TRADITIONAL INNOVATIONS:
AN ANALYSIS OF TRADITIONAL LAND-USE AND MANAGEMENT INSTITUTIONS
OF NGAMILAND, BOTSWANA.

MASTER OF PHILOSOPHY
(NATURAL RESOURCE MANAGEMENT)

BY

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Traditional Innovations:

An Analysis of Traditional Land-Use and Management Institutions of Ngamiland, Botswana.

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Abstract

Mounting global dependence on natural resources has exacerbated natural resource depletion, land degradation and poverty levels worldwide. Scientists and planners acknowledging that science does not have all the answers to growing social, economic and ecological problems imply that the world collectively has a duty to use land and natural resources sustainably. This has opened attention to other disciplines such as traditional knowledge for possible solutions. According to scholars of traditional livelihoods, a country's national, social and economic stability is determined by (i) the extent that policy incorporates traditional systems of its people (ii) its ecological wealth (iii) a secure land tenure system and iv) visionary leadership.

Botswana is applauded by many countries for being one of the most socially, economically and politically stable countries in Africa. It is ecologically diverse and is home to more than thirty five ethnic groups (Tlou, 1971). A large part of the tourism, agriculture, mineral, energy and water extraction economy is based on natural resources (International Monetary Fund, 2017). Similarly, a large portion of the population subsists on natural resources (Kgathi, Ngwenya, & Darkoh, 2010). It is also counted amongst the few African countries with a secure land tenure system and visionary leaders. Nevertheless Ngamiland District in north-western Botswana, has one of the highest poverty levels in the country, has signs of unproductive land-use, natural resource depletion and loss of traditional skills once associated with survival.

The Botswana Government has expressed interest in including traditional knowledge in various policies to improve resource use and livelihoods, but incorporation of the various traditional systems seems slow. This may be due to the need to determine the utility of traditional systems in the current era. Various works on traditional knowledge in Botswana have been done. However previous studies focused on general culture; the primary ethnic groups, or one era. There is a small knowledge gap on pre and post-independence traditional

land-use and management institutions of miscellaneous groups with different emphasis on land along the periphery of the Okavango Delta in Botswana. This study uses the Berkes, Folke, and Colding (1998) social-ecological framework to fill that gap. It investigates traditional land-use and management institutions of the OvaMbanderu, WaYei and BaTawana groups in Ngamiland using five iterative data collection activities.

Prior to independence in 1966, land-use amongst different ethnic groups countrywide was guided by traditional institutions. After independence, the Government perceived the diverse traditional systems as complex, assumed land authority and transferred it to national state run authorities, known as Land Boards. Land Boards introduced standardized, top-down policies based on Roman-Dutch law that frequently exclude (d) communities from decision-making. Traditional institutions have been further eroded by technology, mainstream education, wage employment, intergenerational preferences etc.

Despite decades of stereotypes, the results suggest that traditional knowledge has value in the post-independence era. The results present traditional institutions as checklists amongst all three groups outlining water sources, soil types, animal, fish, tree and grass species that guided communities determine land suitability for various livelihood activities. The results also show that people with distinct traits formed traditional institutional arrangements at multiple levels to govern land and natural resources in a bottom-up approach. To determine the utility of traditional knowledge in improving ecosystem resilience, reducing natural resource depletion and enhancing practical skills for survival, inventories of active traditional systems need to be compiled and deciphered as distinct systems.

Keywords: Traditional knowledge, traditional checklists, traditional institutional arrangements, land and natural resource use, subsistence communities, Ngamiland.

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Glossary

Badimo: BaTswana ancestors.

Cattle post /Moraka: One of the BaTswana areas used for rearing livestock as part of the triple settlement system.

Hamlet: Clusters of scattered homesteads ranging in distance from 1-10 kilometres within a settlement.

IshiYei: The traditional language of the WaYei ethnic group in southern Africa.

Kgosana: BaTswana ward Headman.

Kgosi: BaTswana village Chief.

Legae: Part of the triple settlement system amongst the BaTswana which was the main settlement area where tribal leadership was located and conducted community social, economic and political activities.

Masimo: Farmlands for ploughing amongst the BaTswana that formed part of the triple settlement system.

Molapo farming: Floodplain recession farming method traditionally used by the WaYei ethnic groups.

Ohambo: Temporary grazing zone the OvaMbanderu used for traditional rotational grazing.

Okwaa: WaYei ancestors.

Papaa: OvaMbanderu male household head.

Omutarere: OvaMbanderu land overseer/ head at hamlet level.

Onganda: Permanent OvaMbanderu residence where household members resided and kraaled livestock.

Ovakuru: OvaMbanderu ancestors.

Oshikati: WaYei hamlet head.

OtjiMbanderu: The traditional language of the OvaMbanderu ethnic groups in southern Africa.

Ozonganda: A cluster of neighbouring OvaMbanderu homesteads located within walking distance.

Rre: BaTswana household head.

SeTswana: The traditional language of the BaTswana people in southern Africa.

Sheeto: WaYei household head

Traditional systems: Processes people devised for various interactions. The processes were influenced by knowledge, culture, experience, technology, interactions with others and learned the environment.

Ward: Clusters of neighbouring BaTswana homesteads within a village.

Dedication

To my parents Boikanngo Boyobokae Botumile and Edith Omponye Botumile,

I soar because you enabled me to do so without restraint.

This thesis is for both of you!

Disclaimer

I hereby declare that this thesis submitted for the M/Phil in Natural Resource Management at the Okavango Research Institute /University of Botswana is my own original work except where reference is made. It has not previously been submitted for any award in any other university or institution. I testify that all authors quoted are indicated and acknowledged by means of a comprehensive list of references.

Signature: ……. Date……

Bontekanye Botumile

1 Introduction

This chapter includes the study background, problem statement, research objectives, research questions, study area, scope and limitations of the study, and the thesis outline.

1.1 Background

More than 2.5 billion traditional farmers and 400 million subsistence societies, worldwide, depend on land and natural resources to secure basic needs and wants through farming, fishing, hunting, gathering or a combination of these livelihood activities (Nietschmann, 1970). For generations, these communities used multi-layered, interconnected traditional systems to select specific tracts of land for various livelihood activities (Berkes, Colding, & Folke, 2000). Traditional ecological knowledge was pivotal to capacitating subsistence existence on general survival as it guided land suitability for different livelihood activities. Selection was determined by the ecological make up of each habitat and users' knowledge of the function of the natural resources (Africa, 2004; Reij, 1991).

Traditional knowledge also guided institutional structures to arrange themselves, govern access, use, and manage resources (Agrawal, 2001; Andrae-Marobela et al., 2010; Magole & Magole, 2009). This knowledge seemed to inform users how to reorganise themselves when stressors threatened access to natural resources they needed for survival. With the transformation from a traditional, rural, agrarian society to a secular, urban, industrial society, traditional knowledge was gradually perceived as outdated, irrational, complex, and difficult to implement. There does not appear to have been great attempt to dissect the components of traditional systems to understand them, and select those that might be relevant in the current era. Many modern planners and decision-makers seemingly replaced traditional structures with standardized systems considered easier to administer (Blaikie, 2006; Ostrom, 2009).

The new systems transcended existing geographical, cultural and social boundaries to the detriment of subsistence communities (Cassidy et al., 2011). With so many global users directly and indirectly depending on natural resources, this has exacerbated natural resource depletion, land degradation and loss of traditional knowledge once used for survival worldwide (Berkes et al., 2000). Growing social, economic and ecological problems imply that the world collectively has a duty to ensure that land and natural resources are sustainably used. Scientists and planners are acknowledging that science does not have all the answers. This has opened attention to other disciplines such as traditional knowledge for possible solutions (Grenier, 1998; Ochoa-Gaona, 2001; Stocking, 2008; Velempini & Perkins, 2008).

There are however polar viewpoints on the value of traditional knowledge in the current era (Nustad, 2001). Some scholars perceived traditional knowledge as practical, relevant, and robust (Cassidy et al., 2011; Kolawole, 2015; Olsson, 2003; Ostrom, Burger, Field, Norgaard, & Policansky, 1999; Nustad, 2001). Others are sceptical and regard traditional systems as complex, difficult to implement, and outdated. Some consider subsistence communities incompetent to use and manage natural resources they historically used. To enhance understanding of traditional knowledge, some scholars suggest: (i) taking a comprehensive inventory of active traditional systems within a country then (ii) documenting the systems in a way that withstands scrutiny by demonstrating their utility to daily life as intended by the specific communities (Agrawal, 1995; Andrae-Marobela et al., 2010; Davis & Wagner, 2003; Messer & Townsley, 2003).

Additionally, scholars advocate for acknowledging cultural and ecological heterogeneity to avoid a one-size-fits-all approach as has been the practice in the past. This approach particularly when based on foreign templates has historically weakened traditional systems (Berkes, 2004; Ostrom, 2005). Consequently, innovation will be a challenge to fragmented traditional systems. As a result, when consulted for solutions in the current era, they may

seem outdated. The Republic of Botswana in southern Africa is ecologically diverse and is home to more than thirty five ethnic groups (Tlou, 1971). A large part of the tourism, agriculture, mineral, energy and water extraction economy is based on natural resources (International Monetary Fund, 2017). Similarly, a large portion of the population subsists on natural resources (Kgathi, Ngwenya, & Darkoh, 2010). This suggests that in Botswana, there may be an array of traditional systems with practical insights for natural resource use and management. Many traditional systems have been weakened by various factors; however, Government's top down approach seems to be the primary catalyst.

