development by the resident community*" (MET 2013). Unfortunately, however, and what also causes much confusion about what livelihoods are specifically permitted or prohibited inside of the national park for the Khwe (discussed in later sub-sections), a further description of what precisely can be done in a multiple use zone is missing from this document. The Bwabwata Management Plan gives only this line about a multiple use zone: "*zonation in the Multiple Use Area will be addressed in a separate document that is currently being developed*" (MET 2013, 47) but no other documentation can be found to further define it.

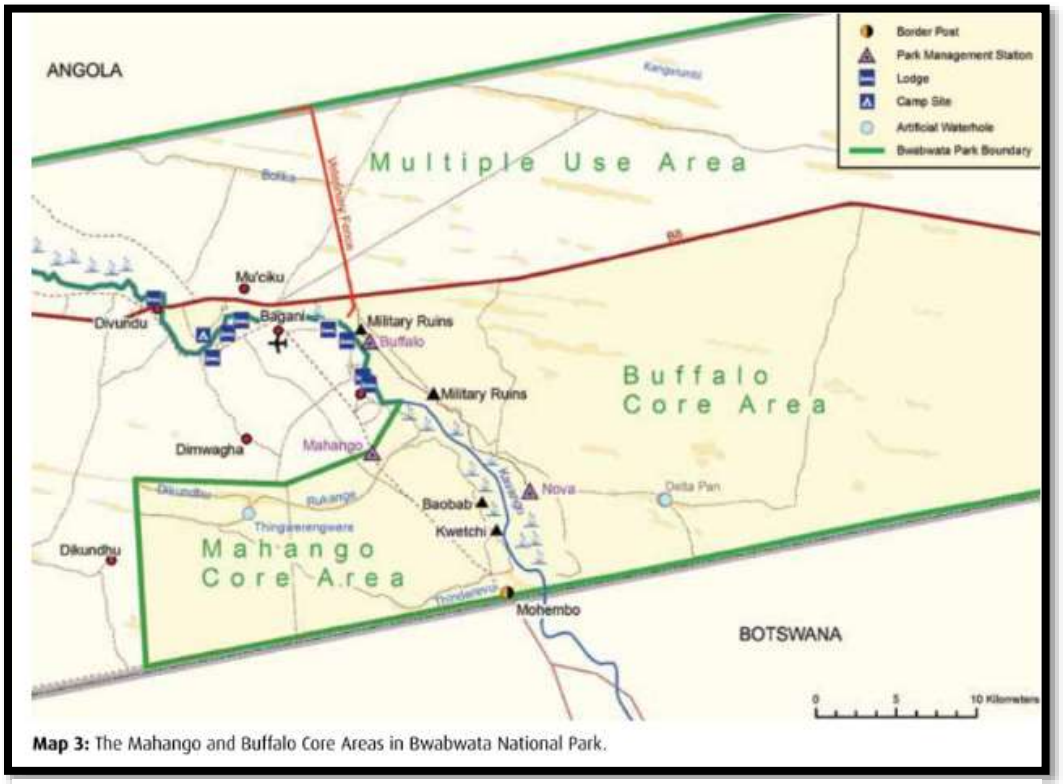

Figure 7: The Multiple Use Area of Bwabwata National Park (MET 2013,7)

Given the absence of a formal definition for a multiple use area but very clear boundaries for where such an area begins and terminates (pictured in Figure 7), the definition of 'multiple use

area' will be taken from the Integrated Rural Land Use Plan for the wider Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA) (MLR 2015, 2) to mean,

> *"…land available for communal livestock farming; crop farming and homesteads… within this area settlements, livestock and crop farming is to receive priority. However, any other uses within this area should be reviewed on merit and not excluded. The aim of this multiple use area is to make land available for any type of land use in the future without being restrictive"* (MLR 2015, 50).

Although these terms are unique for a protected area, livelihoods are nevertheless severely restricted due to the status of the land as a 'wildlife' protected area. Possibilities, therefore, plateau for livelihoods within this restricted framing. This definition, however, is significant for the Khwe as it permits a wide range of livelihood options, including livestock farming, crop farming and other non-restrictive land uses, which, for the purposes of the Khwe should be then the right to full authority and power to practice adaptive co-management on the land as they see fit in cooperation with other partners, not by permission from them.

Results from resource mapping exercises and interviews done previously in Bwabwata West with the Khwe reveal that areas north of the Mutc'iku village— Nonica (N=ane-ca) and (Bo'ri-ca) Borica[7] which are now 'multiple-use' areas—, areas now in Angola and the area of Buffalo which is now a 'core conservation area' next to the river, are those areas most important for veld food and non-food veld product selection (WWF 1997, 24). Today only some of the areas north of Mutc'iku are included within the multiple use area zone and are thus accessible for the Khwe.

4.1.1.1.2. It's People: the Main Livelihoods of Study Area

With only 23% of the human population of the ORB living in one of four urban centers, the rural majority of ORB's population lives off of activities very dependent upon natural resources (King & Chonguica 2016). In the Botswana portions of the ORB more than 90% of the population is dependent upon natural resources through the practice of crop cultivation on floodplains (known

[7] see Resettlement Map in Appendix I

locally as ‘molapo’ farming), dryland farming, animal husbandry, fishing, hunting or other resource contingent activities (NWDC 1997). A reliance upon natural resources means that erratic rainfall and unpredictable water flow from upstream places a large portion of the population at risk if those natural resources are at all jeopardized (Wolski et al. 2006). Arable agriculture is an important livelihood, seen by 23% of respondents in the Delta to be the most important livelihood activity (Kgathi et al. 2007). Another 84% of those farmers are completely dependent upon rainfall in the practice of ‘dryland farming’ (as of 1998) (Kgathi et al. 2005). As assessed by another large survey of livelihoods in the Delta, dryland farming as the highest ranked risk activity with the lowest amount of benefit (Wilk & Kgathi 2007), opposes a reality that despite low benefits, is one of few livelihood strategies in the region as it is the most dominant (Kgathi et al. 2007). Despite the moderate conditions for farming in poor soils and with a low nutrient profile, issues of decreased access to other resources leave little other option for many of the people along the stretch of the Okavango River than to live natural resource-dependent lifestyles.

4.1.1.1.2.1. *Farmers of Divundu; the Mbukushus*

The Mbukushu tribe, as part of the first Bantu tribes which arrived in northeast Namibia by way of Angola, arrived from southwest Zambia in 1795-1800 to settle in and around the Kavango River in the range along the river between Andarra, Namibia and the Okavango Delta in Botswana. Upon arrival, the Bantu tribes met the three existing tribes of the area: the Khwe (also sometimes referred to as the Barakwena or Khoe), the Macanigwe (also called ‘River bushman’), and the !Kung (Vasekele) (Brown and Jones 1994, 3). The Mbukushu of the time likely began a slow assimilation and integration process with the Macanigwe people as both occupied the areas near to the riverbanks. In the time after and prior to the 1920s, there is little evidence of Mbukushu establishment and only record of some few groups in and out of the park area until the 1950s due to cattle disease and restrictions. Under the instruction of the current Mbukushu chief, Chief Mbambo, Mbukushu again began to settle within the park after 1950. SADF’s arrival and recruitment of Khwe in the 1960s had the Mbukushus removed again until independence. Based on findings from this study, it was concluded that there are many Mbukushu farmers inside of the boundaries of Bwabwata West in the villages of Mutc’iku,

Mushashane, and Omega, though the Khwe are still the dominant majority tribe inside of the park.

Results from the fifteen Mbukushu resource-dependent livelihoods interviewed for this study revealed that the five most common livelihood activities were receiving government grants/food aid; skilled labor/handicraft production; receiving old age pension grants from the government; agricultural labor; and crop sales. Figure 8 depicts the livelihood activities reported by the Mbukushu sampled.

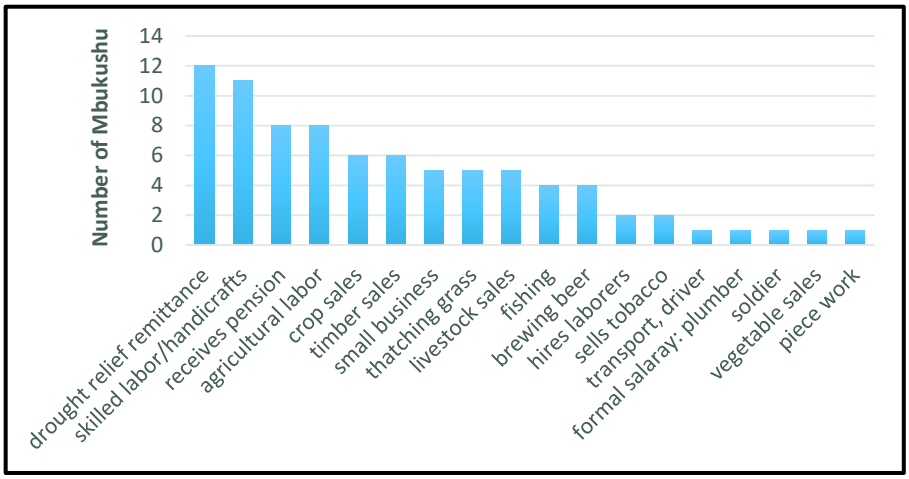

Figure 8: Mbukushu livelihood activities of the 15 interviewed

4.1.1.1.2.2. *4.1.1.2.2. The San Groups of Namibia*

The San people compose 2% of the total Namibian population at around 27,000 to 38,000 people in the country in total (Dieckmann et al. 2014). The San are traditionally small, flexible, scattered hunter-gathering groups with keen knowledge of the environment around them who share common characteristics between ethnic groups, such as the presence of a ‘click’ in the language, but also have many different features between them as well. Poverty, as a universal issue for all San Groups and above levels of any other ethnic group in Namibia, arises out of a group of five key predisposing factors according to Dieckmann et al. (2014): lack of land access or tenure, limited access to land assets and therefore livelihood options, low levels of education, discrimination at many levels from different groups, and inadequate political representation, participation and consultation.

4.1.1.1.2.3. *4.1.1.2.3. The Hunter Gatherers of Bwabwata West; the Khwe*

The term ‘San’, however, though often grouped as such by the Namibian government and others as an evolved classification of the many marginalized groups in Namibia, is not a claimed term that the groups within this category themselves use, preferring to be called by the name of their ethnic group (Dieckmann et al. 2014). The Khwe hunter gatherer group, the San group of this study, numbered around 4,000-5,000 people in 2014 (Dieckmann et al. 2014, 23) and live in the multiple use areas of the park. As of 2016, this resident population of BNP was approximately 5,100 Khwe (IRDNC and NASCO 2016) (7,500 according to Khwe senior traditional headman), residing in 5 main villages containing 13 smaller villages with anywhere from 12 to 100 people in each village (Dieckmann et al. 2014). Omega I, the largest settlement in the park, has a population of roughly 700-900 Khwe. Mushashane village has roughly 448 Khwe (Dieckmann et al. 2014, 370-371). There are roughly 150 !Xun San people inside of BNP boundaries as well (Dieckmann et al. 2014, 366). Together with this small population of the !Xu people, the Khwe today represent 82% of the BNP population with the remaining 16% of the population represented by the Mbukushu farmer livelihood group.

The Khwe have resided within what broadly can be referred to as the Zambesi West area for centuries. There is evidence to indicate the current Khwe population are the ancestors of a tribe of people who occupied the land in the Early Stone Age (Brown and Jones 1994). Historically, the area of the Caprivi Strip arose as the result of political maneuvering of colonial powers and war. Given to the Germans in the 1930s by the British, the area was designated a ‘Nature Reserve’ in 1937, and the more formal ‘West Caprivi Nature Park’ in 1963 (Dieckmann et al. 2014). In 1968, the park name changed again to the ‘Caprivi Game Park’, which was thereafter occupied in the same year by the South African Defense Force (SADF) fighting the Namibian independence forces, the South West Africa People's Organization (SWAPO).

The opinions and attitude of the Khwe people about the South African government comes through in a report from the time. Then the SWA Department of Nature Conservation, Kenneth Tinley did a survey in 1966 on the West Caprivi and its peoples characterizing them as a disillusioned group who have been unable to adapt to the SADF proclaimed land-use changes favorably. The Khwe he observed at the time had ceased many of the traditional hunting techniques, with the exception of Mutc’iku village, in favor of work in the mines and use of

other methods to catch game, such as traplines and wire snares, for meat to exchange tobacco, salt, and money with Mbukushu tribes (Tinley 1996). A clear lack of newly created adaptive behaviors is evident from the beginning of the transition away from hunting and gathering in this report as main forms of employment for the Khwe at the time were dependent upon gaining money for food so as to use in SADF created shops, rendering the need to learn cultivation strategies as an option only.

Research by Dieckmann *et al.* indicate that current livelihoods of the Khwe in Bwabwata West's Mushashane and Mutc'iku villages consist primarily of pensions, food aid, piecework, veldfood, cultivation, begging and formal employment at approximately 5% and 2.7%, respectively (2014, 374). Although the practice is no longer legal and is now considered to be 'poaching', some Khwe in Omega said they secretly hunt (Dieckmann et al. 2014, 376) and participants of this study also alluded to covert hunting done at the high risk of being arrested or shot. Social anthropologist Gertrude Boden gave her interpretation of the current Khwe livelihood options as the following:

> *"They do their fields, maybe do a little, little bit of gathering and a little bit of hunting, but this is all… hunting is secret. They might do a little, but nobody will tell you. They get drought relief from the government. The Khwe get drought relief all the time, at least when I was here in 2014 people told me that they get it through the year, but I don't know at this stage if it's still like that. Then old people's spending money [(pensions)]. Some people have jobs. Some collect this Devil's Claw, a medicine, a commercial thing. They collect it here and a company comes to collect. Some do a bit of craft. Some do piece jobs for the Mbukushu like clearing their fields or herding their cattle, helping with threshing the crops when they are ripe. Some have goats. And a few have cattle. It is very similar to what the Mbukushu people do, it's just that the Mbukushu people have more assets, bigger fields, more cattle, more goats, and I guess they also have more jobs."*

Results from the four Khwe resource-dependent livelihoods interviewed for this study revealed that the top five most common livelihood activities were skilled labor/handicrafts (3/4); drought

relief remittances; (3/4); doing some form of hunting and gathering (2/4); farming (2/4); and agricultural labor (2/4).

4.1.1.1.3. The Climate

The general climate of southern Africa is influenced by Hadley cell circulation, positioning in relation to the Inter Tropical Convergence Zone (ITCZ), cyclones from the Atlantic and Indian oceans and the ENSO cycle. These different air masses, from the cold dry air of the southern Atlantic to the warm moist air from the Indian ocean and middle Atlantic, combine with the ITCZ to create the predominant climate drivers in the region (Wolski et al. 2014).

The combination of these larger air masses in the basin causes climate to vary quite dramatically in a variety of ways. From a high mean annual rainfall of 1200mm in Angola and 600mm in the center of the Basin to 300mm once into Botswana (Pinheiro et al. 2003), precipitation in the northern areas of the ORB make water availability much less of an issue in comparison to water availability in the south. Due to high seasonal variation as a function of the rains (Jury 2010), the flows of the Okavango River fluctuate depending on the time of year as well. Though the wet season is a fairly stable event, occurring once per year between the months of October to April (precipitation ∼6mmday−1) (Hughes et al. 2011), high rainfall years have seen two rainfall peaks which can result in flooding that can last a time of 1 month to the entirety of the year (Thito & Wolski 2016).

In the middle of the ORB, Namibia is one of the most arid countries in Sub-Sahara (MET 2013d). Its temperature and weather are strongly influenced by the fluctuations of the ENSO cycle, experiencing below average rainfall and above average temperature during the El Niño cycle (MET 2013d, 17). The northern part of the country is influenced by the Benguela current from the southwest and warm tropical winds from Angola in the north (MET 2013d15). Ninety-five percent of the total annual rainfall in the Kavango region falls during rainy season (Wolski et al. 2014; OKACOM 2011b), giving clear indication of a ‘rain season’ from November to April in the form of localized showers and thunderstorms across the country (MET 2013d, 15). The average rainfall in the study area of this research is shown by the Namibian 2011 census to be

550-600 in millimeters per year, falling during the months of November to April (IRDNC and NASCO 2016)[8]. On the descending side of a Hadley cell, the study area is located on the northeastern, and therefore higher, rainfall point of the gradient created by this weather pattern that leaves the southwest of the country much drier than the northeast. Summers in the Kavango region range from mean monthly minimum and maximum temperatures of 13-20°C and 28-37°C, respectively (MET 2013c, 16), to a winter monthly minimum and maximum mean between 2-12.5°C and 20-30°C, respectively. The lowest temperatures occur during the winter dry months from June to August.

In recent years, according to the MET, extreme climate events nationally recorded have occurred in 2008, 2009 and 2010 in the form of extreme flooding, followed by the country's worst drought in 30 years in 2013 (MET 2013). The recent extreme drought is said to have affected about 300,000 people in Namibia and caused the country to enter a state of emergency during the crisis (Kahiurika 2016). A very dry 2013 was followed by the country's worst drought in 80 years in 2015 (Rabe 2016), and another extreme drought in 2016 (Grobler 2016) that caused a second state of emergency to be called in the last three years (Haidula 2016; Kahiurika 2016). A 2016/2017 livelihood vulnerability report conducted by the Namibian government found 729, 134 people in the country to be exposed to food insecurity as a result of intense drought conditions (Haidula 2016). In the last four years drought and inconsistent rainfall has been the most significant weather shock across the country, affecting particularly those natural resource-dependent livelihoods which compose a significant portion of Namibia's population. Cousins Gwanama, head of the Department of Crop Sciences at the University of Namibia in Windhoek attributes these drought occurrences, however, not to climate change but to cyclical drought, citing a consistent trend in the data from average rainfall over the past 50 years (Essa 2013). Occurring during an El Nino phase and characteristic of climate change which predicts intensified and more pronounced macro-scale weather patterns, these droughts could also be indicative of climatic shifts.

Whether these cycles are truly part of the natural and substantial variation of the rainfall common to Namibia's climate it is difficult to say. Interviews with the participants of this study, however,

[8] See Appendix III for historical rainfall and temperature data (The World Bank, 2017).

overwhelmingly agreed that the weather in the last three years has definitively been more hardship inducing than in the previous 30 years. The years of 1964, 1970, 1994-5, 2002-3 were mentioned, but of the 16 respondents out of the 19 interviewed all of these agreed that the most recent last 3 years of drought were the most significant and difficult to deal with in comparison to previous years, while only 14 of the 19 interviewed specifically verbalized the intensity of dry weather as drought or 'less rain'. This weather issue—the lack of rainfall and corresponding droughts in the last 3 years (2013-2016)—was the most significant weather issue found in this study to be affecting the livelihoods of people in Divundu and Bwabwata West. Impacts of drought were reported to be crop losses, animal starvation and deaths, food security issues from low harvests, and a general attitude of malaise as many respondents reported themselves and others in the community to have left fields completely unplowed for the last three years.

These issues, however, were not reported by any of the 19 natural resource-dependent livelihood respondents to be their largest challenge in everyday life. This finding is particularly relevant as it seems to indicate that extreme climate change events are less important when considered next to other more significant barriers for livelihoods of this study. The finding could also indicate a blindness to climate change given high natural variability in the ecosystem or the presence of sufficient resources to adapt to such pressures so much so that such impacts are not considered to be as significant as other stressors due to a capacity to adequately respond. While respondents very clearly indicated noticing changes in weather and feeling some effects, it is curious that they also did not seem to acknowledge them as an issue of high importance in the community. Chapter V will discuss further the dynamics of these factors together and conclusions as to what could be the reasons for this what seems to be cognitive dissonance.

The second most impactful weather-related issue from respondents was that of increased intensity and damage from insects following a particularly heavy rainfall year in the last rain season (2016-2017). An interview with a social worker (SW1 2017) indicated the damage of the rains this year on one Mbukushu man's field:

> *"There's an old man, he stays along the road, go to that man he will tell you about what these ones [{insects)] did. He [has] the biggest field here, very big, it's a 30 hectare field.*

Last year no one harvested, [but he] got 15 bags of mahangu. Now this year, he had intended to plow the whole 30 hectares but now those 'imbubo' (insects)-- it's not the army worm but there is a type that affected him seriously and it ate up his mahangu; finished the whole thing. It's like an airport, that field. What it was doing was eating the young germinating mahangu, eating the whole crop, finished it. He said he would go in the morning and find the mahangu had germinated nicely in the field and he would come in the evening and everything [would be] clear. When I went with him there I was very touched because the field is very big. To walk near to the middle you will be tired to reach the middle there. I did not even go beyond and it was very terrible. The whole crop was eaten."

Upon speaking to the 65 year old Mbukushu man in Divundu West, this story was verified as he stated in reference to insect populations:

"This year, generally speaking, [we] are experiencing more--- "a lot!" [more]— than previous years. This year [we] experienced a lot of different types of insects, and ones [we] haven't seen before. If you go and see them they'll go up and start flying. There is an insect eating the crop that has eaten all 30 hectares of [our] crop this year… The insect eats the crop while it's young, especially in this time now when it is hot."

An interview with one of the local agricultural research technicians corroborated this finding, commenting that insects were particularly severe in the 2016-2017 year and noting particular problems with aphids, boleworms, thrips, and stink bugs; *"The effect of insects this year was a lot—especially this year. There was a lot of pesticide [used because of them]. Especially aphids, and that stink bug, there were too many on the maize and sorghum and pearl millet. There were a lot compared to other years."*

Rains from this year were a concern for many of the Mbukushu farmers interviewed in this study, taking the form of impacts through increased insect damages (8 of 15 interviewed), animal diseases (7 of 15 interviewed experienced livestock losses due to either death from lack of food

during drought or death from disease during high rain periods, which, it was difficult to distinguish for respondents), and crop damages (1 of 15 interviewed).

Some of the strategies applied for dealing with insects were named: hand removal, reporting to agricultural extension to spray, abandonment of damaged area, and use of chemicals and insecticides. One technique— taking the damaging insect, putting it in a put to fry with salt in the middle of the field and then leaving the pot in the field—was also tried by participants, though to no avail. When the birds do not eat the insects and, as the 65 year old Divundu West man who had 30 hectares destroyed by insects this year remarked, there is '*no prevention',* the use of chemicals to cope with the issue is a preferred option by those with the resources to do so. As the agricultural research center technician shared, *"we just use the chemical. There are some chemicals that can kill all the insects, whatever insect [comes] it kills it. Those ones are the ones we apply."* From these instances it is fair to conclude that coping, instead of the building of resilience, is how crop damages from insects are handled in the community.

For this particular finding and others like it concerning the effects of weather on land, plants or animals, the results for the Mbukushu farmers and the Khwe former hunter gatherers must be distinguished. As one 75 year old Khwe woman from Mutc'iku woman explained:

> *"[I don't] know of anything. The reason why [I] say that [I don't] know anything is because since they put the park… they say you should stop going in and all these things. We cannot go to the bush [now], they stop us totally. They will shoot you if they see you, [even if you don't carry a gun], because they told us [no one] in the bush. A lot of things are happening in the park, some poachers are going in and killing a lot of animals—rhino, to get the horns… and these people [MET/NDF] don't allow anyone to move there because apparently they want to get a specific person who is doing that. So we are even scared to fetch firewood. That is the only thing, that we are just fixed. And also the medicine that we want is also fixed in the bush. [The] most important thing[s] that we want [are] in the park. The nicest things are there. The medicine, if you want a medicine, you cannot get. [All of our] animals [are] inside the park. So we don't have anything to do, or a share."*

The Khwe senior traditional headman shared these sentiments to note the disparity between what he experienced as a young person and the young people reaching adulthood today in the park, *"There are fewer animals but the children don't know, they can't go into the park to know. They know only elephants because the elephants just come into the villages."*

The remarks from this woman and Khwe leader serve as a launching point for further discussion of Khwe adaptive capacity gaps which will be done at length in Chapter V of this study. What is important to note here, for its relevance to climate change perceptions and impacts, is that the Khwe former hunter gatherers share a large and encompassing barrier to perceiving fully climate changes as they have been forcibly removed and kept off of the land which they consider to be theirs, as inherited from their ancestors. Therefore, as all four of the interviewed Khwe reported, perceived climate changes by the Khwe hunter-gatherer group are limited to any observed changes in temperature and/or rainfall as changes in the land and biodiversity cannot be seen due to physical, political, and ideological barriers.

On the variable of rainfall, however, Khwe traditional scientist Thaddeus Chadeu was able to give his assessment of changes:

> *"It is different than it used to be. [A] long time ago, when I was maybe 10 years old up to 15 I saw many different things, the rain was raining like it should be raining. And the food in the bush was good, you get [the] food you need to get. The water was normal in the bush. But coming to the middle of my [life], 35 to now, I see many different things which [are] not the same. When I was 35 I started to see these changes; one year [it was] raining, the next year [it was] not raining. Previously it was the same every year. Not like it just stops and a big rain comes and the rain is gone [like now]."*

Keen observations such as this one from this Khwe elder and traditional scientist are valuable traditional knowledge (TK) observations on the effects of climate change on the land from the perspective of a people intimately familiar with its rhythms and the various dynamics of the SES they live within. Unlike younger generations who have been barred from learning how to hunt

and gather; due to language barriers; unusually low literacy rates among the Khwe borne out of educational poverty upon encountering immediate language barriers in the school where only Mbukushu language is spoken; and a general loss of this culture and recollection of how things used to be during hunter gathering years by elders, the perspective of this particular Khwe traditional scientist is unique and is considered in this research both as a Khwe hunter-gatherer, and, more importantly, as a traditional scientist holding valuable traditional knowledge.

Conclusions such as these from the Khwe show that those in Bwabwata West seem to be experiencing climate changes as the Mbukushu are, yet due other barriers, are unable to give further details about the effects on other parts of the land.

Changes in temperature, rainfall, and extreme weather patterns have direct and indirect effects on human health, including increased risk of malnutrition and water-borne and spread illnesses such as diarrhea, cholera and malaria. The *Anopheles gambiae* and the *Anopeles funestes* mosquitos, both mosquitos carrying the malaria parasite, is a permanent resident of the study area, vectoring the malaria blood parasite between warm-blooded animals, and therefore is a particular sensitivity for human health given a wetter climate.

From the study findings the third most significant climate impact, as reported by respondents was recorded to be a rise in water-borne illnesses, which, for the purposes of this study where higher precipitation rates for the 2016-2017 year have created higher numbers of mosquitos and more habitable ecosystem space for these insects to occupy, therefore also spawns the characteristic of the insect as a water-borne problem and deserving of its associated illness, malaria, as a water-borne illness.

An interview with a nurse working at the local clinic gave insight into some of these illnesses with her commentary about the connection between climate change and health:

> *"Now, since the climate changed, there are a lot of things people are facing. They have a lot of malaria and skin disease, sores and even scabies. People are suffering for that and even some have bloody diarrhea… sores and skin disease [come] from the heavy rain—*

the bacteria— because there was no sunlight. [There has been] heavy rain in the last few months. This happen[ed] in past years, but this year it is worse. Those past years skin diseases weren't many but this year [there are] many."

Furthermore, an interview with this community health expert indicated that weather changes are noticed through the cycles of illness and quantity of those in the community seeking care during particular seasons of the year or climatic patterns:

"When it is very hot then people are not sitting anymore. But if it is very cold, then they are just sitting. Cold and rain season people are sitting too much. When it's hot, it's better. [During this time], this season, people [are becoming] too sick because it was raining and now it's starting to become too cold again. From July [to] August [and] September it will be better. If you come here [to the clinic then there are few] people."

Of the particular problems noticed as a result of the heavy rainfall from the 2016-2017 season, malaria and skin sores were given as the most commonly observed (CN 2017). Where skin sores are easily treated, the prevalence of the affliction in mostly newborns to 15 year olds (CN 2017) is a concerning indication that climate could be having a stunting effect on the human health of vulnerable groups.

Malaria, the other less easily treated weather-related illness, encountered tight-lipped officials upon inquiry about the year's 'outbreak' (Maghumbo pers.comm. 2017) when interviews were attempted, saying that formal government approval would be needed before such information could be disclosed to 'the media'. Though this veil of protection does not conclusively illustrate a particularly high magnitude of cases experienced for this particular year, various comments from the community draw this point out and indicate the bureaucratic response from government environmental health workers may indirectly signal the need for diplomatic responses in the height of a particularly costly malaria outbreak. A short interview with one environmental health worker supports this claim; "*This year the cases are [higher]".* One of the community government officials spoken to on the matter also replied that **"***from what I am hearing this year*

[malaria] is severe. The number of infections recorded compared to other years is very much high."

Though many of those interviewed indicated some level of evolved resistance to the parasite, one particular observation from a 60 year old Mbukushu woman in Divundu central stood out, *"even the mosquito is changing to have many different colors and types; some are white, some are black, and some are green. [I have] never seen the green one before, it was only the black and the white ones before."* The appearance of what could potentially be a new species of mosquitos in the area due to distribution shifts as a result of climate change or the evolution of new varieties given the proper hospitable conditions, would be a situation to closely monitor. With the potential to cause a regime shift should the situation be left unheeded, developing appropriate adaptation responses ahead of any such event would be the goal there.

This issue is compounded by the proximity of neighboring Angola to the study area, as the political country line is an arbitrary boundary for the spread of disease and illnesses. Many Angolans were reported by stakeholders to be crossing the river to access Namibian services for treatment, while continuing to transmit the illness on the Angolan side as most there are deep enough in the bush that services provided by the Angolan government are inaccessible to these remote populations. These cases in Angola which go untreated if not by Namibian services continue to pose high sensitivities to the health of Namibian residents in the study area.

Of the other mentioned perceptions of a changing climate, temperatures, the water of the Okavango River and fire were picked up. Temperatures were reported by 8 of 19 resource-dependent livelihoods to be higher with the remaining 11 indicating either that no change was noticed or any variation was simply within the norm. One 65 year old Mbukushu man from Divundu West man noticed unusually high temperatures of the Okavango river water in 2014; "*in 2014 [we] went to visit relatives in the other district and when [we went] to the river to bath there the water was hot. [We] have never experienced this before. The river on that side is shallow, it's deeper here. The waters there that year were very hot though, like boiled."* Correlating with the three year pattern of little rain and drought, this observation could be significant for fish populations as many species are particularly sensitive to water temperature,

pH and the associated water attributes of a specific associated environment. Of the four of 19 interviewed who reported to have fishing as a livelihood activity, three of these noticed fewer fish in the last 5 years, one indicating the change had origins in 2013. Though no direct correlation can be drawn from one man's observation of the water temperature, these two pieces of information may be relevant to show climate impacts on biodiversity of the river and should be further investigated.

Of the last notable climate-related effect mentioned from the results is the influence of fire on the community. As one 55 year old Mbukushu woman from Mushashane remarked, noticing an increase in frequency, "*there is more burning of the forest in the last few years. The forest contributed to the fire because even the trees were dry and the fire would then spread continuously from the trees. The grass and the trees are all dry so the fire ends up burning the whole forest."* Another 60 year old Mbukushu woman from Divundu Central noted the influence such changes were having on wild fruits of the bush, *"a long time ago the fruits were many in the bush but [I don't] know if fire is causing the fruits to be small in number now. Maybe there are some burning the forest. Anonymous people burn the forest, [I] can't tell why. Maybe they are doing it to hunt game."* This response offers some insight into the disconnection of people with their land and little surprise then about its mismanagement.

Speaking with Khwe traditional scientist Thaddeus Chadeu about how the Khwe used fire to manage the land up until no more than 50 years ago, he explains:

> "*The owner knows when to burn, there is also special food with bushes. If you burn when it's too hot [bush food will be impacted]—like now in Mutc'iku, [there] used to be Homnahanie here [a fruit] but [it has now become] burned. They are a small bush but they are not germinating anymore because of fires. This area burns in September; October, it's too hot. If you put such a fire every year it will burn and finish. The Mbukushu set the fires. I don't know why. Perhaps [for] grazing [animals]."*

Previously, the Khwe would set fires when winter came and grasses were dry enough to burn but the weather wasn't hot enough allow them to burn intensely. According to a Khwe headman in

1994 *"we always used fires in the past. We burned the grass to make it easier for walking. The long grass made it hard to see the game and the bushes hurt your legs. We burned the veld far from our houses. We don't burn now—only in the old days when we were free to hunt"* (Brown and Jones 1994, 119). So as to lower the grasses for the purposes of hunting and to create new grass shoots to attract the game, these deliberate land management practices with the use of fire were ceased by government officials upon creation of the national park. MET, believing that less frequent burning prevent bush encroachment, though not often enough to be annually, was the best practice for land management, therefore did not find Khwe management techniques suitable management. While it may be too soon to say what the full impact of this important land management strategy has been since the change, it is acknowledged that indigenous plants valuable to the Khwe such as the Kalahari (Tsama) melon (food) and Devil's Claw (income), are already experiencing distribution changes (MET 2013d, 34).

4.1.1.1.4. The Water Resources

With a standard deviation of 22% of the mean (1961–1990), annual flow of the water in the ORB (Hughes et al. 2011) is an example of the high level of unpredictability and variability built into the ORB system inherently from a variety of factors. In response to the rains, flows in the ORB have been roughly identified to vary 'pluri-annually' between wet and dry years (Junk 2002) and alternate between cycles of wet and dry periods on longer timescales of roughly 80 years (McCarthy et al., 2000; Mazvimavi and Wolski, 2006). Recent data show three somewhat distinct periods of similar trends in the ORB's water cycle; wet (1974-1985), transitional (1985-1990), and dry (1990-2000) (Murray-Hudson et al. 2006). Where many of the African river systems have seen decreased flow in the last 20 years the 1990-2000 dry period in the Okavango lies within normal variation of the larger hydrological cycles.

Water levels in the Delta are regulated closely by the amount of inflow from tributary rivers and evapo-transpirative loss (McCarthy and Metcalfe 1990) lost prior to water's entrance to the Delta. The nature and location of the Delta tends to change according to sedimentation patterns and fluctuating flows of water. Long periods of sedimentation have created patterns in the dispersion of water from east to west within the Delta in the past with recent years seeing

patterns of high water inundation in eastern distributaries that decrease westward after a middle section mostly subject to seasonal cycles (Wolski et al. 2008).

The direct link between flooding extent and placement and the correlated effects of wetland ecosystem function and character make the hydrological cycles of the Okavango very important overall to ecosystem function and scale (Thito & Wolski 2016). Lowered water levels in the Delta, a result of decreased rainfall and water flow in the Angolan highlands, can significantly alter the flows of the river itself as well, thereby also changing the pulses of life in and around the river to move with such flows. This seasonal nature of the flooding regime is an important dictating factor for the ecological functions of the Delta downstream (Wolski et al. 2006; Wolski & Murray-Hudson 2008). Low topography and the influence of sedimentation of sandy soils along the Basin's rivers may form entirely new water channels (as seen from 1970 to 2000) as water is diverted to new endpoints in the Delta (Wolski & Murray-Hudson 2005). Using hydrological and ecological criteria to understand floodplain area and expansion, Thito and Wolski, (2016) show a trend since 2004 toward increased inundation extent of the Delta, rising to a maximum of approximately 10,228 km² and 10,394 km² in 2010 and 2011, respectively, and thus changing the Delta's composition in response to this critical resource. From these increased flows, longer and larger areas were also observed from 2008 to 2011 during the study.

The majority of resource-dependent livelihoods interviewed for this study reported minimal use of water resources from the ORB and little notice of any variability in its flows. Few respondents noted changes in the flows of the ORB, but the years of 1966-70, 2005, 2009 and 2010 were identified as years with floods, though none of these floods were perceived to be as significant as the droughts and lack of rain where livelihood impacts were concerned. Conclusions from the interviews indicate that the use of water resources for livelihoods of the study comes mostly in the form of drinking, bathing and other daily use purposes. Most respondents indicated some tolerance and resilience to unfiltered or unpurified forms of this water when drinking it. No irrigation or other water diversion schemes were found from respondents' usage of the ORB water but significant concerns about access were expressed by many.

4.1.1.1.5. The Vegetation: Savannas

The perennial rivers with riverine ecosystems, seasonal rain and water resource fluctuations and the 'omuramba', or ephemeral drainage lines that make seasonal 'pans' of water that compose the floodplains of the Delta— the fifth largest RAMSAR site in the world—shape the nature of the ORB's downstream ecosystem (Smith 1976), creating complex ecological relationships for the organisms within the ecosystem. Vegetative communities of the swamp regions, which include emergent graminoid macrophytes, or sedges and grasses, are classified as both 'seasonal' and 'perennial' swamp, and four different floodplain classes exist, all contingent upon the frequency of flooding events to set water levels (SMEC 1989). With a low vegetation profile of riparian forest and open woodland both Bwabwata West and Divundu lie within a vegetation type classified as a predominantly dry deciduous woodland in a transitional zone between wet forest savannas in the north (miombo), to the scrub savanna characteristic of the Kalahari Desert further to the south (Brown and Jones 1994). More specifically, the land of Bwabwata West is characterized by riparian forests of leadwood, false mopane, jackal berry, sycamore fig, Zambezi teak, baobab and bird-plum trees and to a lesser extent mangetti (nut), silver cluster leaf, kiat, and acacia varieties.

Part of a larger area which could broadly be considered as sub-Saharan savannas, the low water profile of the ORB is one of many factors that shape savannas; seasonal climate, limited resource availability, fire, and herbivore, most prominently of the other factors (Scholes and Walker 1993).

As Folke et al. (2004) discuss, fluctuations in the vegetation from grass to woody plant material is also a characteristic of savannas which grows out of characteristically variable rainfall. Rainfall variation and abundance during certain times of the year has a positive feedback of higher grass growth rates during high rainfall periods which has a knock-on effect of creating fuel for fires once the rains have subsided and grazers are unable to consume excess vegetation. Fire, as a mechanism to consistently reinforce grass establishment over woody species in savannas plays a major shaping role to limit woody species and what is commonly referred to as 'bush encroachment' in sub-Sahara savannas.

The herbivores, however, of this ecosystem are also pivotally important influencers of such an ecosystem as well. As was shown by the removal of megafauna, herbivores are key agents in shaping change in savannas (Asner et al. 2009). In many parts of African grasslands, the impact of the replacement of megafauna for cattle has changed the landscape significantly, favoring the establishment of woody plants over previously palatable grasses when grasses experience sustained grazing. As is often the case during times of drought when animals continue to graze sparse grasses, perennial grasses may be reduced to such an extent that the establishment of woody species may occur in the bare remaining ground when rains come. Folke *et al.* (2004) describe this process as one which, once started and sustained through overgrazing, may have to reach a point of full tree or shrub size before grasses may become dominant again, a process that can take as long as 30 or 40 years.

Comparing the phenomenon at the biogeographical scale between the grassland ecosystems in southern Africa and temperate Europe, Zeller *et al*. (2017) introduce the concept of a 'organismic and comparative approach of ecological interrelations' to argue that the removal of megafauna in Africa could have similar implications for grassland ecosystems of Africa as the removal of megafauna by humans during the late Pleistocene in Europe has had in transforming 'herbivore-driven, cyclic mosaic of grassland, shrubs and trees' into 'dense and uniform forests' (2017, 116).