Several national legislative instruments have historically disregarded diverse socio-cultural, geo-ecological systems devised by local communities to suit certain local areas and replaced them with blanket policies, acts and plans influenced by international Acts and Policies. Legislative instruments that currently govern land and its natural resources include the 1966 State Land Act, National Development Plans, Waste Management Act of 1998, Atmospheric Pollution Prevention Act (APPA) of 1978, Forest Act of 1968, Herbage Preservation Act of 1977, Agricultural Resources Conservation Act (ARCA) of 1974, Wildlife Conservation and National Parks Act (WCNPA) of 1992, Wildlife Conservation Policy of 1986, Wetlands, Forest and Fire Management Policies etc.

Some of these national instruments express commitment to incorporating traditional knowledge to improve conservation of natural resources, alleviate poverty, diversify economies, and supporting projects that maintain diversity and well-being of subsistence societies (Government of Botswana, 2009, 2017)

> "Government will also promote the adoption of indigenous knowledge (IK), following the approval of the Policy during NDP 10. This is the local knowledge that is unique to a given culture or society, which facilitates communication, and local-level decision-

> making in agriculture, health care, food preparation, education, natural-resource management, and a host of other activities." (Government of Botswana, 2017)

A similar declaration was voiced in Botswana's National Development Plan 10 which preceded National Development Plan 11 particularly in reference to the 'sustainable management of natural and cultural resources'. The fact that it is being repeated in another development plan is testimony to stated intentions about incorporating traditional knowledge. However, they seem to remain wedged in legislative instruments with little evidence of implementation. Lack of implementation is further implied by the fact that despite recommendations for implementation and monitoring in the Indigenous Knowledge Policy Implementation Plan (2014), the draft is yet to be approved:

> "The Indigenous Knowledge System (IKS) Policy shows that IKS cuts across all sectors and that there is need for infusing it into national development planning processes. It also indicates the need for coordination that can make IKS the basis of sustainable development as part of Government decision making as done in other countries that have beneficiated their IKS based products and services." (Centre for Scientific Research Indigenous Knowledge and Innovation, 2014).

There is an accumulation of unique traditional knowledge and skills worldwide (Bernáldez, 1991; Gadgil, Berkes, & Folke, 1993; Houde, 2007). Given the cultural and ecological diversity of the world's traditional systems, scholars dissuade planners from taking a one-size-fits-all approach. Even on a national level, scholars advocate for an intra-country lens of traditional systems to minimize defragmentation of traditional systems (Berkes, 2004; Ostrom, 2005). Ideas and solutions designed to fuel subsistence requires updated inventories of traditional systems, lists of existing institutions and their function to livelihood activities in local settings.

This study contributes to the existing inventory of previous works on traditional knowledge by focusing on traditional land-use and management institutions of three subsistence communities in Ngamiland District in north-western Botswana. The study determines natural resources that influenced selection of land for veldt product collection, grazing, fishing, hunting, and farming. It also describes characteristics of the people involved in institutional arrangements that governed land and natural resources amongst the OvaMbanderu, WaYei and BaTswana groups. The traditional land-use and management institutions **a**re analysed for possible solutions in addressing current natural resource depletion, compromised ecosystem resilience and practical subsistence skills.

1.2 Problem Statement

Traditional knowledge is a major asset to survival especially amongst subsistence communities in rural areas and in semi-urban areas in absence of jobs. However, its effectiveness has been compromised by various top down government approaches that have historically exacerbated poverty levels, accelerated loss of knowledge once used for subsistence, impacted ecosystem resilience and intensified resource depletion. Since Botswana gained independence from its previous status as a British Protectorate in 1966, it is applauded by many for being one of the most socially, economically and politically stable countries in Africa (Nthomang & Diraditsile, 2015; Tlou & Campbell, 1984). It is also counted amongst the few African countries with a secure land tenure system (Kalabamu, 2000). According to social economists, applied ecologists, anthropologists etc., a country's national, social and economic stability is determined by four main principles: (i) the extent that policy incorporates traditional systems of its people, (ii) the wealth of its ecology, (iii) a secure land tenure system, (iv) and visionary leadership (Berkes, Folke, & Colding, 1998). Given Botswana's renowned stability, it suggests these principles are in place. Ngamiland District in north-western Botswana is ecologically different from the rest of the country. In

contrast to the semi-arid conditions of Botswana, it is located in a wetland, the Okavango delta. It is nationally recognised as containing the country's largest amount of surface water, having the widest diversity of natural resources, minerals and animals (Ringrose, Matheson, & Boyle, 1988).

The district is home to more than fifteen different subsistence, ethnic groups that originally migrated from different countries during the pre-independence era (Bock & Johnson, 2002; Tlou, 1985). Ngamiland District is however, counted amongst the highest poverty levels in the country (Government of Botswana, 2015/2016). The proportion of the households below the poverty datum line was estimated at 33.4% in 2015/16 in Ngamiland West and 21.6% in Ngamiland East, compared to the national figure of 16.3% (Government of Botswana, 2018).

Prior to independence, subsistence farming was the main livelihood activity and land-use amongst the different ethnic groups in the District was guided by various traditional land-use and management institutions (Meyer & Bendsen, 2003). In 1966, when the national Government took over land authority from tribal leaders, traditional land-use and management institutions of the country's diverse ethnic groups were not taken into consideration. When formulating the national land tenure systems a national, state-run system of Land Boards assumed land authority, using the 1968 Tribal Land Act to determine land-use in the country (Government of Botswana, 1969, 1987). The new systems were influenced by Roman Dutch Law, market capitalism, and aspects of traditional land tenure of ethnic groups of Tswana ancestry but excluded systems of other ethnic group not of Tswana descent (Kalabamu, 2000). National land tenure systems based on foreign templates that fragment and weaken traditional systems appear common throughout Africa.

After independence, many African leaders replaced traditional property regimes with standardized national land tenure systems (Mends & De Meijere, 2006; Pule & Thabane, 2004; Rose, 2002; Sikhondze, 1994). Given the social, economic, environmental peculiarities

of Ngamiland District in comparison to the rest of the country, it can be argued that national level legislative instruments such as the Fencing Act, The Chiefs Act, and Tribal Land Act eroded the social, ecological and cultural stability of Ngamiland. There is current evidence of unproductive land use, natural resource depletion, loss of traditional skills once used for survival, and an increasing dependence on Government aid amongst subsistence communities (Government of Botswana, 2002, 2013).

The Botswana Government recognizes that national legislations did not take cognizance of its various traditional systems in their formulation (Government of Botswana, 2009, Centre for Scientific Research Indigenous Knowledge and Innovation, 2014). However, integration of the diverse traditional knowledge seems slow. This may be due to scepticism about the utility of traditional knowledge, doubt on the ability of traditional people to manage their own natural resources, or unwillingness of elites to share power with tribal leaders (Rose, 2002).

There are numerous works on traditional knowledge and land-use of different ethnic groups in Ngamiland District. Many have focused on traditional land-use and management institutions of one ethnic group such as the BaTswana (Magole, 2003), or on traditional customs in the pre-independence era (Almagor, 1980; Schapera, 1994; Sutherland, 1980; Tlou, 1972). Some studies have examined traditional knowledge in general **(**Bendsen & Motsholapheko, 2003; Bock, 1998; Cassidy & Barnes, 2012; Government of Botswana, 1969; Heinz (n. d.); Kgathi et al., 2010**;** Magole, 2003; Mbaiwa, Ngwenya, & Kgathi, 2008; Meyer & Bendsen, 2003; Motsumi, Magole, & Kgathi, 2012). It appears that not many have focused on traditional land-use and management institutions of diverse, minority ethnic groups concurrently. This has created a knowledge gap, especially for policies and legislative instruments interested in incorporating the country's assortment of traditional systems to maintain overall national stability. This study contrasts the BaTawana system with two groups that are not of BaTswana descent.

1.3 Research Objectives

General research objective

To analyse pre- and post-independence traditional land-use and management institutions of OvaMbanderu, WaYei and BaTawana ethnic groups in Ngamiland District, Botswana.

Specific research objectives

1. To determine natural indicators that influenced land selection for different livelihood activities before and after independence amongst the OvaMbanderu, WaYei and BaTawana.
2. To investigate institutional arrangements for land-use and management amongst the OvaMbanderu, WaYei and BaTawana before and after independence.

1.4 Research Questions

General research question

What were the traditional land-use and management institutions amongst the OvaMbanderu, WaYei and BaTawana **g**roups in Ngamiland District, Botswana pre- and post-independence?

Specific research question

1. What natural indicators influenced selection of land for different livelihood activities before and after independence amongst the OvaMbanderu, WaYei and BaTawana?
2. What were the institutional arrangements for land-use and management before and after independence amongst the OvaMbanderu, WaYei and BaTawana?

1.5 Study Area

The geographical focus of this study is Ngamiland District in north-western Botswana located in a Ramsar site. The district measures about 109,130 square kilometres and has diverse ecosystems consisting of wetlands, flooded grasslands, savanna woodlands, and scrub savannas (Ringrose et al., 1988). It is home to the Okavango Delta, which contains ninety five percent (95%) of the entire country's surface water (Ringrose et al., 1988). The district is ethnically pluralistic with more than fifteen different ethnic groups (Tlou, 1985) and a human population of approximately 137,600 people (Government of Botswana, 2011b).

The study sites are Habu and Toteng villages (Figure 1-1), both with small rural populations (Table 1-1). They were selected because they have similar composition of ethnic groups that lead similar livelihood activities. The study sites are however, situated in ecologically different systems. Habu is in a river floodplain system located at the end of the Thaoge River (Cassidy & Barnes, 2012). Toteng is located at the mouth of Lake Ngami in a scrubby savanna system and the Kunyere River runs through the village. The villages are located distantly from each other and from Maun, the administrative capital of Ngamiland District. They therefore, offer an opportunity for comparison and triangulation.