These interactions between rainfall, vegetation cover, herbivory and fire are significant for the livelihoods of Bwabwata West and Divundu as many were found to own or be affected in some way by livestock. Whereas the effects of the still abundant megafauna manage to keep a semi-savanna, semi-woodland middle state, the introduction of livestock has the potential to disrupt or cause regime shifts to the ecosystem if either too many animals are introduced, or animals graze unsustainably on the same land for too long. Although domestic animals and livestock farming are not permitted activities inside of Bwabwata National Park, small scale cattle, donkey and goat operations have not been removed with the migration and slow creep of Mbukushu tribes into the park over time. There are also political tribal reasons for the presence of cattle in the park. A Khwe senior traditional headman expressed these limitations and impacts*:*

> *"The [Mbukushu] are still allowed to keep the cattle inside of the park but the Khwe can't keep cattle. The Khwe cattle have been killed by the government. [A] veterinary service came to kill cattle [on] this side but they failed because the Mbukushu are in top positions of the government. Maybe [they] allowed [them] to keep them because they are the same tribe. The cattle often come and eat the crops here."*

As social anthropologist Gertrude Boden elaborated on the political situation,

> "*Both [tribes] are in a national park. The difference [between them] is Chief Mbambo's authority. MET is not able to say 'it's a national park, no cattle allowed' because somehow Chief Mbambo or the Mbukushu are strong enough to have their cattle. So they just bring them in and MET doesn't chase them out. And this is something that these people in the eastern villages are very angry about."*

Unsurprisingly then, of the findings and of the two livelihoods present, the Mbukushu farmers were found to be those who kept animals. The Khwe spoken to did not keep but a few animals. Chickens were kept in most households at an average of 10 chickens for the 10 households of 15 Mbukushu farmers interviewed, and goats and cows were also common with some cow herds with as many as 75 head of cattle. As discussed above, the presence of herbivores is a significant shaping influence for the ecology of the land. The increasing presence of livestock from Mbukushu migrating into the park is well capable of causing a regime shift if the 'commons' are not looked after communally and cohesively.

4.1.1.1.6. The Biodiversity

With the species richness of large mammals decreasing from the Delta in the south to Angola in the north due to the combined effects of human influence and poor soils (King & Chonguica 2016), the factors upstream to allow for ecological diversity and healthy livelihoods in the Delta downstream are intrinsically tied together by the activities of livelihoods in the middle of the ORB. Alsonso and Nordin (2003) determine that the highest species richness for the Delta occurs

in areas prone to regular flooding. These same areas, also the same areas with the highest productivity in biomass terms, can be explained by the intermediate disturbance hypothesis which states that diversity will be high in areas experiencing intermediate levels of disturbance and low in areas experiencing low and high disturbance levels (Connell 1978).

According to King & Chonguica (2016), a combination of ecological influences combine to create six main reasons for the rich biodiversity present in the Okavango Delta: 1) water that remains after a flood increases the land productivity potential through the provision of extra water to the land; 2) constantly evolving and transforming channels of the river, as a result of low slope, attract animals which can adapt to the specific and varied conditions present during the different time periods; 3) nutrients available in the low nutrient waters that stay within the system and are therefore continuously made available to plants; 4) salt that leaves the system through various means; 5) water pulses that create many different environments within the Delta throughout the year, hosting high biodiversity in the amount of species which can occupy niche environments; 6) rich soils and favorable undisturbed conditions that create suitable conditions for plants to grow and utilize soil nutrients, thereby creating a fertile environment for large mammals with both food and access to water in an otherwise dry environment. These conditions, where stability is reproduced with regular moderate levels of disturbance, contribute to the rich biodiversity of the Delta, as modified also by upstream factors.

The Delta and middle parts of the Okavango River also benefit greatly from high biodiversity which draws international tourists to observe more than 450 bird species and large game which are drawn to the life-sustaining water pulses into the Delta, and their created, and otherwise dry, surrounding woodlands and grasslands in the broader ORB. The ORB ecosystem is home to a variety of unique large mammals and vulnerable IUCN Red-Listed species such as the African Elephant *Loxodonta africana,* Hippopotamus *Hippopotamus amphibius,* Lion *Panthera leo,* Slaty Egret *Egretta vinaceigula,* the endangered Grey Crowned Crane *Balearica regulorum*. Its biological diversity is noted by the conservation community which named it one of the WWF's top 200 eco-regions of global significance. In the Namibian protected areas of the Okavango River basin large mammals such as lion, leopard, buffalo, elephant, hippopotamus, crocodile, red lechwe, sitatunga, bushbuck, reedbuck, and otter can be found (OKACOM 2011b) and are

common to the Bwabwata West region. African wild dog, eland, sable, giraffe and the lesser common antelope are also found in the within the Bwabwata West boundaries less frequently. These animals may also be found outside of park boundaries in Divundu, though significantly less often.

Very importantly to both Divundu and Bwabwata West, one of the largest populations of elephant— approximately 100,000 of them— roam in a transboundary area between several countries, Bwabwata National Park as the Namibian component of that range.

As a healthy ecosystem still benefitting from the presence of megafauna, the Okavango Delta and River Basin are important areas to understand the effects of climate change on biodiversity. As Morrison *et al*. (2007, 1363) put the relationship, *"although the presence of large mammals offers no guarantee of the presence of all smaller animals, their absence represents an ecologically based measurement of human impacts on biodiversity."* Acting as keystone species for climate change impacts, Pacifici *et al.* (2017) note the importance of large mammals as a keystone species for the effects of climate change, most predominantly primates, elephants and marsupials as the mammal species groups most threatened by a changing climate. The slow reproductive rates of primates and elephants further increase their vulnerability, whereas fast reproductive rates of rodents and insectivores, two groups of mammals found to have benefited from recent climatic changes, are more likely to be adapting at faster rates (ibid.).

Pacifici *et al.* (2017) are hesitant to propose long-term consequences and assert incomplete understanding of the overall effects of climate change on entire ecosystems, but these findings are particularly important for what Morrison *et al.* (2007) determine to be one of the most biologically rich places in the world for large mammal species. Using the Global Mammal Assessment, a process of assessing the conservation status of all mammal species, historical (AD 1500) range maps of the largest 263 terrestrial mammal species (body mass .20 kg), together with the current distributions, were put together to form a picture of areas in the world today which have retained 'complete assemblages of large mammals' (Morrison et al. 2007, 1368). Conducting the work through expert collaboration and the existing IUCN/SSC Specialist Groups for mammals, this study found, at a number of 35 large mammal species, that the Okavango

Delta—an area of 32,291 km2—has the highest number of large mammal species of all 108 sites surveyed globally.

The value of this rich wealth of biodiversity and its potential as a data source about climate change impacts was integrated into this study and posed as questions to interviewees concerning their perceptions of change in wild animal populations with a specific focus on elephant populations. While it was discovered that 7 of the 15 Mbukushu farmers reported perceptions of more wildlife in the last five years and for reasons described previously the Khwe felt unable to comment on the nature of the change, the main finding from these questions brought to light the larger conservation themes of the region which are discussed in section 4.1.2.2.3, alongside corresponding vulnerability positive feedback cycles discussed at length in Chapter V.

To signify how important this issue is for the people of the study area, elephants, from interviews with the Mbukushu, were identified as the most challenging issue for people of the community. Four of the fifteen Mbukushu farmers interviewed reported having their entire field destroyed by animals. The high number of livelihoods affected show a sampling of how influential and significant the underlying larger themes are for inducing further vulnerability for livelihoods in this area.

4.1.1.1.7. The Food

According to Dieckmann *et al.* (2014, 378) the most important foods for the Khwe of Mushashane and Omega I were mahangu and maize. Beans and groundnuts were also important for the people of Mushashane and pumpkin and a melon called the Tsama melon were important to the people of

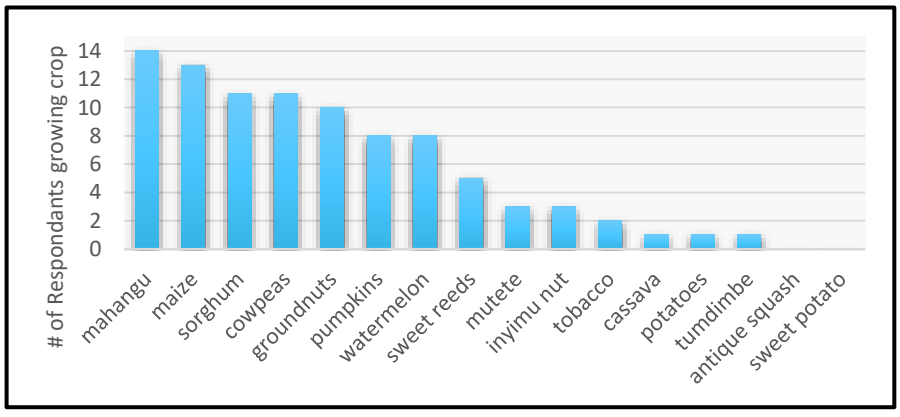

Figure 9: Crops grown by the Mbukushu farmers

Omega I. Figure 9 shows the main crops grown by the fifteen Mbukushu farmers, as reported from the interviews. Figure 10 depicts the main agricultural strategies and techniques used to grow these crops. This study found that the presence of cultivation in Omega I through the NDC farm also allowed for better food security for Omega I residents compared to Mushashane village where more food was bought from a store.

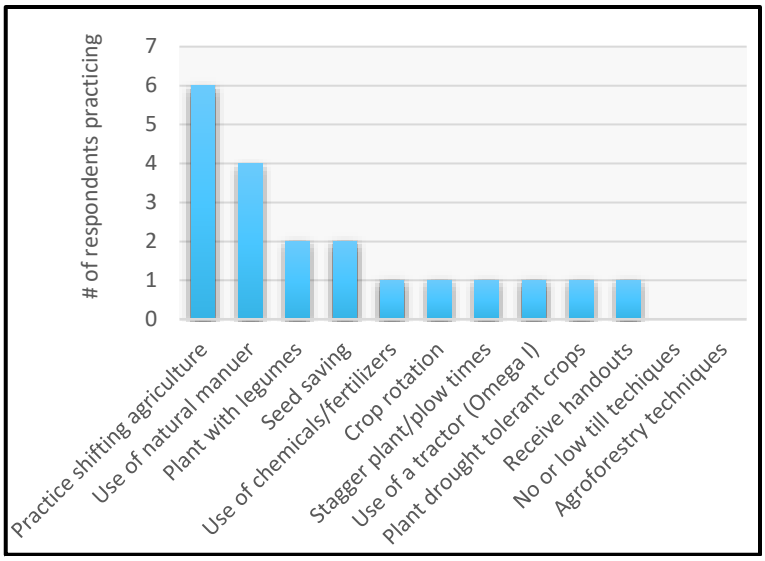

Figure 10: Agricultural strategies of the Mbukushu farmers

4.1.1.1.8. The Human Health

With 90-100 % of households without safe drinking water, 90-100% of people using the bush as a toilet (Namibian Census 2011), and a high HIV/AIDS prevalence in the Divundu area (SW1 2017), the study area fits a national statistic that cites HIV/AIDS, diarrhea, tuberculosis, pneumonia and malaria as the leading causes of inpatient deaths in health facilities in all age groups (Namibian Government 2015; Dieckmann et al. 2014, 387). While both the local environmental health worker and a local government official agree that malaria is one of the most significant health concerns in the community, the environmental health worker also mentions tuberculosis and the local government leader HIV/AIDS, as particular sensitivities for livelihoods in the study area. Speaking with one of the Mukwe district government social workers about these issues, a figure of 20% is cited as the prevalence rate of HIV/AIDS in the Divundu area; *"that [figure] is very bad for the district—the small district that we are— to have such a high prevalence rate as we are."* The CN in the community gave five reasons specific to the study area as to why HIV/AIDS prevalence rates are so high. These reasons, in her words, are: 1) *"The rates are higher here for HIV because our men here are not circumcised";* 2) *"Our men like multiple partners and will not use condoms."*; 3) *"Some of the men will even tell you that me I've never even used a condom in my life. They don't use condoms because it's our culture we don't know about that. They don't know."*; 4) "*Us African women used to use this African medicine to insert so that it can tighten the vagina so that it can make a friction so that it*

can make it easier to get HIV"; and *5) "Sometimes our men refuse to come to the hospital. That is one of the biggest problems we are facing."*

In addition to Divundu's location as a 'transit hub' (SW1 2017) where more frequent sexual exchanges occur along the main tarmac road, these factors combine to pose high sensitivity to the health statuses of the two groups of livelihoods in this study.

4.1.1.2. Nested 'Socio' Resources: Livelihood Capital and Assets

4.1.1.2.1. 'Bonding Capital' and the Community Informal Economy

As was described in the CRSL Framework's definition of bonding capital, the formation of linkages between community members in the form of trust and friendships is pivotal to energizing the human agents of change at the true 'bottom'- up. Particularly is this the case for some non-traditional social structures that have egalitarian leanings, as is found in some other hunter-gatherer groups in the region. Bailey (1985) observed that Efe Pygmie hunters varied the frequency of an activity so critical to survival as a result of strong and centralizing social relationships. Bailey writes that hunters did not try to optimize hunting as a way to leverage social status or calorie intake, but that, instead, social relationships was the sole factor to determine hunting frequency— *"social relationships amongst people and between themselves and neighboring peoples placed significant costs on subsistence behaviors"* (1985, 244). Findings from a similar San tribe in Botswana, the Basarwa San, show that strong social relationships cause the most successful Kutse hunters to stop hunting for periods of time so as to promote equality and encourage social bonding between friends and family through the allowance of less skilled hunters to get meat (Kent 1996, 147).

Similar themes were observed to be true between community members from both livelihoods of this study. A local government official of the Mbukushu tribe illustrated the strength and societal pressure from others to adhere to these norms when he said,

> *"It's just our custom that if you have you must share with the neighbor who is suffering because today it's him or her, tomorrow it's you. So if you have more, then you must also*

pass it on to the others to avoid catastrophe. The neighboring village will laugh at you if someone passes away because they have hunger while you have food; it's a shame to the village. Sometimes you can offer a piece job, maybe you make the fence or something and give them something to eat or money, those sort of things. Those arrangements are there."

For the Khwe, who share closer ties to the egalitarian hunter-gatherers described in neighboring regions, the centrality of the culture around these tenants of community support evolved from similar roots of egalitarian societal structure, as described by one 75 year old Khwe woman from Mutc'iku: *"If someone hadn't enough food you would give information to them about how to meet and get more food from where you might know of food in the bush*." Social anthropologist Gertrude Boden identified the strength of these ties for the Khwe:

"One big thing is always sharing food. So if someone has something, like the people who work, they are always asked by other people to share with them. It's not just that everybody who gets something shares, those people who have something are always addressed to give something. Sometimes they give and sometimes they don't, but there's also always a lot of trouble because of sharing and not sharing."

The power to use this naturally cohesive character of both livelihoods in this study provides an excellent starting point for the empowerment of resilient and sustainable SES if this strength is harnessed and nurtured to produce beneficial positive feedbacks.

4.1.1.2.2. 'Bridging Capital' and Inter-tribal Relations

The importance of bridging capital, the bonds between different groups at the same level of organization in human society, is the next layer of capacity building that is important for this study at the level of interaction between the two different main livelihoods. Similar manifestations of trust and friendship are the product of resilient positive feedbacks.

The strength of social relations is also cited as an important factor for the insurance of peace and conflict resolution in times of hardship as resources may be stressed (Eriksen and Lind 2009; Kelley et al. 2015). Recent research is beginning to explore these connections and their implications for peace and the ability of groups to avoid regime shifts given changing climate conditions. One group of researchers who examine sixty post-1950 quantitative studies of conflict across a range of disciplines find a strong causal link between warmer temperatures and conflict (Hsiang et al. 2013). For each standard deviation toward warmer temperatures and extreme rainfall, this study finds a correlated median increase in human to human violence of 4% and group on group violence of 13.2%. Higher temperatures on the African continent, in particular, were noted from the research to be correlated with an increase in group conflict. Schleussner *et al.* (2016) finds for the period of 1980-2010 that about 23% of outbreaks of armed-conflict between groups 'robustly coincide' with climate-related natural disasters; a coincidence rate of 9% globally was found between armed-conflict outbreak and the specific shocks of heat waves or droughts. Furthermore, a connection particularly between group violence and decreased rainfall that occurs more frequently in low-income areas is noted to be potentially correlated with agricultural productivity levels (Hsiang et al. 2013). A decrease in land productivity causing the land's population to be deprived of a livelihood and food security, drives many to cope by migrating to the urban environment. This relationship has been documented as a cause and catalyst for the escalation of political unrest going on at the time of writing in some parts of the world (Kelley et al. 2015).

The situation in Divundu and Bwabwata West, with strong ties and bonds between those of the same livelihood but less so between livelihoods, could potentially become an issue in the future if climate change begins to stress resources and pit the two livelihoods against one another for them. Underlying or lightly simmering tensions between the Mbukushu and the Khwe have changed through the various political regime shifts over the land in the past. Mistreatment, violations of Khwe women and children, and forced labor by Mbukushus in the past arose from enslavement of the Khwe by the Mbukushu (Dieckmann et al. 2014, 367-368) and a history of slow in-creep of Mbukushu culture that has led many Khwe to feel resentful at the inability to defend their culture, land, and livelihoods and claims for their own space amid the vacuum of rights and power ecologies unique to their land. A Khwe senior traditional headman attributed

the issues of today with the growth of the cultures together; the Khwe and the Mbukushu 'becom[ing] close'. He said:

> *"When we were apart, when I was very young, my parents stayed with me far [in] the bush. Then they started to come, like people are now, so you were seeing maybe people [from] many other tribes, and things that were easier for you to do then became difficult up to today. Since [we] mixed with other tribes it has broken our culture."*

The gradual migration of the Mbukushu tribes into the region has complicated matters of land ownership several times in the area since the SADF occupation of it. After leaving BNP during the SADF occupation, having had little role in the defense operations without being offered formal employment from SADF as the Khwe had been, the Mbukushu began to filter back into the BNP after Namibian independence. Returning Mbukushu cited reasons such as the following for their in-migration into the Park: freedom of movement in a now free country; instruction from *Fumu* Mbambo encouraged it; good soils for farming and veld food collection provided captivating allure; overcrowding pushed them out of other areas; rights to the land remained from forefathers who had settled on it in years previous; and that there would be ample opportunity for employment in the area due to the construction of the Trans-Caprivi Highway (WWF 1997, 21). Potential for reaping benefits from a rumored conservancy that was to be established in the park was also an incentive for in-migrants (WWF 1997, 19). Though the first two families to move are suspected to have consulted the elected Khwe leader Kippie George of the time, these next subsequent migrants are unlikely to have consulted the Khwe leader prior to moving into the park, further weakening of Khwe leadership structures (as this Khwe leader Kippie George was already largely unrecognized by the Mbukushu) and causing strife amongst the two groups.

In-migration of the Mbukushu tribes in recent times has happened for a variety of reasons. Most prominent of these reasons are due to many transfers of authority over the land; the weak influence and power of MET; weak Khwe leadership internally to prevent influx of other tribes onto the land; and the institutionalized though dysfunctional arrangement of the Khwe tribe under an Mbukushu Traditional Authority. Mbukushu *Fumu* (Chief) E. Mbambo, who has

asserted his claim and authority over the people and land of BNP for many years, thus denying government ownership of the land since independence (WWF 1997, 45), has been the most prominent obstacle for the Khwe to get back their own land after Namibia's independence.

A program to actually resettle the Khwe into so-called 'resettlement areas' was formulated by the new SWAPO government following independence in 1992. According to the South African regime's homeland policy, the San tribes were not distributed land. This policy was carried over and accepted with the transition to the Namibian Government at independence, leaving San tribes landless by the same policy until the National Resettlement Policy was released in 2001 which specifically included a plan for land resettlement for the San. Conducted by the Ministry of Lands, Resettlement and Rehabilitation (MLRR), the 2001 policy identified the villages of Mutc'iku, Mushashane, Omega I, Chetto and Omega 3 along the Trans-Caprivi Highway[9] as those villages set aside for development and resettlement (Brown and Jones 1994; Dieckmann et al. 2014, 370). One 4 hectare plot was distributed as a part of the policy to each family (Dieckmann et al. 2014, 370) and receiving families were expected to gather and farm crops from there on.

The results of this resettlement process and its designation of areas then for the Khwe shows by the contrasting situation on the ground today that this policy was not effective for the Khwe and has only lead to further in-migration of the Mbukushu tribe. Speaking to one 60 year old Omega I Khwe woman she notes other tribes in one of these resettlement areas, *"there are 14 Khwe farmers and more than 30 farmers from other tribes [here at the NDC Farm]. Some come only for farming, coming from as far as Kavango West. They don't have a place to plow so they come and start farming here."* Asking one 35 year old Mbukushu farmer found at the NDC Farm why he chose this location in Namibia to relocate to he replied:

> *"[We] came here in 2000 because there was land here where no one was yet so [we] chose these hectares because they weren't being used. There is a difference between farming inside of the park and outside of the park; you get better mahangu here inside of the park. [I don't] know why, but you get less [mahangu] outside of the park. There is*

[9] see Map of Resettlement area in Appendix III

more mahangu you can grow here as well because there is a lot of land. You can have a bigger field here. The soil here is 'too much power'. Last year Omega I [was the best in] Kavango with farming amounts. [I] moved here because [my] grandmother stays here. Now [I live] here permanently. [I like] living here more than Diona because [I] can plow more here, which [I like]."

Responses such as these indicate a clear lack of perceived restrictions on the part of tribes coming into the area to settle and the inability to do anything about it for the Khwe without recognized formal leadership and rights to the land.

4.1.1.2.3. Economic Capital

Poverty, as the main predisposing factor to vulnerability to climate shocks at a household level (Shackleton et al. 2008), can be considered both in terms of natural resources and economic resources. As a country with 28.7% (2010) of the population below the poverty line, a high rate of unemployment in rural areas of 65% according to the 2008 Labor Force Survey (National Planning Commission 2012, 65) and a global ranking of 7th for highest inequality distributions of those measured by the Gini index (measuring at 59.7 in 2010) (CIA 2017), Namibia's rural poor are very poor in economic terms.

One study done in the Okavango Delta show that 62% and 79% of the 629 households in the Delta cope with extreme flooding and river desiccation, respectively, without direct government assistance or other help (Motsholapheko et al. 2013). Many rural poor along the ORB are forced to subsist off of few resources without much external assistance. The gap between the importance of dryland agriculture and its inability to provide the communities of the Delta with resilient, high benefit, low risk livelihood strategies (Wilk & Kgathi 2007) points to this particularly confining vulnerability characteristic of many communities in this region without access to other livelihood options. A regional report of socioeconomic impacts identified communal farming to be the livelihood with the greatest sensitivity to climate changes (SAREP 2013, 1). Not surprisingly, one study assessing the farmer adaptations to climate change from countries in sub-Saharan Africa and Asia found that in poorer countries the wealthier farmers

were more likely to change farming practices and vice versa for the situation in wealthier countries (Wood et al. 2014). In the case of Namibia, where poverty is a large, pervasive and nebulous issue, those with more access to resources are more likely to be those to be willing to change practices prior to climate change impacts.

Of the constituencies in Namibia a local government official indicated that Mukwe was the last at the time of writing in terms of poverty, *"given the government statistics, this constituency is the poorest in the whole country."* Dieckmann *et al.'s* (2014, 380) economic assessment of Mushashane and Omega I village residents using a six point system from 'very poor' to 'rich' to determine participant self-perception of economic status showed that the majority of participants from these villages see themselves as 'very poor' or 'poor' economically. The very poor were defined by participants as those people without pension monies or fields to cultivate, and to be those who relied primarily upon piecework opportunities and begging to survive. The 'poor' distinction was defined by the participants to mean some income from pensions and piecework, little cultivation of their own food, and ownership of few livestock for some. The 'better off' had secured full-time work, owned some livestock and cultivated on land. The 'rich', after 'lower rich' and 'medium rich', had a source of income such as a business, livestock, land for cultivation and were also able to buy assets and hire laborers. Using these categories delineated in Dieckmann *et al.'s* 2014 study to determine levels of poverty in the study area, most participants in this research agreed with the perceptions of those in Dieckmann *et al.'s* (2014) assessment as being 'very poor' or 'poor'.

At a median expenditure per person in Divundu of N$1,000 to N$2,000 per month, piecework and formal employment opportunities, though few—particularly for the Khwe—are the main opportunities for formal employment in the community (Suzman 2001, 60-61; Dieckmann et al. 2014, 375). As one of the social workers commented, *"[there is poverty] …with no real hope of improving; there are just a few government organizations around and one or two lodges, [but] not much else to do"* (SW2 2017).

One of the local government officials describes the formal economy of the area as relatively limited and benefitting primarily from external cash flows:

"The main [formal employment opportunities [are] two big supermarkets that are retailing, then you have this accommodation establishment which mainly caters to tourists-- it offers employment to the locals. The first national bank, they came and did a pilot study on that and found that most of the resources that came to the system [were] from foreign cash— visitors— those people who transact mainly in and around Divundu."

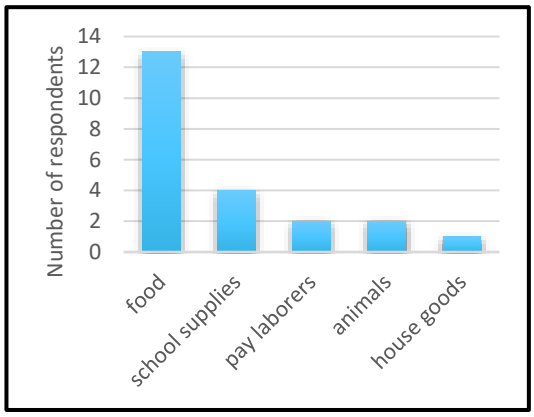

Figure 11: Uses of cash for the Mbukushu farmers

While a second local government official pledged to be "*trying also to change the livelihood of the people through employment creation"* this research found that only one of 19 resource-dependent livelihoods interviewed were employed in formal employment sector activities. Opportunities at the NDC fields for the Mbukushu and Khwe to work in some capacity in the fields of others at a rate of N$15-25 a day from morning until 13:00 (Dieckmann et al. 2014, 375) was a source of income and livelihood activity for 10 respondents of 19. The true nature of these livelihoods, formal or informal, still remains one of subsistence as the overwhelming majority of those interviewed named food as the use of cash received (Figure 11). The NP4 confirms these findings as it was reported that food was the main expenditure item for 42% of those receiving maintenance or foster care grants, followed by school fees for 35% of beneficiaries (National Planning Commission 2012, 64). What little financial capital is accrued and saved in Bwabwata West and Divundu is invested in the form of livestock. As Boden explains it, *"most of the time they keep [livestock] as capital— a kind of saving account. You can ask a person to share food… or whatever you have, and you can also ask people to give you some money, but they won't ask give me a goat or give me a head of cattle. So it's actually like a bank, the domestic animals."*

4.1.1.2.4. Educational Capital

In the Divundu area the 2011 Namibian census indicated that 60-70% of the households had no one with more than a primary school education. These numbers for Bwabwata West were not easily found for the Khwe, but are likely much higher as many of the Khwe spoken to reported experiencing language barriers and difficulties from very early in their educational experience. Although the Language Policy for Schools in Namibia permits mother-tongue instruction for the first three years of school, this policy does not seem to be implemented in the study area as identified when speaking to the youngest Khwe of this study, a 19 year-old Khwe Culture Village Tour Guide and Tracker:

> *"Now we have to learn English and Mbukushu in school. There's nothing like you don't speak Mbukushu, whenever you start from primary it's compulsory. The policy says that we have to learn Mbukushu [in our] education. At home you speak Khwedem and at school you use Mbukushu and English. Khwedem is not taught. Mbukushu is taught from primary up to secondary level."*

These foundational barriers to build capacity toward access to other livelihood options, should they become available in the form of opportunities in formal employment, are critical vulnerability points for both the Khwe and the Mbukushu, though more acutely for the Khwe.

4.1.1.2.5. 'Linking Capital'

Having dissected the forms of cohesivity and bonding between community members and among community groups, the last form of capacity building from the bottom-up is the formation of bonds between different levels of community within the wider ecosystem. This form of capital, linking capital, is the nature of this sub-section. The themes of governance, management, and policy, as personified products of power ecologies and their relevance to vulnerability creation for the Khwe and the Mbukushu, will be discussed in this sub-section.

4.1.1.2.5.1. The Role of Governance

4.1.1.2.5.1.1. Levels of Government

Republic of Namibia organized into three levels of government; central, regional and local government, the latter of which composed of both the lower government authorities and the traditional authorities. After the central government, the 14 regions of Namibia are presided over by governors and within each region are the constituencies which are small jurisdictions with a councilor as head of a constituency. At the local government level the Local Authorities Act of 1992 specifies three different types of local government: municipality, town councils, and village councils. As enumerated by the elected legal political official at the local level, the councilor of Divundu gave his role: *"the function of the regional councilor is to develop the region and uplift the living standard of the people in the region or in the constituency."* This figure acts in tandem with the village council which consists of the CEO and the other staff of the council, as appointed by the councilor. The CEO described his role as the head of the newly created village council, which came into being in December 2015 to provide basic resources and services under its jurisdiction like water sanitation, refuse removal and public health. The council also has the task of enacting the wishes of the community, building capacity and linking social bonds with empowerment at the local government level, *"if you think for them maybe at the end of the day they will reject it. You give them the task and at the end of the day they come up with their idea"* (Thighuru pers. comm. 2017).

4.1.1.2.5.1.2. Judicial System

At the constituency level is also the presence of the two justice systems; the traditional authority court system and the police force. While the government police force needs little more explanation, the tribal court system consists of a headman in each area with a corridor of villages to preside over. When issues arise in the village this tribal court system is the first level of consultation. A community social worker describes the consultation process: *"if someone outsteps the mark or does something they sit down with the headman and the village development committee and a representative and they discuss it and decide what they are going to do as a village and then prescribe certain things. If it doesn't work out at that level then it goes to tribal court (the chief)"* (SW2 2017). The tribal chief also has the right to decide on

property uses for the land he presides over. Under the tribal leader no land is sold, but rather given for a lease of 30 years or so and tenants are required to pay a certain amount 'almost taxes' to the TA Chief (SW2 2017). While this system might seem to be an empowering form of bridging capital for the community as a 'traditional authority' is included, a reality where "*taxes basically go to him [(the chief)]. As far as I know they don't go back to the people. [There is no] control"* (SW2 2017), suggests that any such ideas are illusory as things stand in this constituency.

4.1.1.2.5.1.3. The Role of Traditional Authorities

Elaborating further on the role of TAs in the community, Namibia's Traditional Authorities Act 25 of 2000 recognizes Traditional Authorities (TA)s as legal entities and part of the government system, giving them the responsibilities to cooperate with other branches of government including regional councils and local authority councils. By this act they are also required to keep relevant government officials abreast of development or plans for their jurisdiction. A similar act of the same year, the Traditional Authorities Act 5 of 2000, places these TA chiefs at the same level as local government councilors and pays them to do the jobs they do, as stipulated in the act. One local government official explained how the two governing authorities operate on communal land and where their differences in jurisdiction lie:

> *"Where we differ with the traditional authorities is that they operate under the Traditional Authorities Act while the local authority operates under the Local Authorities Act. Those are the two distinct differences between the two. Their jurisdiction also differs from us; all of the subjects [who] fall under the district falls under the traditional boundaries, they subscribe to the traditional Mbukushu authorities, cultural etc., whereas [we], the local authorities, only follow the Local Authorities Act within our jurisdiction. We happen to be within the Mbukushu traditional jurisdiction here, the district that the Chief [Mbambo] presides over."*

Due to the status of the land as under traditional jurisdiction, the next rung of authority above the levels of traditional headman and local government is the chief, an Mbukushu chief. Since the

tribal system feeds into the central government system, the order of authority in this region is the cause for many Khwe capacity gaps and vulnerability loop cycles, as will be discussed in Chapter V.

4.1.1.2.5.1.4. Government Assistance

4.1.1.2.5.1.4.1. Projects

Given N$500,000 since 2005, money from the government to the region has been allotted for projects from and by local people. As the councilor described, these projects are proposed by the community and some amount is awarded to the best projects to be carried out by community members. While some projects in the community have been successful for a short time, several reasons for failed projects were given both by local government representatives and community members. Reasons for these failures were cited by a government official to be due to the use of funds to drink in the 'shabeens' (informal bars), while one 36 year old Khwe man from Mutc'iku cited improper implementation and preparation upon project launches, saying *"some projects like gardening were given by the government but it was not well functioning due to lack of training. Trainings were not being offered to the community members."*

4.1.1.2.5.1.4.2. Grants

Specific national goals to create and coordinate strategies and mechanisms to accomplish development goals as are outlined in the medium term through the Namibian National Development Plans (NDPs) and longer term through the Vision 2030 goals. The three overarching goals within the National Development Plan 4 (NDP4) are: high and sustainable economic growth, increased income equality, and economic empowerment through employment creation (National Planning Commission 2012).

From the perspective of livelihoods, these goals are conceptualized primarily of in the form of government grants as the situation stands now. As one of the highest livelihood 'activities', or forms of income and subsistence found among the respondents of this study, 15 of 19 natural resource-dependent livelihoods received some form of direct monetary government assistance.

The high rate of people receiving government grants illustrates the point that government grants are an important influence for both livelihoods represented in this study.

Namibia is unique on the African continent with its provisions of 'non-contributory' social grants to citizens in the form of pensioners, people living with disabilities, orphaned and vulnerable children which includes maintenance grants for single parents. While the government reports that 91% of eligible persons (over 60 years) are receiving pension funds and 117,000 people are benefitting from the Maintenance Grant (MG) (National Planning Commission 2012, 62), grant funds in Namibia are only provided to those people who have provided valid identification documents (birth certificate and identity documents) to register for the reception of such monies. This is not always an easy proposition. One of the social workers described hurdles many in the study area encounter to register for documents: *"[You] can't get grants without documents and many cannot afford to travel the 220 kilometers to the nearest town at a rate of N$300 each time to get these documents"* (SW2 2017).

Nevertheless, for those who are able to register, the social worker corroborates study findings that a significant majority of the study population receives some form of direct financial support from the Namibian government:

> "*Almost every homestead has a source of income directly from the government—there is an old male who is receiving on a monthly basis a certain amount of money that they can buy the maize meal to give them until the next month or the children are receiving money for a child support grant. Last year they approved a vulnerable care grant for any person who is not working, [and now] the children are entitled to N$250 a month. If you are working and you are earning less than N$1000 then your children are also entitled to that, unless if those people don't have documents, but almost every household is getting money from the government"* (SW2 2017).

Cash is received on a monthly basis, at a rate of N$1100 for pensions, and all grants are distributed by a mobile government distribution unit. As this study shows, an entire household often subsists off of this monthly income from an elderly family member's pension. This, while

providing coping assistance for households, may provide just enough support for people to keep their heads above water in difficult situations. As government statistics from the country's NDP4 show, however, these funds also have a perverse effect to encourage the proliferation of vulnerability cycles (discussed further in Chapter V) that feed off of these funds given without proper allocation or follow-up from government officials to assure that funds are indeed used for their given purpose. In the NDP4 the proportion of extremely poor households determined was highest among those persons dependent upon pensions (28.4%) and lowest for those who relied on salaries and wages (6.6%). Subsistence farmers fared somewhere in the high middle range (17.6%)(National Planning Commission 2012, 62). While these figures do not equate to causation, clearly the extremely poor are still not meeting the most basic needs despite the fact they are receiving direct and government financial support.

4.1.1.2.5.1.4.3. Food Aid/ Drought Relief

Where climate change is directly and immediately concerned the Namibian government has also instituted programs and funding for drought relief in the form of food supplies to vulnerable populations. This program spent N$916 million from April 2015 to March 2016, extended again from March to July of 2016 at a cost of N$90 million. Extended again, up to the time of writing, Prime Minister Saara Kuugongelwa-Amadhila said in 2016, *"the program [of drought relief support] will be extended from August 2016 to March 2017 at the cost of N$600 million,"* giving for this a reason that, "we [the Namibian government] do not want to cause any disruptions in support to those who are affected" (Kahiurika 2016). Figures such as these indicate that there is government concern for the issue and attention is being given to remediate particularly vulnerable situations.

What is also clear, however, is that the disparity between intention of these funds and distribution and practical use of them is large. One local government official expressed concern about the reliability of such support, *"we don't have access to food so we depend [up]on the drought relief from the government which is distributed not so regularly. You don't know when the next round is coming."* A social worker expressed similar skepticism about the distribution and timing of these funds in alignment with needs of the community, "*drought relief isn't given*

when there's drought, they're given drought relief when the government decides they want to give food away. They've had this amazing rain and they've been handing out drought relief" (SW2 2017). Many of those receiving these funds echoed a similar unpredictable nature of the drought relief support, saying that funds were received anywhere from once in the last five years to three to four times per year. Though unpredictable and unreliable, most respondents from this study who received drought relief nevertheless indicated that when the support arrived it was able to satisfy hunger and that it was 'enough'.

A special case, the Khwe, also receive drought relief as a part of the San Feeding Program through the Namibian government which is given out more regularly than regular drought relief. Previous studies in the Mushashane and Mutc'iku villages recorded the Khwe receiving food in the form of mealie meal (maize meal) anywhere from every month to 3 times throughout the year on an annual basis (Dieckmann et al. 2014, 374). Consulting with the Khwe in this study, many Khwe were very dependent upon such aid distributed once per month to once every 6 weeks. One 36 year old Khwe man from Mutc'iku detailed what he receives from the program *"sometimes up to three times [per] month they give maize meal of 12.5 kg, cooking oil, [and] fish. After 3 months, they give [it] again— 3 bags per person— and then again you wait for [another] three months. Every [Khwe] household gets this—every person 3 bags."* Such regular amounts of food aid and a dearth of programs or funds to build real capacity has some stakeholders of the opinion that these forms of support are crippling true adaptation formation and creating dependencies upon the lifeline evolving from these government funds, particularly for the Khwe: *"Khwe people get drought relief almost every 6 weeks. That's how the government tries to keep them, appease their conscience by giving them maize meal. And they give them so much that they [then turn around and] sell quite a lot of it"* (SW2 2017). As will be discussed further in Chapter V, these vulnerability-inducing positive feedbacks for the livelihoods of the study area spawn larger problems with the help of external resources when these resources are given with little other assistance or resources to supplement.

4.1.1.2.5.2. *The Role of Institutions*

4.1.1.2.5.2.1. The Bagani Agricultural Research Center

Between the Divundu and Bwabwata National Park boundary lies a government sanctioned Agricultural Research Center for research focusing on crop improvement, soil and plant nutrition and crop diversification, as set out their government mandate. Speaking with one of the Center's technicians, staff of the Bagani Agricultural Research Center work jointly with the government Agricultural Extension Agents who are given seeds from the government to extend to farmers for agriculture. The research center must improve the seeds as per the community preferences based on environmental conditions such as the weather and the sandy and clay soils of the area and consult the community once per year through a field day which occurs in the first quarter of the year each year. Of the 22 cowpea, 14 maize, and 18 pearl millet varieties, each of these has been developed at the agricultural research center through a diversity of trials and evaluations toward crop improvement. While the extension agents are tasked with working directly with farmers to employ specific techniques and engineer methods to achieve adequate food production, the center works to create seeds and discover methodologies for planting seeds which will produce the best based on criteria decided upon through consultation with the community.

How well this center and the extension agents are doing to provide support and useful assistance to the community is still largely undetermined following the discussion with an agricultural extension field agent, an agricultural research center technician and the livelihoods of this study. None of those natural resource-dependent livelihoods interviewed mentioned either agricultural institution, except for one farmer in the context of seeking support for this year's insect infestation on crops and finding no help from either institution whatsoever.

4.1.1.2.5.2.2. Namibian CBNRM

Inspiration for Namibia's CBNRM comes both from the efforts of the NGO IRDNC since 1982 to combat poaching through the use of community game guards and inspiration from neighboring community resource management program CAMPFIRE in Zimbabwe, a wildlife management program also influenced by a historical division of land (Jones and Murphree 2001).

Widely acknowledged as a success story globally for CBNRM, Namibian CBNRM is well regarded in the international community. Achieving global recognition in 2010 within the Communal Conservancy Sector as a finalist for the "tourism for tomorrow" award in the community benefit category at the World Travel and Tourism Council; in 2011 for communal conservancy tourism sector Namibian CBNRM was awarded the Platinum Award by the National Geographic Traveler Magazine; and in 2012 for Outstanding Conservation Performance, MET won the Markhor Award, Namibia's communal conservancies and the CBNRM program is held internationally as an example of how communities can manage resources directly from the bottom-up.

Namibian CBNRM has also veritably been a positive for the animals within these conservancy boundaries (Nelson and Agrawal 2008, 566), particularly in the Caprivi communal conservancies (Figure 12), as wildlife populations have been nursed to viable levels for tourism consumption and exploitation.

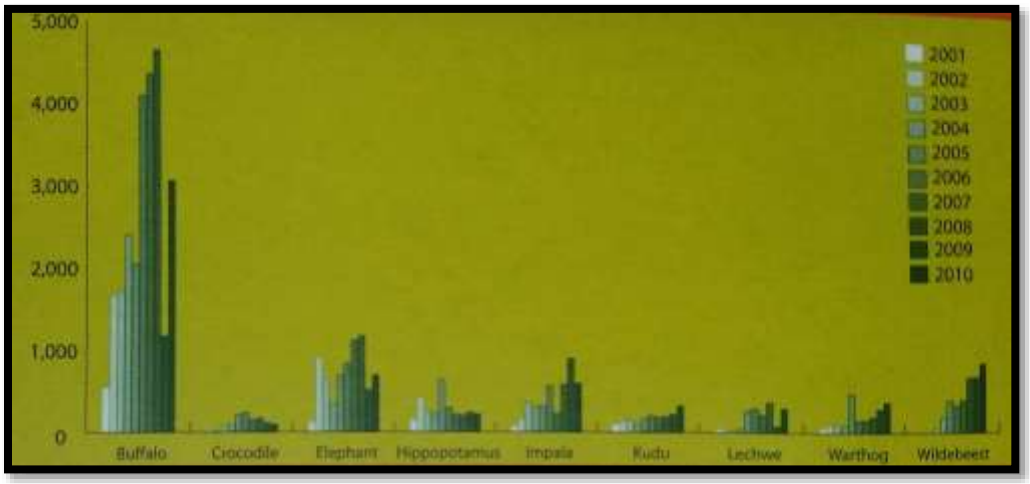

Figure 12: Sighting index for wildlife in seven conservancies in Caprivi as recorded by CCGs (source: NASCO 2011)

Country	Value of Centralized Commercial Utilization of Wildlife on Community Lands	Transparency of Procedures for Allocation of Wildlife Use (Hunting) Concessions	Overall Governance Transparency	Disincentives for Central Authorities to Devolve Authority over Wildlife	Level of Devolution Carried Out
Namibia	Low	High	Medium	Low	High
Botswana	Low	High	High	Low	Medium
Zimbabwe	Low	High	Low	Low	Medium
Zambia	High	Low	Low	High	Low
Mozambique	Medium	Medium	Low	Medium	Low
Tanzania	High	Low	Low	High	Low
Kenya	Low	n/a	Low	Low	Low

Figure 13: Key variables influencing central actors' incentives and disincentives to devolve authority for wildlife to local communities and actual devolution achieved as provided by Nelson and Agrawal (2008, 576).

The Namibian government, for its current role as an arbitrator of concessions and overall manager of the CBNRM program, is doing an exceptional job to manage resources through the local

conservancies of the CBNRM program. In comparison to neighboring countries with similar programs, Nelson & Agrawal (2008) show that low values of wildlife, high transparency of wildlife use and acceptable governance are the factors that lead to high incentives and subsequently high levels of devolved rights and authority of central government to the management of those resources by, for and with endogenous communities (Figure 13). In Namibia's specific case, Nelson and Agarwal (2008, 567) highlight Namibian CBNRM successes;

> *"The combination of limited state control over tourist hunting revenues and concessions, low value of wildlife on communal lands prior to conservancy formation, transparent hunting administration procedures, and the generally high quality of national governance institutions all serve to reduce the incentives that state wildlife authorities in Namibia possess to resist devolution of wildlife management to local communities."*

Citing further transparent hunting administration and concessions distributed through a process of public auction, wildlife management is accredited, according to Nelson and Agrawal (2008), also to a stable economic environment and decreased corruption in comparison to other sub-Saharan African countries.

While rather successful for the form is takes, rights to Namibian CBNRM for the Khwe in Bwabwata National Park have not been won without a fight. As Corbett and Jones (2000, 19) point out, government counter agendas have threatened land and resource rights of a community tourism enterprise as won through a concession for the Kyaramacan Association (KA) in the past. In that situation, government interests wished to extend a prison farm near to what was at the time a slowly building KA White Sands Community Lodge. Plans were proposed that would spread the prison farm into this land, despite KA already having won rights to the area along the Okavango River for the construction of this tourist enterprise. After filing an application to the Namibian High Court shortly after receiving eviction notices, the Khwe were determined to be the original inhabitants of the area and as such had aboriginal right to the land, despite any confusion due to colonial influences which forcibly shifted their presence from living immediately atop it during their time in the area. As Corbett and Jones describe (ibid.), the

Namibian government heeded bad publicity from the case and quickly retracted their proposal, leaving the members of KA in Bwabwata National Park with rights to the land and as the forbearers of another precedent— the first of its kind in southern Africa.

As this example of CBNRM in practice illustrates, some practicality issues arise when the concept and theory of CBNRM are applied to the conservancies themselves. Collomb *et al*., (2010)'s findings on the 'Event Book' monitoring system for wildlife populations in the conservancies of Namibia show that communities are not consistently the recipients of the benefits of this kind of monitoring. This Event Book System is the system by which Namibian CBNRM monitors and manages land and wildlife populations through the conservancies. Using an 'Event Book', conservancies collectively decide what to monitor and, through a decided upon plan data is collected and analyzed on a monthly and annual basis to be reported back to the MET (Miller et al. 2012) in paper form (Stuart-Hill et al. 2005). Successes of this system on communal land also led MET to suggest implementation of the same system into six Namibian national parks (Stuart-Hill et al. 2005)– BNP as one of these six.

Boudreaux and Nelson (2011) point out another critical weakness of Namibian CBNRM which is that of the limited operating space of many conservancies in Namibia. They highlight the near but incomplete devolved authority from government to conservancies, saying that conservancies would have more potential to 'flourish' if government would allow them further rights to determine quotas and monitoring, and therefore also land and wildlife management. Evidence from these reports and the findings in this study from the community seem to indicate that although Namibian CBNRM may have the roots of what is needed to empower endogenous communities at the institutional level, at the time of writing, conservancies are operating on the same 'subsistence' basis as the people they serve and until they are given full rights to practice adaptive co-management with government and other stakeholders in the CBNRM program will continue to do so.

4.1.1.2.5.2.3. CBNRM in the Study Area: Kyaramacan Association (KA)

"KA reports to the community like a conservancy reports to its members, its community. Being a national park, it makes it more complicated. There is a close working relationship between MET and KA, more here because it's a park. Other conservancies can keep cattle, can plow, can have business, can have normal livelihoods, but the park residents are told 'no cattle, you're not allowed to plow in certain areas'… so even though the Khwe are not farmers, there are limited livelihood options. You cannot fetch [an indigenous fruit] here or Devil's claw east of a boundary because its core area. So there are severe livelihood limits because it's a national park. That's why the MET is so important; finding solutions, finding alternative livelihoods through alternative livelihoods through KA. KA is a CBO which works with the community to do CBNRM inside of the community."

These words from IRDNC's rural development practician Friedrich Alpers situates KA as the constituent body of Namibian CBNRM for Bwabwata National Park, also commenting on the slim operating space available to KA and livelihoods of Bwabwata West given the land's establishment as a national park.

As the institutionalized and government-acknowledged body in the park, serving the people as a conservancy but unofficially recognized as one due to the status of the area as a national park, Kyaramacan Association (KA) began its Community Based Organization (CBO) role in March 2006 after becoming legally endorsed as a management and representation body for all members inside of BNP. Offices for KA were established in the same year at Omega I, and concessions of trophy hunting (2006), Devil's Claw gathering and collection (2008), certification of BNP as an organic area, and a joint-venture lodge called White Sands (2011) have been won by KA for the community since.

Initially supported by IRDNC, the now independently supported KA trust has the formal responsibility to act as a representative for the community; manager of core and multiple-use areas; contact and managerial point for services, concessions, and development in BNP; and is an extension of Namibia's formal nationalized CBNRM program where conservancies are 'co-managed' and 'partnered' with the Ministry of Environment and Tourism. A constituted

management board of people from the community manages concessions and income within KA, overseeing a total of over N$4.5 million of revenue in 2014, primarily from trophy hunting concessions. The purpose and function of KA, as seen by government, is described by Alpers, *"the Namibian government wants to help rural people so the CBNRM program is now taken over by government, since 1996— MET government. The objective is to have people like Bwabwata residents, people all over the country who live with wildlife in beautiful places, have them benefit from tourism and wildlife management*."

One of KA's board members describes the population KA serves and the distinction of KA from other conservancies, also an important point for its capacity to adapt and create institutional resilience for the livelihoods of Bwabwata West which will be discussed in further in Chapter VI,

> *"KA is the 'conservancy' inside of the park and yes Mbukushus are included in KA. KA is legal body which works with the government. KA represents everyone who resides or is settled inside BNP. They['re] communal conservancies— that's why here KA is called an association; it is State land and because of that it's protected land. They do the job of a conservancy. After their work, KA reports to the community, same as a conservancy, but KA works together with MET."*

Like all conservancies in the CBNRM system, KA bids for concessions at public auction and has won several for members of KA to benefit from. Also creating livelihood options for the people of Bwabwata West, KA pays out a total of about N$1 million annually in December of each year to what is currently the 1000 or so members registered, a total that amounts to N$240 each. The meat from trophy hunting is also a shared benefit to the community. It may either be utilized by concessionaires for consumption in camps and/or as bait in concessions with large carnivores, but any remaining meat must be made available, by policy, to 'neighboring communities, traditional authorities or other institutions such as schools and old age homes, in consultation with the Ministry' (MET 2009, 7).

A quite important concession and increasingly threatened activity by both the politics of park management due to poaching issues and by climate change threats, the harvesting of the indigenous Devil's Claw plant is done through a training and formal registration and permitting process which allows the final DC product to be accredited officially as an 'organic' product by ECOCERT, as determined in 2010. During the months of Mar 1st to 31st October, optimally once rains end so that the harvest can be properly dried for export, community members are able to collect the DC from the designated places in the Park. A good medicine in the form of a substance called *harpagoside, is* found in the side tubers of the plant which is sold to and used by international markets. The function of these side tubers for the plant is the storage of water and food during dry periods, and thus should be carefully regarded in the harvesting of DC so as to leave enough root for the plant to regenerate, hence the need for proper training and harvest. Before tubers are sold to international markets, however, they must sliced and dried and prices must be negotiated annually according to market value, as rendered by KA. Enabling as many as 311 community harvesters (424 registered harvesters) to earn an average of N$896 for the harvest of DC in 2010 (Dieckmann et al. 2014, 377)—one of the five Khwe interviewed for this study reported receiving as much as N$800 in her own experience harvesting—this process which becomes a livelihood activity for many Khwe in Bwabwata West is an important source of tangible financial resources; one of few for the Khwe.

One of the last and most contested concessions of KA, a community campsite and the White Sands lodge, which was previously mentioned as threatened in the past by government interests in the same land, is a developing touristic enterprise that will have 20 rooms and 10 campsites, directly on the Okavango River. As the only accommodation inside of the national park, such concession is a coveted one for those against KA and its gains for members. Future projects to create a traditional knowledge education center with the support and accreditation of national qualification frameworks based on traditional knowledge of training and tracking are underway for KA as well in the next few years. This institution will be discussed as a strategy and pathway toward resilience for the Khwe livelihoods in Chapter VI.

As a way to remedy decreasing game populations after independence, and as a part of the CBNRM approach in BNP and surrounding areas to monitor and manage resources, Community

Game Guards (CCGs) and Community Resource Managers (CRMs) are another structure and function of KA as employees paid by KA to monitor wildlife and the effects of people on wildlife, reporting first to headmen and then to MET, as also was set up from the first land-use plan for the park after independence (Brown and Jones 1994: 92). One KA board member gives a figure of 27 CCGs and 16 CRMs in the whole park at the time of establishment and a description of the duties of each:

> "*The CRM women were monitoring the foods, the plants, the medicinal plants so that the people [could not] cut them down, all edible trees and also the reeds from the river. The women are monitoring that. The CGGs are focus[ed] on the animals. They are community rangers— same as government rangers— but they are from the community so they have their role to patrol and to monitor what is happening and to record in their event books what is happening. For the ministry and the community to know what is happening in the field. This was all through KA; they are employed by the KA. They are still employed by KA, they still exist. Now they are just walking in the villages, patrolling inside the villages, just walk around. They cannot go to the bush."*

The KA Board member touches upon the one important limiting factor of the CCG and reason, ultimately, for the escalation of a situation in the park where poaching ends up affecting the whole community. The effectiveness of the CCG was severely limited by this factor, as he describes again due to limited authority:

> *"The CGG was watching for the poachers, doing the same job NDF is now doing, but our CGGs they would see the poachers and they [could not] arrest them because the poachers are armed, the CGGs are not armed. So if they saw [poachers] or heard their gunshots they might stand away and look for the place where the reception is working and report to the MET so that the MET is can come because [the MET] are also armed. The system was working but the system could not work well, I don't know what happened. The officers from the MET were not working very much. Sometimes they took time to get the report. If they took the report today they might come day after tomorrow to follow-up. CCGs did well, not MET."*

It is here in this small space where CBNRM misses complete devolved authority from government. While the CBNRM system is operational in BNP, conservancies of this program, and KA as a conservancy within the park, are not allowed full authority to govern their resources as they must seek approval for concessions and determine quotas which are ultimately determined by the state through MET. Repercussions of these aborted devolution feedbacks are discussed in Chapter V and stand at current as a snapshot of the levels of institutional resilience achievable for the livelihoods of people in Bwabwata West.

4.1.1.2.5.2.3.1. Opinions from the community on KA

KA as an institution, it was discovered in the course of this study, should also be noted for its divisiveness within the community as what it represents is empowering for one of the livelihoods and threatening, seemingly, for the other. This interesting interaction that the institution gives to the bridging capital between the Khwe and the Mbukushu is important as similar themes, at the bonding level, also influence the creation of resilience or the perpetuation of vulnerability positive feedbacks.

Many different people in the community who were interviewed had some opinion on KA and many of these were also very strong. One 60 year old Khwe Omega I woman, when asked about KA replied, "t*heir job is to protect the San community. They are a conservancy that stands for caring for the San people. They ask everything from KA and KA helps the Sans. It's the job of KA to help the Khwe people; only the Khwe people."* This controversial stance is supported by an opinion from a social worker *"KA is supposed to represent all of the people in this community, but now they're only [Khwe]. Only [Khwe] working for KA"* (SW2 2017). As expressed by a KA board member in the previous sub-section (4.1.1.2.5.1.3), despite these opinions, KA is an association that represents all of the people in the park.

These sentiments from the community, however, do manage to influence the success of KA through its projects. The creation of a traditional ecological knowledge academy and the success that KA may be able to have serving the community through this institution is one project which

has suffered hostility from other stakeholders. Alpers describes some negative sentiments from the community about KA and its projects, *"the Mbukushu headman in Mutc'iku attacks KA, lies about KA, acts like KA doesn't exist. So that is incredibly dangerous what he is doing."* Active resistance to the benefits KA provides to the community is seen also from a social worker— *"I personally think KA was a mistake, MET and KA appointed here is a lovely theoretical idea, but in my opinion it doesn't work, it has complicated it rather than sorting anything out"* (SW2 2017) and from local government officials,

> *"We are, for more than 10 years now, with that organization KA, but if you go to the community see what development this fund brought to the community, it is not good. KA, the money that they are getting most especially does not get to the people. The KA should be giving back to the community what they are getting in their account…not to give them N$100 [and] at the end of the day the mother or the father take it to the shabeen, they are killing."*

Whether it be envy from the community pulling down success between livelihood groups or that KA truly serves as a pediment to success for livelihoods in the community it is difficult to determine as these many different stakeholders have different sets of facts they seem to reference with these opinions. While KA has, like many other projects in this community and other economically impoverished rural parts of the region, had many turbulent starts to reach where it is as an association today, benefits and the rights that KA represents for the Khwe has been borne out of this institution and, thus far, this institution only.

4.1.2. Other Influencing Factors to Livelihood Adaptive Capacity within the SES

4.1.2.1. The Role of Rights: the Presence and Status of Entitlements and Rights

As the term 'indigenous' is vague and contested for on the continent, as all Africans under some definitions of the term could be defined as 'indigenous', the African Commission's Working Group of Experts on Indigenous Populations/Communities' defines the term with use of resources and subjugation by larger society, outlining also some of the specific issues faced by

such groups:

> *"Their cultures and ways of life differ considerably from the dominant society and their cultures are under threat, in some cases to the extent of extinction. A key characteristic for most of them is that the survival of their particular way of life depends on access and rights to their traditional land and the natural resources thereon. They suffer from discrimination as they are being regarded as less developed and less advanced than other more dominant sectors of society. They often live in inaccessible regions, often geographically isolated and suffer from various forms of marginalization, both politically and socially. They are subject to domination and exploitation within national political and economic structures that are commonly designed to reflect the interests and activities of the national majority. This discrimination, domination and marginalization violates their human rights as peoples/communities, threatens the continuation of their cultures and ways of life and prevents them from being able to genuinely participate in deciding their own future and forms of development"* (African Commission on Human and Peoples' Rights 2005, 89).

Generally speaking, there are many international legal instruments that include the right to 'self-determination' for indigenous people. Most importantly from these are the United Nations Covenant on Civil and Political Rights, the UN Covenant on Economic, Social and Cultural Rights, the UN Convention on Biological Diversity, and, most poignantly, the UN Declaration on the Rights of Indigenous Peoples. Regional support for these rights is also included in the African Commission on Human and Peoples' Rights (ACHPR)'s adopted November 2003 report that urges African governments to address issues of discrimination, rights transgressions and denial, and general marginalization of indigenous groups. The 2003 ACHPR report defines indigenous peoples simply as those groups with a reliance upon natural resources for survival who carry out subsistence livelihoods apart from the formal economy.

Several of these international frameworks that build upon rights-based approaches have been ratified by the Namibian government and therefore mean that the people may hold the government accountable for the provision of such rights. The UN Declaration on the Rights of

Indigenous Peoples (UNDRIP) was signed by Namibia in 2007, and although mechanisms outlined within the Declaration are not mandatory, reference to existing human rights documents which Namibia has also signed are enforceable. As Articles 4, 5, 19, 20 and 34 show[10], UNDRIP specifies clearly indigenous rights to self-determination and autonomy, including through the establishment and maintenance of their own institutions; right to carry out practices and customs; and the right to, through the prior-informed-consent process, consultation before legislative or administrative actions are implemented which may affect such groups.

The International Labour Organization's ILO Convention 169, a legally binding agreement, commits states to the adoption and enforcement of many human rights norms outlined in the UNDRIP. Ratification of this Convention would provide the specific legal framework for the enforcement of these rights more directly, however Namibia has not yet ratified this Convention.

Despite the relative recent conception of the modern Namibian State, no such legislation appears to outline the rights of Namibian indigenous peoples within the Namibian Constitution either. While there is mention that discrimination on the grounds of ethnic or tribal affiliation will not be tolerated, no clear 'rights' are reserved for such groups. The International Convention on the Elimination of All Forms of Racial Discrimination (ICERD), ratified by Namibia in 1992, provides further reinforcement for the protection of racial groups against discrimination, however, according to the highest office in Namibia overseeing the matter, racial discrimination of the indigenous San people in Namibia still occurs in the areas of leadership and recognition, control and access to lands, extreme poverty, low education levels, high prevalence HIV/AIDS and infectious disease, culture loss, and rights of indigenous peoples on protected lands (Office of the Ombudsman 2012, 37-40).

As another— one could argue more effective— approach to accomplish similar rights for indigenous peoples, has been the implementation of the United Nations Convention on Biological Diversity (UNCBD), ratified by Namibia in 1997. The larger three goals of the UNCBD provide the framework to adhere to and include the rights of the indigenous populations living with biodiversity; conservation of biological diversity; sustainable use of the components

[10] UNDRIP Declaration (see Appendix IV for specific articles)

of biological diversity; and fair and equitable sharing of the benefits from such resources. Using the conservation of natural and biological resources as justification for the protection of the indigenous people who have evolved, managed and lived beside such resources, has been the primary route for indigenous people in Namibia to access rights to livelihood and land. Articles 10(c), 8(j) and 18[11] of the UNCBD provide a clear foundation for contracting parties to protect the customary use of natural resources through indigenous traditional practices; preserve and maintain traditional knowledge of indigenous peoples; and allow development of technologies (perhaps also with the added interpretation of conservation monitoring technologies and practices) inclusive of indigenous and traditional technologies, respectively.

Furthering principles in the UNCBD, the Nagoya Protocol on Access to Genetic Resources and Fair and Equitable sharing of Benefits Arising from their Utilization (2010) supports the need for states to formalize access to genetic resources and benefits sharing from the utilization of those resources for the people who harvest them, particularly for indigenous groups. The protocol supports the implementation of key principles for indigenous peoples in the UNCBD, including association of traditional knowledge with genetic resources in the form of 'prior and informed consent or approval' and 'mutually agreed terms' for such cooperation (Article 7); pursuit of research to develop and understand the best conservation strategies for biological diversity (indigenous modes of knowing indirectly prescribed) (Article 8a); support of indigenous and local community customary laws, community protocols and procedures (Article 12); the establishment and support of national legislation to ensure utilization of genetic resources in accordance with practices of prior informed consent and mutually agreed terms via domestic access and benefit-sharing legislation (Article 15; Article 12:2); awareness-raising of such mechanisms and authority (Article 21) and capacity-building and development to strengthen and institutionalize the structures created in light of the Protocol (Article 22)[12].

Although Namibia became an accessed Party to the Nagoya Protocol in late 2014, the domestic legislation to create the framework for access and benefit sharing, as outlined in Article 15 of the

[11]UNCBD (United Nations 1992) relevant articles see Appendix IV
[12] Nagoya Protocol (Convention on Biological Diversity 2010) relevant articles see Appendix IV

Protocol, has lingered in draft form since its initial development in 1998. Nonetheless, this draft ABS Bill (called the 'Access to Genetic Resources and Associated Traditional Knowledge Bill') is tasked with carrying out the objectives of the UNCBD, namely Articles 15 and 8(j), which mention the need to create systems to allow access and management of natural resources and their sharing by local people, and the maintenance of indigenous peoples and their culture and practices while also including them in the benefits sharing, respectively. As a supplement to the UNCBD, the ABS Bill would also address directly indigenous peoples' rights within the Nagoya Protocol.

The rise of 'bioprospecting', external groups venturing into often indigenous or rural communities to gain access to and information on biological ingredients for food, drug or commercial monetization purposes and co-opting such goods for economic gain, has given rise to the need for ABS and the securitization of benefits for indigenous groups where many of these biological ingredients originate. So as to avoid 'biopiracy' and indigenous groups being intentionally cut out of the benefit-sharing from genetic resources, the UNCBD, the Nagoya Protocol and domestic ABS bills aim to provide protection to local people in the form of a necessary process of permission from the local providers for any of such activities to proceed. A need to provide 'Fair and Equitable Sharing' through these mechanisms and the mandate to have their 'Prior Informed Consent' (PIC); communicate with local providers and agree on 'Mutually Agreed Terms' (MAT) and to include and share benefits with local providers is a significant step toward ensuring 'rights' to resources for indigenous and local communities, the livelihoods of this study and the Khwe particularly.

Though the rights outlined in the UNCBD have been slow to materialize in Namibia, some domestic Acts of Parliament have been able to designate some land-use rights, rights to leadership and representation and rights to benefit and access to resources. More specifically, these acts are the Communal Land Reform Act of 2002; the Traditional Authorities Act of 2000; and the Nature Conservation Act of 1996, respectively. The Communal Land Reform Act of 2002 broadly established the system of communal land which is observed today with the help of TAs. Section 30 of this act requires TAs to be consulted and give consent to leaseholds for agricultural purposes on their land. A corollary act, the Traditional Authorities Act 25 of 2000

(*Government Gazette* No. 2456, 22/12/2000), out of which the country's customary law system is based, outlines the functions and responsibilities of traditional leadership and structure as overseers of that land. The functions detailed in the TA Act are to cooperate with government structures, enforce customary laws, provide counsel, support and information to their community and to encourage peaceful interaction between people and communities. By this act, ethnic groups such as the Khwe San people in Bwabwata National Park also are entitled to the legal right to elect a representative and leader in the community who is recognized by the national government. Together, these two acts, with the Nature Conservation Act which states the importance of natural areas, provide some basis for adaptive co-development.

Namibia's traditional authority structures and customary laws provide the parallel governance system possible to indigenous groups and local people that can represent them with and to government. Whether these systems are functional and operate upon implementation as the policy and strategies suggest, however, is debatable. Harmonizing the interaction between the levels of government with the parallel levels of leadership within the customary system and securing recognized leadership have been particular issues for the indigenous San Khwe people in this study.

4.1.2.2. Global Factors: Wide and Broad Stressors

4.1.2.2.1. Colonialism and History

> *"As I say, we were people living in the bush. Before the SA were there we were staying in the bush just by ourselves. We did not ever know the politics; why these people [are] like that or what are we fighting for. Then, when SA came, they just give food and bring people together in one place and start having someone who understands their language and having others talk to become a soldier. Now they just say that they are looking for SWAPO, they did not say why; who are SWAPO? They say that if we don't kill them, the SWAPO, they will kill us. [From] 1963 [to] 1968 the people did not know that this area was park. They didn't know that it was a park, [they] just [knew] that they couldn't shoot anymore. The way that the SA government treated us [then] is the same way that the Namibian government treats us. When they are talking about our area they talk there and*

decide there. They don't care about what we are thinking and who we are."—Khwe senior traditional headman

Eriksen & Lind (2009) note that significant events from the recent past have an influence shaping livelihoods of the present. As this Khwe senior traditional headman illustrates with his words, the imposition of the SADF forces in the 1960s began a series of events out of this collision of cultures and ideologies— one forgiving, the other less so—that would lead to the Khwe becoming involved in a power ecology wrapped up in Western conceptualization of resources. This is the story of the Khwe of Bwabwata West.

Prior to SADF occupation in West Caprivi, the Khwe were concentrated in the village of Mutc'iku (WWF 1997, 17) and spread distantly throughout the greater park area. When SADF arrived they forcibly removed the Khwe in the park to make way for military operations along a one kilometer wide strip along the Angolan border which was declared to be a fire free zone. At this same time, as the Khwe elder explained, the reputation of the Khwe as skilled hunters gained them employment as an extremely well-paid unit of the SADF called the 'Bushman Battalion' that was tasked with assisting SADF in tracking and defense against opposing Namibian independence forces, the People's Liberation Army of Namibia (PLAN), the armed wing of the South West Africa People's Organization (SWAPO). Incomes of Khwe in the Bushman Battalion were over 30 times higher than Khwe in communal lands (Dieckmann et al. 2014, citing Suzman 2001).

"We were working for money then. Everyone was working on the SA Defense Force. They gave us money to work with them. Every month they gave salary. It was all the tribes in Namibia, not only us which were employed by the SADF. But now, when the SA [left], they le[ft] all of the problems with the Khwes. What about all the others though? Even the Ovambos were working with the SA Defense Force. They were the biggest group. Their family, all of them— Chakati, Dambwa—they were big camps, but they don't talk about that. At Rundu, where now the military place is, all those Ovambos were employed; Capacha was for Caprivians. But they don't talk about those ones. It's only that now that the government has against the Khwe. I don't think there are other

problems. It's only that we were helping the white people. All those other people, other tribes, were not as good trackers. Other tribes are not good trackers— even now they are not. SA defense army knew the skill of the Khwe, [they] sought [us] out. This area was strong because they had the Khwe with them."—Khwe senior traditional headman

Times were good for the Khwe during SADF. In addition to a fresh infusion of capital in the form of cash SADF also provided services such as medical facilities and support, shops, schools, houses and food to residents of BNP during their occupation, places at which the Khwe could use this new capital (Dieckmann et al. 2014, 373). The political affiliations and context so as to understand any ramifications of Khwe involvement with the South African Army was, as the senior traditional headman explained, not given to recruited Khwe trackers and this deception into the wider political dynamics has since been the largest issue for the resiliency of the Khwe as they have struggled to extract themselves from wider power ecologies which still place them outside of a sphere of influence over their own destinies.

The War for Namibian Independence affected the area from the 1960s until the 1990s. Following Namibian independence and the withdrawal of South African forces in 1990, major changes continued in the region for the Khwe land as nearly 4,000 Khwe sought asylum in South Africa following the war for fear of the new SWAPO government retaliation (Brown and Jones 1994; Dieckmann et al. 2014). SADF's recruitment of Khwe during the war, for their hunting and tracking skills with finely attuned awareness of their natural environment around them, created barriers and the roots of discrimination between the indigenous people of the area and the newly victorious SWAPO government. SADF's influence throughout BNP was not limited to the scar of discrimination, but was also imprinted permanently upon the people of the region through lasting leadership issues (Brown and Jones 1994, 48) after and since the breakdown of traditional hunter-gatherer society and the newly determined land-uses for the area, as imposed by SADF and respected and carried forward by the new Namibian government. As one Khwe security guard for Culture Village project describes the transformation,

"I don't think the government came to ask the Khwe [before calling the land a national park]. They came to know after it became a national park, so they were not told. The

government also found from the SA government that this was a park, according to the history, it was already proclaimed a national park. After we got independence they also took that policy from the SA regime to right now as we are. We came to know that we are already in the park. As time goes on, as I said, as they have proclaimed this as a national park, that's when people came to know. That's when elders knew we were in a park but young people did not know. But these other people start coming in, like the Association, IRDNC, MET, they come in to the areas and control the wildlife and resources. That's when people came to realize we are now in the park. They started making signboards from that far end that from this kilometer to this kilometer that is the area and all those type of things."

One 75 year old Khwe women from Mutc'iku gives a similar recollection of the experience:

"That time they were very small and when those people came to the park to talk to the elders, the elders also thought that it was something good and they accepted that time. But the moment they came to realize that it was something that would stop everything for us to get food, clothes, and all these things—because that is the only place for us to get [them] — that is the time they feel really bad because they know that that was the time they could use only money because all the thing of us was stopped."

Erosion of the Khwe population in BNP occurred tangibly also in 1998, allegedly due to threats from the Namibian Defense Force, as 600 Khwe fled to Botswana for fear of persecution. Another 1000 left to Botswana when the Angolan civil war reached Caprivi in 2000 (Dieckmann et al. 2014, 368) as the area was tangentially involved in a bush war with Angola at the Namibian northern border.

While rhetoric and attitude gave Khwe further reason to be apprehensive about the new SWAPO government, the responsible authority over park matters after independence in 1990, the Ministry of Environment and Tourism (MET) (previously the Ministry of Wildlife, Conservation and Tourism) recommended in a report from the time that the inhabitants of the park be allowed to remain and gain benefit from conservation plans made for the area (Brown and Jones 1994, 53-

54) as the park was turned officially into the Bwabwata National Park in 1999 and park boundaries were extended to include the Caprivi Strip and Mahango National Park in 2007.

Despite this small concession to allow the Khwe to remain on their ancestral land, the removal of a dependency on the bush to income from services proffered to SADF, which utilized similar skills used in the bush, had a great and immediate effect on Khwe society and organization (Brown and Jones 1994; WWF 1997). Quietly enacted during the SA government's time in Namibia, the Nature Conservation Ordinance of 1975's Articles 22, 23, and 24, which prohibited hunting and picking of indigenous plants in a private game park or nature reserve was instituted, became slowly institutionalized through the emphasis of distant stakeholders' conservation priorities on what was once Khwe land. Little further support from government to ease a sustainable and resilient range of livelihood options after independence and ulterior motivations and designs for the land upon which the Khwe live has served to create the 'shadow landscape' (Bryant et al. 2011) that the Khwe of today currently find themselves within. One social worker describes her perceptions of how these interests have interacted since independence for the Khwe inside of the park:

> *"MET with KA as their working organization was supposed to have committees going and monitoring the people on the ground level to ensure how to help them and be there for them on the ground level and check on their livelihood and basically also advocate for stuff that they needed and whatever, but they never did anything. So now, 26 years later after independence, the people on the ground level sort of just carried on and now cope with their structures but the organization appointed by government to actually do something did nothing. It's one of those catch-22s where they are in the middle of a game reserve and they have to be tolerated because this is where they were left. Omega I is an old military base. They've made it a multiple use area they say, [but] what it means is that this was part of the war area, war zone, when we had the border war, so they literally have villages that these people were located to and they could stay in the military base and military housing, but it's now 26 years later and there's no maintenance that has been done, nothing has been looked after, but they still live there" (SW2 2017).*

4.1.2.2.1.1. The 'Veterinary' Fence: the Evolution of Institutionalized Boundaries for Khwe Livelihoods

Dieckmann *et al.* (2014) indicate mixed reactions to the construction of a veterinary fence in the middle of the park to limit cattle movement and interaction with wildlife. Another regional document notes that such fences were 'not well planned' and have been done on ecological contours of the land which prohibit free and natural animal movement (SAREP 2013, 10–11). Studies from the region find that veterinary cordon fences erected in Botswana to adhere to EU policies for beef export have been a significant limiting factor for those near or at a distance from these fences as adaptation strategies are limited by an inability to move or access resources for certain livelihood activities (Wilk and Kgathi 2007; Albertson, 1998). In Bwabwata West, while some Khwe expressed resentment over a restriction and physical boundary which would limit movement and veld food collection, a Khwe headman is quoted to be in favor of the fence in this Dieckmann *et al.'s* 2014 study, saying, *"the veterinary fence is a right thing; if it wasn't here, the cattle would get into the core area. The fence is only for animals, not for people"* (377). In the course of this study, whether it is the same headman or not was not possible to determine, but the Khwe senior traditional headman in Mutc'iku indicated disapproval of the fence and its placement, citing the use of the fence in the last few years as a fence to also limit the movement of people as well:

> *"The veterinary fence, our understanding, is there to prevent the cattle from grazing with the buffalo. That was the issue when they came and put the veterinary fence, but now they turn it to put the fence for us also. When they came to bring the fence they didn't say anything that it would be a human fence, no. The cattle are getting this foot and mouth disease so they said the fence was for the cattle, but after putting that fence it turned out to be our fence. The area directly across from the veterinary fence is the area for mangeti, our monkey orange, our water resources—a lot of our veld food are there. And now we are unable to reach there. Since they put the fence the local MET restricted us to go over the fence. The clearance for the line of the fence was in 1998-9 and later they came and put the fence in 2007-8."*

A 75 year old Khwe Mutc'iku woman echoes similar sentiments after the erection of the veterinary fence: *"When we were Khwe young people we could do things, but now it's difficult. This time there is a wire so people aren't doing anything on that side because of the fence to the bush. So that is the thing that has closed everyone's lives. No Khwe in the bush is what the government says."*

The contradictory nature of government interaction with the Khwe has been confusing and inconsistent, as is most clear through the power struggles and exchanges going on outside of the sphere of influence for the Khwe. IRDNC's Friedrich Alpers notes the inconsistency of the specified land-use designations for the Khwe and the physical boundaries which counteract rhetoric and policy in practice:

> *"Bwabwata's multiple use area means community access area. The fence is a veterinary fence from the Ministry of Agriculture. The core area is MET zonation. So the multiple use area was always open to the community, but some officials, MET officials, have told the community that they cannot go east of the fence and that's wrong. That's been since the fence was put there. Since 2007-8 the community has not been able to access this area."*

While in the policies and on the maps of the area the Khwe appear to have access to a larger 'multiple use area', in practice the political histories and palimpsest of power inherited by the current Namibian government from past colonial influencers still limit ambitions and larger ideas for livelihoods within the park. As manifested in the macro-politics of the region and paired with future plans of distant top-down influences, this almost impenetrable barrier for the Khwe is scarcely acknowledged or discussed outside of Bwabwata National Park, let alone brought to light and addressed by the underlying actors who hold the power and reigns to the situation.

4.1.2.2.2. Westernization and the Market Economy

"I was very strong when I was young. I did not know money. The money is your arrow and bow. The money is your strong stick to catch a spring hare. Your money is your body, how you feel."—Khwe senior traditional headman

The Khwe were very severely and immediately impacted by rapid changes in the transition to a market economy that started with the employment of SA Defense Forces, rapid declines in animal numbers from poaching by colonial powers in the area (WWF 1997) and replacement of lifestyle by force. As these words from the Khwe senior traditional headman of only 58 years illustrates by the disparity between how he lived as a child and what life looks like today for the Khwe, the magnitude of such sweeping societal and lifestyle changes is difficult to comprehend for most reading these words. Suffice it to say that the culture and information transfer from elders to children about the Khwe way of life during this massive transition was wholly and rather abruptly stopped (Brown and Jones 1994, 62) with the onset of both westernization that SADF brought and the influence of a different mechanism for the interactions and valuation of interactions for Khwe society.

Previous reports depict the ban on hunting game and the transition to a more sedentary life as almost welcome change for the Khwe men, citing that few seemed to exhibit interest in continuing to hunt or learning to hunt from elders (WWF 1997, 14) and actually preferred to partake in activities that would generate cash. Social anthropologist Gertrude Boden describes the change in mindset of men employed by SADF and the allure of this foreign system and new livelihood opportunity for Khwe of the time:

"At that stage they were no longer allowed to hunt, but also at that stage the army offered jobs. So for the men, they could just earn money in the army and they did not actually have to hunt to support their families. They could earn money and spend in the shops so they were 'big men' actually at that time. The men were [in] high [positions] at that time. Then when the SA army left it was actually the men who had nothing because they were not allowed to hunt and could no longer do their job in the army so they were just hanging around doing nothing while the women were still caring for the household. A lot of work in the fields is women's work. The women were, at that stage at least,

allowed to gather in the bush. So the women could still do things, but the men had nothing."

As Boden describes, the gathering and venturing into the bush to collect other foods, however, continued on through the bans, and, as observed in this research, is still done in a controlled sense under some official (Devil's Claw harvest) and unofficial means, though limited by the veterinary fence line.