Table 1-1: 2011 Study sites population demographics

Village/Area	Population
Habu	533
Toteng	1193

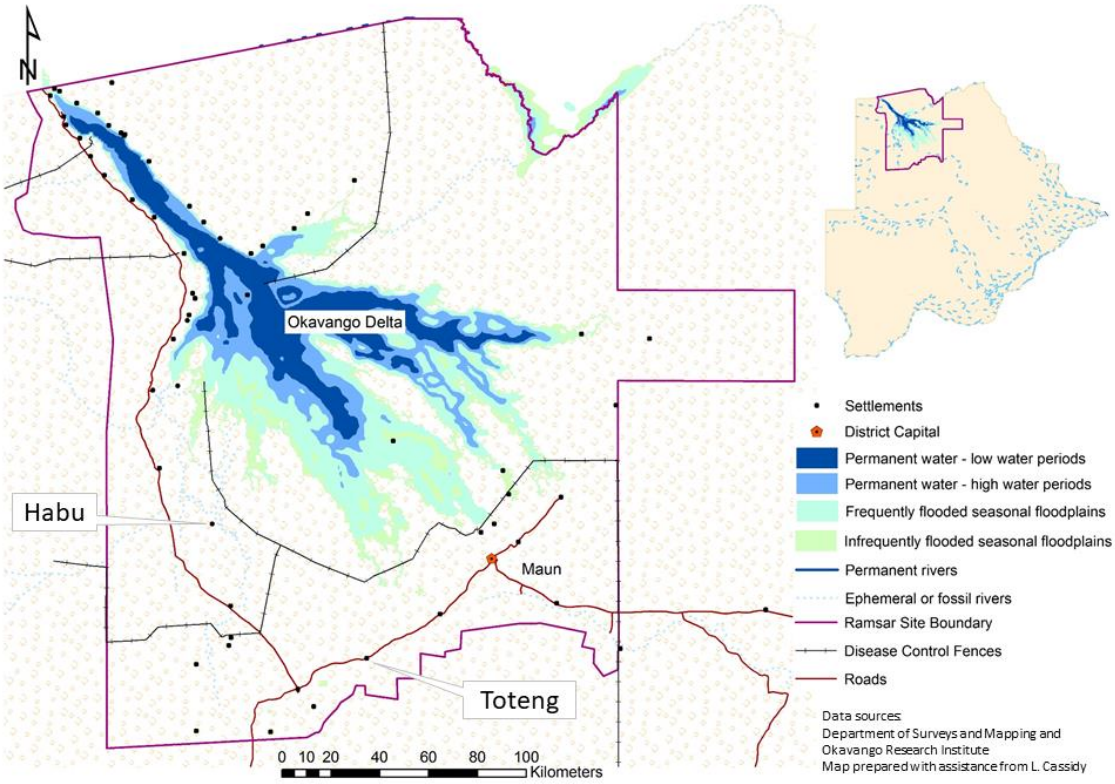


Figure 1-1: Map of study communities, showing the Okavango Delta and Ramsar Site boundary

1.5.1 Habu village

Habu village is situated one hundred and sixty kilometres (160km) north-west of Maun. It is between Nokaneng and Tsau villages on the south-western edge of Botswana's Okavango Delta at the end of the Thaoge River (Cassidy & Barnes, 2012; Galeage, 2008). Habu had a population of 533 people in 2011 (Government of Botswana, 2011a) comprising WaYei, HaMbukushu, BaSarwa, OvaMbanderu, OvaHerero ethnic groups etc. Livelihood activities are mainly subsistence agriculture, seasonal fishing, veldt product collection, and controlled hunting (Enger, 1982; Galeage, 2008). The closeness of the village to Wildlife Management Area NG-26 and other tourism facilities has complemented the predominantly subsistence existence with paid wage employment in lodges and camps (Stewart, DeMotts, Tlotlego, & Botumile, 2012).

1.5.2 Toteng village

Toteng village is situated 64 km south-west of Maun and 20 km east of Sehithwa upstream of Lake Ngami. The population of Toteng was 1193 people in 2011 and comprised WaYei, OvaMbanderu, OvaHerero, BaKgalagadi, BaSarwa and BaTawana ethnic groups (Government of Botswana, 2011a). Livelihood activities include livestock farming, rain-fed farming, fishing, flood plain farming, veldt product collection and trade (Dziewiecka, 1996). Until early 2015, employment from the BOSETO copper mine, complemented the predominantly subsistence existence in Toteng (Daily News, 2012).

1.5.3 Scope and limitations of the study

Traditional land-use and management institutions have multiple visible and invisible facets. Power dynamics are one of the embedded, invisible facets. As institutions were unknown at the inception of the study, the scope of this study is to identify them and understand their function in land-use during the pre-independence era and possible utility in the current era. Power dynamics are complex as they exist within and between institutions, ethnic groups, gender, age, ethnicity, relationships, socio-economic status, special knowledge etc. This study therefore, marginally addresses power dynamics as they warrant a separate study.

Based on the multi-component social and ecological framework guiding this study, this study focuses mainly on two components; 'ecosystems and people' in. The 'ecosystem' component discusses natural indicators that influenced land selection, use and management for livelihood activities amongst the three subsistence groups. The 'people' component discusses traits of individuals included in decision-making, skills, roles, hierarchy and the levels they arranged themselves in each community to govern land-use. A limitation of this study is that the age of the informants most suited to report on pre - and post-independence conditions were those born before independence. Some scholars claim that elderly informants may have challenges recalling facts accurately. To address this limitation, a range of informants were interviewed

including those born in the year of independence. The study also used five iterative data collection methods for triangulation to verify their responses.

It is a noted limitation that the pre-/post-independence period was not a sharp break, but a period of evolution whereby processes overlapped. This study uses the terms pre and post-independence as threshold periods to effectively provide a then and now comparison. Pre-independence era includes the time before Botswana became a protectorate, the protectorate era until 1966 when Botswana gained independence from the British. However, in the context of land-use institutions, the post- independence era in this study is marked by 1968 when the Tribal Land Act was introduced and land authority was transferred from Chiefs to Land Boards. The era in this study ends at the time of field study in 2017.

1.6 Outline of the Thesis

The thesis is organized into eight chapters. The first chapter contains the background, problem statement, research objectives/questions, study areas, scope and limitations of the study. Chapter 2 is the literature review and includes the conceptual framework guiding this study. Chapter 3 describes the methodology, data collection methods and analysis. Chapters 4, 5 and 6 contain the study results. Chapter 7 discusses the findings, followed by conclusions and implications of the study and references in Chapter 8.

2 Literature Review

2.1 Literature Review Overview

This literature review is made up of eight sections that explore studies of traditional knowledge, land-use and management, various land tenure systems, and institutions. The conceptual framework guiding this study concludes the section.

2.2 Traditional Knowledge Systems

Traditional knowledge can be used to distinguish any knowledge or system that differs from formal systems and western science (Agrawal, 1995). It is also defined as expertise accumulated from actual experience, and adapted over time, in varying conditions by its users. Some say it is a system used, understood and made sense of by a specific group and passed on from one generation to another (Grenier, 1998). Others say it is knowledge of people or practices typical to a community, rather than the state (Chanda & Phuthego, 2004). It can also be a unique combination of diverse culture, resources and experiences formed to devise new hybrid systems that make sense to users (Berk & Galvan, 2009).

Although this study does not use the term 'indigenous', it considers it synonymous with the term 'traditional'. The term 'traditional' is predominantly used throughout the study and only affixed to other words such as systems, skills, insurance, knowledge, ecological knowledge or institutions to make the distinctions where necessary. The working definition of traditional knowledge in this study is *distinct intellectual and practical knowledge, skills and systems accumulated from experience, adapted over time, used, interpreted in varying conditions and passed on for generations by a group of people.*

Part of the reason that planners and decision-makers may consider traditional knowledge irrational or difficult to implement is due to decades of stereotypes that regard all traditional systems as one irrational system rather than as distinct but systematic systems that once

fuelled basic survival amongst subsistence communities. One reason may be because many traditional cultures engage the transcendental in their daily lives in an era when science is considered a fail-safe knowledge source. Many communities consider deities as actual parts of their social structures and interact with them daily (Chute & Speck 1999; International Bank for Reconstruction and Development/ World Bank, 2008). Commonly in Roman, Greek, Norse, African, Asian mythology etc. belief in ancestors was used to guide social conduct.

Reverence and fear of deities also improved governance as it helped cement individual and communal accountability and guided sustainable natural resource use, care of descendants or vulnerable members such as orphans, widows, destitute etc. (Amanze, 2002; Bulfinch, 1988). Agrarian societies tended to attribute environmental shocks such as poor rains, crop failure or droughts, as an act of God in retribution to their actions or lack of actions. Rather than accept a scientific explanation, they were more likely to engage in rituals to appease the gods (Amanze, 2002; Geertz, 1973; Udechukwu, 1996). Another reason why traditional knowledge may have been considered irrational was that rather than be documented in printed media; it was orally passed on from one generation to another, and therefore, subjective to distortion.

Traditional knowledge is the means for survival amongst subsistence economies especially in areas where there are limited jobs. To subsist means 'to live or to have the capacity to support oneself' (Schoar, 2010). An efficient subsistence economy implies that users have access to land containing the necessary resources they require, that they do not have to pay for to survive such as tree and grass species that can be used for food, fodder, fuel etc. from season to season. In other words, subsistence is the ability to use land for basics such as food, shelter and medicine. A subsistence economy also suggests that users with authority to access natural resources have the knowledge and skills to transform natural resources into basic commodities at little to no cost (Cundill, Fabricius, Folke, & Schultz, 2007). Consequently, communities may be able to support themselves without heavily leaning on Government

programs. Absence of natural resources, authority, knowledge or skills to use them, strips subsistence communities off a sense of dignity, leads to poverty and separates them from society (Franklin, 1967). Traditional knowledge is therefore the means for survival amongst subsistence economies. It capacitates individuals and families to subsist at little to no cost. They can grow their own food, collect, fish or hunt rather than buy it. They are able to build houses using free raw materials and individual or collective effort.