The changes to a market economy have mixed reactions— as expected— from the people and community stakeholders. One 74 year old Mbukushu man from Indongo commented on the increased resilience to climate shocks that the presence of shops and development has had in the community:

"[During] the drought of a long time ago (1964, 70, 84) [we] were very vulnerable, the government couldn't even help, [we] didn't even have shops—only 1 shop in the whole village a long time ago. In this time the government gives help and they have shops to buy food at and [we] have drought relief when it gets very bad. It was worse in the past without the development."

While the benefits of increased access to services can provide support to people living natural resource-dependent lifestyles, the increased appetite for other aspects of westernization to accompany a shift toward a market economy draws other opinions from social workers in the community; *"Once they come to the area where the people are, the young people become more westernized. They want a cell phone. The more traditional living people seem to be coping better"* (SW2 2017), and, *"Honestly they are not to blame. We are also in a materialistic world where, due to peer influence, once in a while they are exposed to peers with modern gadgets and they also want to have such and they end up not resisting the temptation…"* (SW1 2017).

4.1.2.2.3. Conservation and the Allure of Touri$m

With a steadily increasing annual income from N$600,000 in 1998 to N$45.8 million in 2010 (NASCO 2011), CBNRM's figures are convincing from the perspective of country economic development, rural development, and natural resource conservation. Dissecting these totals in a bit more detail, joint-venture tourism lodges and camps (N$18,682,342 in 2010), consumptive use of wildlife (N$17 million in 2010; N$11.4 million of in the form of cash from trophy hunting concessions and N$4.4 million in in-kind contributions such as the meat byproducts from trophy hunting concessions), and employment opportunities for community jobs associated with these conservancies (N$1.2 million) (NASCO 2011) are the primary sources of income for conservancies nation-wide.

Currently, the World Travel and Tourism Council estimates tourism's contribution to Namibia's GDP to be 20.5% in 2012 (MET 2016, 13) with a total of 27% of the Namibian employment is in some way related to travel and tourism (MET 2016, 13). On the national level, Namibia aims to become the highest ranked country for tourism globally (MET 2016, 8), currently ranking 5th compared to countries in Sub-Saharan Africa and 91st globally in 2012 by the World Economic Forum's Travel and Tourism Competitiveness Index (MET 2016, 14).

Plans to accomplish sustainable development goals are actionable within the national planning and goal setting frameworks which delineate further focus on tourism and resource conservation by endogenous communities, as outlined in Namibia's Green Plan (1992), five-year National Development Plans (NDP) and Vision 2030 document (adopted 2004). Evidence of progress is shown through the country's Third National Report to the UNFCCC by some of the programs successfully implemented since the publication of the previous report: improved and extended tourism services, infrastructure improvement, and a strengthening of the National Conservancy Information System to provide better information about the status of the country's natural resources (Namibian Government 2015, 149). Recent tourism contributions to the country's GDP, at a total of N$3.8 billion in direct income for 2014 (Namibian Government 2015, 149) is the starting point for continued emphasis and development of the sustainable tourism regime. As one of the fastest growing sectors in the Namibian economy (Namibian Government 2015, 149), this sustainable tourism emphasis, as a route to development and natural resource conservation,

has the potential to provide much benefit to the country and to local communities overseeing the resources via 'sustainable development'.

The further growth of CBNRM under the expansion of tourism goals provides a vehicle and mechanism for the attachment of development goals to tourism goals at the national level, thus creating this 'sustainable development' pathway. As methods to accomplish the three overarching goals referenced in the NDP4, the sectors of logistics, tourism, manufacturing and agriculture are specifically targeted for programs within the next period. Namibia's ambitious goal and strategy to become the most competitive tourist destination in Africa by World Economic Forum Travel and Tourism Competiveness Index by 2017 (Desired Outcome 7 of NDP4) is explicitly enumerated and targeted as a goal for the future in NDP4.

Tourism is a theme which also appears prominently as a national focus within Namibia's Natural Resource Sector Vision 2030 strategic goals for wildlife, tourism and biodiversity, targeted through the following objectives: '(1) Extend and maintain well managed parks and nature reserves; (2) Extend CBNRM to all viable rural areas and by so doing improve livelihoods; (3) Protect Namibian tourism potential through low impact, high quality tourism; (4) Include 'biodiversity hotspots' in the protected area network; (5) Tourism and wildlife to increase economic growth in Namibia; (6) Cut biodiversity loss; (7) Provide equitable access and tenue over natural resources through CBNRM; (8) Foster strong partnerships between and with stakeholders; (9) Create vibrant, productive rural areas' (Office of the President, 2004; Namibian National Planning Commission, 2002). Within the Vision 2030 document, a plan that identifies an extension of CBNRM initiatives, advocates the need to also do more with CBNRM. The creation of a sustainable tourism practice throughout the country that goes beyond the use of wildlife and tourism and provides further and more substantial benefits and livelihood options to Namibia's rural resource-dependent-livelihood communities, hailed as a viable strategy for poverty reduction in rural areas, is proposed as this needed measure (Namibian National Planning Commission, 2002: 68). As a young country, Namibia's recent independence in 1990 allowed it the be the first country in the world to structure environmental preservation and sustainable development directly in the Namibian Constitution (CIA 2009) within Articles 95(l)

and 91(c)[13]. This framework provides fertile ground for CBNRM to take root, yet the interpretation of these Articles does not distinguish between conservation and sustainable development, as in practice these disciplines have still yet to fuse.

4.1.2.2.4. Development versus Conservation: Conservation Priorities as a Guarantee of a Future Denied of Rights?

As a part of larger regional plans to advance tourism and conservation, the Kavango Zambezi Transfrontier Conservation Area is an initiative to bring together areas in Zambia, Namibia, Botswana, Angola and Zimbabwe for the creation of a wildlife and conservation zone that is one of the largest continuous conservation areas in the world[14].

Established on 18 August 2011 after negotiation with the Republics of Angola, Botswana, Namibia, Zambia and Zimbabwe, the KAZA TFCA pact *"establish[es] a world-class TFCA and tourism destination in the Okavango and Zambezi River Basin regions of Angola, Botswana, Namibia, Zambia and Zimbabwe within the context of sustainable development"* (KAZA TFCA Secretariat, n.d.). The goal of the KAZA TFCA and now its prioritization at a regional level for tourism development (and therefore all other development on the land), as laid out in the KAZA TFCA treaty, is to

> *"sustainably manage the Kavango Zambezi ecosystem, its heritage and cultural resources based on best conservation and tourism models for the socio-economic wellbeing of the communities and other stakeholders in and around the eco-region, through harmonization of policies, strategies and practices."*

As one of the main strategies and points of approach for accomplishing objectives in the Namibian component of the KAZA TFCA project, Namibia plans to *"focus on securing the national conservation estate [through State and community involvement] as well as supporting CBNRM"* (MET 2013, 36). Developing and managing North East Parks within the KAZA area is

[13] Namibian Constitution (see specific articles Appendix IV)
[14] See KAZA TFCA map in Appendix III

a project borne out of this strategy (MET 2013, 37), and together these parks are identified as a 'development engine' for the region due to the wealth of natural assets and tourism potential of these parks (MET 2013c, 2). Further restructuring and potential reassignment of land in these parks in accordance with conservation priorities is also planned for the future through Integrated Region Land Use Planning projects (MET 2013, 42). This last aspect of land reallocation to conservation purposes foreshadows what could potentially become even larger tracks of land claimed by KAZA. Declared protected area is left quite vague in the proposed land use IRLUP for the KAZA TFCA project, *"increased tourism access and movement is essential if the benefits of tourism are to reach a wider audience, especially the areas that form part of the conservancies and community forests. .. enabling tourists to easily reach more remote areas within the KAZA TFCA landscape".* Furthermore, this document *"emphasi[zes] the need for conservation planning to be integrated with planning of other sectors"* (MET 2013, 42).

These brief but significant clauses could provide enough of a claim for later use as a foundation for assigning further human restrictions in the name of conservation, thus limiting a larger area to tourism-only livelihood options for Khwe and other endogenous communities of these areas. Explicit mention of the KAZA TFCA project within the BNP management plan gives this regional plan credibility and priority. As a tertiary Park purpose it states:

> *"The management plan for BNP prescribes the two core purposes of the Park, namely to protect the biodiversity and to maximize the potential for regional economic development. The plan further explicitly recognize the position of Bwabwata National Park in KAZA TFCA"* (MET 2013, 47).

Language within these planning documents provide suggestions for communal land to be turned into a nature reserve/natural park *"to support the ecologically migratory routes of wildlife [as] has been advised by conservationists"* (MLR 2015b, 25). These wildlife corridors, which are "*kept free from development*" are proposed to eliminate human wildlife conflict (HWC) by removing the 'human' and prioritizing 'wildlife', to promote conservation for tourism end-uses in the region. This, however, as a plan to remove the 'conflict' of 'human-wildlife conflict', is very much dependent on how such a plan is implemented. Simple establishment of a KAZA

TFCA area will not provide 'conflict''s opposite unless it is also done with, by, and for endogenous communities (ref. section 2.1.2.1).

At the time of writing, mitigation for further HWC on what would be the remaining development in the region is suggested by this IRLUP to be remedied through the use of *"chili bombs, better herding and quality kraals where predators cannot see the cattle; fencing of fields and 'buffer areas' and land-use planning"* (MLR 2015, 25). The KAZA TFCA land-use plan lends further support to what it proposes within the document by explicitly giving support to itself, *"being part of the KAZA initiative is an opportunity for the region. A sub-regional marketing strategy focusing on the main tourism areas will also lead to more opportunities for the region"* (ibid). Little mention of livelihoods and livelihood expansion and diversification is mentioned in this land-use plan, with the exception of a small section at the end of the report listing diversification activities for the "*majority of households in the region [which] are dependent on subsistence livelihood activities"* to include *"harvesting of natural resources such as Devil's claw; grass; reeds and fishing; arts and crafts and tourism and hunting"* (MLR 2015, 66). Despite a potential to manage land through adaptive sustainable co-development techniques such as fully devolved CBNRM, the exclusion of a discussion of how livelihoods are included in this plan hints at a 'people-less' kind of conservation devoid of 'sustainable development'.

As will be discussed in the form of a vulnerability feedback loop in Chapter V, formed by the prioritization of conservation over development when conservation is determined to be 'people-less', speaking with the people of Divundu and Bwabwata West unveils a different perception of conservation priorities and the struggle to live with 'assets' that become hazards when animals lives are prioritized over human ones.

While many of Divundu and Bwabwata West quietly observe poaching bans, as 54 year old Mbukushu man from Indongo shows *"[I don't] hunt as the government says that people cannot kill wild animals so [I don't] do it [because I'll] get arrested. Even rabbit, [we]'ll leave them because [we] know the law. Everyone understands so no one kills it,"* others, like one Mbukushu headman, notice the rights abuses through the apparent contradiction in what he understands fairness to be,

"If I kill an elephant less than 6 months old I go to jail! Whether [it] is a buffalo or what, I have to go to jail. The people who were putting up this policy they never mind about the people, they only mind about the animals. I have the policy—it's with me to see if it [stays] true or not. Really it's not fair."

Although the extension of an area where herbivores and other large megafauna that shape the savannas of Africa (Asner et al. 2009) is a positive for the genetic exchange and survival of the biodiversity of species present, these critical points about conservation priorities and wildlife rights over human life rights does not uphold the value of fairness to the people on the land. Such a stance also serves as a very critical departure from resiliency that leads to further vulnerability— instead of resilient development pathways— for both livelihoods of this study.

As the community becomes further estranged from the animals they keep for someone else, animals that also turn into hazards for them instead of assets— *"[we] hold the Ministry of Tourism policy to not shoot animals so it's not fair that [we] get no support when animals cause damage"* (Mbukushu headman 2017), perverse incentives to degrade the commons (Ostrom 2005) become the root of positive feedback loops. Once this important insulating layer of the community is broken down and the competition instead becomes one of who can take the most resources for himself, further exploitation is opened up for the likes of distant and obtuse power interests who may decide how to 'manage' their resources.

4.2. Assessing Vulnerability through the Multiple exposures to Stresses

While many sensitivities have the capacity to become doubly hazards as well, (e.g. priorities of the Bwabwata West land given to conservation generating incentives to poach wildlife for international trade markets) this sub-section explicitly sets out some of the most obvious threats and 'hazards' (IPCC 2014) to livelihoods in the study area while also understanding that many of the aforementioned sensitivities could also be considered 'sensitivities'.

Globally, river basins are the most threatened environmental resources due to the pressures from both humans and ecosystems and their needs for water (Brouwer et al. 2001). In DeStefano *et al.'s* (2010) study of 'at risk' global transboundary river basins to assess vulnerability through climate change's effect on hydrological cycles and the lack of institutions or treaties to manage water resources, 10 of the 16 discovered 'at risk' river basins were located on the African continent.

At the regional level, in 2011 the Permanent Okavango River Basin Water Commission (OKACOM) finished a basin-level assessment and analysis of river system function—the Cubango-Okavango Transboundary Diagnostic Analysis (TDA). Scientific assessments were made for ecological, social and macro-economic parts of the ORB SES and use of scenarios and projections were used to inform estimations about how elements of the system would be impacted by future possible developments or changes within the basin. Hydrology, climate and social criteria of the basin were mapped in the TDA, gaps in data availability were identified and data sets were combined and standardized for comprehensive assessment. Findings from the analysis of socio-economic and water resources identified four main drivers of change from the TDA: population dynamics, poverty (discussed in this research as a sensitivity), land use change, and climate change (OKACOM 2014). These findings inform the broad scope of hazards for this research as well.

4.2.1. Climate Change

Population growth, development, and increased abstraction are all areas of concern for future water resources in the ORB, but modeling from Murray-Hudson et al. (2006) shows how the highly uncertain factor of climate change (Hughes et al. 2011) may have effects on the Delta that measure at least one order of magnitude greater than the effects from human development and any changes to the Okavango River as a result of human impacts. Already a highly sensitive system to climate change (Roy et al. 2011), further climate stresses could be enough to significantly compromise livelihoods and ecological functioning in parts of the ORB, including those parts of the study area.

Africa generally is set to show warming above the global average throughout the year and across the entirety of the continent (Boko et al. 2007) with dry and semi-arid Africa projected to experience a 20% decrease in growing season (Boko et al. 2007)— a significant change for livelihoods dependent upon natural resources. At the regional level, intensifying El Niños as a result of anthropogenic warming in Southern Africa also caused devastating droughts in 2016, findings supported by perceptions of people interviewed in this study, potentially also indicating that climate shocks may be more influential and vulnerability-inducing than across-the-board warming (Funk et al. 2016).

Much quantitative hydrological modeling has been done in recent years to understand and quantify the effects of climate change and development in the ORB (Andersson et al. 2003; Hughes et al. 2011; Andersson et al. 2006; Gumbricht et al. 2004; Murray-Hudson et al. 2006; Wilk et al. 2006). While some of these studies show that climate change compounded by water diversions for human needs will result in higher temperatures, less rainfall, and decreased magnitude of water flow to the Delta (Murray-Hudson et al. 2006), much uncertainty remains regarding the magnitude of the immediate 2020-2050 changes for the basin overall (Andersson et al. 2006). Murray-Hudson *et al.* (2006) extend scenarios related to development and climate change to ecological effects, such as changes in distribution, extent, frequency and duration of changed water flows, to determine that the combined effects from the various sources of change to the Okavango Delta produce inconclusive results, as single variable changes tend to produce effects contrary to expectations. The study also notes that modeling the variation of other ecological functions within the Delta sufficiently enough to allow for completely accurate mathematical models is very difficult due to insufficient data from the ORB.

Using the Pitman model, proved to be fairly accurate when calibrated against historical climate observations, Andersson *et al.* (2006) use four global climate models (GCMs) to show future hydrological scenarios in the ORB. For the 2050–2080 period, all four GCM model projections indicate a likely reduction of 14-20% in mean annual flow of the Okavango River, and depending on the scenario, the results from this study indicate that climate change will *"likely to have a proportionally larger impact on minimum monthly flow compared to mean flow, with*

reductions in minimum flow of 27% (20%) and 36% (29%) for the 2050–2079 and 2070–2099 periods, respectively, under the A2 (B2) GHG scenario" (Andersson et al. 2006, 53).

Using data from an ensemble of 7 climate models from the results of the IPCC AR4, Hughes *et al.* (2011) ran 1000 simulations for 7 models using the simple potential evaporation demand approach to build upon information found in these earlier ORB climate assessments. Significant results regarding the magnitude of change in the basin were found; 5 of the 7 GCM models showed a change upwards of 10% for ORB mean annual flow under the 2°C of warming scenario compared to global mean temperatures from 1961–1990; 3 models showed a change of at least 30%; 2 models indicated a change in the peak times of water flow discharge; and at 4°C or greater warming 1 GCM model showed results which led to the drastic total loss of wet season runoff high points (Hughes et al. 2011). Disagreement between the results of the models, however, show that high uncertainty remains for the direction and magnitude—lower or higher— of changes to river flows. Casting uncertainty also on the results from previous studies of the basin, Hughes *et al.'s* (2011, 938) analysis comments upon results of Andersson *et al.'s* (2006) assessment of climate change and development in the ORB to say that such studies may have *"underestimated the magnitude and uncertainty of potential future changes"* within the region.

Rainfall projections for Namibia vary greatly, but an expected increase in late summer rainfall is shared across the country with northeasterly regions of the country expected to see increases in rainfall during the January to April months (MET 2013d, 17). Historical recorded mean rainfall recorded near to the study area at neighboring town Mohembo, Botswana (-18.12, 21.68) from 1933 – 1999 was indicated by one study to have increased by 14% from the periods of between 1931–60 compared to 1961–90 (Conway et al. 2008).

Regionally, higher temperatures and decreased precipitation is anticipated at the basin-wide level, evidence which is supported by IPCC reports (Niang et al. 2014). Variations in the position and dynamics of the Intertropical Convergence Zone (ITCZ) summer rains may occur with greater variability than before as the zone is expected to extend further south in these reports. Greater uncertainties for summer rains, coupled by Namibia's already arid summers could also

further jeopardize adaptive capacity thresholds and livelihood resilience within the ORB. Dirkx *et al.* (2008) express high certainty that Namibia will experience hotter temperatures throughout the year in the future, anywhere from 1-3.5°C in summer to 1-4°C in winter for the period of 2046-2065. A rise in number of days of the year with temperatures of 35°C or over in the past 40 years and fewer days with temperatures below 5°C, was also identified in this research, suggesting generally warmer temperatures in Namibia's future if trends continue. Local rainfall and temperature projections for Divundu as compared to historical trends is given in Appendix III.

Natural variation in the rainfall of the ORB make it difficult to predict how increased precipitation will impact the livelihoods of the study area, but it is estimated by this research that increased rainfall would be less likely to cause vulnerability to livelihoods of the region than decreased rainfall. This should likely be the case unless increased rainfall occurs in the form of truncated high quantity events instead of throughout the season.

4.2.2. Population Changes: A Growing Population

Estimated to have pushed 204,024 people out of their homes in the Angolan Okavango area (Porto and Clover 2003), neighboring Angola's ceasefire in 2002 has laid the foundation for a future of certain development in the stability and wealth of natural resources preserved both by the livelihoods of the area and the instability in the region and lack of development in the past (Weinzierl & Schilling 2013). Referred to as the 'sleeping giant', Pinheiro *et al.* (2003, 114) describe Angola as, *"a sleeping giant that will come alive and that may have severe consequences for the future availability of water for Namibian abstraction and the Okavango Delta."* As one of the more populous places of the region, recording roughly 5,400 people at the last census in 2011, and as a growing economic hub in the Kavango East region, one social worker shares the appeal of Divundu as it starts to attract people from outside town limits,

> *"Everyone is moving to Divundu, they see it as their town. It's an upcoming town. It's a village council now so a lot of people just move, migrate, shift to Divundu from [surrounding] villages. Divundu is the center of the whole district. It's a melting pot,*

mixed. Some end up erecting illegal structures, shacks, what you are seeing there. It is because of that belief that things are fine, maybe I'll be able to get a job [there that they come]" (SW1 2017).

Interviews with the people of Divundu and Bwabwata West indicate also that it is most common for residents of the area to remain in the area into adulthood, a source of human capital for the region.

4.2.3. Land-use Change and Development

As one of the least developed river basins in Africa (Green et al. 2013), the ORB's natural variability in the context of this pristine natural environment actually makes for a fairly stable current picture. An extensive assessment of the resources of the ORB done in 2011 to assess the current state of affairs, both socioeconomically and environmentally, concluded that the highest user of the water in the Delta is currently the natural environment itself (Barnes et al., 2009; OKACOM 2011a). Additionally, where humans are involved, there is little conflict in the region over water to date (Green et al. 2013) and where conflict has arisen it has occurred between riparian states in the form of mere verbal disputes between Botswana and Namibia over proposed water allocation or development projects (Mbaiwa 2004).

Nevertheless, the migration of returning Angolan refugees has scholars and scientists of the region concerned about potential environmental impacts of an unpredictable and unstructured change in population that is expected to impact the ORB as people return to their homes and stability in the region is restored (Mbaiwa 2004; Hughes et al. 2011). Although many barriers exist before development may take place, preparations are being made by the Angolan government to devote resources to development following the war by laying the groundwork for the institution of basic services, improvement of roads and infrastructure, and provision of water and energy for the population (Pinheiro et al. 2003). Major investment programs are also underway to provide jobs to the people of Angola, laying the foundation for livelihood creation further upstream of the study area.

With the increased population also comes associated with that increased water needs for people. As the TDA describes, most of the people in the Kavango region of Namibia settle in a narrow strip along the banks of the Okavango River so as to access water resources for human consumption and livestock (OKACOM 2011b). While no major water diversions from the Okavango exist currently, and only a comparatively small ~ 90 million m3 have been withdrawn to date (FAO 2014), the largest of which for supplying urban centers with domestic water needs around the Delta (Pinheiro et al., 2003), water needs from domestic use, livestock and irrigation are projected to increase to 500 Mm3 - 3,871 Mm3 in the future based on development scenarios (FAO 2014). The need for water that accompanies development and increased population is expected to stress the Okavango River's water provisions, potentially compromising also ecosystems and human livelihoods downstream (Pinheiro et al. 2003; Porto and Clover 2003).

As the middle, dry country of the ORB, thirsty Namibia currently uses 20 million m3 of water from the Okavango River for agricultural and urban purposes (Pinheiro et al. 2003). In order to continue to meet current and future socio-economic activities in central Namibia, 250,000 people are expected to need more water from the ORB in the future (Pinheiro et al. 2003). Although there have been rather controversial discussions of large infrastructure projects to supply Namibia with water from the Okavango in the past, no action has been made to date on such plans (Weinzierl & Schilling 2013). The most notable of these past discussions was the discussion of a plan for the Eastern National Water Carrier, which would have brought water from the Okavango to the capital city of Namibia, Windhoek, and surrounding areas by 1986 (Pinheiro et al. 2003). Despite resistance from the communities along the river after previous proposals, a 1993 assessment of Namibian water resources indicates that the creation of large scale water projects which draw upon the Okavango will likely take place sometime in the future (Andersson et al. 2006; Pinheiro et al. 2003). Of those large scale projects, the potential for expanded irrigation projects to support a burgeoning population is also a significant concern for water availability (Andersson et al. 2006; Andersson et al. 2003; Hughes et al. 2011) if ecosystems along the ORB are not carefully considered in such planning. Furthermore, increased agriculture in the Angolan highlands brings with it risks of eutrophication for downstream users as well, potentially compromising water quality (Ellery & McCarthy 1994) if not properly managed.

4.2.4. Economic Stresses

According to the Namibian Government's Third National Communication to the UNFCCC (2015) the Kavango region is identified currently as the second most vulnerable tourism region in the country to climate change, expected to become the most vulnerable if current population projections continue. As one of the largest potentials for development, threats to tourism, particularly for the limited livelihoods available to Bwabwata West residents residing inside of the national park, are a hazard to the resiliency potential of livelihoods in this study. The effects of any decreases in the critical water resources to the region would impact the national economic outlooks for both Namibia and Botswana as a large part of the GDPs of these countries— 14.9% in 2014 (Turner 2015a) and 8.5% in 2014 (Turner 2015b), respectively— depend upon a productive tourism economy.

Having discussed poverty as a particular sensitivity for both livelihoods of the study area as well, poverty is a large issue and doubles also as a hazard. The magnitude of the issue for livelihoods in this study is encapsulated succinctly in some words from one of the social workers, *"[this is] the biggest problem [for this community generally speaking] — the disillusionment of poverty. Poverty is difficult to live with"* (SW2 2017).

4.2.5. Health Stresses due to Climate Change

In Namibia climate is expected to increase vector borne diseases such as malaria, decrease access to clean water and further jeopardize water sources by contamination during large flood events (MET 2013d). Furthermore, an expected increase in heat-related illnesses will cause further vulnerability for heat-sensitive groups such as young children and the elderly (MET 2013d, 37). While many of those interviewed in this study reported observing livestock falling ill or dying due to severe drought or high frequencies of rainfall, continued health stresses as observed in this chapter's earlier discussion of health sensitivities from the community, are expected to continue to be a source of stress in the future.

Despite the high level of uncertainty in the ORB's future, climate change, increased development, population and water needs, increased temperatures (Hughes et al. 2011) more variable water discharge (Murray-Hudson et al. 2006; Arnell 2003) and the prominence of climate change impacts over impacts from development scenarios (Andersson et al., 2006) can be fairly certain conclusions from the assessments done concerning the ORB's future. While these changes do not inherently threaten the balance of the system, sustained increases and pressures in the direction of further water resource scarcity for parts of the Okavango would jeopardize the system's ability to absorb the change (Green et al., 2013). Since climate changes threaten to destabilize systems with even resilient government structures (Dinar et al. 2010), understanding the impacts of climate change, particularly within the context of socio-economic elements for development models (Andersson et al. 2006), will be critical.

Chapter Five: Discussion

5.1. Assessing Adaptive Capacity Gaps by Identifying Vulnerability Feedbacks

From the assessment of SES and livelihood sensitivities and exposure to anticipated hazards discussed in Chapter IV, this chapter will analyze emergent vulnerability cycles to identify gaps in adaptive capacity of the two livelihoods of this study, conducted prior to and leading up to conclusions made about SES resiliency and recommendations to create such in the context of climate changes in the future for the livelihoods of this study.

Adaptive capacity gaps according to the literature has found that rapid economic and population growth, coupled with poverty and weak institutional structures can be a particularly vulnerable combination for livelihoods (Tucker et al. 2014). Tucker *et al*. (2014) find from a study of African hotspots of vulnerability that limited livelihood options and rapid development are the fundamental underpinnings to vulnerability in many cases. As such, determining availability and access to other livelihood options as a means to diversify and create resilience is critically important (Bizikova et al. 2014).

Gaps in adaptive capacity as laid out in a USAID SAREP Okavango climate change vulnerability report (SAREP 2013, 28) note a loss of knowledge about crop cultivation connections with indigenous traditional knowledge as a result of HIV/AIDS or migration to urban centers and the need for increased focus upon the food security gap and conservation agriculture. A large study from the Okavango Delta collected information from 117 questionnaires to find that the livelihood activity of dryland farming, though deemed the most important livelihood activity of the region, was considered by respondents to be highest risk and of the lowest benefit (Wilk & Kgathi 2007). Changes in social structure, originating from mindset changes from an informally-based economy to a monetized formal economy, was found to lead to an increased reliance upon government assistance, a finding also supported by this research. Adaptation strategies such as livelihood diversification and migration were also observed to be limiting mobility and access to alternative livelihood resources in the Delta because of veterinary cordon fences (ibid.).

At the level of institutions, adaptive capacity gaps exist where the need to increase conservancy governance, particularly where financial governance and creative beneficiation schemes from wildlife are concerned, as noted by the USAID report (SAREP 2013, 28). While Eriksen & Lind (2009) note that government and outsider intervention can, at times, be disruptive to natural adaptation and resilience-building in rural communities, these gaps are also particularly relevant for this case study as well. As a source of capital through successes won via the securitization of rights for Khwe hunter-gatherer livelihoods, identifying gaps at the institutional level for the Khwe livelihoods are important sources of bonding and bridging capital within the community as well.

Mortimore & Adams (2001) give a model to show vulnerability loops from an examination of household livelihood and farming systems of indigenous groups in the Sahel's northeast Nigeria. This model is relevant to the adaptive capacities of both livelihoods in this study, particularly for the Mbukushu. Unlike the Mortimore & Adams (2001) model, however, as seen in Figure 14, the step extended from animals for the Mbukushu and Khwe livelihoods is marked not by business, but by government pensions, disability grants, social grants and the like, thus creating spin-off and detrimental vulnerability positive feedback loops. Main adaptive capacity feedback loops as determined from the interviews of this study are discussed below.

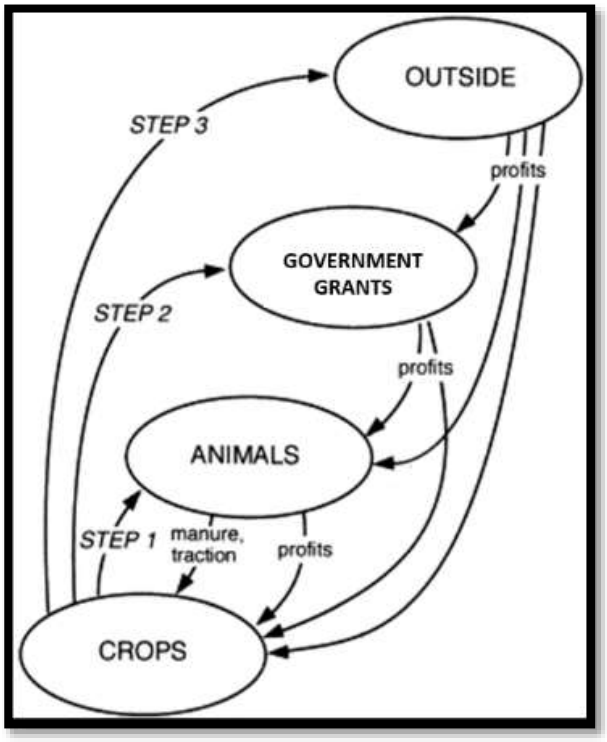

Figure 14: Vulnerability loops for the Mbukushu and Khwe, adapted from Mortimore & Adams (2001)

5.2.6. Capitals Vulnerability Loops within the SES

5.2.5.1. Ecological Vulnerability Loops:

5.2.5.1.1. Abundant Land Resource

One of the most obvious reasons for Mbukushu and Khwe to allow vulnerability loops to be created is built upon a larger rich and healthy base of relatively pristine natural resource assets. The most common farming technique of Mbukushu farmers, specifically named by 6 of the 16 Mbukushu farmers interviewed, was the practice of shifting agriculture, only possible when land resources are abundant. This technique entails finding a whole new plot of virgin land to farm atop once soils are exhausted in one location, leaving the previous ground fallow for however long. Offering the perspective of an outsider born from the region but not a Namibian, the Zimbabwean social worker notices the dearth of development in ingenuitive farming techniques that arises out of a lack of need for them due to what he alludes to be unnoticed wealth:

> *"They have also not mastered the art of fertilizing, organic fertilizing. If you move around here you see any place where you see a thick bush [of] nice grass, green, green, there was a cattle corral there. My friend! …Here if the corral is muddy they shift and put [animals on] the other side. I don't know why they are not actually [making these connections…]. The next season there is a lot of verrrry big grasses there. Why don't they think that if the grasses are growing like this that there is a secret to this? Slowly there are some people, but they haven't gone that extent to see that they can work to make manure, but some see that they can make this manure useful. Some are putting their crops there, but with time they'll know"* (SW1 2017).

While these practices are possible given the very low density of the human population in Namibia and the abundance of land managed by wildlife and endogenous peoples, a combination of increasing population and a focus on a market economy not directly or intrinsically tied to environmental attention and sustainability could be factors to create significant vulnerability for livelihoods of the region, potentially also compromising the long term health of the SES. The social worker again gives his observation on the abundance and use of land by the people in the community:

> *"Look at the way the Kavango people survive. They have a lot of land available so they are still practicing shifting cultivation. They don't have permanent houses, it's only nowadays that you can see them building permanent brick houses, but if you go around*

here you [will] see that those are grass thatched structures and that next year they have shifted to another place because there is still plenty of land. The whole part of [the country] is not habitable because of the desert, it is only this region and Zambezi which is supposed to be the breadbasket of Namibia. These guys are privileged, these Kavango regions, East and West and Caprivi region, they are supposed to be feeding Namibia. Those they are the ones feeding Namibia through this micro-irrigation program from the government— the Green Scheme. They are here. But it's not enough. Individuals are supposed to be surviving on [their] own, independently, because they [have] land, very fertile land, [they have] a river."

He also comments on the abundant water resources that flow through the community, seemingly without anyone noticing, *"every time I see [the river] I say 'if my father would come here he would cry', because [he and Zimbabweans were] struggling with [their] stream. Come August it [would be] dry and we [would] have to dig to get water. [We would] dig deep in that stream to get water to be able to water [our] vegetables all year. Now, here, there is water running throughout the year and no one is doing anything with it."*

5.2.5.1.2. Cattle Replacing Natural Wildlife in BNP

While it is difficult to assess directly those impacts of cattle in Divundu where cattle are allowed on communal land, complaints from both Mbukushu and Khwe interviewed indicate that lackadaisical or absent sheparding of cows and goats cause many people in both areas damage to crops and livelihood assets. Furthermore, four Mbukushu respondents reported to suffer from lack of traditional leadership's authority to bring justice to them after owners of damaging cattle were told to pay compensation for crop losses. This reinforcing vulnerability feedback loop indirectly shows sign of jeopardizing the ecological balance of the current ecosystem regime if livestock are not managed deliberatively in the future.

5.2.5.2. Socio Vulnerability Loops:

5.2.5.2.1. At the Bonding Level

5.2.5.2.1.1. Motivation

The issue of motivation given government support and inconsistent irregular rain patterns in the last five years has greatly impacted the resiliency of both the Khwe and the Mbukushu as increased pressures from weather have an effect to intensify and widen the space between resiliency and the current status quo for livelihoods in Divundu and Bwabwata West. Many Mbukushu and Khwe in the course of this study were found to 'do nothing' once crops had been eaten by cattle or wildlife, indicating a severe loss of motivation and investment in the future. One 60 year old Mbukushu man in Mushashane explains, *"now when the rains start and [we] go and sow seeds, but then it doesn't rain, the seeds are damaged [and we] lose hope and give up."* The Khwe security guard of Culture Village explains the particularly vulnerable situation of the Khwe, reinforced by government support: *"since now [we are in] a park and animals [are confiscated] and all those type of things, some don't plow. So they are just sitting at home and waiting for the government relief. There is nothing that they can do up to now since their [livelihood] has been cut off."*

As the link between survival and the alternative, such fickle will is both shocking and illustrative of the enormous struggle to simply survive that many of both livelihoods face on a daily basis.

The case of government support is a difficult one, as will be discussed in later sub-sections, but given without proper assistance to assure funds reach needs they are given to address creates maladaptive behaviors. As the social worker explains, *"where there is free handout there is always dependency and dependent children creates laziness. Why will I go out there and start a garden if I will be able to get money and go buy food?"* (SW1 2017). A similar phenomenon could be also the case for a community library in nearby Mukwe which 'is not busy' but could be used as a resource for empowerment and capacity building; *"that library is well equipped, computers [are there], but you go there and hardly find anyone. You find two or one and wonder what is happening"* (SW1 2017).

Although some projects have been started from access to government funding through the constituency's office, many of the programs in the community fail, such as youth programs, a cleaning and carwash company, market and gardening projects, and an 'against alcohol support group', but most no longer exist due to lack of commitment and ability to see beyond the immediate benefits. As one social worker said, *"that commitment, you won't find it. I think they are still in the mindset of doing something because [there is] a certificate attached to it. They are looking for monetary benefit from something and they don't see the long term benefit"* (SW1 2017).

5.2.5.2.1.2. *Loss of Cultural Capital*

For many reasons described throughout this research, the Khwe experience both forced and unintentional loss of culture by having to find completely new livelihood options given the land designation as a national park. Not allowed to practice their own culture to the fullest extent, one 75 year old Khwe woman from Mutc'iku sees young Khwe people following the cultural practices of other tribes in Namibia, modeling the culture of *"any tribe that they want to follow because there is no time that people can sit together and bring the elders old life."* Another Khwe elder woman of 60 years living in Omega I explains that today only a single day of the year is reserved for Khwe people to meet and talk about culture, *"this cultural day is on Dec 4. People meet at the Kippie George Primary school and discuss cultural lives and such."*

Social anthropologist and Khwe research expert Gertrude Boden expresses doubts about the ability of the young Khwe generations to connect fully again with the culture of the past, citing the interest in westernized lifestyles and a disconnect with the bush as reasons for the separation: *"the young people haven't learned how to live in the bush. Maybe they can learn again, but I think that they want cell phones— they want the modern things. They want to take part in the modern life."* A 36 year old Khwe man from Mutc'iku laments a similar loss of culture due to 'modern' influences and systems, *"I don't know why but modern life is on us now and people tend to forget their culture. Things are much quicker now then olden times. Things were a bit slow then. Maybe they don't want to go back to the slow systems. Maybe they want to go to the*

faster ones." These points of vulnerability may serve to further weaken important social bonds between members of the same culture if not addressed in the future.

5.2.5.2.1.3. *Lack of Role Models: Inspiration Poverty*

Both community social workers commented upon the strong influence from the lack of community role models, what could otherwise be a source of social capital within the Khwe hunter-gatherer group. A source of lacking educational capital, literacy levels are low in the whole of the study area. The Khwe experience particular difficulties, however, to learn new livelihood strategies after their forced transition from hunter-gathering to life in a limited market economy as they are very immediately and at a young age forced to overcome massive foundational barriers with little to no external support. Mbukushu language and English are taught in schools, despite national policies to say the first three years of mother-tongue language should be practiced, and as a result the school drop-out rate for the Khwe is unusually high as a simple understanding of what is required for such a transition is out of reach. One of the social workers comments on her understanding of the problem with the Khwe:

"There's potential, but I think they eventually lose a vision. They're excited in their early 20s and then see they're getting nowhere and that it takes a lot of effort to get somewhere and be somebody and they eventually fizzle out, [motivation] die[s] and [they] become as dysfunctional as the rest of the people. [There] is a lack of role models; there just aren't any" (SW2 2017).

In a separate interview, the second social worker makes a similar observation of the situation, both for the Khwe and the Mbukushu in this context: *"you find that role models are hard to find. You find someone going through primary and secondary education without pregnancy— ah, those guys!— they are becoming rare. So if you don't have someone to look up to you also end up falling into the same track"* (SW1 2017).

As a corollary problem and often cause of early school drop-out rates for young women, the high incidence of teenage pregnancy in the study area and for all of the Kavango West region (SW1 2017), though acceptable culturally under the age of 16 (SW1 2017) but still illegal by national

law, thwarts what could otherwise be the opening of opportunity and other livelihood options for young people. Design of both educational accommodation arrangements and the way housing units are configured, as perceived by one of the social workers (SW1 2017), provide some insight as to why adaptive capacity is being eroded for young women of the community:

> *"The hostels for the schools are not big enough to accommodate everyone. Most of the girls are coming from outside Divundu [and] they will end up finding accommodation outside of the school and no one is going to control such. They stay with relatives or distant relatives so they end up being very cheap prey for those who are scouting for sex or sexual favors";*

> *"Another thing that I also observed about the way the housing units are built: they are built in such a way, most cases, that you find the girls' house—I'm comparing with other cultures where the girl is kept so closely and monitored well by the brothers—here, you find that most of the time the girl's house is near to the entrance or outside of the courtyard. I asked one guy why is it that [way] — he had a fence around his house—the traditional courtyard—and the daughter's room was outside? I asked 'whose room is that one outside?' he said 'it's my daughter,' I asked 'why is your daughter's house outside?' and he said 'ah, I don't want to hear those nonsense noises'. Imagine that situation. What do you expect from a child? They fall pregnant at a very tender age. We have cases of people falling pregnant as young as 12 years."*

While some cultural capital is lost to modern influences, some resistance to change due to culture might also serve as an inhibitory mechanism for developing resilient practices and livelihoods. An interview with one 60 year old Mbukushu man in Mushashane village illustrated this resistance to change when he said, *"in our culture we don't try to change things. Since we find things from our forefathers we don't try to make changes in our field."* These, and other more pervasive societal cultural beliefs, may serve to perpetuate vulnerability-inducing positive feedback loops for livelihoods.

One of these pervasive societal traditional beliefs that both binds the community together and acts to pull it down, simultaneously, is the ever-present effect of witchcraft on the Mbukushu people. As one of the social workers explains, the issues associated with witchcraft imbues 'a lot of fear' in people and is difficult to explain how it actually works (SW2 2017). She did, however, have comments upon observations of it acting as a source of vulnerability for Mbukushu in the community:

> *"If they have any income their whole family wants them to support them and eventually it brings you right back down to level. That sort of breaks their momentum and makes them think, 'is it really worth it?', because the more you have the more second and third cousins will phone asking for this and that. It's not as if it's your close cousins or family members. If you don't help then there's the whole thing that they'll bewitch you, so there's a whole way of manipulating them saying that you must do this. So it's very demoralizing for them to actually stand up and make a difference."*

The influence of jealousy among the Mbukushu, also serves as a limiting factor for the establishment of resilience for many as well; *"there is a lot of jealousy… there is so much infighting and negativity [if someone is promoted in the community] that they eventually prefer to go back to a junior position and not the position of authority"* (SW2 2017).

5.2.5.2.1.4. *Alcoholism*

The influence of alcohol in the study area has been domineering and pervasive, both for the Mbukushu farmers and for the Khwe hunter-gatherers. As a local government official comments on the situation, *"alcohol is a general problem… people sitting the whole day from morning to sunset at the kuka shop, drinking the whole day."* Both social workers noted the commonality of the problem across the country, one comparing local rates with other social workers at annual national social workers' meetings, *"these problems are not unique, special to this region per say… What we will differ is probably the extent, the degree of abuse"* (SW1 2017); the other noting the pervasiveness of the issue throughout the entire day as well, *"[there is a] very high*

occurrence of alcohol abuse, especially traditional alcohol which is sold at .50 N$ a cup, which is enough to knock you out. In some villages they start drinking very early until late so that's quite a bit problem among the two main ethnic groups the Mbukushu and the [Khwe]" (SW2 2017).

Issues with the enforcement of alcohol laws, specifically those of licensing, trading hours, and alcohol content of brew, serve only to reinforce positive feedback loops that enhance vulnerability created out of a lack of employment opportunity and 'general life dissatisfaction' which leads many to drink (SW2 2017). Tasked with enforcing the implementation and the execution of Namibia's Liquor Act in Namibia, which should limit alcohol issues seen in the study area, one of the social workers comments on the problem:

> *"Most of those provisions are not being met in Divundu. We tried a number of times to have them comply with the normal trading hours, but the challenge is that there is low enforcement and it becomes a very difficult problem for us to really nail such people down [also] because they are connected. The police force is there, but it's understaffed and they also take—they are also at the shabeens. The ones eradicating that problem, they are the problem. You, the outsider, see [that] there is the problem but who do you engage? The one you want to engage is having a shabeen also"* (SW1 2017).

These words indicate the societal nature of the problem as the 'connected'ness which the social worker refers to is in reference to the enforcement officials themselves drinking at the informal bars, essentially leaving no reputable enforcement mechanism for alcohol policies.

Though the problem is not unique to the Khwe, the Khwe do share a particular vulnerability to alcohol issues as the presence of alcohol is still novel for many Khwe people. One 75 year old Khwe woman from Mutc'iku explains the evolution of alcohol for the Khwe:

> *"When [we were] living in the bush [we] didn't drink any beers in [our lives]. If the men brought honey back they would make beer out of it, but only the men, not the women or children. Now women drink at the shabeen. Elders and little and big women and small*

boys also, they all drink alcohol at the shabeen. People are drinking too much and there's no work."

The Khwe senior traditional headman explains alcohol's palliative effect in the community, to assuage pains of having a lifestyle and culture suddenly prohibited without the substitution of any alternatives, *"[the government] offered us nothing, no alternative. If you will be found [hunting] you will be killed, just like that. That's why you see many people are drinking. There is nothing that they can do, they are just drinking. They are just sitting there [with] the alcohol."*

The issue of alcohol creating cycles of vulnerability and increasing poverty is apparent in the picture conjured by the scene at Omega I, the old military base in the east of Bwabwata West, as told by one of the social workers:

"In Omega I if you get there anywhere after 10 in the morning it feels like 90% of people are already drunk on the street. They are loud and rowdy, music playing full blast. Whole families [are] sitting around a shabeen. It's just a totally dysfunctional community. There must be stable people, but you don't really see them. The police that work there at Omega I say that that is the only thing that they are basically handling—they maybe have one or two criminal cases a year—but all the others are alcohol related where someone beat up the next guy or the parent or someone can't take care of the child because they're too drunk. That's basically all they are actually doing. It's a community that the dysfunctional level is quite high. That's what you see when you are there" (SW2 2017).

The other social worker gave a similarly dire picture of the vulnerability cycles created out of a lack of opportunity and the infusion of government cash from grants to the Khwe:

"Omega I, it is one of the establishments that is in such bad shape. Alcohol is just ruining that community. Last time we did a count there were about 14 shabeens in Omega I, a very small settlement. There are people who are [getting food drought relief] and [they are] selling it, exchanging it for something else, because the mindset is that next month it is coming again. [It's] the problem of dependency. It becomes a disease. And if you are

dependent, you fold your arms. The only ones who get food on a monthly basis are the Khwe community, San people… [other tribes come] for their money. They are happy to take their money. It's unfair but it's happening" (SW1 2017).

From this what the social worker said, it is important to note that the 14 shabeens he refers to exist in a community of 700-900 people total (Dieckmann et al. 2014, 370-371). The proliferation of such a high density of shabeens is propped up by the infusion of government support and grants and without productive other opportunity in the community or the assurance that funds will used for designated purposes by enforcement, has the effect of creating a perverse economy of vulnerability which feeds off of this government support. One 60 year old Khwe woman in Omega I confirms this phenomenon, commenting *"[the] Khwe don't open the bars here, other tribes from other places come here and start bars. The San people are the ones going to the bars."* Some forms of piecework, it is also reported, are paid directly in alcohol. Such piecework is known as caca-djao, or 'beer work' (Boden 2005, 112).

Other comments from the community indicate that the devastating influence of alcohol in the Khwe community is not limited to the most recent generation of hunter-gatherers barred from practicing their culture and previous livelihood activities. Comments from a social worker (SW1 2017) and a 75 year old Khwe Mutc'iku woman, respectively, show below that the effects of alcohol have become something passed down to young people, usurping motivation at a very early age:

"They are basically a drinking community. People drink traditional beer. If you go down to find out why they are drinking it is something that they took from their parents. The parents drink, they aren't at home to check the children's welfare the children's progress in school. They don't have that motivation. They are not there most of the time to be giving them that guidance and counseling. Without that guidance and counseling you are bound to be misled."

"The youth are just at the shabeen. They don't have time to come listen to the times of past. They start going to the shabeen early in the morning until 9 at night. They start at 13 years old."

A story reiterated from discussion with the social worker (SW1 2017) gives a depiction of the mentality that forms for some of the livelihoods in this community who achieve contentment from the vulnerability feedback loop cycle they are stuck within:

"I tried to help people refrain from alcohol, traditional brew. They are drinking and they will tell you that they even compete with us people who are working because he will tell you he gets money [(paid)]. This president just doubled their monthly [payments]. [It] was 600 something, now they get 1100 for old age and disabilities. Every month. This man at the bar will tell you he gets paid again next month. So you ask him, 'is the government really giving you money to drink?' He says, 'grow old also and you will get this money, that's all you have to do'."

Attitudes such as this one provide ample reason for the large adaptive capacity gaps that occur at other levels for livelihoods in the study area as, at a very foundational level, the bonds of people in the livelihoods are built around unsustainable government sanctioned vulnerability-inducing behaviors and practices.

5.2.5.2.1.5. Food Insecurity

Due to the distortion of government support, irregularly influencing food supplies of the Mbukushu and regularly influencing food supplies of the Khwe, food security was only determined in terms of coping strategies when crops would yield poor harvests for this study. The main coping strategies determined for those who had difficulties with crops involved switching over to the market economy by doing piecework or other cash-paying activities. As one 75 year old Khwe woman from Mutc'iku states it, *"[I] get money and go to the shop to buy rice, chips, drinks. [I] no longer go to the supermarket of the bush."* A 60 year old Mbukushu woman from Divundu illustrates the agricultural labor coping strategy: *"[I] get nothing from my*

crop because of the cattle eating the crop. The cattle come at night and [I don't] know whose cattle it is. [I go] to do weeding in others' fields now." A quote from a 75 year old Khwe woman from Mutc'iku shows the small amount of pay, however, that is earned from working in the fields,

> *"Since they stopped the people of gathering and hunting [we have been] working at the house of the Mbukushu. The Mbukushu plan a big field and you work for the day—they start paying N$5, maybe N$10, until today up to N$30. Those days when the elders were working they could only get N$5. It's not even enough to buy food."*

Both livelihood groups utilize both of these coping strategies, this research found, though the Khwe were found to be more often working in the fields.

The depth of food insecurity also exists beyond immediate tangible resources, as one 75 year old Khwe woman from Mutc'iku explains how she uses cash when she receives it, *"You can get maybe 800 from harvesting DC. When [I] get money from DC collection, [I]'ll pay the Mbukushu. [I] take food on credit from the Mbukushu and pay it back with this money when [I] get it."*

A maladaptive strategy to cope with food insecurity was also found to be that of, essentially, eating as little as possible. One of the social workers describes how meals disappear as vulnerability increases:

> *"They say we only eat lunch. From morning they are not eating anything; lunch, and evening they have a cup of coffee and a slice of bread. They are trying to use what is available sparingly. If situations go for that they have to adjust. It becomes one meal a day. The gentlemen or the whole family—that is what they do. That is what they are adopting to meet the hunger and also to make sure they face the changes in weather without them suffering that much"* (SW1 2107).

The inadequacy of these responses to food insecurity and generation of positive feedback loops that such responses create indicate a clear need for more resilient strategies for this critical form of capital.

5.2.5.2.2. At the Linking Level

5.2.5.2.2.1. Population Dynamics Vulnerability Loops

As one 74 year old Mbukushu man from Indongo village points out, *"[we] used to see a lot of fruit harvested in the bush, particularly during times of rain but now [we] don't harvest so much. Also, because of the population, many people in the bush depend on these fruits so it could be because of people as well,"* anticipated increases in the amount of people in the study area may be starting to impact livelihoods as resource abundance may be changing due to it. Rapid and unplanned development in and around Divundu is also an issue for livelihoods as settlement structure is beginning to manifest in other ways in the community. As one social worker explains, social problems are a consequence of improper planning; "*You can see that the structures in Divundu, most of them, are improperly built— there is congestion. As a result, it is an area that suffers from a lot of social problems as a result of people living together within a place that is not that well planned"* (SW1 2017).

5.2.5.2.2.2. Continued In-migration of Mbukushu to BNP, a Recipe for Conflict?

The impacts of Mbukushu in-migration into the land somehow designated for the Khwe are felt by the Khwe hunter-gatherer group on the whole to be unsustainable and difficult to curtail due to the myriad of influences limiting the rights of the Khwe on the ground. Interviews done previously in this area indicate these frustrations and powerlessness, "*the Mbukushu people continue to harvest a large number of veld products in this area, they destroyed the area*," and *"the Mbukushu are cutting out all the trees and cannot be stopped by any Barakwena because they say it is everyone's land"* (WWF 1997, 34). The Khwe are unable to prevent further loss of land as no de jure legal right to the land exists for the Khwe as it does for many other tribes as issued by the Namibian government upon independence (Dieckmann et al. 2014). As a result, despite what many Khwe feel and what should be the case, Mbukushu and other tribes continue

to percolate into the national park without the mandate to speak to any Khwe authority to be granted permission before doing so. Researcher Boden speaks from her observations of the situation:

> *"The Khwe see this area as their land, but even as the SA came in there were also Mbukushu settling here… And at the time, when I started my research, even the Mbukushu who wanted to come here they were asking Kipi George, the one who followed Martin Dumba, whether they were allowed to stay here. But since then they just move in, they don't ask the Khwe, they just ask their own chief, Mbambo, and the Khwe have no say anymore."*

One of the social workers echoes these rights transgressions for the Khwe, *"[the government] was supposed to check what was happening on the ground for all those years and they did nothing so all these different tribes have moved in over the years. These other people are with them in the park and that's not supposed to happen, because it wasn't controlled"* (SW2 2017).

While no large conflicts have occurred in recent years between the two livelihood and cultural groups, the Khwe express resentment and frustration over the influx of foreigners to the land, changing the culture and way of life. As one 75 year old Khwe woman from Mutc'iku explains:

> *"In the old years the elders stayed in good conditions. No one was scared of the elephants and they would go and gather in the bush. It was very comfortable. Would eat good things. The men would kill animals and bring them home, eating different things as they brought different animals home. But now [we] eat nothing from the bush and [we] aren't feeling good. That time when they were only Khwe in this area things were good."*

Boden explains that there is '[a lot] of animosity' between the two groups, but sees conflict itself still mostly limited to verbal disputes; *"if there are fights it's mostly individual or personal issues. Many Khwe are angry about so many Mbukushu coming into the park. They talk about it but feel they cannot do anything about it—representation issue again."*

Although this animosity seethes under the surface of the bonds between livelihood groups, the vulnerability cycle churned off of such negativity manifests also by stalemating development in the area as projects are either sabotaged out of jealousy and resentment—*"If there is development, like they put up water tanks for instance, the young ones will come and break down the line, sabotage it and say they want money out of the system. They sabotage it. They'll say to you, 'what are you doing here?'"* (SW2 2017)— or foreigners who have come to live in the area and start business are ostracized by locals unable to prevent foreign invasion and establishment while also simultaneously benefitting from the businesses opened up by the foreigners. One of the social workers gives an illustration of the contradiction:

> *"There's animosity—when you've got a group talking to businessmen and Khwe will come and say 'you people should not be here this is just a Khwe area, what are you doing here?'. And the others say 'if we weren't here you wouldn't have food, [you] wouldn't be able to buy anything'. So there's a gap that they fill that they themselves should be filling. And they aren't doing it, they're not getting themselves activated"* (SW2 2017).

Clear adaptive capacity gaps exist both for the Khwe and the Mbukushu when animosity and jealousy unravel the construction of successful or beneficial institutions or projects within the community.

5.2.5.2.3. ***At the Bridging Level***

5.2.5.2.3.1. *Government Vulnerability Loops*

As referenced indirectly in previous sub-sections, the supplement of government grants and financial support has come at a high cost for the two livelihoods of the study area. As one of the social workers terms it, 'dependency' is being created off of the government support grants instead of resilience, *"…the government is also the one making them [that way], all those avenues [support projects]. They are helping and making them that much dependent. They will be exploiting those avenues, but the government is also checking in, giving them drought relief, food, basics"* (SW1 2017). As the social worker explains, the provision of some programs exist, however short term, but the overarching theme of government assistance is seen by many of the

livelihoods in this study as an entitlement. Seen this way, this support has the effect of crippling motivation and a sense of necessity to find resilient adaptations in the face of climate change and other future hazards.

As a stakeholder in the community able to identify this large and very severe vulnerability loop creating adaptive capacity gaps for both livelihoods in the community, the social worker also notes the latent threat that these adaptive capacity gaps have to shift the SES into another regime if something intentional is not done:

> *"The government policy is, well, I can't say partly to blame because there isn't anything [bad] they've experienced out of it yet. It's only from the outside you can see that something is wrong because it is not making our people independent, creative, getting initiative. For them there is nothing wrong. For them there is nothing wrong because they don't see anything wrong with it yet, the people. It's because the population is still small—2 million in a country that is vast, very big, there is still plenty of it. [Money from the government] will come to an end— but not very soon. Even if there is corruption [at the national level] you won't notice it that much because the population is still small. So that kick, even after taking ¾ of it they are still able to give that quarter to the people. But when this population increases, that is when you will pay for yourself. When that happens, if you are caught and you find yourself in the situation we are now in, not being prepared, you'll all perish, my friend. You will die!"* (SW1 2017).

Though dire, this assessment of the high vulnerability of livelihoods in this region supports findings of this study and is perpetuated, though in different ways for the Mbukushu and the Khwe, through the provision of unsupervised government support. The other social worker and researcher Boden express the level of dependency on government grants as intrinsically important to the livelihoods of the Khwe, in particular, *"I'm not sure if government support were to go away if [the Khwe] could support themselves. Will they become self-supporting, I don't know. I don't know if they can and want to*" (SW2 2017), and *"All of this government money is very important for the Khwe in the Khwe economy. In the end, I think many people just survive*

because others help them…but the big things are what the government gives and KA" (Boden pers. comm. 2017).

The vulnerability loops that arise out of government support provisions, however, are also proposed to be easily fixed by the same stakeholders who cite them as such large issues for the community. One of the social workers brings up this point of monitoring and enforcement, both referencing the law enforcement officials of the community and other public servants, such as himself, respectively, to be responsible for this task:

> *"Monitoring has to be there. We have to make sure that we are strict and stringent, especially with the laws. The [laws now] are not that stringent, not that deterrent. The laws are there, but there is no one to enforce it";*
>
> *"The government is giving out money with a clear motive—that money is supposed to be used specifically for what that money is used for. If it's for child welfare, then it's supposed to be for child's upkeep. If it's for elderly, elderly upkeep. The problem is [that] we lack monitoring and evaluation of whatever program we are administering. There is no one to follow up and check. Social workers are supposed to be doing that but how many are they? There is one social worker for the whole district, there is one social worker for children for the whole district. So what do they expect? If I happen to go out it's just once in 3 months, the resources are just not there. The resources are supposed to be there. If this money is supposed to be used properly there must be someone to monitor. And if possible, there has to be someone doing the spending, to help them spend that money….. What happens is you give them food, [and] they exchange with alcohol. The San community they used to give them food and very wise people will travel all the way from Ovamboland to get food" (SW1 2017).*

What this social worker is essentially saying is that government support grants could and should work they just do not because appointed civil servants are not given the capacity to enforce and oversee the funds. Citing further the source of change needed, "*we can do something with this land but it will only take a change in government's stance for them to be able to see differently*,"

the social worker (SW1 2017) connects vulnerability loops from the bottom-up, identified in previous sub-sections, with adaptive capacity gaps of government, vulnerability loops churned from the top-down. It is here in this critical response and form of aid from government where adaptive capacities are lessened and vulnerability is produced as a product of this particular SES, instead of resilience.

These two adaptive capacity gaps of government— the need for assistance to facilitate grant spending and giving necessary personnel the resources to carry out such tasks— is acknowledged by the Namibian government, formally, in the most recent published National Plan, NP4:

> *"Access to social grants, especially to the FCG [foster care grant], is hampered not only by the backlog in civil registration, but also by statutory requirements. The limited number of social workers in the country that investigate and verify all applications for FCGs is the largest constraint in the grant approval process*" (National Planning Commission 2012, 63), and, *"While cash transfers – whether as remittances, social grants or in other forms – have proved to be effective in addressing poverty to some extent, supplementary measures are needed to enable people living in impoverished conditions and benefiting from social grants to climb up from this lowest rung of the socioeconomic ladder* (National Planning Commission 2012, 65).

Disorganization and financial mismanagement at several levels of government could be to blame for these disconnects. One social worker tells the story of projects in the community that have started seemingly out of nowhere without the coordination of necessary stakeholders:

> *"At the end of last year I hear from somebody at the councilor's office that somebody at the councilor's office has decided to buy N$20,000 worth of sewing machines. So I then phone and ask who they are buying it for— no, they 'don't know', 'is it under existing project?' they say they're 'not sure', 'did you go and check?' [I asked], no, 'no one went to check'. So they then bought sewing machines for a project that isn't under the existing [project], but nobody knew there was a new one. Someone wrote a project proposal and*

that person got N$20,000 worth of equipment and nothing has happened with it. So [this shows] that each one is doing their own thing and it's just not being coordinated. I think the problem is to get the people together to coordinate is just too much of a schlep, so each one says I'll get a N$20,000 amount of money and 3 or 4 people have come to me with this project and I choose the one but I don't check with anyone else… On the ground level nobody knows. That's why I say the government departments don't, even the headmen just saw [development] going up. Nobody knows, it's this disjointed chaotic chaos" (SW2 2017).

5.2.5.2.4. Ecologies of Power: Conservation Priorities Creating Vulnerability Loops

As adaptive capacities and gaps tend to weave together and devolve together through positive feedbacks, the combination of the vulnerability loops created from conservationist priorities from the global level tie in to government support at this point as maladaptive measures from government are made to try to assuage impacts from conservation vulnerability-inducing priorities, as perceived by livelihoods. A particular focus where government and conservation priorities from international interests meet is the issue of increased poaching and its corresponding increased human-wildlife conflict (HWC) for study area livelihoods.

The issues related to poaching first start to become a problem in Divundu and Bwabwata West around the 1980s when communities begin to feel the effects of wildlife losses as large predators start to consume livestock. Little information about animal decreases are recorded before the introduction of SADF forces, presumably because— as the main causes for animal decreases in the past prior to independence are attributed to poaching by colonial government officials— SADF was one of the primary reasons for their decline. Particularly low levels of wildlife were reached in the 1980s (Nelson and Agrawal 2008, 566) in many areas of Namibia, perhaps for similar reasons. General military activity and disturbance in the area is also suspected to be a cause for game decline (Brown and Jones 1994, 60).

Whatever the reasons, as a result of the leadership issues, limiting land-use designations and the absence of the co-evolved management of the wildlife populations between endogenous

communities and government, the resident human populations of Bwabwata West and Divundu have since become increasingly negatively affected by the continued growth of wildlife populations and are increasingly threatened by the further hazard of poaching in the area. Brown and Jones (1994, 50) record from an interview with one BNP resident that the Khwe were stewards of the land for generations prior to the external influence of SADF in the region: *"We always lived with the game but we did not finish it. Then the white people came with guns and they also gave them to black people. They shot the game and gave some of the meat to us. They said they were helping us, but they finished our game.* –Omega 3 resident"

A regional assessment by USAID captures the issue of HWC which is having counteractive effects for many livelihoods of the region:

> *"Human-wildlife conflict (HWC). This is a significant issue in all three countries. People living in the Basin are not significantly benefitting from wildlife resources, and often perceive wildlife as a threat to their livelihoods. This causes discontent among people living in the Basin, and reduces the local incentive to protect wildlife. Accordingly, poaching is a problem throughout the Basin"* (SAREP 2013, 10).

Trying to manage the problem, self-insurance schemes set forth by conservancies and supported financially by NGOs and MET have been trialed under Human Wildlife Conflict Self-Reliance Scheme (HWCSRS) to give people affected the resources to adapt to this problem. These funds, which aim to provide reimbursement to farmers who have had crops damaged by wildlife, aim to do so *"at rates that do not cover the full value of the animal concerned but aim to partially offset the loss to the farmer*" (MET 2009, 9). The purpose of the scheme*, "meant to provide the means to directly offset the losses of communities and individual farmers caused to livestock and crops on State land"* (MET 2009b, 20) shows careful intention for the scheme not to be seen as a compensatory mechanism. The government strongly denounces compensatory inclinations for the scheme to be seen as a source of revenue after losses of livestock or crops, distinguishing this new scheme as 'different' from 'very problematic' similar schemes in the past (MET 2009, 9). Payments for HWC through the scheme are also not for livestock killed in a national park; for

damages incurred by any animal other than the elephant or the hippopotamus; or for crops other than maize, millet, sorghum and vegetables (MET 2009, 9).

Unable to compete financially with the likes of wealthy international business in the black market, these efforts from government are ridiculed by the recipients of such support, as one Mbukushu headman shows the policy playing out at the ground level, *"[if] a lion catches your cattle you are paid N$1500, which is not even enough to buy another cattle. If your cattle is 6.5 months and down, then if it is caught by the lion you cannot be paid,"* later in the conversation referencing the more convincing financial compensation lure of assisting or conducting poaching, *"if you hear about N$10,000 today then you cannot sleep because you must go and get that money."*

Unsurprisingly, the bounty of international cash provided by poaching is not a temptation only to the natural resource-dependent livelihoods of the area. One government official very frankly depicts the temptation of such high immediate rewards from the position of leadership and very secure employment:

> *"This illegal poaching is not only on the Khwe—if they come to me and say they have this huge amount of money that they say they will give me [then] I will go and do and that is not good. Between us we are finishing our wealth, so to say. If it wasn't for these people who come from other places then, I don't think that there would be a problem with how the Khwe [used to] live."*

Very clearly from these words is the influence from international coffers asserting power to drive vulnerability cycles within the community. Forced under such pressures, government, without devolving full authority and rights to the endogenous Khwe community, can do little but 'throw fuel on the fire' with government support grants.

As foreign power interests play out and stakeholders in the more immediate community try to grapple with the inconsistencies of an SES controlled distantly, but experiencing immediate and devastating impacts, vulnerability feedbacks at the national level in the form of increased

militarization of the contested resource and local feedbacks in the form of crop damages from scared elephants snowball into amplified impacts for the livelihoods of the study area.

As a tactic to stem poaching, efforts were made by conservationists to employ poachers to protect wildlife in the form of game guards first in 1983 (Miller et al. 2012). The Khwe senior traditional headman speaks about the transition from near co-management of the natural resources of the park through these community game guards (CGGs) to what is now the Namibian Defense Force's (NDF) special poaching unit that has removed CGGs to make way for 'the big guns':

> *"The change that I see— what I hear about poaching is that it [has slowed], the killing of the elephants on our side, but I see the risk is difficult from the community side. They are afraid, they cannot go to the bush [or] they will be shot. They are restricted where they can go since [the] NDF came. Here they are restricted in the multiple use [area]. During the CGG time there were certain places they could access that they can't access now, even [in the] multiple use area."*

As more land is slowly usurped from the Khwe by 'conservation' interests (or, rather, from their vulnerability feedback loops), what land is left is ravaged by naturally afraid wildlife which seek the shelter of an area where these intelligent animals know they will be unharmed; the communities. Several different community members comment on the phenomenon:

> *"There are a lot [of elephants] now, this year and last year, because Angolan elephants [are coming] also. They run away [from] the poaching [in] Angola. That's why, now, people are not sleeping. Starting at 5 in the morning you will hear people in their fields— they'll start [banging pots to keep them away]. They're there until 5 in the evening. They come eat the crops in the field because they are afraid. They cannot stay in the bush because they know if they stay in the bush they will be killed. So if they stay here they don't hear the shots. If they go a bit out from the people they hear the shots. So they stay here close to the people."* (Khwe senior traditional headman 2017)

"They are being chased by poachers deep in the bush and they run close to people because they are protected; no one will poach them here. Poachers [are] causing most of the problem. During this time you should find elephant deep in the bush. Around this time they come 1-3 in a group, but now when they come they come in dozens. You can't do anything. There is water and food there so they are just coming because they are in danger." (Mbukushu headman 2017)

"Even when we were working last week in the KA office one Mbukushu that has stayed on [the east] side of the river said that the elephants had finished his whole field. At the time I was here this was not normal. At that time there were not so many elephants. There has been an increase in elephants at least in the villages. People told me that it also has to do [with fighting]. In 2014, most of the people in Mashambo and the eastern villages told me that they cannot grow in their fields because of the elephants. But now the elephants are more this side… now I hear there are many poachers, so that's why the elephants come to the villages." (Boden pers. comm. 2017)

"Poaching is a problem in the park. In the past it was quiet. We were living—the San community were living— with these animals… Before independence to 15 or 16 years after independence we didn't have this problem. The Khwe were living normal life." (Thighuru pers. comm. 2017)

Few effective defense mechanisms were observed from the interviews with the livelihoods of the study area as none allowed anyone to adapt to the constant hazard of elephants eating crops. Adaptation strategies and responses from the interviews are identified in Figure 15. By far the most common of the strategies tried is for crop owners to be physically present at the fields and to bring a container to hit on when elephants approach with only the hope that this will scare the elephants away; *"Unless you do it by yourself, to make sure the animals don't reach these areas, there is nothing [you can] do"* (74

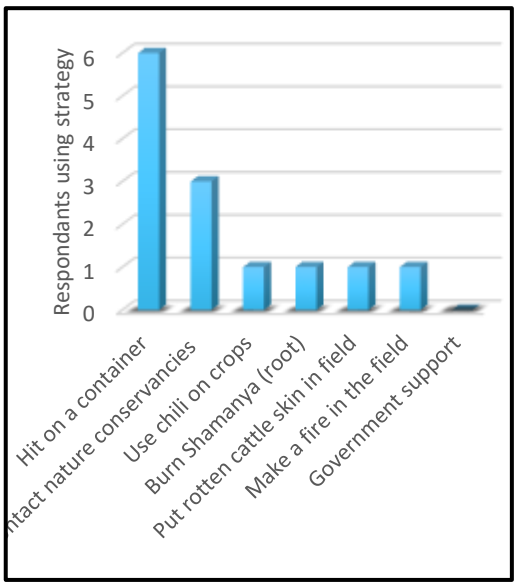

Figure 15: Strategies used to cope with elephants for Mbukushu farmers

year old Mbukushu man from Indongo 2017); *"I always just go to my field and come back to [the village to] check if anything is wrong here because I have to be in the field to chase them away [during the day]"* (Mbukushu headman 2017).

While elephants are revered in a sense, acting as the 'government' for the Khwe— *"elephants are just uncontrollable; they are just moving up and down. He's the Khwe government. That one cannot be controlled,"* in the words of a 36 year old Khwe man from Mutc'iku— very critical adaptive capacities are identified here where the people of the community are forced to have a livelihood which is entirely devoted to the constant oversight of their food source. The development of resilience under such stresses becomes questionable as how could it be possible to build capacity and develop if an entire community must be simply physically present to protect their food supply?

Many Khwe and Mbukushu acknowledge the shared benefits via the use and conservation of wildlife, yet cannot escape the reality that livelihoods are extremely limited by the national emphasis on tourism and international influencers to create 'people-less' conservation places. These interests are coupled with an inability of the local livelihoods to manage their resources jointly with government, as has been discussed in this sub-section. Government, clearly, still holds ultimate authority over the management and right to such natural resources that these livelihoods have looked after for millennia.

*5.2.5.2.5. **Institutional Vulnerability Loops***

5.2.5.2.5.1. <u>CBNRM</u>

The CBNRM approach, in practice, has proven positive results for wildlife population and has been a positive start for the generation of community livelihood development, but is merely the "*crumbs off of the table*" (Alpers pers. comm. 2017) for livelihoods in the study area and must be further developed.

The largest adaptive capacity gaps of the Namibian CBNRM program are those of land tenure insecurity, incomplete transfer of resource use rights to the endogenous communities, and an

incomplete transfer of authority and management of the land from central government to the people (Boudreaux 2010; Boudreaux & Nelson 2011). Governance, these considered broadly, is a weakness of the CBNRM model of Namibia (Miller et al. 2012).

Corbett and Jones (2000) highlight one of the key issues for conservancies and the CBNRM program in Namibia that the State is still largely in control of the consumptive use of the resources through the provision of concessions, hunting quotas and decisions about how much and of which resources conservancies are permitted to be utilized for economic purposes. This issue, where authority and responsibility for the management of resources has superficially been given to the communities inhabiting the land, provides an unstable footing for the intuitions managing the resource as no real authority is granted to the people (Martin 2000).

As a starting point, it is true that the extent of devolution in Namibia's case is relatively robust (Jones 2004; see also Schlager & Ostrom 1992). Community conservancy capacities are administered by community elected management committees, retaining all revenues from tourism, joint ventures and tourist hunting concessions, and they have also the free will to determine their own investment partners (Nelson and Agrawal 2008, 565). Nevertheless, the rights granted to communities are still only given on a conditional basis, leaving them short of the full right to manage land and wildlife without their own ability to set quotas and decide how many and what concessions will be doled out and for what and how much of these resources.

The tendency to incompletely devolve authority is, 'more than any other factor' the reason for failures of most local resource management schemes (Murphree & Mazambani 2002, 53). Murphree and Mazambani (2002) note also that the Namibian government does not necessarily have any responsibility to return lands to communities who have been dispossessed of their land rights, questioning then the plausibility of the development of full resilience for those livelihoods of Bwabwata West.

On the near, but not quite, status of devolved authority that the Namibian government has invested in the people themselves, IRDNC's rural development practician Frederich Alpers comments on the relationship between the KA and the MET, which, although KA is also not

completely co-managed, is able to circumvent the issue of corrupt TAs, a blight for other conservancies:

> *"Conservancies are not partners with MET like it is here in the park. In the park MET has higher authority than in communal land. It's a very grey area here in Namibia. Our state has given traditional authorities mandate how to allocate and give concessions for land to develop, but then the state also has a land board all concessions in communal area should go through. And that's conflicting, there has been conflict between land boards and chiefs because our state has given a lot of authority to chiefs—TAs— and they determine development, or priorities, or land use in their areas. It should be in parallel with the land boards, but often it's not. They aren't parallel and that's the grey area. They created this board because some chiefs are corrupt."*

As an effective way to prevent corrupt headmen from taking money from the tourism and concessions won by conservancies, the Namibian government has enacted CBNRM as a check to TA corruption, forcing tourism benefactors to pay money to conservancies directly on communal land, instead of through the TA. As Alpers explains the situation on communal land with conservancies:

> *"[They] distribute the money to more people than a chief or corrupt headman; it's to work against corrupt headmen to have a wider distribution of benefits to a wider group of community members. Because of corruption and mismanagement, government realized that they have to find another way of aligning and maybe uninformed and misappropriation of land and resources, because, remember, it's still communal land; it's still the State's. Communal land belongs to the State, typically, but the TA are the custodians. They are the keepers, the historic land users and the government doesn't want to disregard them like they did in SA or some other countries. They say that they recognize you, but they also recognize that there are problems of land allocation and development and land priorities."*

One of the social workers agree to say of a project under KA, *"the project falls under KA so the chief cannot go against it—that's the advantage of KA. The KA has given the approval, so as their project he can't stop it"* (SW2 2017).

It is this issue of TA corruption, which, unlike Bwabwata West due to the presence of KA, the township of Divundu suffers from under the traditional authority of Chief Mbambo. Without the representation of a conservancy, people in Divundu are unable to see much, if any, of the external resources flowing into the community from international tourism as money flows in to tourist lodges and out from there into the dark abyss of a corrupt chief's pocket.

Alpers tells the story of one situation where KA, who reports directly to Namibian MET government, has done precisely this what it was set up to do, thus avoiding pitfalls faced by Mbukushus in Divundu:

> *"This British, American consortium wanted to implement a food and fuel production unit, [which] no longer exists because KA wrote a letter or rejection and they effectively ousted this plan— big time— because the chief [who accepted it initially] has no authority over the park. MET says the authority in the park is KA; not the chief. So with the pressure from the community saying 'no, we also oppose this', and the government seeing that it is going against development agendas and going against biodiversity development, it was going against a lot of policy, it was shelved--sunken."*

While Bwabwata West's KA has issues of incomplete devolution from government in the quotas set and ultimate authority over park resource management, Divundu's absence of a conservancy to stand between TA corruption and external sources of income provides a critical and inhibiting barrier on the success of a region which could potentially benefit from the development of tourism as a livelihood option. There is little research done on the sustained participation of communities in the monitoring and accumulation of information on the natural resources used for tourism purposes, but studies show that there is great potential for further exploration and this kind of management to understand tourism impacts (Miller et al. 2012) and achieve real adaptive co-management through a concept of CBNRM. In this situation, however, although CBNRM

circumvents corruption at the level of TAs, full rights to determine resource needs and use are not given to the conservancies, KA included, thus meaning adaptive co-development in its true form is not taking place.

5.2.5.2.5.2. *Other Institutional Adaptive Capacity Gaps*

One of the social workers mentions an obvious institutional adaptive capacity gap as what should be an obvious asset for this community of farmers is almost completely neglected. The government-sanctioned Bagani Agricultural Research Center is an immediate resource provided to the community, but seems to be very underutilized. He identifies correctly the access to weather information that exists for many farmers in the community, but excuses them from what should be better outreach activities by expressing sympathy for a lack of resources:

> *"[They] don't have a lot of access to information regarding the weather. No one is out here giving people weather information. [The agricultural research center is] supposed to be out there giving information… I think it is one of their responsibilities, but they have constraints… we hear they are having problems because of transport constraints and manpower. There is one [agricultural extension agent] in the district who has to be everywhere. He has to be in workshops and going in the field. So if [he] travels [he] goes with [his] office, so it becomes a challenge"* (SW1 2017).

Other sources of institutional adaptive capacity lie in the poverty of resources to create alternatives to the issues of alcoholism and lack of employment for both livelihoods in the community. A social worker notes that such is a "*situation of funding, [and] without [it] you don't have anything to motivate them*" (SW1 2017). After school programs, recreational facilities, sports leagues or clubs (SW1 2017) and cultural activities such as a dance for young people called '*deboke'*, which one 44 year old Mbukushu man from Indongo mentioned no longer exists, are all potential sources of diversion from alcohol and other societal issues, but are severely lacking in the community.

5.2.6. Global level; Wide and Broad Vulnerability Loops

Having discussed global and overarching influences that impact the community deeply and extensively in the discussion of government vulnerability feedback loops, only briefly will these other vulnerability loops which occur out of international forces be discussed in this sub-section.

As referenced in Chapter IV, the Khwe hunter-gatherer livelihoods are extremely limited in their ability to observe environmental changes in the land and therefore adapt and adjust correspondingly due to the institutionalization of barriers from historical influences (i.e. the veterinary fence and land-use designations). The influence of the market economy to draw people toward formal employment, potentially also be away from natural-resource management activities, also creates a dissonance at the community level as an exchange system in the community of food and in-kind donations, mentioned in several interviews of this study, becomes less influential. Market demands, instead, become more important for some farmers in the community as there is an awareness of a reliable market for crops bought by the government *"people decide what to grow based on the price it can be sold for. They are encouraging mahangu sale because buyers want mahangu"* as one 65 year old Mbukushu man from Divundu West states it. There is evidence that San tribes have adapted well to modern influence of national governments and policies before (Osaki 1984), but for the Khwe many global influences paired with the national ones seem to provide a fairly insurmountable barrier without the provision of fairness through rights.