The passing on of knowledge and information between generations was one way to keep it relevant to prevailing conditions and perpetuate sustainability. Children were physically and psycho-socially groomed for competence and survival in adult life. To do this, many traditional systems embedded age specific skills so that younger members gained practical competence in adult hood (Bock, 1998, 2017). A similar practice in the modern era is the role social policy plays to minimize generational vulnerability (Hunter, 1998). The rates of global youth unemployment are high. Global youth unemployment was estimated at 13.6% in 2017, while the 2017 youth unemployment in Botswana was 35.5 % (UNDP, 2018). These current rates suggest that teaching subsistence skills to the younger generations requires revisiting. The common cause seems to be an oversupply of graduates for white collar jobs and an under supply of youth with practical, artisan skills (Okafor, 2011; Scarpetta et al., 2010; Sechele, 2017). This suggests that practical skills are not being passed on to the younger generation. It means they are likely to struggle to fend for themselves as adults or in the event of economic recessions. If this happens, there will be implications for a country's stability.

Countries such as New Zealand, Spain, Indonesia etc., recognised the utility of traditional knowledge for improving biodiversity and natural use. In New Zealand, the Maori have a traditional conservation system called '*rahui*,' that bans harvesting of specific resources to reduce their depletion (Lyver, 2002). In Spain, planners are investigating ancient traditional farming once used to promote soil, plant, tree, bird, flower and game diversity and grass

nutrition to rehabilitate areas depleted of plant and tree species (Bernáldez, 1991). Current national irrigation schemes in Indonesia were developed and evolved from traditional techniques (Grenier, 1998). In Canada, research scientists work alongside native Canadians to improve natural resource inventories and track animal population and migration patterns (Davis & Wagner, 2003). All over east and West Africa, communities are using traditional soil and water harvesting practices, such as traditional stone lines in Mali, because they are considered efficient (Reij, 1991).

Traditional knowledge may appear to have social, cultural and ecological merit relevant to current issues; it however, holds some outdated viewpoints particularly towards age and gender. Traditions such as male primogeniture recognise the eldest surviving male as solely eligible for inheriting property. This cemented the belief that men are undisputed heirs, are the only ones that can own property and be community leaders or decision makers (Chute & Speck 1999). As a result, women are forbidden to hold land rights, inherit property, hold leadership positions nor have any decision-making powers in different African, Native American Indians and aboriginal societies. This belief is currently practiced world over, even when men are supposedly more liberal (Schatzberg, 2012; Tripp, 2004). In East Africa, women's rights groups are battling traditional and political patriarchal institutions opposed to women holding any land rights or positions of authority (Becker, 2006; Düsing, 2002; Razavi, 2007; Schatzberg, 2012; Tripp, 2004).

Various other factors inherited from the traditional system are currently used to exclude some individuals from decision making or leadership. Traditional system also assumed older people wise, experienced and infallible, while youth were associated with inexperience, naivety, and fallibility (Manning & Junankar, 1998). Ultimately, young people, although experienced and wise, could be excluded from decision-making due to their age. In Botswana, the Government accelerated erosion of its cultural diversity by excluding all local languages other than SeTswana as the medium for teaching or public gatherings. This resulted in a rapid loss of

various languages country-wide (Nyati-Ramahobo, 1998). For example a WaYei scholar attempted to develop IshiYei orthography in 1962, but it was interpreted as a challenge to the BaTawana chieftainship (Nyati-Ramahobo, 2002). IshiYei is currently considered one of the endangered languages in the world (Vossen, 1988, Jason and Underson, 1997).

2.3 Land-Use and Management

Land-use and land management are sometimes used interchangeably. Lesslie (2004) distinguishes the terms by defining land-use as the 'what' and land management as the 'how' in land-use and management. For instance, land-use determines 'what' is produced or done on tracts of land - such as farming, veldt product collection, cultivation, grazing, residence etc. Subsistence societies, worldwide, use land to secure food, fodder, fuel, building material, industrial material, and medicines. Culturally, land is also used as a form of identity. It could be transferred to descendants especially amongst hunting and gathering societies (Berkes et al., 1998; Deininger & Feder, 2001; Gallagher, 1988). Kayapo Indians in Brazil, for example, used their fallow fields to grow medicinal and water producing plants (Gadgil, Berkes, & Folke, 1993).

Natural resources are very complex to govern because they cross various political and economic borders. Land management explains 'how' land is handled to achieve a desired outcome (Lesslie, 2004). To develop practices that guide use and management users created systems to protect local level ecosystems. Some communities create laws that excluded other users and or devised mechanisms to ensure compliance to rules or minimize overharvesting of certain natural resources. For example, to maintain eco-system resilience, Swedish and Canadian fishing communities divided different users to manage large expanses of water and coral resources at various social-ecological scales (Berkes et al., 2000). Based on their expertise and interest, some groups managed pools for subsistence; others for sport and some for commercial fishing (Berkes & Seixas, 2005).

To accommodate population growth and increased demand for grazing pastures, China, parts of Africa, and Mexico managed their lands by creating variations of traditional communal tenure systems that enable re-allocation and shared land-use (Deininger & Feder, 2001). To conserve water, retain soil fertility and reduce pressure off woodlands, mountain dwelling Nepalese farmers employ various techniques (Stocking, 2008). To improve soil fertility, farmers throughout Africa use traditional crop rotation, crop mixtures, manure application, and nitrogen-fixing trees (Africa, 2004). Algonquin Indians in North America and Nuer communities in southern Sudan reduce overharvesting of veldt products and overhunting by leading nomadic lifestyles and maintaining highly diversified diets based on natural resources available at different times of the year (Hjort, 1976). East African Masaai and Sahel herders reduced overgrazing by moving herds between pastures during the dry and rainy seasons (Berkes et al., 2000).

In Botswana, the BaTswana practice mixed farming and lead a semi-nomadic lifestyle by maintaining a triple settlement system comprising of temporary migration between grazing, ploughing and permanent residence throughout the year (Larsson & Larsson, 1984). Each settlement had a system of use and management to plan grazing, maintain soil fertility, secure residential plots and communal land for domestic use (Schapera, 1994). In the Okavango Delta, fishermen, hunters and natural resource gatherers used natural boundaries to designate and share fishing ponds and hunting grounds. The users determined their own access, use, and management systems within their designated boundaries guided (Tlou, 1972). This may have enabled them to reorganise themselves when threatened by ecological and social stressors. The above examples give insight of various traditional ecology systems and ways subsistence communities reduced vulnerabilities. They also suggest that there isn't a single best crop, or land management practice, optimal design, or interpretation of rules. Use and management approaches that work well in one society may not work in another.

Land is not only important to subsistence communities; it is an important asset to a country. This is because the importance of land lies less in its spatial extent, but more on its natural resources (Bornegrim & Collin, 2010). Control over land, gives peoples that control it access to those resources and ultimately a source of power. It is therefore probable that certain individuals position themselves to control land and its resources to access definitive power. Age, gender, socio-economic status, skills, ethnicity etc. have been used to exclude some individuals from land governance. For example, in East Africa land and its resources is controlled by political leaders. Several East African communities equate political leadership to 'eating' or 'living' as those that control land are perceived as having access to wealth (Schatzberg, 2012). This could explain why many African politicians tend to jostle for political power and insist on perpetual rule. Control of land and natural resource governance seemingly gave them access to wealth and uncontested power.

The debates about who is most suited to manage communal land and natural resources are numerous. Hardin (1968) favoured Government and private enterprises as better managers in his seminal work "Tragedy of the Commons". His thesis was adopted by Governments and conservationists worldwide, but criticised by scholars, especially in the common pool resource management literature. They suggested that Hardin (1968) mistook common property for open access. This is because open access regimes do not have defined users or common user rules (Agrawal, 2001; Magole, 2003; Ostrom et al., 1999). Other scholars advocate for direct users at a local level (Ostrom et al., 1999; Peterson, 2000) while some scholars promote collaboration of all stakeholders to manage land and its resources at multiple levels (Walters & Holling, 1990).

As natural resources change in response to various social, economic and environmental events (Peterson, 2000), whoever manages land and its resources needs to know the ecological make-up of the ecosystem, the utility of those resources, and the seasons the different resources are available. The question perhaps should not be about who is most suited to manage land is, but

rather ‘what’ the best approach to maintain the balance could be. Lebel et al. (2006) suggest that good governance determines who makes the ultimate decisions, identifies what resources need to be made resilient, whom resilience is managed for, why, when and how interventions should be made. They also need capacity and authority for management. Without governance structures, ecosystem resilience and subsistence livelihoods would be compromised. Sustainable governance approach by subsistence communities is based on users having improved understanding of natural resources and ecosystem functions (Olsson, 2003). This implies that if principles of good governance are followed, it does not matter if end users or Government manage communal land and its natural resources, but rather that ecosystem resilience is not compromised and natural resource depletion is not exacerbated. It is therefore, unclear why users are often excluded in governance without ensuring that their systems ineffective.

2.4 Land Tenure and Property Rights

As a cultural or legal regime, land tenure has different definitions (Berkes et al., 1998; Murphree, 2004; Rose, 2002). Some define it as a type of interest or treatment of land, while others define it as ownership over land and its natural resources. Others define it as terms and conditions that determine how land and its resources are used. Four categories of property regimes; open access, common, state and private property (Schlager & Ostrom, 1992) are commonly used worldwide to define land-use and management. In open access, land and natural resources are not specifically allocated to particular users and there are no rules of use in play. Actual possession of the natural resources rather than usage confirms rights. In common property regimes, access, withdrawal, use and management rights are determined by rules devised by specific individuals even if the resources are used by other users (Ellis, 2000; Heltberg, 2002). Some scholars claim that terms like common property are a colonial creation

adopted by elitist leaders in developing countries to manipulate land rights into their control (Rose, 2002).

State property is a regime whereby land rights are controlled by the state. In private property regimes, access, use and management rights are 'vested in the individual' in varying intensities across regions and countries (Heltberg, 2002). Private property rights are considered perfect or secure when individuals have the right to possess, use, destroy, transfer or change them and considered imperfect if individual lacks that authority (Heltberg, 2002; Panayotou, 1993). The above categories are mainly based on western principles (Agrawal, 2001; Cassidy & Barnes, 2012) despite the fact that some land tenure systems are not so linear

2.5 African Land Tenure Systems

Prior to colonisation, many African countries had various forms of traditional land tenure systems. The systems had common features such as *right of avail* - an embedded philosophy devised to ensure equal access of land for community members. No formal documents confirmed rights, but community members knew the natural borders of the properties (Collin & Bornegrim, 2010; Kalabamu, 2000; Schapera, 1994). In this philosophy, land was regarded as a family heirloom and the head of the family was its custodian. Thereafter, the property was passed down to the oldest surviving male. The family owned it "for perpetuity", or for as long as the family used or occupied it or relinquished their rights (Kalabamu, 2000; Schapera, 1994). It appears that only under extreme circumstances were rights forcibly revoked such as if a family committed a crime or caused too much conflict in the community (Schapera, 1994). Ancient Greece and the Israelites used a similar system whereby once land was allocated, it was considered family or clan property "for perpetuity" (Malamat, 1962).

After many African countries gained independence, countries like Tanzania, Mozambique and Ethiopia adopted a replacement land reform to phase out traditional land tenure systems. Legal documents confirmed land rights rather than witnesses. The duration of perpetuity was

changed to fifty or ninety nine years depending on the type of lease. In southern Africa countries where Christianity is the dominant religion, the duration was influenced by the Bible stipulating fifty years as the duration of land leases (Deininger & Feder, 2001). Kenya and Malawi totally replaced community rights with private land ownership (Kalabamu, 2000). Zambia, Sudan and Uganda created partnerships between private and state owners. Many Governments regard land rights for communal land as user rights subject to specific terms and conditions rather than outright ownership. Some families maintained the pre-independence traditional philosophies and believed that allocated land was their family heirloom and private possession to use, transfer, manage etc. as they saw fit (Mends & De Meijere, 2006; Pule & Thabane, 2004; Sikhondze, 1994). These land reforms were reportedly poorly articulated and created variations of informal *de facto* systems. The varying interpretations of land rights created conflicts between communities and their Governments (Rose, 2002).

Many land reforms were reportedly not well implemented and led to excessive pressure on communal land and its natural resources and heightened insecurity (Adams, 2001). To improve land tenure security and embrace heterogeny Namibia and South Africa are developing various reforms that constitutionally recognize systems of their different ethnic groups, various leadership structures, languages, traditional customary law, ethnic groups, political and judicial systems, etc. (Düsing, 2002). Implementation of the reforms has been divided into short, medium- and long-term phases (Düsing, 2002).

2.6 BaTswana Land Tenure

As part of nation building amidst the heterogeneous groups in Botswana, a *morafe* concept was introduced in the pre-independence era. Botswana was made a mono-ethnic Tswana state and SeTswana was adopted by all its citizens as the national language. Control of land was placed under BaTswana rulers as leaders of the dominant cultural group using variations of traditional land tenure system based on livestock and dry land farming (Kalabamu, 2000).

People could only access land within their tribal area of origin. Migrants from different countries needing land access were often assimilated into the BaTswana tribes through the *morafe* concept.

They were required to become ward members and conform to BaTswana norms and practices (Datta & Murray, 1989; Schapera, 1994). However, it appears that migrants were allowed to continue their traditional livelihood activities to fend for themselves in order not to burden the community from whom they sought refuge (Hitchcock, 1980). The Botswana traditional land tenure system was therefore, flexible, inclusive and accommodated other land tenure systems.

Land was considered the collective property of the tribe and the community participated in determining land-use and management (Kalabamu, 2000). Tribal leadership called *bogosi* in the SeTswana language independently governed land and natural resources on behalf of the tribe using variations of traditional land tenure depending on the character, skill and experience of tribal leaders (Schapera, 1994; Sharma, 2005). There also appears to have been discriminatory practices that denied groups that were not of Tswana descent to have a voice in village level decisions (Schapera 1994; Magole 2003; Nyati-Ramohobo 2008; Datta & Murray 1989).

After independence, the country's Constitution was introduced. Sections 77, 78 and 79 divided Botswana's heterogeneous society into 'major' and 'minor' groups (Government of Botswana, 1965). Eight homogenous groups of BaTswana ancestry were classified as the 'major' groups. The country was divided into eight districts under their leadership and cultural identity. Other groups were classified as 'minor' groups and were integrated or assimilated depending on their ability to resist domination (Magole, 2003). In 1968 a national Tribal Land Act was introduced and replaced the diverse traditional land tenure systems with a standardized top-down approach. The central Government introduced Land Boards as the district-level authority for land allocations.

The Chiefs were initially included and appointed as ex officio members of the Land Boards. In other words they were not able to vote, which automatically put them in-a subordinate position to other members in the new institution. Finally, they phased out the position and Chiefs currently have no authority in any national land-use and management institution. Currently, there are twelve main Land Boards and thirty eight sub-Land Boards in the country (Collin & Bornegrim, 2010). Appeals arising from disputes from Land Board decisions are directed to the Minister of Lands and Housing. This practice has created a highly centralised policy approach to land management and natural use that excludes the community as users in the planning and decision-making process (Cassidy et al., 2011; Magole, 2009; Neme, 1997). Land rights are confirmed by legal documents using Customary Land Grant Certificates (CCLG) (Collin & Bornegrim, 2010). Botswana may be applauded for having secure land tenure systems, but, post-independence changes to land governance suggest the contrary. The exclusion of Chiefs in land use and management implicated other members once involved in traditional land governance. The traditional hierarchies, roles and communication channels are fragmented and the traditional land-use and management institutions are weakened.

2.7 OvaMbanderu Traditional Land Tenure

The OvaMbanderu are a semi-nomadic pastoral farming society from Namibia that migrated to Botswana between 1890 and 1904 (Gewald, 2002). They live in various districts in Botswana and some were assimilated into the BaTswana nation through the pre-independence, *morafe* concept. When they arrived in the pre-independence era, many were impoverished and some worked for BaTswana as herdsmen (Vivelo, 1976). Those that had livestock stressed that sedentary BaTswana lifestyle and settlement was not practical for their traditional animal husbandry and they maintained their cultural ways (Vivelo, 1977). In Ngamiland, Chief Sekgoma Letsholathebe of the BaTawana tribe described as compassionate to migrant groups recognised their superior livestock husbandry skills and granted them the

unusual privilege of retaining their semi-nomadic lifestyle (Vivelo, 1977). As they preferred land characterised by good grazing and vastness for livestock mobility (Almagor, 1980) they were granted access to cattle posts in the outskirts of the BaTawana villages. The OvaMbanderu reared herds that were generally of superior quality and their numbers exceeded those of their dominant BaTawana overlords in two generations. As a result, they gained independence from their servitude (Gewald, 2002; Vivelo, 1976; Pennington & Harpending, 1991). Historically, OvaMbanderu relatives spanning two or three generations strategically lived in separate but neighbouring homesteads. This strengthened social and economic cooperation and improved management of shared grazing pastures (Pennington & Harpending, 1991). A communal grazing area considered a 'single ecological zone' known as an *ekondua rimue* was subdivided into temporary and permanent grazing pastures. This created a dual grazing system to conserve pastures between the rainy and dry seasons (Almagor, 1980). In the rainy season, cattle were moved to temporary camps. Predecessors' burial sites were automatically considered ancestral grazing and residential rights (Pennington & Harpending, 1991).

In the post-independence era, predecessors' burial sites are not automatically considered ancestral rights. Introduction of cordon fences and privatised ranches have blocked livestock migratory routes and reduced grazing pastures. This has disrupted grazing patterns, resulted in overgrazing and exacerbated unproductive land-use (Magole, 2003). While such disruptions affected all livestock owners, the OvaMbanderu were probably more strongly, affected because their livelihoods were more based on livestock farming, as compared to the BaTawana who also grew crops in addition to livestock farming.

2.8 WaYei Traditional Land Tenure

The WaYei are a matrilineal group originally from central Africa that migrated to Botswana in the early eighteenth century from the middle Zambezi (Larson, 1989; Tlou, 1972, 1985).

They are associated with diverse livelihood activities based on an extensive knowledge of natural resources (Meyer & Bendsen, 2003; Stigand, 1923). When the WaYei first moved into Ngamiland District, they lived in self-governed, stateless communities. They selected areas along rivers because they were similar to those they had lived in, in the Zambezi (Tlou, 1972). This enabled them to practice floodplain farming, which mainly relied on moisture from receding river waters, and rain fed farming simultaneously (Stigand, 1923; Sutherland, 1980; Tlou, 1985).