5.2.7. Rights Vulnerability Loops

5.2.7.1. A 'Shadow Landscape'

Using Bryant *et al.'s* (2011, 461) concept of a 'shadow landscape', a concept which describes *"the essential otherness and seemingly distinctive if ever contingent properties of in-between rural places characterized by historical depopulation and cultural marginalization",* the Khwe hunter-gatherers can be said to occupy a 'shadow landscape' in the marginalized state that they exist in Bwabwata West. The Khwe senior traditional headman describes this conflation of

historical influence and current cultural marginalization well when he expressed sentiments of 'enslavement' by the conditions:

> *"So now we are in difficult years, nothing has changed. Even I could say that SA time was better than now, very much better. The people were eating that time and now the people are suffering, they must go to the Mbukushu, [to] work for them to get food. How could we be still slaves in an independent country?"*

5.2.7.2. Khwe Leadership and Discrimination

Unlike other Khwe, this headman is aware of the rights that should exist for the Khwe and expresses disappointment in the difficulty to secure such rights without representation:

> *"Many things are in the constitution and in international law, the UN declaration, there are many things in the UN declaration but they go to the UN and sign and come back to the country—they don't come and make laws and work on it. So when they go to the UN forum, when they go and report, we are not there so we don't know what report they are giving. Even decision making in Windhoek, anywhere in Namibia where the government or people are making decisions, there's no Khwe there. So even in our land they decide what they want to have in our land by themselves. So after they decide they come and tell us. [This means] we are not free, you cannot say our concerns are there [if] we can't tell them our concerns. So it's very difficult."*

This adaptive capacity gap in the form of a missing and government-recognized appointed leader of the Khwe community is the most significant barrier for resilient livelihoods at the bonding level of capital for the Khwe. Although four responses from the Mbukushu noted the weakness of Mbukushu headman, this issue is particularly debilitating for the Khwe as the senior traditional headman notes that no rights can be secured without this form of leadership and representation.

The roots of this issue can be traced back to traditional Khwe society. Prior to SA occupation the leadership of the Khwe was weakly defined and unclear in structure to outsiders (Brown and James 1994, 48; WWF 1997, 15), as, characteristically of San groups, hunter-gatherer societies were primarily egalitarian and the small group concerned made decisions by consensus (Dieckmann et al. 2014). Upon arrival of SADF and need to speak to a point person in the community, elections were organized by the government of the time and this structure was changed. Discussion with social anthropologist and Khwe expert Gertrude Boden describes the cultural impact that the SA Defense Force had on the area during their occupation of it:

> *"When the SA came or started to rule this area in late 1950s they appointed a Khwe leader who was responsible for the whole area in Namibia but he chose local leaders in the area to help him. [This leader] was recognized by the government but he still followed the 'old laws, so to speak, [where] he discussed things with the local leader."*

This leader, Martin Ndumba, was elected as headman for the Mutc'iku villages. A man named Kaseta was also elected headman for Bwabwata West area villages. Boden comments:

> *"[With] this leader they appointed, Martin Ndumba, from 2000 on it's actually a big mess. It's because they cannot agree, from then on they couldn't agree on a leader. They have handed in several applications for a traditional authority, but all of them have failed and since they've failed the people became not happy with the person they had appointed as a leader and still they are the only San community in Namibia that don't have recognized leadership."*

What Boden is describing is a chain of events after Ndumba's death in 1989 that lead to further consolidation of leadership as government structures at the time ask people of the region to elect an overall chief to replace Ndumba. Kippie George, Ndumba's maternal nephew, was elected to do this job, but despite this clearly elected leader, many in the community were not convinced of the new leadership structure and did not accept the authority of the newly appointed leader, likely due to his young age of 25 years (Brown and James 1994). A lack of agreement on who can lead the community, as chosen by the Khwe themselves, continues to this day as the current

election has had three appointed candidates to run for 2 years, but still no election has taken place.

As a potential reaction to indecision and disagreement at the ground-level about leadership, the problems of Khwe leadership today also have much to do with a lack of official and formal recognition from government to Khwe elected leaders. Applications for traditional leadership have been submitted in the recent past, only to be denied or ignored by the central government. While five other San groups in Namibia have been able to gain recognition for leaders, the Khwe have been waiting now for more than 10 years to gain official recognition (Dieckmann et al. 2014), an issue that has caused a cascade of other negative effects in the community since. Researcher Boden explains the situation as she understands it:

> *"The Khwe have to apply for a traditional authority and the government has to recognize it. But this hasn't happened for more than 20 years. The traditional authority law came into being in 1959 and later it was approved again in 2000. The Khwe were one of the first traditional groups to apply for a traditional authority, but they never got it. The government just doesn't reply and there are no Khwe who follow it up and keep following it up and then they don't agree among each other who should be the chief and who should follow up. So it's a big problem."*

The Khwe senior traditional headman, one Khwe from the community who has been following up on one of such applications remarks, *"we sent our application since 1996, 20 years it has been pushed out. They ignore it and just take out the application up to now."* Sentiments from one 60 year old Khwe woman in Omega I show a shared sentiment of neglect and marginalization perceived by Khwe in the community, *"the government won't organize to have a Khwe leader. We have no chief because government prevents [it]."*

There are several reasons why the government does not recognize a Khwe chief. Boden gives the next level of adaptive capacity gap, where leadership is concerned, to point out strife between livelihood groups. This, the absence of bridging capital between the Khwe and the Mbukushu chief, she sites as the main reason for this passive stance from government:

> *"The most important [reason why government doesn't recognize a Khwe chief] is that this is a post by Chief Mbambo, the Mbukushu chief, as he sees the Khwe as his people. He also sees Bwabwata as his land and he has good connections with the government so he is opposing it. But this is not official. This is what everybody thinks, what everybody knows, but you will not find files to confirm this… I don't know these days if chief Mbambo is still strong or still close to the current government, but he was very close to [the previous president] Nujoma and so at the time when I was working here everybody knew that [Mbambo] was approving it, the government just didn't reply to the application. Letters were sent again and again, they just didn't reply. They didn't turn it down, they just didn't accept."*

Filling this vacant leadership role, the domineering and powerful Mbukushu government-appointed chief, Chief Mbambo, speaks for the Khwe and assumes leadership for them despite opposition, often from both the Khwe and Mbukushus. One of the social workers describes feelings of resentment from the Mbukushu people toward their own chief, Chief Mbambo:

> *"Our present [chief] is not appointed by the community. Normally there is a bloodline that [is followed from] the family they come from. [Mbambo, however] is a cousin of the guy who is supposed to be the chief. He was brought in by [Namibian] SWAPO [government]. He was head of a planned army group [during the war] so he was brought in as a political appointment [when it ended]. He was brought in by the government of Sam Nujoma. That's why there's a lot of tension because he's not really the [chief]. So you get this division on the ground level of people who don't acknowledge him"* (SW2 2017).

This situation, where a chief asserts leadership over another people, is both problematic constitutionally and logistically. The Khwe senior traditional leader asserts the Khwe peoples' entitlements to the right to "*enjoy, practise, profess, maintain and promote any culture, language, tradition or religion"*,[15] as set out in Article 19 of the Namibian constitution, *"we do*

[15] Article 19 – Culture from Namibian Constitution

not fall under Mbukushu traditional authority because we are not Mbukushus. The constitution says that every tribe must have their representation so we are not under the other fumu."

One of the social workers in the village describes the logistical constraints and gaps in adaptive capacity from the lack of Khwe leadership. Adapting to fit the strange and dysfunctional leadership structure that has evolved in the place of formal leadership she says:

> *"In this area MET and KA have their own headmen [in addition to the headmen of the villages], but the headman of the tribal authority are the ones who write [formal documents]. The [MET/KA] headmen are not accepted by these people in the different government departments. If you've been in a dysfunctional system [long enough] you know how to manipulate it and work it. Every level there's an issue. It's very complex"* (SW2 2017).

Boden describes a legacy of discrimination originating from the historical influences that pitted the Khwe on the wrong side of history in several instances:

> *"There is a disconnect between the government and the Khwe and this also has to do with the history, that the Khwe were fighting in the SA army so the government is still afraid of the Khwe that they are against the government. Then in 1998 and 1999 the Caprivians wanted to separate from Namibia so they also got some Khwes involved and at that stage (some Khwe were involved). It might even be that Kippie George himself had connections to the Caprivians but he ran away to Botswana and why should he run away if he had no connections to the Caprivians, but I don't know it from him, people don't talk about it, but it must be the case, otherwise why should he run to Botswana and stay in this refugee camp? And then the Caprivians succession was turned down and then started the Angolan war which was from the end of 1999 onwards. The civil war in Angola affected this area because the Namibian government had allowed Angolan army to fight UNITA from Namibian territory and then UNITA started to attack villages and people and even tourists in Northern Namibia and then the government again thought that the Khwe were working together with UNITA and were against the Namibian*

government. So the government is always very suspicious of the Khwe because they live in this area where the military camps were and they were fighting in the SA army. There are lots of other San who have been fighting against the SA in this area, the Suasi and the [click]oln, but they have their traditional authorities. I think it's the combination that they have the military camps that were here, that the whites were here, it's Khwe land and then the story with the Mbukushu chief is very close with the government and not wanting the Khwe to have their own land."

If it were not for the following story from the Khwe senior traditional headman, it would be difficult to equate causation between the Khwe's inability defend their rights to ancestral land through representation and leadership with yet another, higher, level of discrimination; discrimination from central government and the president himself. He tells the story:

"There is history there. Even now as I'm sitting here we were good trackers. We track[ed] for the SWAPO, the white people; the struggle fighters. We were with the white people— the SA Defense Force, against the SWAPO. We were good trackers. In 2004, the first president, Sam Nujoma wanted to kill me. I was here sitting and writing [to the government], asking the government, 'this government is not our government?' So the State of Namibia could tell us where our government is [as a response to] that letter. So he said [Nujoma] 'you will be invited, officially, and directed to talk'. [It was an] invitation to come see him. After the second week the regional governor stopped to tell me 'the president has invited you, fellow officer, [to come see him]. Even the government is paying for you to sleep in accommodation in Rundu tonight.' I didn't talk, I just prepared myself and got in the car to go to Rundu. [The] next morning [at] 10 in the morning we [went] to the Rundu airport. He [was] still saying, [at the] last minute at the meeting, 'I am inviting Thaddeus Chedau, to an NDC conference.' I [wondered], 'am I going to be killed or what is going on here?'. He went there and he left the chair next to him open for me to sit there. He just asked the person who knows me in the door, says [that] if that person [sees] me that he must bring me to that [specific] chair. People were entering, leaders of government departments. Then when I [went] there the person [at the door] was carrying me [to Nujoma]. I didn't want to come near to [Nujoma] but when I

[was] just ready to sit— 'Hey!' and I just see his finger [Nujoma's index finger] in front of my face, and he says 'where are your white brothers?, what did you think when you were tracking?, taking white persons arm, taking SWAPO to that hole? They wanted to have life, but you showed the white people that hole so that they put the hand grenades there in the hole to die' (put the hand grenades in the hole for the SWAPO to die). 'This is SWAPO government, you don't ask such questions to SWAPO government! Why didn't you go with your white brothers to South Africa?' He talked, talked, talked, lots of stories. You could see him like that. This was in front of all those people. 'Don't cooperate with BOAS,' he said, (BOAS are white people). I had no chance to ask or to tell him why I [did it], he just asks this to me and leaves. Even from that day, when I think about it, I think that is why all these things are happening to us. If someone wants to cheat me I know there is something behind [it]; there is something special behind which they talk. This was 2004. You see, because there is only law helping us to be there. Otherwise, they could have done something to us. But the law prevents that. There is no way that they can kill so many people. There is a plan for what they want to do against us" (Khwe senior traditional headman 2017).

This, a strong story of direct discrimination from central government in 2004, continues today in less obvious or directed forms from local government. With the conviction to 'change mindsets' and 'change livelihoods' one local government official continues a legacy of historical discrimination by not acknowledging the particular and acute marginalization and poverty of the Khwe as different from any other ethnic group, *"if you move, on the other side of the river and come again to visit our people here they are more or less the same level. No different. No different when it comes to livelihoods of our people";* viewing the circumstances many Khwe find themselves in to be due to a lack of motivation instead of positioning against many obstacles and scarce opportunity, *"there are some still sitting doing nothing but the majority are trying… they are a bit lazy, so to say, but we keep on encouraging them";* disavowing responsibility of government to acknowledge Khwe ancestral lands by asserting Mbukushu presence prior to the Khwe, *"…they do have their traditional leaders, but not the chief because of the… the government is looking into that. Conflict. Because in the past the whole piece of land from where Mbukushu starts in the West up to Komudadima, it belongs to the chieftainship of the Mbukushu*

speaking peoples"; using 'law' and 'policy' as reasons to excuse a lack of creativity and will to assist the Khwe in preserving their culture and tradition;

> *"['Is there a way for the Khwe to save their culture?': I don't think so. By now, I don't think so. Government will not allow that. We are now being governed by one law. If you put the law here you cannot say these people will do like that and the others another way. You have to have one law and guidance…. We [the Mbukushu] were also living like the Bushmen, like the San community, the same way. No different between my ancestors' livelihood and the way they are living in the San community. It's the same. But because of the policy and the law and the guidance that comes in people have to change. You should change";*

…and dismissing their right to culture by inculcating them with Mbukushu culture, *"in the past the San community were not involved in cultivating. Now if you go to visit them you will see that some have huge mahangu fields, etc. We went to them, to try to encourage them to start with small plots. Now others have other bigger plots. Now they are changing."*

Trickling down from the national level into various institutions, the Khwe also experience marginalization at the Omega I NDC farm, in the classroom and in formal employment opportunities, as the following quotes from one Khwe 60 year old woman in Omega I reference:

> *"the government is supposed to give money for the tractors to the Khwe [at the NDC farm] so that [we] can use them for free, but [we] have to pay for them. The people in the office who run the program say that the Khwe are equal and just like everyone else, they can pay. They also plow for the Khwe late, the Mbukushu [fields] get plowed first, the Khwe last";*

> *"if a San learner goes to school they [have] problems at school from teachers and students. There are no Khwe teachers. The kids learn Mbukushu and English. No Khwe is taught at school";*

"the government sends other people to come work in this area, they won't let the San people work here in the public offices.

Namibia's 'open access' problem, as referenced by the NP4, where rural areas of Namibia experience a "*dissipation of net benefits and a reduction in production to levels that are economically unsound*" (Namibian National Planning Commission 2002, 71) is relevant for the Khwe as resources are considered 'open' without representation to say otherwise. As the literature on common-pooled resources indicates, if there is no responsible institution to set rules and define rights and duties to govern, monitor and manage a resource, seeing to it that overuse or misuse is reduced, degradation through positive feedback loops (Berkes 2007, 15191), overuse and a lack of concern about resource maintenance is likely (Ostrom et al. 1999). Evidence of resource degradation in Bwabwata West are drawn from the interviews in this study due to a lack of substantive rights over the resources themselves and an absence of strong leaders in the community to define rules of the commons.

Inviting further vulnerability without proper leadership, the Khwe also miss critical opportunities to compete for development as they are overlooked due to the difficulty for outsiders to connect with a point-person within the community;

"Things have happened but they haven't happened because they don't stand together. For example, the councilor got toilets— mobile toilets— to install in the community. There were 190 to install, but he didn't install anything [in Bwabwata West] because he saw [that] there was no one to talk to and there's always so much fighting that he decided he'd rather go install those in the inland [instead]" (SW2 2017).

5.2.8. Climate Vulnerability Loops

Some climate vulnerability feedback loops also exist for both livelihoods. Despite free malaria, TB and HIV free tests (CN 2017) the intensifying threat of malaria has few very effective prevention techniques, particularly if resistance to the malaria treatment medication is growing for the parasite, as some of the interviews of this study suggest. One somewhat effective

treatment, the burning of dung or the Ngambwe plant, is described by one 93 year old Mbukushu woman from Indongo*: "[we] burn dung or this special plant [as] a way to prevent mosquitos. [We] do it every night around 7 or 8 at night until April. It works."* Although this treatment is described to be effective, the government nurse working at the community clinic points out limitations for this treatment and other malaria prevention options, *"… once those [Ngambwe plant] leaves are finished—the smoke is finished—then the mosquito comes again. So it's not very effective unless you burn it the whole night. Maybe burn it fresh. There are no other techniques to prevent [malaria]. We don't have a tablet for prevention."*

A second climate-induced vulnerability feedback loop arises from the uncertainty, as a result of inconsistent rains in the last five years, of people about whether or not they should plow fields and plant crops for the year. Not wanting to waste valuable seed, many, particularly the farmers, opt to not plow their fields in preparation for cultivation. One of the social workers comments,

> *"People are speculating now, you will see in the fields most of the people did not plow. [There was not] time for people to work in the fields. Some will say 'ah, it will stop raining soon so then we will plow', only to realize that it is non-stop, continuous. So it did not give people time to plow— they waited. Some plowed, but you see the grass is outgrowing the crops so they don't have time to weed, you need money to go clear your fields quickly. It was supposed to be a very good year, have a bumper harvest, but some of these challenges that people are always speculating that that's what happened last year, that it rained and people say they are still observing while others plowed and they are not enjoying"* (SW1 2017).

With a significant majority of Mbukushu farmers (9 out of 15) explicitly stating that the only information they receive about the weather is occasionally from the radio, observations about the weather is all that most of these natural resource-dependent livelihoods can draw from for information about weather patterns and predictions.

The loss of genetic diversity, and therefore loss of adaptive options for an SES (Maestre et al. 2012), is also a concern for the adaptive capacity of natural resource-dependent livelihoods. As

only the following comment from one 65 year old Mbukushu man from Divundu West supports a claim that multifunctionality options are being lost for an ecosystem, it is hard to reach a conclusion on this issue without further investigation: *"[people in the community] used to grow three different kinds of sorghum. Now they don't grow three because they don't taste so good. People aren't interested in growing sorghum anymore, so they mostly grow mahangu."*

Chapter Six: Summary and Conclusion

6.1. SES Resilience

Are Climate-Resilient Sustainable Livelihoods Being Created?

Other studies show that adaptation strategies of indigenous groups include migration, irrigation, water conservation, reclamation of ancestral land, crop cultivation strategies, and livelihood diversification, as some of the most prominent (Macchi et al. 2008). Of these, migration is a known and practiced adaptation strategy for those of the Kalahari (Hitchcock 1978), but while the improvements in borehole technology have increased water access to some groups, human population increases in the region and fencing have increased pressure on water resources and made stationary populations more vulnerable to lack of water (Wilk and Kgathi 2007). As a means to escape poverty and vulnerability cycles, migration is a strategy also reported by some of those interviewed in the study area as a median number of those living outside of the household for the 15 Mbukushu interviewed was 1 individual. One 74 year old Mbukushu man from Indongo details some of the adaptation activities opted for by these persons: *"some of the children went to Windhoek to look for jobs and send money back home. Kids also go to work with the grapes in the south and send money back home."*

According to a USAID Okavango climate change vulnerability report (SAREP 2013, 26) the existing adaptive capacities at the regional level relate to cultivation of drought resistant crops like sorghum and millet (though in low yields); the existence of different income streams of the livelihoods found 'such as remittances'; the presence of a variety of animals (goats, cattle, etc.) for most households; people at the community level who are willing to work; and that land tenure is improving through the land registration processes. An 'innovative model policy for CBNRM (wildlife as livelihood option)' is also noted by this report to be an existing area of adaptive capacity.

This research supports some of these findings as areas of existing capacities and finds other areas of adaptive capacity as well. This chapter will discuss those areas of adaptive capacity found in this research and will conclude with some recommendations on how to further nurse out

resilient, sustainable pathways so as to create resilient livelihoods for the two livelihoods of the study area.

6.1.1. Ecological Resilience

A large strength and source of resilience which is all-encompassing and significant for the livelihoods of this region is the rich biodiversity and multifunctionality of the natural resources present. There is ample evidence to lend support to the idea that a preservation of plant diversity has the ability to bolster adaptive capacity as species richness and diversity creates a network of alternatives for an SES to avert regime shifts and draw upon resources to adapt, particularly in the context of climate change (Maestre et al. 2012). While many factors influence risk of impact to natural hazards, factors such as soil fertility, amount of slope, groundwater availability, alternate watering scheme options and vegetation for the absorption of water were shown as those ecological variables with the greatest possibility of affecting livelihoods in the Okavango Delta (Wilk & Kgathi 2007), suggesting similar importance of these elements for resilience in the study area.

Resilience recommendations for the livelihoods of the study area includes the better utilization water resources of the Okavango River through fishing and agricultural irrigation activities. A local government official remarks that "*only traditional fishing and cutting reeds for fences and making tools [and] some small scale irrigation"* are the activities that water from the Okavango is used for, outside of basic human needs. As such a large resource, livelihoods in the study area could do much to utilize water through these kinds of livelihood activities without creating issues for residents downstream. As one social worker points out, fishing in the Okavango is also an underutilized resource as there is plenty of fish but the option to fish is seen as merely a way to pay back a debt and not as a way to make a livelihood or increase food security:

> *"Those who are fishing fish here when they are broke—when he doesn't have money or when he [has a debt]. That is when [they] decide to go to the river and get fish. Once that is solved you stop. There is no issue with the numbers of fish… I fish for a hobby. I get a lot of fish and I give [them] out"* (SW1 2017).

6.1.2. Social and Livelihood Resilience

6.1.2.1. Motivation

Although alcoholism along the Khwe hunter-gatherers has the potential to significantly and substantially erode motivation and will to seek adaptive development, there is will to try and observers report that if the Khwe were allowed to practice their culture that they would. As the critical forms of capital for the bottom-up formation of capacity building toward resilience, empowerment foundations in the form of motivation and will are critical ingredients for the creation of climate-resilient sustainable livelihoods. One 75 year old Khwe woman from Mutc'iku shows that despite her preferences, she is trying to learn how to farm as the Mbukushu do*, "plowing, it's not for us, it's for the Mbukushu [or other tribes]. We are also trying to do this, but it's not our culture, but we are trying."* Another 60 year old Khwe woman from Omega I replied, *"if [I was] allowed to hunt and gather again [I] would [do it]."*

6.1.2.2. TEKOA and TEK

An important aspect of this motivation and desire to further their culture is the materialization of an educational institution created by, with, and for the Khwe. Researcher Boden comments that education is a significant barrier for the Khwe in the context of the tourism opportunities in the park: *"if the Khwe were educated enough they could utilize the tourist industry as a livelihood source."* Alpers comments on the high drop-out rates in the community and the lack of opportunity for Khwe thereafter:

> *"The school system is failing this community, the dropout rate is more than 90 percent in this community. Incredible! The government schools have an incredibly high rate of people not finishing school. Even this Khwe tracker here [*Khwe tour guide in training nearby*] speaks fluent English, [is] capable and confident, but [he] cannot get a government job [without a grade 12 education]. So what do we do with a few thousand school dropouts who cannot get a job?"*

The Khwe senior traditional leader has one answer to Alpers' question. He explains the concept of the Traditional Environmental Knowledge and Outreach Academy (TEKOA):

> *"Our knowledges, we must use, like TEKOA and BCP. TEKOA is also a part of development, so if the government recognizes and endorses TEKOA to go ahead, there will be more than 10 or 20 people to be employed. [But more importantly] TEKOA is our traditional knowledge. TEKOA is the school, or where we want to put a center to bring the youth and teach them, other tribes [also] if they want to come and learn our knowledge—not settling in Bwabwata, just [come] for some days or weeks and learn from us. The teachings will come from our elders."*

While TEKOA exists as an official trust registered with the Namibian High Court, applications for official accreditation are still being decided over by the Namibian government (Alpers pers. comm. 2017). The very alive idea of TEKOA as an academic institution, however, very much exists as a reality for the Khwe people. Elders have begun teaching young people about the 'old ways' for alternative livelihood options for some years and the creation of 'Khwe trackers' has been established. Speaking with one Khwe tracker undergoing training at Khwe Culture Village, another traditional knowledge (TK) institution up-and-coming in the Khwe community, she gives a testament to the success even of the beginnings of the development of this TEKOA:

> *"That's where I have learned from these other guides who are now doing their guides, the other side, who are trained. Those were trained here, but now they are working in one of the lodges as a guide, a tracker, as a guide… the training they got here, right here in the village, with that knowledge they are now taking that for work."*

Alpers explains how such endeavors have helped some young Khwe achieve successful and arguably resilient livelihoods to date:

> *"A few young people from here [have trained here]; two more are going next year to another training place; five have jobs in Wolwedans Lodge in the Namibrand Game Reserve [(fancy and expensive tourism lodge in the sand dunes of Namibia)]; two have*

jobs in southern Namibia. [All of this] not because of learning from books, is just [from] confidence building. I just wanted to add that because it's hard to quantify it or define it."

Touching upon an important point, this excerpt from rural development technician Friedrich Alpers notes the intangible and invaluable empowerment and confidence building that such institutions have in the mindsets of a people perpetually marginalized by society; *"it's more than just, its correct,"* he asserts. TEKOA, an idea he has helped the Khwe to sustain to fruition, is a powerful idea and source of bonding capital and capacity building for the community. Picking up where Khwe senior traditional headman and Traditional Scientist Thaddeus Chadeu left off above, Alpers says:

"It's more than just the professors and staff [of TEKOA]. If you lift someone's dignity and confidence that person can become an IT specialist or a lawyer, or a teacher, or farmer, or whoever he or she wants to be in society. TEKOA is more than TA. It's someone who, for most of his life he has been hearing that he is just a bushman, by government, by white people—you're just unemployed person that cannot even speak an international language. But if you break that mould and you give them the confidence, even though they didn't finish a western Cambridge school system (the school system we use here is Cambridge-based), that that's not going to deter you from becoming a professional. With that confidence they can go—I've seen it, people from around the world, aboriginals from south American Australia—lot of people who have no western schooling system but they are standing at UN fora and have incredibly strong professional, legal, scientific, arguments. They are confident people because something in them stirred to become politicians, activists, lawyers, [they had] the desire to fix problems. TEKOA is doing that. Today Thaddeus is talking for young people, for his community, for government, to researchers, differently because something in him said that this fight to get TEKOA going was a fight for something, [that said] 'even if we don't get our land, if we have a training institute where we can teach our values, our importance, that's more than anything else'.

Thaddeus Chadeu drives this point home to show that it is not only the young people learning in the TEKOA, the elders teaching, or the staff paid to manage operations who will benefit from TEKOA, *"the Khwe, the Khwe will benefit from TEKOA. From the employment they will be teachers, professors; they will be cleaning or driving; the school, the youth [who] are learning there, they will benefit. The community will benefit from TEKOA."*

Alpers points out how such community empowerment and capacity building connects with top-down planning in national planning documents as well: *"our NDP 4 and 5 (in draft) talk a lot about school development and vocational abilities. There are a lot of people, artisans and crafts people, that exist already. But [there's no] exploring traditional knowledge as a science, not just being a guide. It's scientific."*

Very importantly also for the resilience of an SES— as the connection to multifunctionality of an ecosystem through the perpetuation of traditional ecological knowledge (TEK) and the connection of human systems with ecological ones in an SES as an invaluable asset which is distilled through the institution of TEKOA in Bwabwata West— Alpers gives one example of how the Khwe's TEK has been used to manage land within the park, as acknowledged at an IUCN conference:

> *"The community has fought government that they have a right to set this national park on fire every year using a spider as their GIS information system indicator. A spider tells the elders when to burn. That's science eh? Very scientific. That's why there is such an abundance of wildlife here. That's why the buffalo and wildebeest and all the wildlife come here— because it's flush, fresh grass here. It's a park, but we burn. At an international meeting we explained this to an IUCN group: how [Bwabwata National Park] manages land with a spider. This is the [Khwe] TK knowledge."*

Conservation, as stakeholders on the ground involved in the perpetuation of such in Bwabwata West, is not 'people-less' landscapes of the 1980s, but it is the natural resources together with their endogenous peoples who see to it that these resources are protected in the form of an integrated and adaptive SES; *"we've got the biggest elephant herd in the world, or Khwe cattle*

herd, we have incredible value here… so [just] as this is an important elephant farm, it is also an important people farm" (Alpers pers. comm. 2017).

While the importance of this motivation and strengthening of community ties in the form of TEKOA is critical to the future resilience of the Khwe livelihoods in Bwabwata West, community support was also observed in this study through the social bonds between the Mbukushus. One 60 year old male in Mushashane explains, *"since [I] see hunger in other households, [I] cannot just do nothing. [I do] help if [I] can."* Finding this an important enough point to make sure it was properly interpreted, the man followed this statement with another in English, *"I cannot eat while others are hungry".*

6.1.3. Government Resilience

Resilience from government, as has been discussed in other areas of this research, has its strengths and weaknesses. On the whole, since adaptive co-development is not occurring, needs much attention and improvement to facilitate climate-resilient sustainable livelihoods at the ground-level. One measure, the Famine Early Warning System used in the 2013 famine year and hailed as a success by national government (Namibian Government 2015) has potential as well as the much discussed CBNRM Program.

Although it is likely unlikely that the Namibian government will de-prioritize conservation where it stands now as a rung above sustainable development (in practice), Dieckmann *et al*. (2014, xv) highlight the following missing factors as key reasons for a lack of success for projects in the past that were aimed at uplifting the San people from poverty: 1) developing an integrated strategy; 2) focusing on empowerment; 3) coordinating and bridging communication between stakeholders; 4) inviting true and full participatory involvement of participants; 5) designing projects to accommodates and account for the San culture; 6) create grassroots links for projects and make long-term commitments to such projects; 7) ensure effective monitoring and evaluation of projects; and lastly, 8) to build capacities of local organizations. Addressing these points and devolving rights to land a resources to endogenous communities, within and outside of tourism-purposed land, are places for Namibian government start, working with the

people to develop resilient livelihoods through adaptive co-governance/-management/-development.

6.1.4. Institutional Resilience

6.1.4.1. CBNRM

At an institutional level, the success of CBNRM, as has already been well explained in Chapter V through the identification of adaptive capacity gaps, could be improved through by the full devolution of rights and authority over land and resource management from government to endogenous communities. Termed and defined in this research as 'adaptive co-management' as a practice toward 'adaptive co-development', CBNRM has the capacity to be a source of institutional resilience for livelihoods across rural Namibia if this is done—not just livelihoods in the study area.

Taking the 'management' aspect of this institutional resilience a step farther, Martin (2000) and Martin (1997) propose a rough estimate of the number of field staff needed for state protected areas based on protected area size and operating costs. As seen by the red delineations in Figure 16, Bwabwata National Park, at 6,274km2, would need about 100 game guards and $100,000USD to run sufficiently.

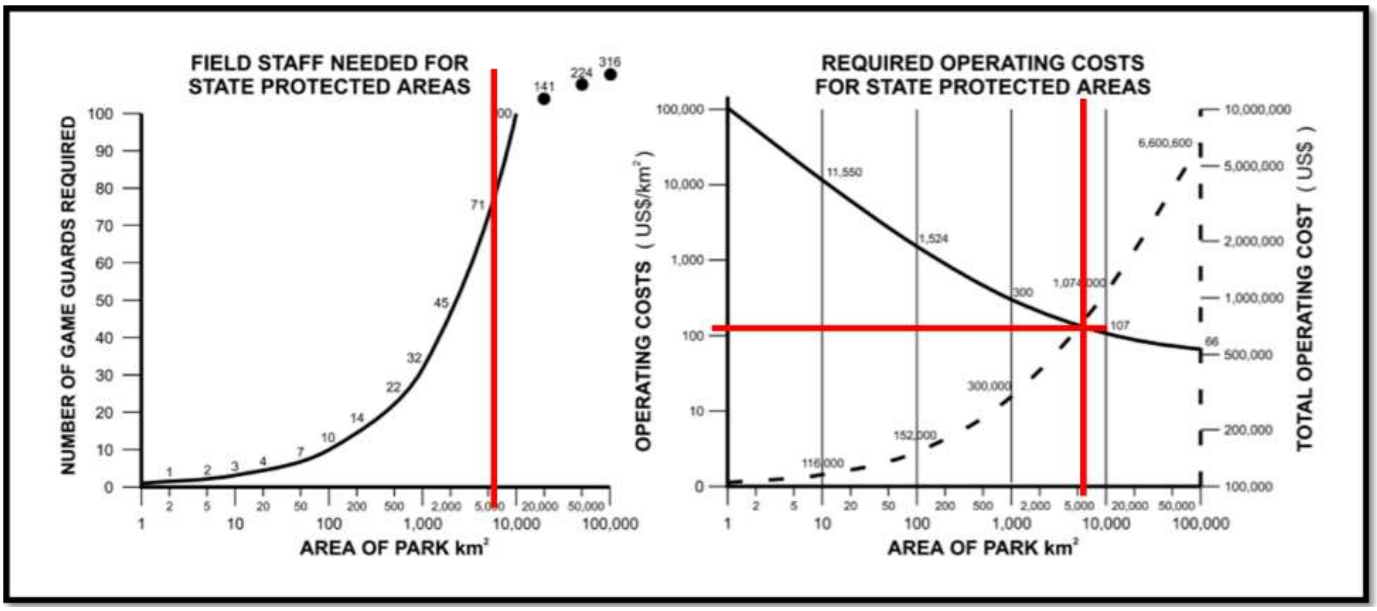

Figure 16: Number of game guards and operating costs required for well-run and managed protected areas, adapted from Martin (2000) and Martin (1997)

While others have already noted the success of Namibia's community game guards (Nelson and Agarwal 2008; Baldus 2009), even going so far as to say they've been 'extremely successful' (Baldus 2009, 38), the escalation of arms inside of Bwabwata National Park to involve the NDF shows that CGGs could do better. As the KA Board member noted, the addition of armament for CGGs would be this improvement to produce resilient management schemes in the Park and quell vulnerability feedback loops related to poaching and elephant crop damages felt by the community:

> *"[How can you stop poaching in the park?] Employ [CGGs]— make them armed. If they are not armed they cannot stop someone who is armed, who has a firearm. So it's difficult. They are already employed by KA but the government refused to give them firearms so it means they cannot stop people from poaching. If they employed them at the MET, then give them firearms. Because these CGG were born here, they know all the area, all the pans, like now the water pans will dry up by July in August so there is no water. So if they see the track of the poacher in the field they will know where they are drinking water; they are owners of the area. You cannot just pick someone from Ovamboland and say 'go work here'. He [doesn't] know the area, he doesn't know the movement of the community in the area, so it is difficult [for him]. He [would] just start shooting the community when they go start looking for food. I think they would be more effective [even] than NDF if they had guns. They can employ even 100 people in the park, it's a big park this one, 200 km and you don't know what [is] happen[ing] if you just put 10 people. They don't know what is happening on other sides, so better to employ many people. CGGs you can make them up to 200, but it can't help [if] they are not armed. Better employ them more and give them arms, you can make them 200-300, but without arms it cannot help. The park is big; 100 or 50 if the CGGs are armed. There are more than 100 people who could, but I just say 100 people by how much money they have."*

Traditional Scientist Thaddeus Chadeu very accurately reflects the academic analysis of the situation as both the TK and western knowledge systems produce the same figure for number of CGGs required to sufficiently manage and patrol the national park.

Furthermore, it is argued that well-managed community-based conservation shows a community which has taken it upon itself to employ village scouts and patrols to manage poaching operations in this endogenous form of local law enforcement (Baldus 2009, 24). Further support of this idea is whole-heartedly endorsed by one local government official as he remarks on CCGs,

> *"[Could CCGs work to control poaching?] 100%. If we happen to get those people. The government puts up a mechanism how to get them. It will work because everybody will think that if I do this somebody is looking at me and he or she will report me, then [the poaching] will come to an end. I don't think there will be barriers to implementing such a thing… If the government gives you the green light, no problem."*

6.1.4.2. Conservation Agriculture and Food Security

Within the IRLUP for the Zambezi Region as a part of the KAZA TFCA regional project, there is a clear emphasis on the conversion of land to commercial agricultural purposes with the assistance of irrigation to produce high-value crops produced only (MLP 2015, 50).

This, as a kind of similar alternative to community-based natural resource management, is proposed by the Namibian Ministry of Agriculture, Water and Forestry (MAWF) under the theme of "*new farm management systems such as Conservation Agriculture*" which is proposed by the NDP4 to "*result in higher yields and increased food security, [and] can also lead to surplus production for the market*" (National Planning Commission 2012, 65). Stating further in the NDP4 that conservation agriculture will "[*increase] household food security and, hence, nutrition levels in order to reduce malnutrition among children in particular*" (ibid.) this program targets all crop producers in Namibia and aims for conservation agriculture as an approach to *"manage agro-ecosystems for improved and sustained productivity and food security while preserving and enhancing the resource base and the environment*" done through three main principles: sustaining continuously a piece of land through minimum mechanical soil disturbance; keeping permanent organic soil cover; and diversifying crops and crop groupings

together (MAWF 2015, 5). The main crops for production targeted by this program are reported to be pearl millet (mahangu) and maize, also those main crops from the study area.

Successful in recent years, Green Scheme and Youth Service projects in the country have produced 6592 metric tons of maize and 565 metric tons of millet (from 2012-2013) and continue to be an example to the rest of the country as what a medium scale agricultural project can look like for a community to benefit from. Plans for such a scheme in Divundu, funded by the Global Climate Fund (GCF), have been proposed after a preliminary study in the area found that most of the vegetables consumed by the lodges in the area came from South Africa instead of from local sources (Maghumbo pers. comm. 2017).

Still in its early stages, plans to revamp the NDC Farm in Omega I have also been rumored for the Khwe livelihoods in the study area. Focusing on the combination of traditional crops and endemic plants to the region, this food security project, fully realized, would utilize agroecological principles to produce food, employ people from the community, and preserve valuable park biodiversity capital (Alpers 2017). Often touted as the Khwe's 'supermarket', such an investment in local indigenous and endemic crops would also serve as another tangible connection between the human and the ecological in the SES. The Khwe senior traditional headman notes the food security of old for the Khwe, *"there are many foods [in the bush], that's why I myself call it my supermarket. We did not wait for someone to come and give me money to go and buy food and come and eat. I [used to] stand up and go. I [would] prepare my hunting things and go."*

Though few resilient agricultural strategies were observed from the traditional subsistence farmers, the Mbukushu, those techniques noted from interviews include: plowing another field when fields were eaten by insects; harvesting from the bush when crop harvests were insufficient; buying specific crops to plant based on climate predictions; planting different varieties of crop as a risk remediation strategy; diversifying sources of income; and planting drought-tolerant crops like cassava. Some of these listed techniques are described by those practicing them:

"[I] will go and buy whatever seed [I like] at the moment, but there is an element of what the weather is doing. [I] won't buy beans if it's very hot as small beans don't like heat. Mahangu, sorghum and groundnuts can tolerate hot weather"—70 year old Mbukushu woman from Mushashane

"[I] plant cassava near [my] home and in the field—it won't die during hardship but people here don't know about it so they don't grow it. He got it from Angola. There are 5 different kinds. To prepare it you cook it well, dry it, then pound it into a powder and then cook it again. It is often prepared with maize or mahangu meal at the same time as it cannot be cooked by itself because the powder is too fine like flour. In this month when you start to cook the mahangu you only harvest a little now, selectively, and harvest the rest later." – 65 year old man from Divundu West

Although it was difficult to ascertain which precise varieties of crop were being used in Divundu and Bwabwata West due to the language barrier, it was shown in one study of four communities in the north-east Nigerian region of the Sahel that farmers in all of the communities inventoried used 3-12 named types of pearl millet, 6- 22 types of sorghum and 14- 42 of other cultivars (Mortimore & Adams 2001). Within this study farmers reported management of the diversity of their genetic resources by selecting and storing the best seed from each year's crop. One of the social workers describes government involvement in seed management as drought-tolerant varieties were given to many farmers in Mukwe District to provide faster-maturing crops:

"(Shifting rain) has also affected how people respond, of course. [The Ministry of Agriculture] has also come out with varieties people to suit the changes. There is now a new early maturing variety of sorghum that they are now planting, which is very common here. There are natural mahangu which is a verrry tall variety which is slowly [phasing] out. The majority of people are now going with the shorter ones, called Kananco (the brand name)— it's the new variety of mahangu that matures early, and it is short and drought-resistant. I think they plow it toward the end of the rain season in Jan/Feb. The traditional one they plant [in] early Nov./Dec., somewhere there. The yield produces the same. The traditional one grows tall and takes [a] long [time] to mature. The [other one]

doesn't grow that tall— it's short and matures fast fast. [The] Ministry of Agriculture provides this shorter variety to people. There is one directorate in the Ministry of Agriculture providing the seeds in Mukwe somewhere" (SW1 2017).

While it seems like this is a resilient practice, how these seeds interact with other environmental factors is still an unknown. For now, anyway, it could be called a resilient coping strategy for livelihoods of the study area.

6.1.5. Global Factors

6.1.5.1. The Market Economy

A common adaptation technique in parts of the world with resources to do so, the acquisition of financial capital to buy solutions to climate change is also an option for some livelihoods in the study area. A study from the Delta showed that men with formal employment were considered to be the lowest risk group with the highest benefit of the livelihoods assessed (Wilk & Kgathi, 2007). While few in this study were found to be receiving significant enough income to spend money on anything other than food and school supplies (see Figure 11), those with cash, such as the Mbukushu man of Divundu West who worked as a soldier some years ago and saved money to buy a vehicle and start a transportation business, are found to be better off in the event of a climate shock or influence from another stressor. Viable markets for livelihoods of the area to participate in, such as Namibia's livestock industry and its many international markets for export—the EU, Angola, South Africa, Zimbabwe, Zambia, Botswana included (MAWF 2013)—could be sources of financial coping for livelihoods of the study area, though this research does not consider them to necessarily be 'resilient' adaptation strategies.

6.1.6. Fairness and Rights

As discussed in Chapter 5, the situation that the people of Bwabwata West and Divundu exist in where conservation priorities inch out development ones and a 'peopled' park is tolerated but left unembraced is a situation that must be remedied before true resilience can occur for these livelihoods. Living with animals which continuously pose as a hazard to livelihood resilience

while other interests reap fairly aesthetic or abstract benefits is not a situation poised for resiliency. As proposed for CBNRM resilience, devolving rights to land and authority over resources is the most important step to begin to remedy such a situation and achieve adaptive co-development. Allowing the local communities the right to choose, the fairness to choose how they would like to live in their circumstances, is an aspect of authority that not only must be granted from government and institutions, but must also be recognized by the people themselves.

For the Khwe, several important steps in this direction have been made by some leaders in the community. As Alpers comments on this, *"there is no leadership here by government. So at least [even] if you are not recognized it doesn't matter, you still practice the leadership with your people. It's a system. If you don't [do at least this] then everything is broken."* This mentality is critical to the successes that the Khwe have made thus far. Chapters IV and V of this research commented upon the leadership issues that the Khwe face as pivotal issues that influence many aspects of life for the livelihoods of Bwabwata West. Although no leadership is recognized by government, the continuous reference to the 'Khwe senior traditional headman' throughout this research should be noticed as this will, persistence, and perseverance of a group to demand recognition and rights that they are entitled to, despite the many stresses on livelihoods and forces set out to weaken those stretches for resilience.

6.1.6.1. The Khwe Biocultural Community Protocol

An important first step in this process to rights for the Khwe has been the compilation of a Biocultural Community Protocol (BCP) which stipulates cultural practices and traditions of the hunter-gatherer group, as told by the Khwe themselves. This, as a formal document, may show that the Khwe have something that cannot be simply side-stepped or dismissed and provide also the foundation for getting rights through the legal process. The Khwe senior traditional headman explains the Khwe BCP, the reason for its creation, its purpose, and what information it keeps:

> *"The reason for the BCP is because of the erosion of culture. BCP is Biocultural community protocol—[to] bring old people back, they are lost… BCP is the book where you keep your culture alive…Take [all of the aspects of culture] together and keep them*

and that is the protocol, the book is protocol… The oldest ones must come back and think what was happening…BCP is the document where we keep or where we have our culture then everyone who comes from other places… they come through BCP then talk with the committee there. They are the ones to give PIC [prior informed consent]."

A good concept in theory, the Khwe BCP, however, like their applications to government for traditional leadership, has still not been recognized by government. The senior traditional headman explains again:

"*BCP is still not recognized, that is why these things are still happening. [In] the BCP it's there, inside the draft document of BCP—what should happen with the people who come in and do all different things. We don't think that MET should be the high authority in the park, but the government took the benefit, the money. [People] come to interview and do research [in] the community then [they] don't pay as MET already took [that] money [in Windhoek] and this is not fair."*

Touching upon fairness and the right to dignity and culture, the Khwe senior traditional leader makes succinctly the point that adaptive co-development is not happening because the Khwe do not have the right to govern and manage land and natural resources. As he points out through this statement above, they also do not have the sovereignty over the transmission of their culture even to outsiders. MET, as the permitting agency, which also benefits financially from the permitting process, has the ultimate authority within the park and thus is not a 'co'-manager or 'co'-developer with the indigenous people, but instead it is *the* manager and the developer of park-related matters in the absence of these rights for the community.

The Khwe story, however, does not end there. Resilience and regime transformability for the Khwe means forced adaptation, either with government or through the legal process against it. The Khwe senior traditional headman again:

"Last December, we invited the group of lawyers, Natural Justice, which are stationed in South Africa, Cape Town. They used to come [often], but this time they invite[d] us to go

there and talk about the next step. MET, we are taking them to the court. We [gave] them [until the] 8 [of a past month] but they are still talking, so now we are listening to the lawyers. I spoke with them over the phone on Saturday. They said they were already talking to MET, but that one [person from the] Parks [Division has] to give the date now. The Directorate of the Parks has to say directly [what they will do] because they are the ones rejecting our development. So they have to give us the date when we must meet [and] when. [Until] now we are waiting to talk with them. If [they won't talk to us] then our way forward will be with the court. We [will] tell them if you don't want to give us development then we are claiming our ancestral land back, [through] the high court, maybe. If there is [a] good result from the Directorate of Parks, then the relationship will go well, but if they are negative then our [response] will also be negative."

6.1.6.2. Khwe Culture Village

In the meantime, while the Khwe wait for a decision from the national level about how they will work with government, Khwe Culture Village has been created. An institutional and coalesced form of social and cultural capital for the Khwe, Culture Village is also a viable resilient livelihood for many young people and an opportunity for the Khwe to revive lost cultural ties through the direct transmission of culture. A voice to foreigners, from young Khwe, the livelihood created out of culture village to guide tourists through the bush, showing them plants, tracks, and uses of these to the Khwe, taps in— as fully as possible— to the one viable resilient option that currently exists for the Khwe. Since the introduction of the national park as a protected area, exclusionary conservation practices that limit the range of livelihood options available have severely limited the Khwe's adaptive capacity to survive. Within this power ecology, national and international interests prioritize wildlife— tourism as its monetized value— which comes in direct competition with local communities and their ability to co-exist off of a land inhabited for generations. Turning a kind of 'heritage tourism' (Bryant et al. 2011) into a livelihood opportunity, the Khwe have creativity formed a new livelihood option to benefit directly from. As explained by the Khwe senior traditional headman: *"[culture Village] is a village where you show tourists what the Khwe culture is about, it's Hollywood, it's a show. They [the tour guides] make money. That's the idea."*

Not only as a money-making livelihood option for young Khwe, Culture Village also infuses the modern Khwe with knowledge of the ways of the elders and bridges a lost connection for many Khwe in Bwabwata West today who grew up disconnected from the lifestyle of a hunter-gatherer livelihood. One of the Khwe tour guides from Culture Village explains:

> *"The project is geared to, most especially, bring the traditional knowledge from past to present, of which the [young] generations now are coming to also inherit. This will be sustained. Everything that our elders were doing must be practiced for now. Our elders must come learn about it. And people must also come and get knowledge about it, how people were living in the past—their culture, what traditional views they [had], [their] way of talking, greetings... The main aim of this project is that. We also hav[e] a guide, tour guides, when the visitors come we are taking them to the [paths through the bush], explain[ing] to them the different types of medicine, the different types of [tree uses], animal tracks, and so on. That is the main key of this project, to learn about traditional activities from the elders to the youth—to transform the new generations."*

The conviction and dedication to building new resilient options for the Khwe, from the Khwe, is clear:

> *"Article 19 on the Namibian constitution says that every tribe has a right to practice their culture… I'm never going to leave the cultural village, I want to protect my culture and I would like to have a site here for my culture. To tell or to show others and to teach young ones what we are doing here"* (Khwe senior traditional headman 2017).

While international rights agreements like the ILO 169 would provide greater power to back Khwe motivation to be granted rights, for now institutions like the Khwe BCP and Culture Village help to overcome local injustices and power ecologies that try to wash away culture, as evidenced from the following statement by a local government official about Khwe Culture Village: *"maybe to bring young people together and show them how to identify the tracks [of*

animals], etc. [Culture Village is important, but] to me personally that is not important by now. We have to change the minds of our people. To develop them mentally and physically."

6.2. A Final Word

While both livelihoods of the study area demonstrate the capacity to develop resilience, of the two livelihoods assessed in this study the Khwe hunter-gatherers were observed to be making it a reality, despite what might seem like insurmountable barriers.

The loss of connection between the Khwe and their land is a missed opportunity to understand not only the effects climate change is having on the land, but also to learn, or re-relearn, how to manage and protect an ecosystem in a sustainable way, as the Khwe have been doing for centuries. It is critical to understand this connection as this connection, today, is also the reason why this area has been able to achieve even the status of 'national park' worthy of international conservation efforts. The irony of a situation where the international community doles out accolades for such a well-fitted management regime without actually acknowledging the parts of that regime which make it possible is the central point of this research study. This point is best captured by the Khwe themselves through the Khwes' words and their situation, which, on so many fronts, has so many forces pitted against their resilience and success. Their story and quest to achieve recognition for their culture and position as essential stewards of a vibrant and living land is adaptation and adaptive co-management, by definition. It is this struggle for survival now for the Khwe, against the human forces that claim power and usurp power by dubious means, which is the larger adaptation battle that the Khwe must persevere through and conquer. This point is not lost on its people, nor for those who speak directly to the Khwe, as even UN Special Rapporteur on the Rights of Indigenous Peoples, James Anaya, expressed concern after a 20-28 September 2012 visit to Namibia on the situation of Namibia's San people, saying that despite effort at the government level to address the San and other indigenous and minority groups that efforts have been far from enough:

> *"Overall, however, I have detected a lack of coherent Government policy that assigns a positive value to the distinctive identities and practices of these indigenous peoples, or*

> *that promotes their ability to survive as peoples with their distinct cultures intact in the fullest sense, including in relation to their traditional lands, authorities, and languages."* – Anaya (2012)

Despite the overwhelming number of obstacles at a livelihood; historical; inter-tribal; local; regional; institutional; governmental; and international level, the Khwe show resilience in their ability to fight back against all of these forces and avoid cultural collapse by adapting to what remaining livelihoods are left for them in a severely limited-use, confined, and slowly culturally-eroding endogenous space left for them on the planet. Through the motivation and determination of a few Khwe, they have managed to create new institutions in the form of a Traditional Ecological Knowledge Outreach Academy to demonstrate, practice and institutionalize traditional knowledge; craft creative livelihood strategies to appeal to international interests with Khwe Culture Village tours—also circumventing national, regional and inter-tribal interests and power struggles; gain international attention from noticed Khwe-tracker guides throughout Namibia in tourist hotspots; craft a legal document showcasing Khwe culture; and, somewhat miraculously, have also managed to survive daily onslaught against them with an in-tact culture and sense of motivation despite rampant, contagious and a domineering loss of social capital personified by the societal alcoholism infliction that unites the entire community around the one vestige of pleasure allowed to them from a system turned on its head against their success. This joy, the joy in and of the shabeen and what it represents, the only institution fully acknowledged by all of the many other non-Khwe interests, draws children, mothers, and the elderly to sit and share the dregs of a culture that has been nearly robbed completely from them in their unique 'shadow landscape' (Kizos et al. 2017) of marginalization that can only see them as 'lazy' and incompetent through the lens of the power ecologies of Western society.

Unlike all other stakeholders represented in this study, this research aims to make a very clear and important point to say that the creation of this image of the dignified and ecologically brilliant group of invaluable keepers of the land should be uplifted, aided, and upheld as an exemplary case of the potential of humans to live sustainably, resiliently, and brilliantly, within an SES. To see the Khwe's celebration of culture as only that what is left at the shabeen is to miss the entire story. This, this what is happening outside of the shabeen and in the everyday

battles of the Khwe with the endurance left to continue to adapt, this is the is adaptive co-management and adaptive co-development defined and always missed by science who goes looking but never comes back finding. How different would be this story if the Khwe and other local indigenous or otherwise groups were actually allowed the tools and the authority to manage?

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"As the century closes, the focus of the natural sciences has begun to shift away from the search for new fundamental laws and toward new kinds of synthesis—"holism," if you prefer—in order to understand complex systems. That is the goal, variously, in studies of the origin of the universe, the history of climate, the functioning of cells, the assembly of ecosystems, and the physical basis of mind" (Wilson, 1999: 292).

Much like naturalist E.O. Wilson says, this synthesis of 'holism' as 'consilience', which he defines throughout the book of the same name, but succinctly puts as *"units and processes of a discipline that conform with solidly verified knowledge in other disciplines have proven consistently superior in theory and practice to units and processes that do not conform"* (Wilson, 1999: 216) *"measured by the degree to which the principles of each division can be telescoped into those of the others"* (ibid.: 91) is what allows us to create best fitting adaptations for the situations we face in our respective socio-ecological systems all around the world.

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Appendices

Appendix I: Theoretical Framework Literature Review

Determining Adaptive Capacity through a Vulnerability and Resilience approach using 'bottom-up' structures

Defining Vulnerability as Exposure and Sensitivity

Due to the relatively recent emergence of vulnerability as a concept in climate change adaptation and mitigation research, there is no resolute consensus on a methodology to operationalize, quantitative or qualitative, the measurement of the many different factors that create stress and vulnerability to climate change and its impacts (Adger 2006; Eakin & Luers 2006, 382). Many different notions of how to measure and define vulnerability appear in the literature (IPCC 2012) as the concept is complex, with many moving and shared parts (Adger 2006 and O'Brien et al. 2004). Generally the concepts of adaptation, adaptive capacity, exposure, sensitivity, vulnerability and resilience, though they may be grouped differently depending on the analysis, are interrelated and important when considering how to conduct and assess climate change research.

Traditionally, however, within the climate change research, two broad categories have evolved to contextualize climate change and address adaptation and mitigation with different policy approaches (Figure 17). While much of the climate research from the United Nations Framework Convention on Climate Change (UNFCCC) in 1995 to 2001 was focused on attention to impacts and mitigation, a shift has been occurring from this 'first generation' of adaptation research to a 'second generation' that picks up where the first generation left off with climate change focal points particularly relevant for developing parts of the world. Where the first generation of climate research focused little on adaptation to climate change and only inherent vulnerabilities to it were considered (Tschakert et al.

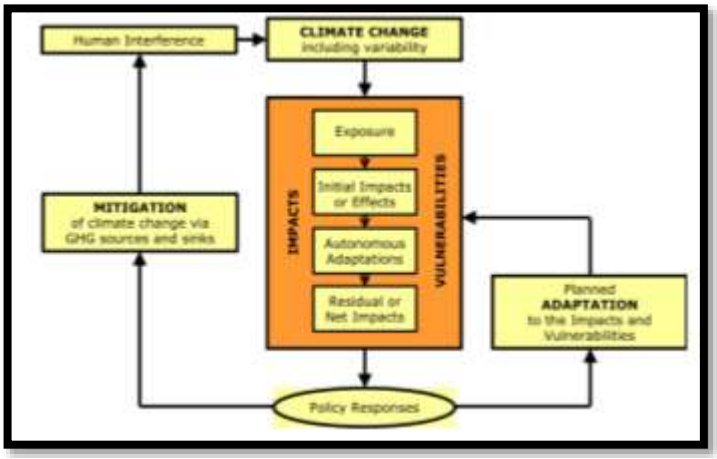


Figure 17: Adaptation and Mitigation Responses to Climate Change according to the IPCC (2001), adapted from Burton et al. 2002

2013, 342), this second generation of research focuses on more proactive approaches to adaptation with a socio-ecological/socio-political focus within a context of vulnerabilities and adaptive capacities toward resilience against its impacts (Burton et al. 2002).

The UNFCCC's Article 4.4, provides a basis for this shift as developed parties committed to the UNFCCC must "assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting the costs of adaptation to those adverse effects." As a critical part of addressing this mandate sufficiently, the need for vulnerability identification and quantification on the part of developing countries receiving assistance for further climate change adaptation plans is critical, particularly in light of still vague understanding of what climate adaptation means and looks like in practice (Noble et al. 2014, 853-857). As many of the most vulnerable countries to climate change suffer from high internal corruption, the need to properly determine specific vulnerabilities and places for development within adaptation plans (Conway & Mustelin 2014) will facilitate the channeling of funds to address the needs of the most vulnerable populations. Further research into vulnerability to understand adaptation options for the most vulnerable and how to build adaptation research for mitigation policy, ('impacts assessments'), adaptation policy ('vulnerability assessments') and to steer away from understanding of what adaptations are *likely* versus to what adaptations are *recommended*, is also severely needed (Burton et al. 2002; Smit et al. 1999).

Within the IPCC terminology, the two main epistemological paradigms of vulnerability are also reflected in IPCC reports as the 'vulnerabilities-threshold-first' approach and the 'impacts-first' approach, which result in 'bottom-up' originating vulnerability, and 'top-down'

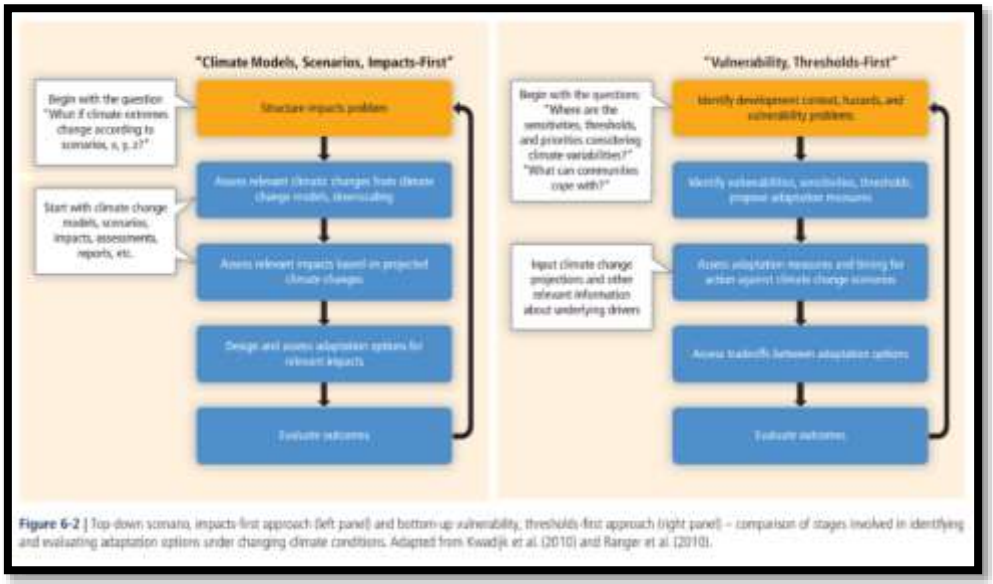


Figure 18: IPCC approaches to identify and evaluate vulnerability (IPCC 2012, 350)

originating vulnerability (IPCC 2012). Where the bottom-up (also deemed 'resilience') approaches focus on vulnerability as a tipping point and critical threshold which requires policy-first approaches (right side of Figure 18), 'top-down' approaches are focused on impacts and science, first, through classical understandings of climate responses (left side of Figure 18)(IPCC 2012, 350). Put in another way, notions of vulnerability appear as both an outcome, or 'endpoint' (Adger et al. 2004 and Vincent 2004), and as a contextual central concept, or 'starting point' (Füssel 2007; Kelly and Adger, 2000; O'Brien et al. 2004). Due to the fact that the vulnerabilities-threshold-first approach is seen to be better suited to small-scale projects (CRIDF 2015), this bottom-up way of understanding adaptation options to climate change will be used in this research. The combination and interplay, however, between the 'top-down' and 'bottom-up' approaches is increasingly important in the development and harmonization of adaptation strategies at the national level in a way that can be relevant and effective to rural stakeholders (Bizikova, Crawford, Nijnik, & Swart, 2014). For this reason, elements of both orientations are included in the Climate-Resilient Sustainable Livelihoods (CRSL) Framework applied to this research.

Regardless of the point of origin, certain paradigm shifts have been important to understand vulnerability and the development of resilience in a more holistic way within the adaptation literature. Turner *et al.* (2003) writes about the origins of the shift in thinking from vulnerability as a singular creation— a linear output of impacts— to thinking of vulnerability as a factor that has an effect throughout a system, thus influencing the system in many ways. Adger *et al.* (2005) further refine the examination to include the importance of spatial and societal scales and boundary definition in defining the scope of vulnerability and its stressors in any given system.

For this analysis, the precise definition of vulnerability used will be the widely cited IPCC's Fourth Assessment Report definition; '[Vulnerability] is the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity' (IPCC 2007). The inclusion of non-climatic (Füssel & Klein 2006) adverse effects will be added to this definition as well as elements from the most recent definition from the IPCC (Noble et al. 2014, 839–840) that indicate vulnerability can also be defined as the "*propensity or predisposition to be adversely affected*".

Measuring vulnerability with Socio-ecological Systems (SES)

The origin of complex systems thinking for climate change adaptation builds off of general systems theory that emphasizes wholeness and feedbacks. By this theory, a vulnerable system responds to vulnerability through positive or negative feedback loops and is integrated, or "nested" (Ostrom et al. 1999, 278), within larger ecosystem functions. Vulnerability, as the negative result of feedbacks, is often seen as the opposite of resilience (Eakin & Luers 2006, 368), or, as Folke *et al.* (2002, 34) situate it: "reducing resilience increases vulnerability". Resilience as a concept has roots in ecology (Holling 1973; Berkes et al., 2003; Holling 2001; Gunderson and Holling 2002) and relates back to complex systems which are understood broadly by five emergent criteria: nonlinearity, uncertainty, resilience, scale, and self-organization, as seen from different perspectives (Berkes et al. 2003) that are interlinked between levels. Holling's seminal paper pioneering the concept of resilience from 1973, defines the term to mean "*ability to absorb change and disturbance and still maintain the same relationships"* that control a system's behavior (Holling 1973, 14). As Folke (2006, 254) captures from a 2003 communication with C.S. Holling, "the useful measure of resilience was the size of stability domains, or, more meaningfully, the amount of disturbance a system can take before its controls shift to another set of variables and relationships that dominate another stability region." Extreme events and consistent stress move the system out of natural variability and a new basin of attraction must be found within which the system can adapt to variation (Smit & Wandel 2006).

Understanding how complex socio-ecological systems (SES) respond to their many stressors is important for the creation of resilience (Folke et al. 2010; Walker et al. 2004; Folke 2006) and provides a useful unit of measurement to assess feedbacks and external impacts on system function as social and ecological systems are inextricably linked, highly interactive, and co-exist off of one another (Berkes and Folke 1998). The unique characteristics of culture and place of each SES are also important for understanding and characterizing adaptive capacities (Adger 2001; Adger et al. 2011; Reed et al. 2013). An SES, as defined by Folke *et al.* (2010, 22), is an *"integrated system of ecosystems and human society with reciprocal feedback and interdependence… [that] emphasizes the humans-in-nature perspective".* Moreover, undermining the 'thresholds' of change at the system level is difficult to pinpoint precisely (Folke et al. 2004), but is generally understood to lead

to an irreversible transition between regimes as a result of positive feedbacks (Walker et al. 2004; Folke et al. 2010), and thus provides an entry point of adaptation strategies and policy.

Fusing the concept of resilience with an SES requires the integration of three themes; resilience as persistence, adaptability and transformability (Walker et al. 2004; Folke et al. 2010; IPCC 2014). The concept of 'resilience thinking' can be applied through an evolved understanding of Holling's 1973 definition to include circular elements of reorganization and restructuring, proffering the role of adaptation as a means to achieve resilience. Folke *et al*. (2010, 22; and Walker et al. 2004, 6) give this definition of resilience as:

> *"The capacity of a system to absorb disturbance and* ***reorganize*** *while undergoing change so as to still retain essentially the same function, structure and feedbacks, and therefore identity, that is, the capacity to change in order to maintain the same identity."*

With this new understanding systems must be able to absorb change, re-organize, and learn from changes in order to be considered 'resilient'. 'Transformability', as "the capacity to create new stability domains for development, a new stability landscape, and cross thresholds into a new development trajectory" (Folke et al. 2010, 27) requires resilience thinking to do deliberatively (Manuel-Navarrete & Pelling 2015), but is key for the development of sustainable adaptation to climate change. As O'Brien et al. (2009) note in a discussion of resilience thinking, disturbance should catalyze action and innovation; climate and other shocks or stresses should further adaptation in a direction so as to induce better results should a similar event occur again. For the purposes of this research, resilience will be considered in this way where SESs have a capacity for renewal, re-organization and development through feedback loops and successful adaptation yields socio-ecological resilience (Folke 2006; Folke et al. 2010).

Vulnerability, Resilience and Adaptive Capacity frameworks from the Literature

Of the many frameworks used to assess climate impacts and responses, several are relevant to consider for this analysis. Eakin & Luers (2006, 379–382) capture four of the main challenges to assessing vulnerability from the literature: addressing multiple, interacting stressors; capturing

socioeconomic and biophysical uncertainty; accounting for cross-scalar influences and outcomes; and emphasizing equity and social justice. While several permutations of these challenges are addressed by the different frameworks found in the literature, none were completely suitable for the needs of this research for various reasons, details of which will be summarized in this section.

Using the boundaries of an SES, the Sustainable Livelihoods (SL) framework (Chambers and Conway 1992; Ellis 2000; DFID 1999) has been traditionally been used in economic development research as a conceptual tool to understand the how people, through their livelihoods, interact with resources, assets and external influences in ways that further perpetuate vulnerability or ways that reduce it and lead to resilience. Using the lens of livelihood appears for the first time in the fifth IPCC report as a means to address the multiple dimensions of poverty, not just income poverty (Olsson et al. 2014), that are critical to understanding climate change impacts.

According to Chambers & Conway (1992, 9-12), a 'livelihood' is 'the means of gaining a living, including livelihood capabilities, tangible assets and intangible assets'. Ellis (2000, 19) elaborates on this definition to call a livelihood as "*the assets (natural, physical, human, financial and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household*" that simply also equates to 'a means of gaining a living' (Chambers & Conway 1992, 5). At the level of household then, the SL framework understands resource availability through assets, access to assets and opportunity to use resources available in a context of shocks, trends and seasonality. These definitions for 'livelihood' will be used in the CRSL Framework with the intangible assets conceptualized in some form as 'entitlements' (Sen 1981; Sen 1991).

Research is often done with the SL framework in the form of qualitative case studies that involve inductive and participatory methods (Eakin & Luers 2006, 374) and gaps in adaptive capacity are identified by the separation between access to resources and livelihood sensitivity and exposure to stressors. By the definition of resilience stated above, livelihood resilience to climate change within the SL framework means that local people are able to anticipate, recognize and adapt to risks to livelihoods in such a way that impacts are not so destabilizing for the entire system to require the establishment of a new equilibrium and general recovery of disturbed system elements. Boyd et al.

(2008, 392) writes of the 'resilience approach' from a livelihoods perspective that it *"allows undesirable socioeconomic states (for example a system characterized by deep deficits in income, power, education and social capital) to be transformed into more desirable ones without threatening the integrity of the atmosphere or the ecological systems on which humans depend."* Since vulnerability is scale-dependent (Eakin & Luers 2006, 381), the SL framework gives richer detail about what stressors specific populations face, but is limited for climate change research as it has traditionally been focused on poverty reduction for rural livelihoods.

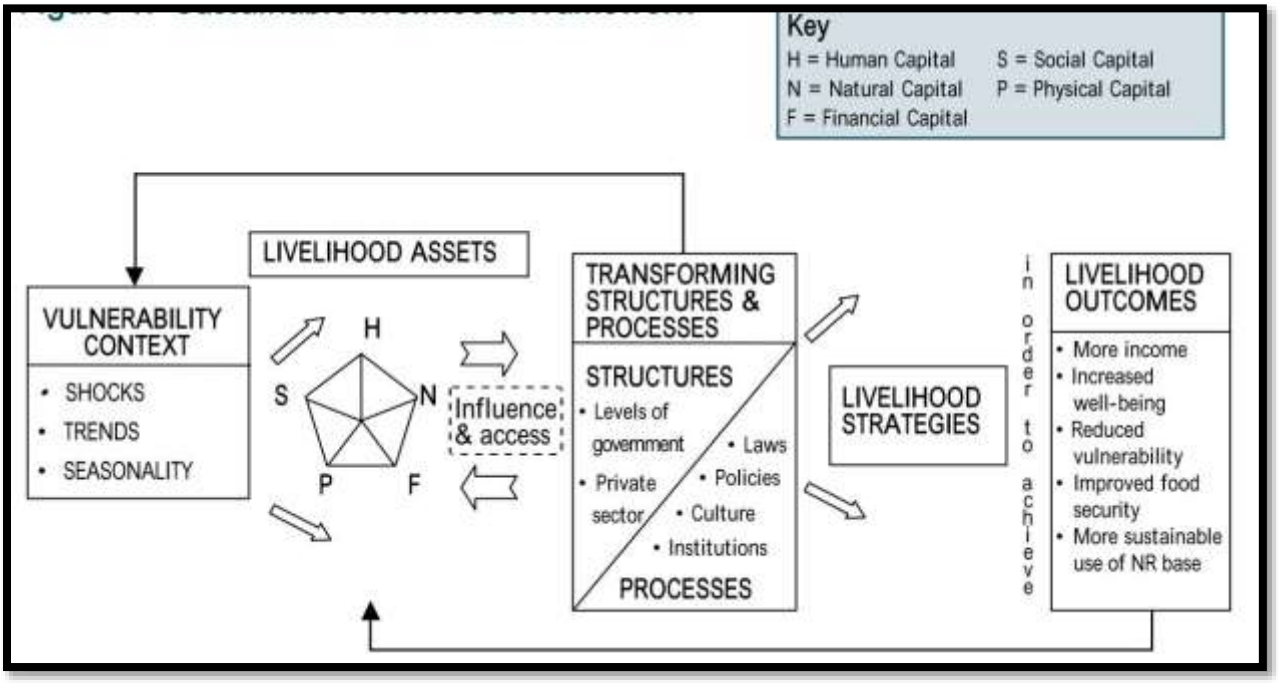


Figure 19: Sustainable Livelihoods Framework (DFID 1999)

While the narrow, specific focus of concentrating on impacts experienced at the livelihoods level allows for the specifics of localized and situational vulnerability to manifest, global factors and other macro-scale issues which may also predispose individuals to high vulnerability are also increasingly important considerations for the assessment of climate change adaptation potential (Rasanen et al. 2016). Particularly for many developing countries, where other more pressing developmental needs are obvious, it is difficult to design effective adaptation management schemes for climate change when simple development strategies may actually be the most effective climate change resilience-inducing strategies (Mertz et al. 2009). Understanding that the driving forces behind vulnerability are myriad, and are often the most significant are not climate-induced

(Rasanen et al. 2016), ecosystems and social systems are recognized to a deal with this issue in terms of a 'double exposure' to stresses (O'Brien & Leichenko 2000). O'Brien and Leichenko (2000) bring together the many overlapping stressors on a population, but the detailed dynamics of how these stressors interact or how important they are to influence vulnerability, as well as non-linear responses of an SES to such stressors, is left unmentioned and is therefore not nuanced enough for this research (Eakin and Luers 2006).

One of the more widely accepted frameworks to examine vulnerability, the Turner et al. (2003) framework (Figure 20) and analysis captures the multiple factors of a 'double exposed' perspective, as well as the examination of these at different scales. The framework elaborates on the O'Brien and Leichenko (2000) framing to shed better light on how the mechanisms of vulnerability interact with one another to create further vulnerability of build resilience. The important details of vulnerability at the level of livelihood, however, is not included in this framework and thereby

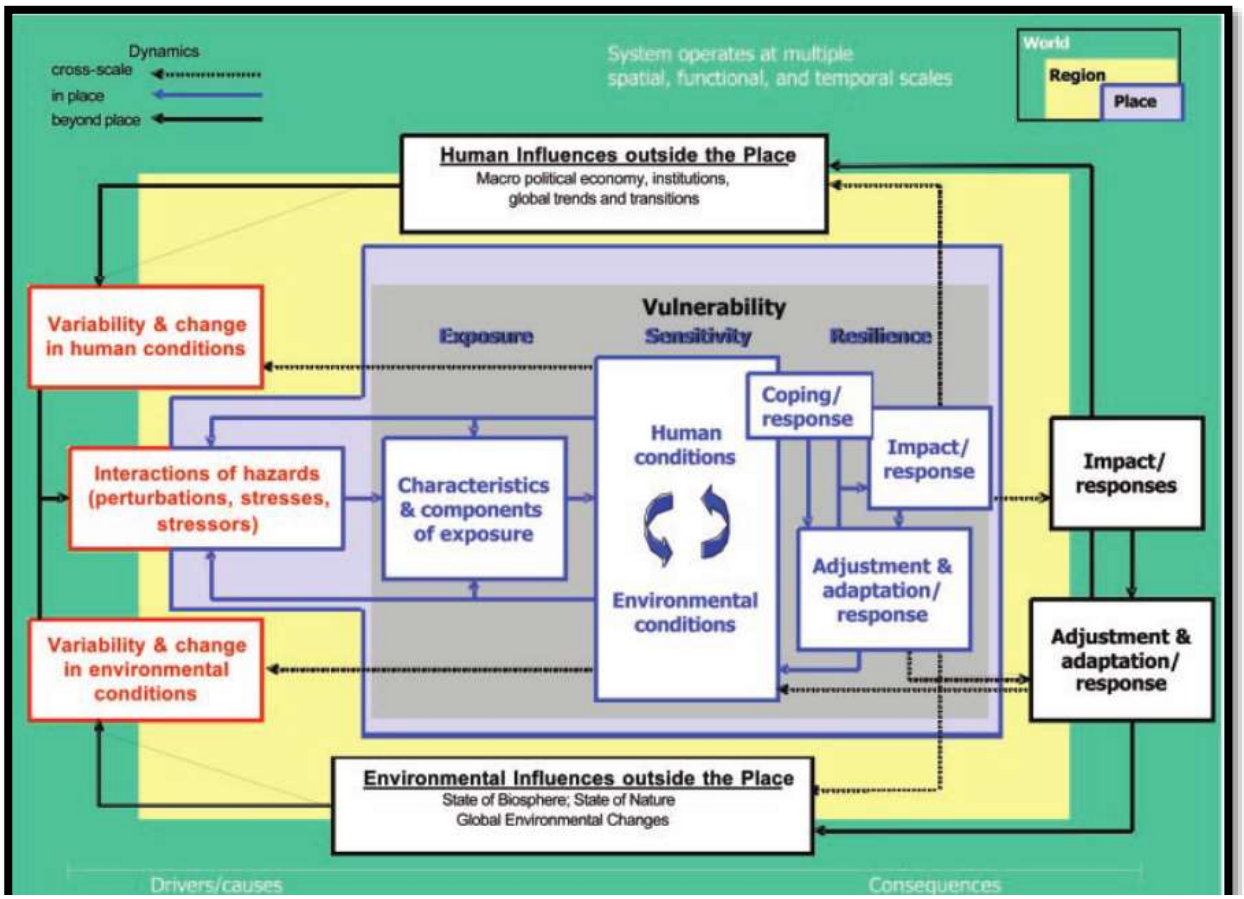
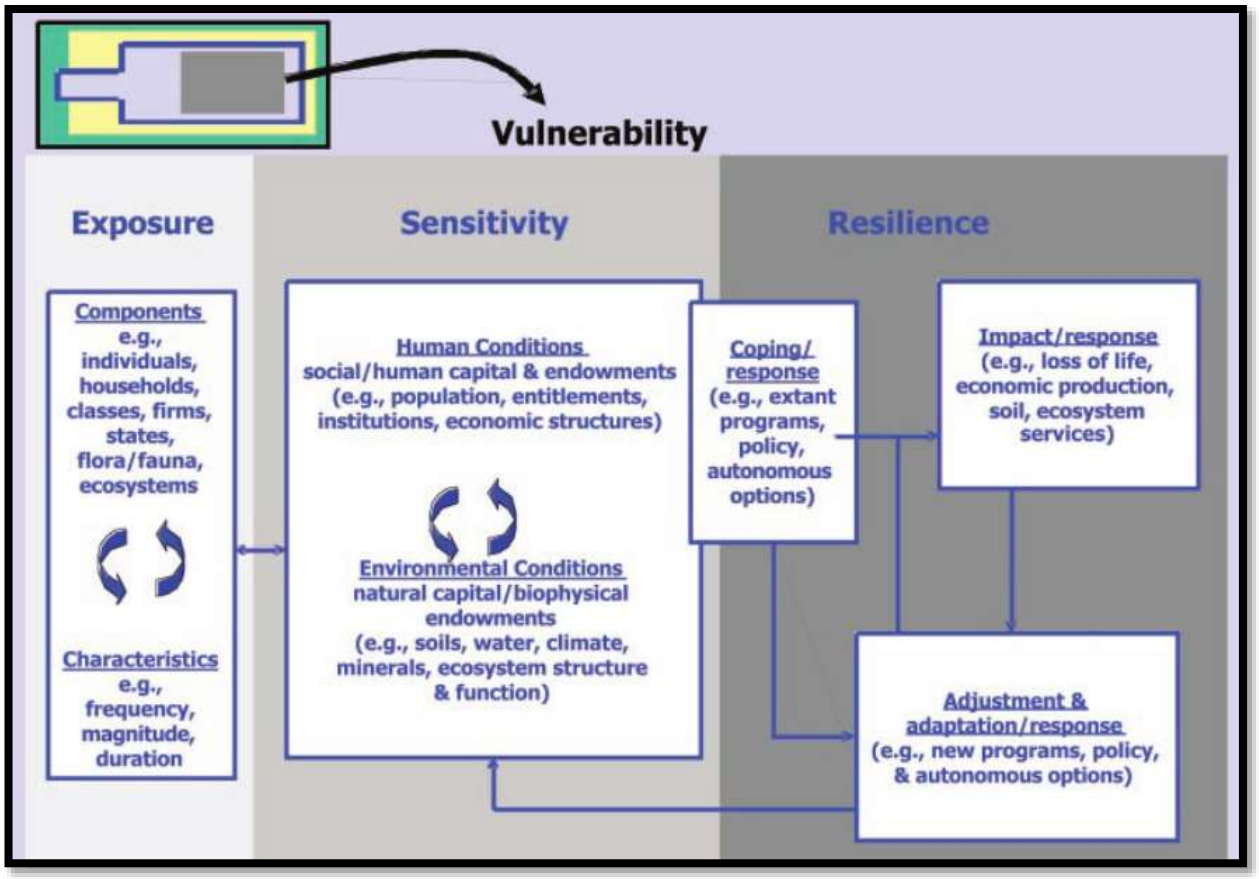


Figure 20 (Above and below): Turner et al. (2003) Vulnerability framework and detailed elements of exposure, sensitivity and resilience included within understanding of vulnerability



misses the granular detail of vulnerability for the specific livelihoods of the SES examined in this study.