Concurrent flood-plain and rain fed farming allowed them to mitigate the impacts of the variability of the Okavango Delta floods (Larson, 1989; Sutherland, 1980). Their homesteads and ploughing fields were scattered in hamlets comprising two to eight households around the Delta islands and floodplains. The homesteads were strategically located to reduce congestion and competition for natural resources that could potentially lead to conflicts (Sutherland, 1980). Individuals could break away from an established hamlet and form their own hamlet if they felt competition for resources was mounting. An individual that established a 'new' hamlet automatically became its leader and determined access, use and management rules. They devised special regulations and fishing and hunting boundaries to determine rights of access, use and management (Tlou, 1985).

This traditional knowledge guided livelihood activities as a form of traditional insurance, enabling access to different natural resources and crops throughout the year (Potten, 1976; Tlou, 1972).When the BaTawana as one of Botswana's eight major ethnic groups, according to the Botswana constitution, moved to Ngamiland district in 1820, they supposedly assumed dominance over the WaYei. They usurped their land, livestock, and subjected them to serfdom (Tlou, 1985). Described as docile, the WaYei traditional institutional arrangements were weakened, lost decision-making powers to the BaTawana and forced into becoming slaves of the BaTawana (Larson, 1989). Some WaYei tried to resist domination by moving further into the islands from BaTawana rule (Sutherland, 1980). Since independence many

WaYei are fully assimilated into the BaTswana settlement structures and traditions (Mpho, 1989; Nyati-Ramahobo, 2008).

Although Tlou (1985) suggests that WaYei were livestock farmers, Stigand (1923) reports fishing, veldt product collection, hunting and flood-plain ploughing activities as the land-uses of the WaYei. Stigand (1923) mentions livestock farming as the WaYei livelihood activity after the arrival of the BaTawana in Ngamiland. Although, Tlou (1985) mentions that BaTawana usurped the livestock of WaYei, he describes BaTawana as pastoralists and WaYei as cultivators. For instance, he notes that "The BaYei it will be remembered were a major economic force, in Ngamiland. They were expert cultivators of the flood plain, innovative fishermen, and skilful canoeist." (p56). "BaTawana were pastoralists whose economy centered on owning cattle." While this might suggest a contradiction about traditional WaYei land use, but it might indicate a transition whereby WaYei livelihood systems changed from one that was mainly based on cultivation to one that included pastoralism when they assimilated and co-existed with the BaTawana. This may explain why Tlou (1985) suggests WaYei practiced mixed farming when he states that BaTawana came to seize WaYei land and livestock and forced them to become slaves (see also Larson, 1989).

Flood-plain farming is historically peculiar to the WaYei, Stigand (1923), however other ethnic groups such as the HaMbukushu have adopted this farming style (Shinn, 2016).. This is because yields are said to exceed those of rain fed farming. Living in wetland areas additionally offers farmers access to veldt products and fish **(**Motsumi, Magole, & Kgathi, 2012). In the post-independence era, top-down approaches have affected the flood-plain farming. Flood-plain farmers do not receive Government subsidies, benefits, or compensation if their crops are destroyed by wild animals or floods like rain-fed farmers (Bendsen & Motsholapheko, 2003; Bolaane, 2007; Kgathi et al., 2010). Furthermore in 2011, Government forced residents of

Etsha 13 village in the Okavango to relocate from the wetlands of Etsha 13 to the village outskirts in dry land areas called ‘New Stands’ (Shinn, 2016).

2.9 Institutions

The concept of institutions has increasingly gained importance in recent years, mainly because of the rapid growth of institutional economics and the importance of the concept in other social sciences (Hodgson, 2006). Jordan and O' Riordan (1997) define institutions as varied orders and complex structures that reflect how a particular society operates, or should operate, how rules work or ought to work, and how fairness can be judged in different ways. Ostrom (2005) defines institutions as ‘prescriptions that humans use to organise various forms of repetitive and structured interactions within families, neighbourhoods, markets, firms, sports leagues, churches, private associations and Governments at all scales’. The most widely used definition appears to be that of North (1990), who defines institutions as “humanly devised constraints that structure political, economic and social interaction”.

North (1990) further states that institutions “consist of informal constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights)”. He distinguishes institutions from organizations, defined as “groups of individuals bound together by some common purpose to achieve objectives”. According to North (1990), institutions could simply be defined as “rules of the game” and organizations as “players of the game”. However, Ostrom (2005) stresses that rules are focal to analysing institutions, but are not necessarily institutions themselves. In his communication with Hodgson (2006), North (1990) made it clear that he regarded institutions as “players of the game” for abstraction to analyse macro socio-economic systems. North (1990) agreed with Hodgson (2006) that organizations are forms of institutions; implying, that scholars who thought he said institutions were different from organizations were incorrect.

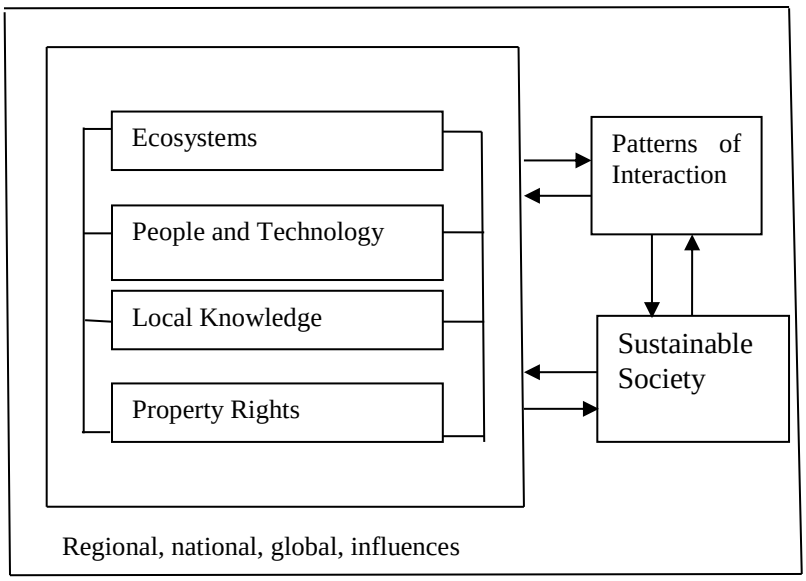
Although the definitions vary slightly, they all lean towards defining institutions as processes. This is problematic for this study because its focus is on traditional systems that are founded on oral traditions. In oral traditions, processes and players are intertwined. Processes do not appear to exist independently from players. Processes are devised, safeguarded, interpreted, implemented, adapted and passed on by people. Hodgson (2006) asserts that, institutions are "systems of established and prevalent social rules that structure social interactions". Based on these definitions, he includes legal laws, norms, social conventions, as well as firms, village wards, trade unions and other organizations in the definition. He adds organizations to the definition of institutions, but points out that they can be considered institutions if there is clear evidence of membership, hierarchy and specific roles amongst the members (Hodgson, 2006). Neale (1987) stresses that although institutions are not a distinct, 'tangible' entity, three factors distinguish them: (i) presence of distinct groups of people (ii) rules guiding repetitive action and (iii) folk views or insights that help understand the community better (Neale, 1987). These viewpoints and definitions suit institutions as analysed in this study because they recognize people and processes as aspects of institutions. Therefore, to divorce people from processes would not fully capture the definition of institutions to better understand traditional land-use and management institutions in this study. This study's working definition of institutions is therefore: *an assemblage of individuals with common interest(s), distinct characteristics for inclusion in the group and their processes such as rules, interactions, constraints etc. influenced by norms, culture, beliefs devised for a desired outcomes in the broader community.*

Lebel et al. (2006) reinforce the link between players and processes by outlining terms of sound governance; in that they determine who makes decisions, identify resources to be made resilient, whom resilience is managed for, why, when and how interventions will be made (Lebel et al., 2006). Leach, Mearns, and Scoones (1999) outlines micro, meso and macro levels as guidelines that improve efficiency of institutions to manage natural resources. This

further suggests an enmeshment of processes and players because at each institutional scale, people devise use and management processes. Inclusion of players in institutions varies amongst societies. Forest users in Nepal use financial status, caste and gender to determine participation in conservation-oriented measures in forest resources (Adhikari & Lovett, 2006). Many African countries use gender, age, relationship and special skills for decision-making roles (Mends & De Meijere, 2006).

2.10 Conceptual Framework

To systematically analyse traditional land management institutions as a multiple-component, but coherent system, this study was guided by the Berkes et al. (1998) social-ecological framework (Figure 2-1). The framework is based on what Folke et al. (2002) describes as resilience thinking, a concept introduced to facilitate the understanding of the complex social-ecological system. A resilient socio-economic system is described as one that copes with or adapts to new developments in the event of change (Berkes et al., 1998). The resilience concept was first introduced by Holling (1973) to broaden the understanding of how to manage "complex adaptive systems", most notably social-ecological systems.



(Source: Berkes et al. (1998)

Figure 2-1: Resilience thinking social-ecological framework

The social-ecological framework was inspired by the Ostrom (1990) and Bromley, Mckean, Gilles, Oakerson, and Runge (1992) Institutional Analysis and Development (IAD) frameworks. The IAD framework was used to analyse different empirical settings and the impact of institutions in monitoring and evaluating Government development projects in Botswana, USA, Cameroon, Korea, Kenya, Bolivia (Wynne 1989). It was designed to support understanding of institutional arrangements for common property resources. Though the Berkes et al. (1998) improved framework was designed primarily to help determine a society's and ecosystem's resilience, the framework is useful in the context of this study for two reasons: (i) it enables the study to dissect and identify the critical components in the context of traditional land-use and management institutions for each ethnic group and (ii) it emphasises a concurrent social and ecological lens characteristic of traditional systems.

Ostrom (2005) suggests that to appreciate the complex relationship between people and processes requires looking at an interaction between participants and a situation, the variables that affect them, the outcomes produced and how they affect the participants and their situation. Berkes et al. (1998) added four additional elements 1) ecosystems, 2) people and technology, 3) local knowledge and 4) property rights to Ostrom's (1990) model to view social and ecological systems concurrently rather than as separate disciplines.

The 'ecosystems', component focuses on the structure and function of the physical environment, including aspects of its temperature, biodiversity and rates of nutrient cycling. The definition of the first component, 'ecosystems', is contested by different scholars; some define it as a type of natural capital from which basic goods and services can be acquired, or as part of a landscape (Swinton, Lupi, Robertson, & Landis, 2006; Doing, 1997). In this study, the following parts of ecosystems are of great relevance: (i) soil attributes, (ii) water sources, (iii) plant and (iv) animal species that influenced selection of ecological areas for

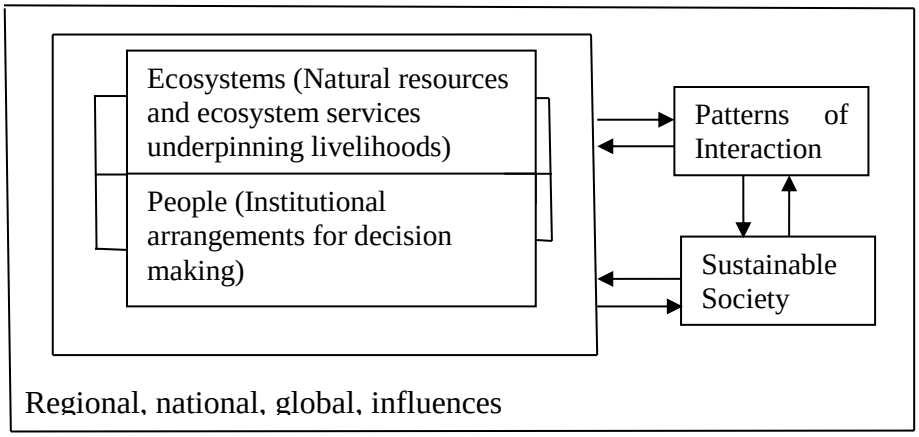
different livelihood activities. The ecosystem component helps determine practices and institutions that communities adopt to manage their land and its natural resources.

The second component of the social-ecological framework, 'people and technology', describes the way a social group utilises technology to sustain its livelihoods, either in the context of a small community, a district, or even a regional population. In this study, the focus will be on the 'people' rather than technology (in the sense intended by Berkes and Folke). In other words, it focuses on how people are involved in land-use and management, but not on the tools they use. The third component, 'local knowledge', is about the knowledge people have about the utilisation of their land and natural resources. In most cases, this knowledge was accumulated over a long time that it could be regarded as a traditional institution (Berkes et al., 1998). The 'property rights' component is about institutional arrangements for the management of land and its natural resources.

Apart from traditional property regimes of private property and state property, research in developing countries shows that there are various forms of common property regimes whereby groups of users hold rights for the use of land and natural resources. The 'national, regional and global influences' component links traditional land-use and management institutions to external factors that impacted traditional systems. The component is particularly useful in this study for the pre- and post-independence lens to support reflection on how various components of traditional land-use and management institutions were affected by external influences over time.

The 'patterns of interaction' component and 'sustainable society' in this study viewed how the four components - ecosystem, people and society, local knowledge and property rights - institutions interact to produce, lead or derail from a sustainable future. While social-ecological frameworks, such as the one by Berkes et al. (1998), are highly regarded for facilitating transdisciplinary discussions, they are criticised for their failure to incorporate

analytical and conceptual tools for addressing power relations. In addition, scholars such as Cote and Nightingale (2012) and Walker et al. (2006) particularly critiqued the Berkes et al. (1998) framework for not reflecting cause and effect amongst the components. Given the fact that social-ecological systems are multi-tiered and conceivably nested with sub-components within each component, and that the components have a dynamic relationship with one another, it is unclear how the framework could have been better designed to reflect cause and effect and still be coherent. The fact that the framework does not reflect cause and effect is not a weakness for this study. The lack of sub headings in each component, however, is conceived as one weakness. It was addressed by designing the research tool to describe in detail each component to tease out further links. Another weakness of the conceptual framework is that it considers people and technology as one component, implying they are synonymous when they are actually not. It is for this reason that the focus in this study is on people rather than technology. Specifically, the study modifies the framework to link the social aspects of the ethnic groups of interest with their ecological environment through their local knowledge and institutions for land and natural resources management (Figure 2-2).



(Source: Adapted from Berkes et al. (1998)

Figure 2-2: Modified social-ecological framework

2.11 Key points Arising from Literature Review

While there is growing belief that formal institutions will be effective only when embedded in tradition, a deep understanding of the multi-facets of traditional systems is needed to effectively incorporate traditional knowledge (Murphree, 2004; Ostrom, Burger, Field, Norgaard, & Policansky, 1999). Key points stemming from the literature review suggest that traditional systems and governance of land and natural resources are distinctive, complex, but coherent. Scientists have acknowledged that science does not have all the answers to the world's mounting social, economic, political and ecological problems. This has opened up platforms for systems previously ignored such as traditional knowledge. Scholars caution against a single, standardised land management approach, optimal design or interpretation of rules. To be more effective processes are customised by users to suit individual local systems. Debates about who is most suited to manage communal land and natural resources lean towards engaging multiple stakeholders, using different approaches, structures and processes at different scales (Ostrom & Schlager, 1996; Peterson, 2000). Criteria for players most suited to manage land and its resources in different traditional systems include age, gender, financial status, caste, relationship to leaders, special skills and knowledge.

Suggestions for good governance and how interventions can be effective include clearly outlining (i) who makes the ultimate decisions, (ii) resources that need to be made resilient, (iii) for whom resilience is managed, (iv) why, when and how interventions should be made. Players with knowledge of their environment are most likely the most suited to identify best processes and devise effective interventions as they have improved understanding of their own ecosystems. The three subsistence ethnic groups focal to this study in Ngamiland district in north-western appear to have improved understanding of their ecosystems, because they lived in rich ecological systems that they selected.

OvaMbanderu as primarily pastoral farmers prefer vast grasslands for livestock grazing. The WaYei a largely riverine society specialising in veldt product collection, fishing, floodplain and rain-fed farming, prefer permanent waters and wilderness areas rich with natural resources. The BaTawana practice mixed farming, rearing livestock and cultivating crops; prefer three different types of land tracts: (i) with fertile soils for ploughing, (ii) vast grazing pastures for livestock and (iii) stable social, economic and political amenities. Given the concerns of natural resource depletion, shortage of jobs and recurring economic recessions worldwide this suggest that traditional knowledge has utility in the current era. Practical lessons to enhance sustainability that can be learned from various subsistence communities include natural resource conservation, improved ecosystems resilience, land-use and management and empowering the younger generation with practical survival skills.

However, national legislative instruments such as the 1968 Tribal Land Act have disregarded cultural diversity. This eroded many sound land-use and management practise, inhibited the innovation of many traditional systems and weakened various subsistence livelihoods. Traditional knowledge however, should not be over glamourized for it has shortcomings. Some systems exclude competent individuals from decision making, leadership and access to land rights due to ethnicity, gender, age, socio-economic status. This criterion was used to exclude individuals from leadership positions or inheriting property despite meeting criteria for inclusion stipulated by tradition.

3 Methodology

3.1 Methodology Overview

This section on methodology explains the data collection, analysis methods as well as ethical implications of this study. The following methods were used in this qualitative study; archival research, key informant interviews, general household interviews, focus group discussions, observation and others to achieve triangulation.

3.2 Data Collection

Data collection was divided into three phases; the pre-test, preliminary/study sites visit and field work. Field work began with the preliminary study site visits described in more detail in Section 3.2.2. Interviews began with key informant interviews, followed by household interviews and focus group discussions for an iterative approach (Table 3-1). Data verification and analysis is the last activity in the methodology section.

3.2.1 Literature review and archival research

Various data base sources such as the University of Botswana library, Botswana national archives library, online academic journals, books and newspapers were used to provide the background information about conditions during the pre-protectorate and post-independence era. This method helped identify knowledge gaps, guided formulation of questions for the research tool, and helped nullify and verify responses during and after field work.

Table 3-1: Data collection methods

Interview type		Toteng field work held in September, 2016		Habu - field work held in November, 2016	
	Age	55 years-102		66-97 years	
Key Informants - 16 Men		OvaMbanderu	Chief of arbitration.	OvaMbanderu	Hamlet Head-Animal Husbandry.
			Hamlet head-Farmer.		
			Household head-Well digger and Farmer.		Household Head-Hunter.
		WaYei	Land Overseer.	WaYei	Ward Headman.
			Flood plain farmer		Retired Headman.
					Veldt product collector.
		BaTawana	Village Development Committee Chairman.	BaTawana	Village Chief
			Livestock Farmer.		Farmers Association Chairman.
			Ex Age Regiment.		Ward Headman.
Key Informants - 12 Women		OvaMbanderu	Household Head.		Household Head
			Household Head		Widowed Household Head.
		WaYei	Thatcher-Veldt product collector.		Retired Village Development Committee member.
			Flood plain farmer.		Veldt product collector-wild foods.
		BaTawana	Widowed household head.		Rain fed farmer.
			Rain-fed farmer.		Veldt product collector-building material.
Household Interviews - 180 men and women		30-OvaMbanderu 30-WaYei 30-BaTawana.		30-OvaMbanderu 30-WaYei 30-BaTawana.	
Focus Group Discussions- 4 Focus Groups comprising 8 members each.		**Focus Group 1** 8 – OvaMbanderu men -farmers **Focus Group 2-** 2 WaYei men – 1 flood plain farmer, 1 mixed farmer. 2 WaYei women-1 veldt product collector, 1 mixed farmer. 2 BaTawana men -1 mixed farmer and 1 retired land overseer. 2 BaTawana women-1 mixed farmer, 1 household head.		**Focus Group 1** 8 - OvaMbanderu men -farmers **Focus Group 2** 2 WaYei men – 1 Ward Headman, 1 mixed farmer. 2 WaYei women- 1 retired Village Development Committee member, 1 female household head. 2-BaTawana men -1 Farmers association chairman, 1 mixed farmer. 2 BaTawana –women, 1 mixed farmer, 1 veldt product collector.	