A framework from Reed et al. (2013), the Integrated Analytical (IA) framework (Figure 21), takes the SL framework (DFID 1999) a step further to incorporate climate change in the understanding of rural vulnerabilities, including elements of influence beyond simple biophysical stresses. This framework gives specific attention to livelihood exposure to various and multiple impacts, sensitivity to impacts through the understanding of livelihood assets and access to resources, and critical tenets of adaptation interactions to form resilience in the form of learning, innovation and adaptive management are well explained by the IA framework. This framework is very nearly what is needed for this research to assess livelihood vulnerabilities in the face of many development, climate and other impacts, which are all captured as feeding into the dynamic adaptation process towards resilience. The nested nature of livelihoods, 'sub-systems' (Walker et al. 2004, 6) within an SES and affected by larger processes and institutions throughout the adaptation process, as captured

by the Turner et al. (2003) framework, is not, however, built into this framework, thus rendering it insufficient for the needs of this research.

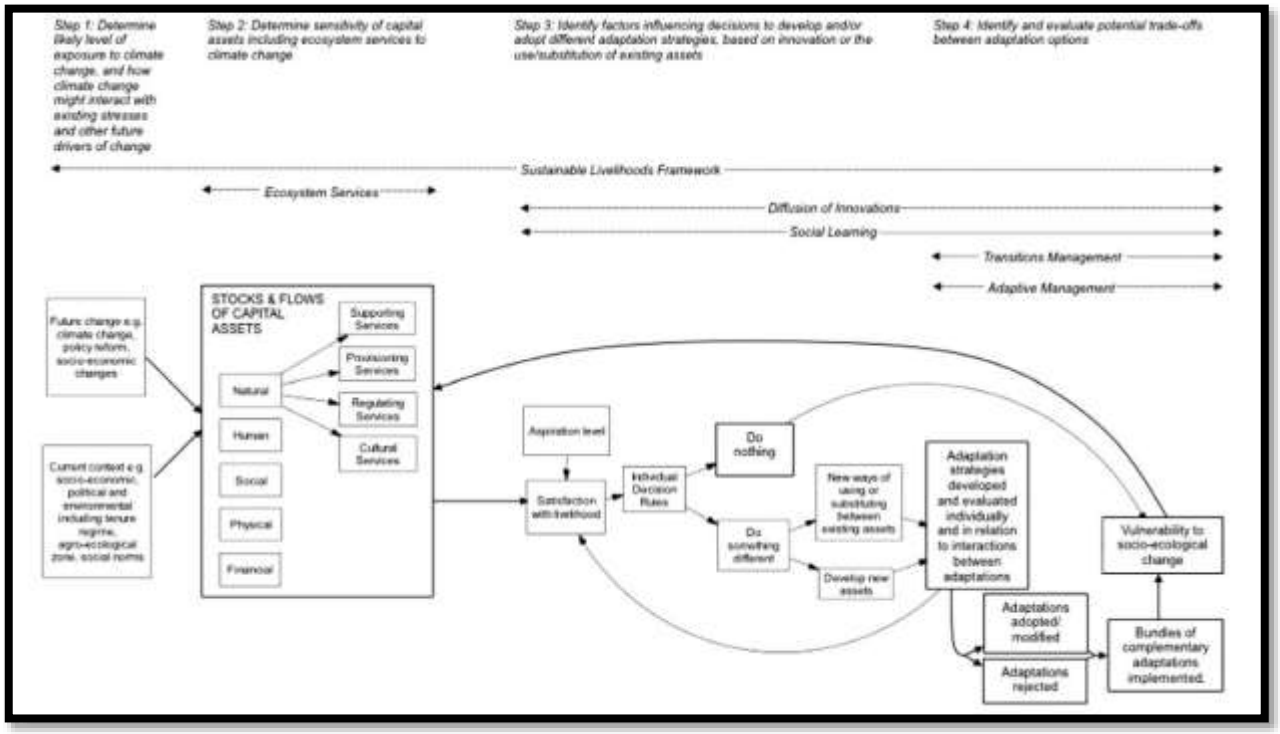


Figure 21: Reed et al. (2013) integrated analytical framework for analyzing livelihood vulnerability to climate change

Appendix II: Individual Interview Template

Interview guide (English)

Hello. Who are you? Where are you from? Were you born in Divundu/Bwabwata West?

Informed Consent: Part 1

"I am Gina D'Alesandro, a master's student doing research for my degree on climate change and local responses. Thank you for taking the time to participate in this research about your perceptions of, vulnerabilities to and behaviors in response to weather changes. Your participation in this research is entirely voluntary but will hopefully contribute to finding ways to help people in this area cope with and adapt to weather changes better. It is your choice whether to participate or not; should you choose not to participate or wish to stop the interview at any time please let me know. The information recorded is confidential; your responses will be kept anonymous in the reporting of this data. There are no perceived risks in participating. The interview will take about approximately one hour.

In order to accurately reflect the responses for the study do you have any objection to me recording this interview?

Do you understand everything in this statement? If so, please sign ***Informed Consent Part 2*** (attached)"

Background Brief

Knowledge Gap:

There is limited research has examined the current state of knowledge at a regional level between climate change and socio-economic experiences/food security

Study Aim/Goals:

The aim of this study is to understand local level vulnerabilities and adaptations to climate change so as to assist and inform broader, regional programs by including local perspectives and opinions at the macro-planning level, aiming to ultimately provide relief, assistance, and create resilience to rural stakeholders in the face of climate change.

Study Research Themes:

Resource Use

1) How are water and land resources conceptualized and used in the context of livelihoods in Divundu?

Climate Change Observations

2) Can local residents observe the symptoms of climate change that go beyond weather variability and indicate pattern shifts?

Climate Change Impacts

3) What are the impacts of these symptoms on their livelihoods?

Other Impacts

4) How do these impacts interact with other forces of change (e.g., in technology, policies, access to resources etc.)

Adaptation and coping: local

5) How are these impacts coped with and responded to in terms of livelihood choices and resource use at the local level?

Adaptation and coping: institutional

6) How do institutions cope and respond to these impacts

Resilience

7) How effective are these adaptive responses at the local and institutional levels?

Individual Interview Guiding Questions

Characterization

*(**livelihood defined as 'activities to support and sustain the family' What are key livelihood patterns in the region that organically connect people to the natural resource base?)*

1. So that I can understand you and your life a bit better, please tell me what you do on your average day from the time you wake up until the time you go to sleep.
2. How many people are in your family?
    a. How old are they?
    b. Do any of these family members live outside of the community?
        - Do they give back to the household in anyway?
3. Which of the following activities are you involved in?

Activity		
□ crop sales	□ brewing	□ skilled trade/artisan
□ casual agriculture labor	□ formal salary/wages	□ mining
□ casual non-agriculture labor	□ charcoal wood production/sale	□ work in tourism or with the tourist industry
□ livestock sales	□ vegetable sales	□ handicrafts
□ med/large business	□ NGO/other org associated work	□ reed harvesting
□ petty trade (cooking oil, g/nuts, etc.)	□ fishing	□ Harvesting wild non-timber products
□ Thatching grass	□ receiving pension funds	□ skilled trade/artisan
□ Harvesting wild non-timber products	□ receiving remittances	□ Other (specify _____)

4. What do you use your cash for?

Natural Resource Use

5. Do you grow food? What kind of food:

Food	***Quantity***
□ Mahangu	
□ Maize	
□ Sorghum	

□ Cowpeas	
□ Pumpkins	
□ Groundnuts	
□ Green maize	
□ Sweet reeds	
□ Water melons	
□ Other, specify _____	

6. Do you keep animals? What kind:

Animal	***Quantity***
□ Chickens	
□ Cows	
□ Goats	
□ Guinea fowl	
□ Bees	

7. Do you harvest any wild foods?

3. Food
□ Wild plants [water lilies, wild spinach]
□ Wild nuts
□ Wild fruits
□ Wild fish
□ Wild caterpillars
□ Hunt game
□ Wild birds [guinea fowl, franklin, doves]
□ Insects [termites, mopane worm]
□ Mushrooms
□ Tortoise
□ Frogs
□ Honey [mopane fly, honey bee, ground bee]
□ Other, specify _____

8. Where do you get your water? (e.g. Rain, groundwater, etc.)
    a. Is it clean?
    b. Do you notice any illness after drinking the water?
9. What tools do you use in your field?
    a. Animals?

b. External labor?

10. How do you keep your soil healthy?
11. What techniques do you use in your field? (ref. to table below)

[Soil health] Agriculture/livelihood	
□ crop rotation	□ growing indigenous plants to the region
□ residue management (no-till)	□ regenerative agriculture
□ mulching	□ village/traditional seed (not store-bought)
□ composting	□ use of pesticides, fertilizers, herbicides?
□ cover crops	□ planting, protecting, or managing on-farm trees or doing agroforestry
□ use of natural manuers	□ producing biomass and using waste in energy production

Climate Change Perceptions, Impacts

12. In the last 30 years have you noticed changes in weather systems?
    a. And how were you and your family affected by the environment?
    b. And i*n response to these things…*
        - □How did you manage through that disaster?
        - □What kind of support did you have from family or other people in the community during and after the changes?
        - □What kind of support did you/do you have to give to others?
        - □How did things change after the disaster?
13. Have you noticed any changes in the following weather and ecological patterns in the last 30 years? (higher/more; lower/less) (e.g
    a) Frequency of droughts/floods
    b) Intensity of droughts/floods
    c) Temperatures changing
    d) Describe the rainy season [uneven rainfall distribution, amount of overall rainfall, late/early start of rainfall season]
    e) Length of the growing season
14. ….Changes in animals populations? (e.g sizes of animal populations, timing of animal migrations, length of animal seasons)
15. …Changes in insect populations?
16. …Changes in fish?
17. …Changes in plants or trees (e.g size, density, type)?
18. …Changes in the soil?
19. …More or less water flowing in the Okavango?
20. …Any combination of these changes together?
21. Have there been important drought, flood, famine, pest outbreak or other natural disasters here?
22. How has the community reacted previously during severe flood or drought?

Adaptation Responses and Resilience Creation: local

(Are they able to adapt? What is their adaptive capacity?)

23. Were any of the responses you used in the face of weather changes effective?
    a. If they weren't effective, how could they have been more effective (with technology, resources, government involvement, policies, specific capacity building strategies, etc.)
24. Did you have sufficient capacity to respond to the changes?
25. Does informal exchange/barter transaction happen in times of hardship?
26. What do you do in times of hardship?

Adaptation Responses Resilience Creation: Institutional

27. Are there any traditional rules which affect your life directly?
28. Are there any national laws or policies which affect your life directly?
29. What role do institutions (informal/formal) play in your life?
30. Is there any kind of community support to respond and recover from droughts, floods, cyclones, pest outbreaks, and similar weather-related disasters?
31. What kind of support does local government or NGOs provide to the community?
32. What kind of support does the Namibian government (or Botswana gov?) provide to the community?
33. How have these responses from others in the community and government been useful?
    b. Have they given you anything tangible (i.e. tractors, seed, church or school buildings, etc.)?
    c. How could they have been more effective?

Close of interview

Is there anything else you would like to add to this discussion? Is there something that hasn't been covered yet?

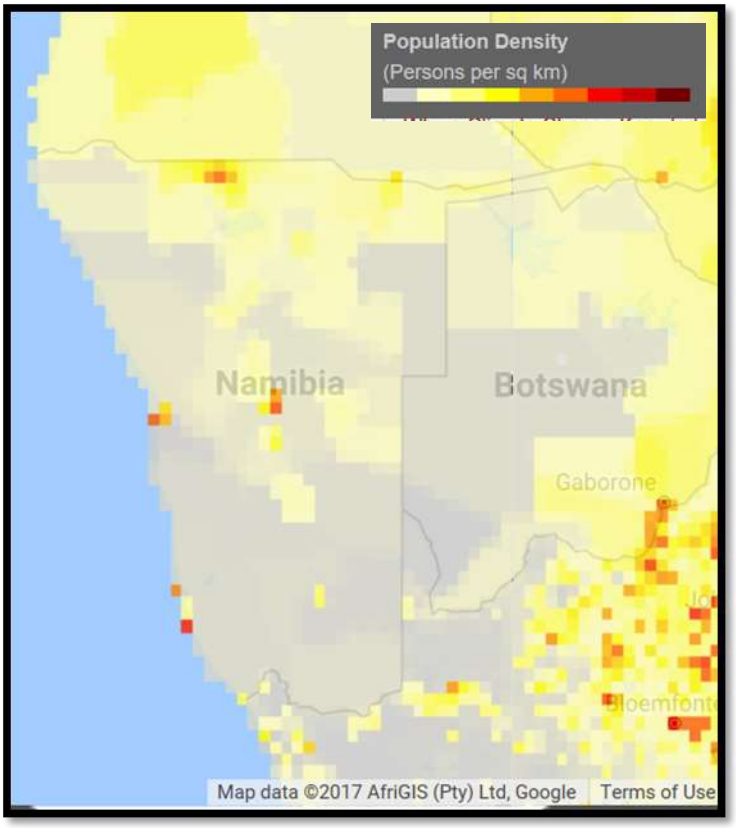
This is the end of the interview, thank you for taking the time to talk to me today!

Appendix III: Supplementary Figures

Stakeholder analysis from Namibia's NAP (OKACOM 2011b)

Category	Roles	Institutions
Government		MAWF- DWRS /DoF–Agricultural extension support Min. Environment and Tourism- Climate change/Env programmes (CPP) Min. Education- capacity building initiatives Min. Health and Social Services Ministry of Lands and Resettlement MLGHRD- Nkurenkuru Town Council; Kavango RC; Rundu Town Council
Community Based Organisations	Collection and assessment of indigenous knowledge, local needs identification and linkage with modern science, research partners	Kavango Tourism Forum Kavango Farmers Union Community-Based Craft Kavango Basin Management Committee Conservancies and Forest Committees
Non-Governmental Organisations	Interpretation and dissemination of scientific research for development, awareness raising and engagement, implementation of basic/applied research to inform decision makers for policy input and resource allocation	Namibia Nature Foundation (NNF), Desert Research Foundation of Namibia
Donors	Financial support implementation of basic/applied research for development	GEF Africa Water Facility-Africa Development Bank Millennium Challenge Corporation by the US government BMBF (German Ministry of Education and Research) Kreditantstalt fur Wiederaufbau (KfW) USAID/SAREP
Parastatals		Chamber of Commerce (NCCI) NamWater
Academics	National, Regional & International Basic/applied research, access to knowledge/capacity building, dissemination of scientific research	University of Namibia -UNAM

Population Density map for Namibia (The World Bank, 2017)



Average monthly temperature and rainfall data for Divundu (World Bank, 2017)

Cumulative Average monthly Temperature and Rainfall for Namibia at location *(-18.09,21.55)* from 1900-2012

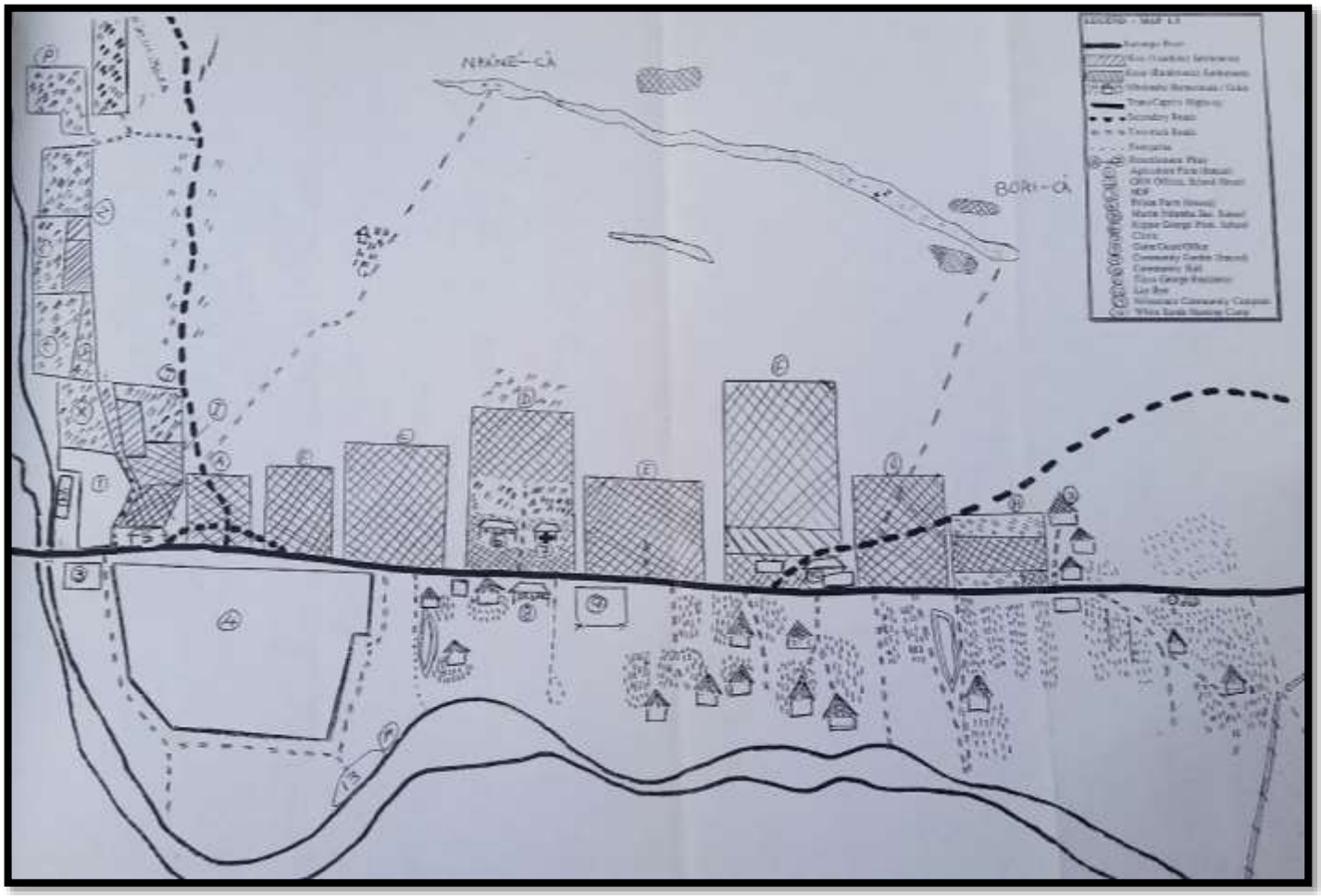
Average monthly Temperature and Rainfall for Namibia at location *(-18.09,21.55)* from 1990-2012

Average monthly Temperature and Rainfall for Namibia at location *(-18.09,21.55)* from 1960-1990

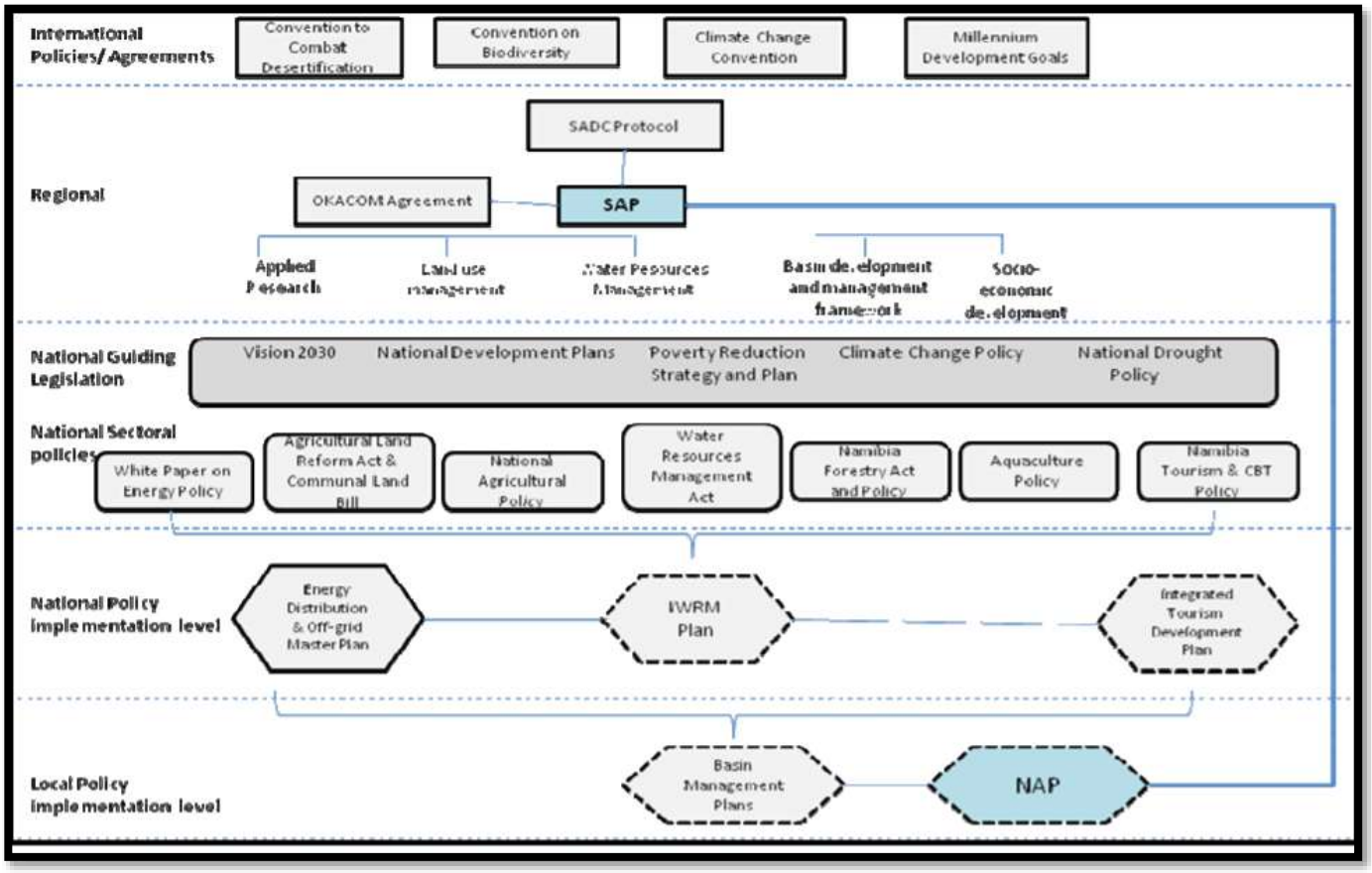
Average monthly Temperature and Rainfall for Namibia at location *(-18.09,21.55)* from 1930-1960

Average monthly Temperature and Rainfall for Namibia at location *(-18.09,21.55)* from 1900-1930

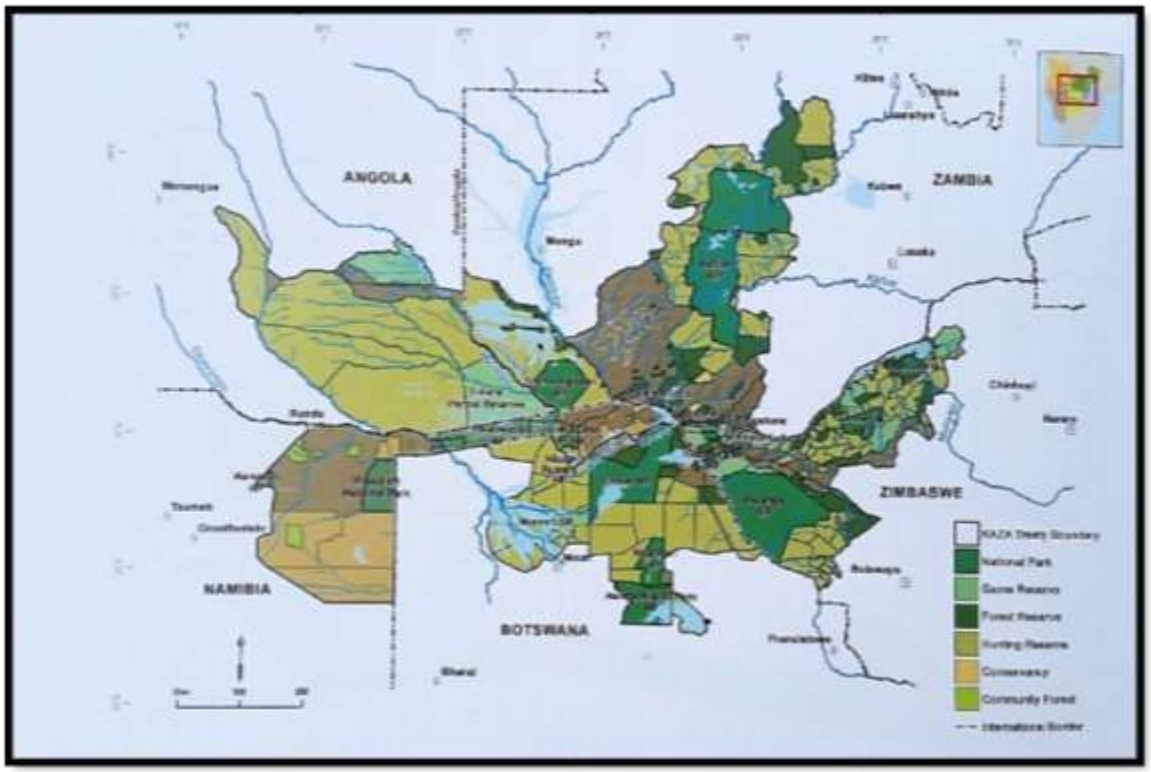
Resettlement Map (WWF 1997: Cover photo)



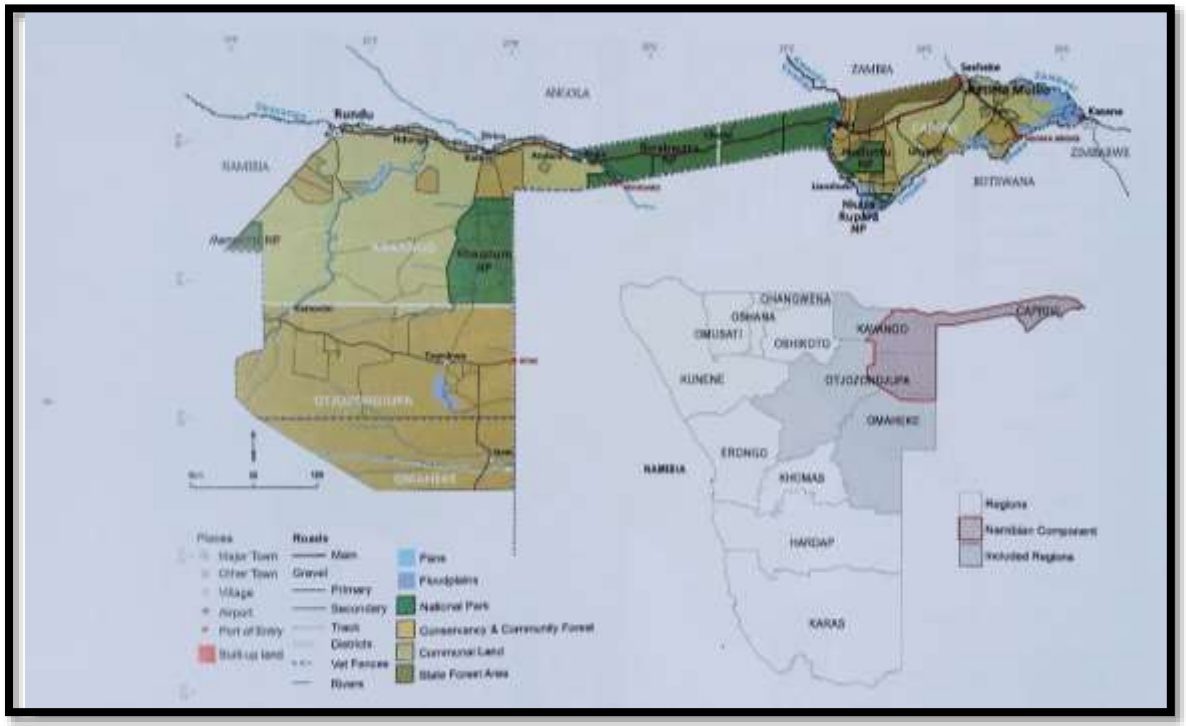
Okavango River Basin National Action Plan linkages at various sectoral legislative frameworks and implementation plans (OKACOM 2011b)



KAZA TFCA Map, region (MET 2013)

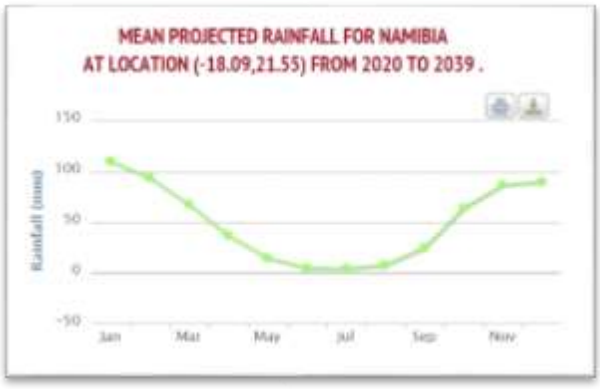


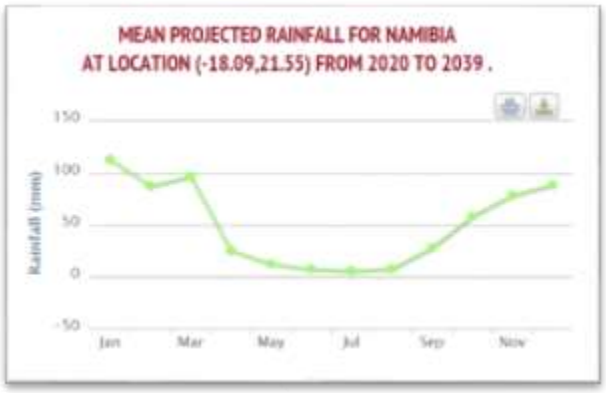
KAZA TFCA Map, Namibian component (MET 2013)

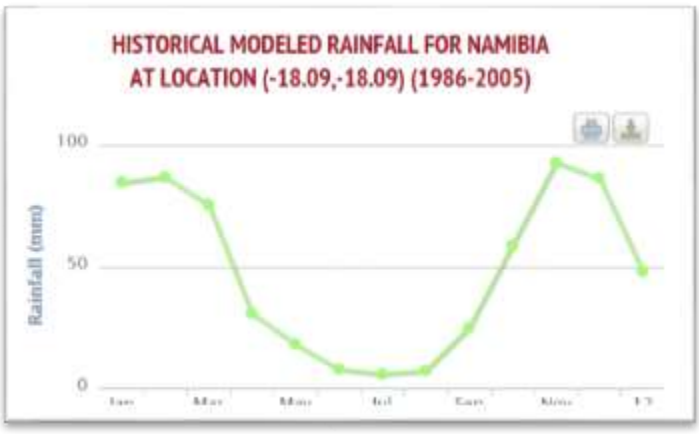


Rainfall and Temperature Projections for study area as compared to historical rainfall and temperature data (Jones and Harris, 2013)

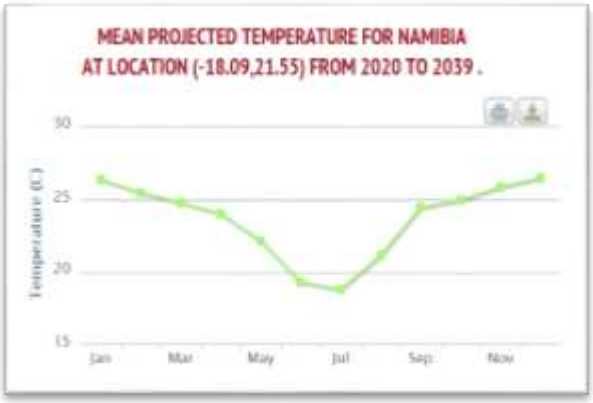
Rainfall Projections for 2020 to 2039 at Divundu for RCP 4.5 (top left) and RCP 8.5 (top right) as compared to historical temperatures from 1986 to 2005 (bottom middle)

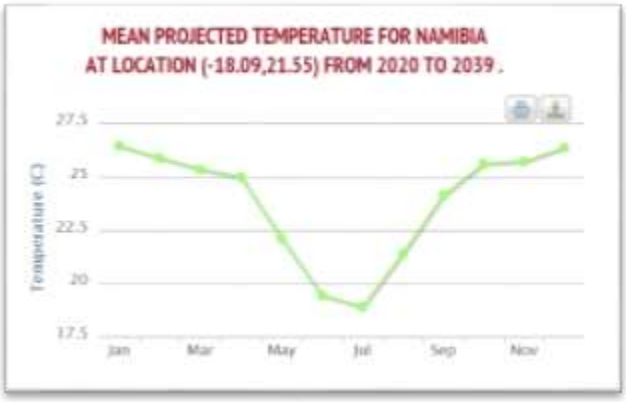


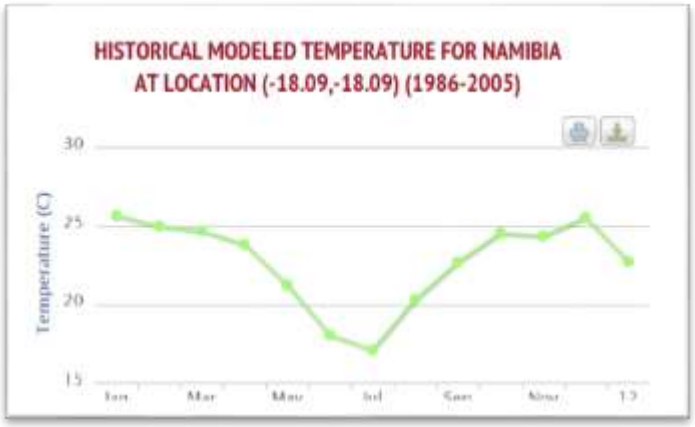




Temperature Projections for 2020 to 2039 at Divundu for RCP 4.5 (top left) and RCP 8.5 (top right) as compared to historical temperatures from 1986 to 2005 (bottom middle)







Appendix IV: Legal Framework References

UNCBD (United Nations 1992)

Article 10(c):
"Protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation and sustainable use requirements".
Article 8(j):
"subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovation and practices"
Article 18:
"The Contracting Parties shall, in accordance with national legislation and policies, encourage and develop methods of cooperation for the development and use of technologies, including indigenous and traditional technologies, in pursuance of the objectives of this Convention. For this purpose, the Contracting Parties shall also promote cooperation in the training of personnel and exchange of experts."

Nagoya Protocol (Convention on Biological Diversity 2010)

Article 7 Access to traditional knowledge associated with genetic resources:
"In accordance with domestic law, each Party shall take measures, as appropriate, with the aim of ensuring that traditional knowledge associated with genetic resources that is held by indigenous and local communities is accessed with the prior and informed consent or approval and involvement of these indigenous and local communities, and that mutually agreed terms have been established."
Article 8 Special considerations:
"a) Outline the need for non-commercial research purposed study that might contribute to the conservation and sustainable use of biological diversity."
Article 12 Traditional knowledge associated with genetic resources
"(1) In implementing their obligations under this Protocol, Parties shall in accordance with domestic law take into consideration indigenous and local communities' customary laws, community protocols and procedures, as applicable, with respect to traditional knowledge associated with genetic resources. (2) Parties, with the effective participation of the indigenous and local communities concerned, shall establish mechanisms to inform potential users of traditional knowledge associated with genetic resources about their obligations, including measures as made available through the Access and Benefit-sharing Clearing-House for access to and fair and equitable sharing of benefits arising from the utilization of such knowledge.(3) Parties shall endeavor to support, as appropriate, the development by indigenous and local communities, including women within these communities, of a) community protocols in relations to access to traditional knowledge associated with genetic resources and the fair and equitable sharing of benefits arising out of the utilization of such knowledge"

Article 15 Compliance with domestic legislation or regulatory requirements on access and benefit sharing

"*(1): Each party shall take appropriate, effective and proportionate legislative, administrative or policy measures to provide that genetic resources utilized within its jurisdiction have been accessed in accordance with prior informed consent and that mutually agreed terms have been established, as required by domestic access and benefit-sharing legislation or regulatory requirements of the other Party."*

Article 21 Awareness raising:

"Each Party shall take measures to raise awareness of the importance of genetic resources and traditional knowledge associated with genetic resources, and related access and benefit-sharing issues."

Article 22 Capacity:

"should facilitate the involvement of indigenous and local communities and relevant stakeholders, including non-governmental organizations and the private sector"

UNDRIP Declaration

Article 4:

"Indigenous peoples, in exercising their right to self-determination, have the right to autonomy or self-government in matters relating to their internal and local affairs, as well as ways and means for financing their autonomous functions."

Article 5:

"Indigenous peoples have the right to […] maintain and strengthen their distinct political, legal, economic, social and cultural institutions…"

Article 19:

"States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free, prior and informed consent before adopting and implementing legislative or administrative measures that may affect them."

Article 20:

"Indigenous peoples have the right to maintain and develop their political, economic and social systems or institutions."

Article 34:

"indigenous peoples have the right to promote, develop and maintain their institutional structures and their distinctive customs, spirituality, traditions, procedures, practices, and, in the cases where they exist, juridical systems or customs, in accordance with international human rights standards."

Namibian Constitution

Article 19 – Culture

"Every person shall be entitled to enjoy, practise, profess, maintain and promote any culture, language, tradition or religion subject to the terms of this Constitution and further subject to the condition that the rights protected by this Article do not impinge upon the rights of others or the national interest."

Article 95(l):

"Maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future..."
Article 91(c):
"The duty to investigate complaints concerning the over-utilization of living natural resources, the irrational exploitation of non-renewable resources, the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia."

Appendix V: Miscellaneous Items

Glossary of Key Undefined Terms

Adaptation deficit:
"the gap between the current state of a system and a state that would minimize adverse impacts from existing climate conditions and variability" (Noble et al. 2014, p.839)

Coping capacity:
"The ability of people, institutions, organizations, and systems, using available skills, values, beliefs, resources, and opportunities, to address, manage, and overcome adverse conditions in the short to medium term." (IPCC 2014)

Interviews from this Study Cited

Social worker 1 (SW1). 2017. Individual formal interview. 22 March 2017. Andarra District Hospital, Namibia.
Social worker 2 (SW2). 2017. Individual formal interview. 22 March 2017. Divundu, Namibia.
Mbukushu headman. 2017. Individual formal interview. 15 March 2017. Mutc'iku village, Namibia.