3.2.2 Development and pre-testing of research tool

The first stage of the study was testing the questionnaire as the instrument for key informant and household interviews. The pre-test was in Maun and Shorobe villages in April 2016 and not the study sites to avoid bias or influencing informants in the study sites. The questionnaire was tested on a sample of 14 people (7 men and 7 women) born between 1930 and 1966 that had served in leadership positions in land-use and management before central Government

systems were introduced. They were selected based on their willingness to participate and their expertise such as farming, age regiment members, land overseers, Village Development Committee members, tribal and political leaders etc. The pre-test helped (i) revise the content, structure and length of the questionnaire and (ii) refine variables for each objective and analysis tool.

Following the pre-test, a preliminary visit and site inspection of the two study sites was done in August 2016 in both villages to introduce the study to the tribal leaders. The Chief was presented with the questionnaire. An appointment was made to present the intention of the study to residents and seek consent to carry the study in their villages. During the preliminary visit, a drive around the village helped identify the structural layout of residences in and around the village, establish land-uses and locations of different activities at the time of the study. The visit further helped refine timelines for interviews and determine recruitment needs.

The sampling frame (defined as a list from which the sample is drawn) was based on a list of people born between 1930 and 1966, which is a period before the central government was introduced. It was constructed using a list of pensioners from the Social and Community Development office and a registration form at the *kgotla* - customary court. During the preliminary visit, additional names were referred by other informants of a similar age and expertise sourced through the snowballing method. To ensure that the sampling frame was current, it was verified and updated with the tribal leaders' and social workers' list of pensioners in each village.

When presenting the study at the kgotla, it became evident that older OvaMbanderu informants mostly understand, but do not speak SeTswana fluently. Enumerators from the village were therefore, recruited during this time, particularly translators for the older OvaMbanderu informants. Before commencing fieldwork, the five enumerators were trained

to ensure they understood the questionnaire. This included ensuring they recorded responses properly, developed rapport with one another, and shared interviewing and recording roles. The research team consisted of three teams including the researcher. Each team comprised one SeTswana speaker and one OtjiMbanderu speaker to eliminate language barriers.

3.2.3 Key informant interviews

After the preliminary visit, the field work began with key informant interviews in Toteng village in the first week of September, 2016. Key informant interviews followed the secondary data collection and pre-test method to triangulate the informants' responses with the secondary data. The method addressed the two research objectives particularly on conditions before independence. The study population in the key informant interviews comprised a total of sixteen (16) men and twelve (12) women born between 1917 and 1966 in both villages. They were disaggregated according to gender, ethnicity and livelihood activity **(**See Table 3-1**).**

To identify key informants in this study, the Chiefs selected names of individuals considered experts, with in-depth knowledge on farming, hunting, veldt product collection and fishing during the pre and post-independence from the sampling frame. When some informants from the list were approached for interviews, they gave additional names of peers they considered as or more knowledgeable or competent on land issues. Four informants each from OvaMbanderu, WaYei, and BaTswana ethnic groups recognised for having in-depth expertise on land-use and management and two tribal leaders in each village formed the key informants. The questionnaire for key informants comprised demographic data and in-depth open ended questions in English and SeTswana. Two informants were interviewed a day for about an hour and a half per interview. The researcher posed the questions and recorded the interview on a digital voice recorder, while the enumerator wrote the responses on the questionnaire. The voice recorder fully captured raw data and therefore, reduced risk of investigator bias and

enabled the researcher to revisit the interviews or pick up missed cues. The questionnaire was used to record responses pertinent to the study, for data entry and analysis. The same key informant interview process was repeated in Habu in the second week of November, 2016.

3.2.4 General Household interviews

General household informants were interviewed after the key informant interviews to verify key informant's responses. The same questionnaire used on the key informant interviews, comprising demographic data and in-depth open ended questions was used in the household interviews. In Toteng, the interviews were held in the second week in September, 2016 and in Habu during the second week in November, 2016. The household interviews method helped address the two specific research objectives, particularly on post-independence conditions. To select the household respondents, the names of all the people in the sampling frame that had not been identified as key informants were automatically assumed household respondents. A total of one hundred and eight (180) men and women in both villages were interviewed. Thirty (30) household interviewees per ethnic group were interviewed in each village. To minimize enumerator fatigue, the three research teams interviewed a total of 12 households a day, (four households a day per team - two in the morning and two in the afternoon). Each interview lasted about an hour and a half. One enumerator posed questions and the other recorded the responses.

3.2.5 Focus group discussions

Focus group discussion was the final data collection method following the key informant and household interviews. This was mainly because; (i) focus group participants were selected from the key informants and household interviewees based on their willingness and ability to express themselves (ii) as the study had adopted a grounded theory approach, the open ended questions for the focus group discussions emerged from the key informant and household responses. Focus group discussions addressed the two research objectives but were pivotal to

analysing weaknesses and strengths of the traditional land-use and management institutions and their relevance principally in the post-independence era.

A total of four focus group discussions (two in each village) comprising eight members per group were asked nine open ended questions. The number of the members (eight) per focus group was guided by the works of Morse (1994) who stresses that eight members in a group (i) enable equal chance of participation of all members, (ii) results in a rich discussion and (iii) reduces chances of a few participants dominating the interview (Morse, 1994).

Two focus group discussions were held in each village and each discussion lasted two to three hours. In Toteng village, the focus group discussions were held in the last week in September, 2016 and in Habu village the focus group discussions were held in the last week of November, 2016. Two focus groups comprised WaYei and BaTawana men and women per village. Despite the different emphasis on land-use amongst the WaYei and the BaTawana during the pre-independence era, the two ethnicities were combined in the two focus groups. This is because they shared similar viewpoints on the weaknesses and strengths of traditional land-use and management institutions in the pre and post-independence era. The members were male and female because it appeared that the level of decision-making and participation in land-use and management amongst men and women amongst the two groups during the pre-independence era were similar. Finally, members from the WaYei and BaTawana ethnic groups spoke SeTswana fluently so there were no language barriers to contend with.

The other two focus groups on the other hand, solely comprised OvaMbanderu men. This was because decisions on land issues amongst the OvaMbanderu were only made by men. A research team of three members led the discussions. The researcher posed the question, one enumerator circulated the voice recorder amongst participants and the third enumerator recorded the responses. Discussions were mainly through an interpreter. Each discussion lasted two to three hours.

3.2.6 Observations

The observation method began in the preliminary visit with studying the layout of the villages. It continued throughout the field work. This method helped determine land-use and village layout at the time of study and verified the responses by observing various activities at the time of field work. During field work, the researcher took a guided walk with informants around the study sites to observe some of the tree species considered indicators of land suitability for some verification. Digital photos of the trees, layout, architecture of houses, materials used for construction, location of ploughing fields and community members active in various land-use and management activities were taken. These images provide a snap shot context of land and natural resource use and some were included in relevant sections in this study as a visual reference of land activities at the time of study.

3.2.7 Spatial overview

In order to supplement the description of the ecological aspects of the study, and verify respondents' descriptions, remote sensing visualisation in the form of a google earth map of both study sites was used. Vegetation maps using multi spectral images from the Geographical Information Systems (GIS) lab in the Okavango Research Institute were included to reflect ecosystem types (See Figure 4-1 and Figure 4-2). The maps gave a spatial interpretation of landscape distribution of vegetation, soils and surface water sources.

3.3 Data Analysis

Using a four step method recommended by Morse (1994), to analyse qualitative data, the analysis process included (i) comprehending, (ii) synthesising, (iii) theorising, and (iv) re-contextualising (Morse, 1994). In the *'comprehending'* stage, informants' responses were entered on an excel spreadsheet. Responses helped identify and categorise the various traditional land-use and management institutions of each ethnic group in different social-ecological context. 'S*ynthesising'* helped identify emerging patterns. It guided understanding

of the individual function of each institution and its interconnectedness to other components in the social-ecological framework to create coherence. The third step, '*theorising',* identified commonalities and variations in the institutions amongst the different ethnic groups and helped answer the why and how questions that arose. The final stage, re-*contextualising',* helped determined the utility of traditional land-use and management institutions and policy implications.

3.4 Ethical Considerations

A research permit was secured from the Ministry of Environment, Wildlife and Tourism in 2016. In each study site, an oral and written explanation of the research was presented to the tribal leaders and community at a public gathering during the preliminary visits. The explanation included the background of the research, indicating why each village was of interest to the study, how research would be conducted, how the findings would be used, and distributed, and what benefits the study would bring to the community and nation at large. If/when they agreed, informants were presented with a copy of the questionnaire to review the questions they would be asked.

Each questionnaire had a written consent form on the first page in English and SeTswana. The consent form was read out in SeTswana and translated to OtjiMbanderu to make sure all participants understood it. The consent form described the study, expectation of the participants, benefits of participating, compensation, and potential risk, if any. They were given the option to participate or not to participate. Those who confirmed that they understood and agreed to be interviewed were asked if they objected to the interview being digitally recorded. For those that objected, responses were not recorded. Confidentiality was assured to all participants. A bound copy of the thesis will be entrusted to the tribal leadership in each village for access once the study has been finalised.

4 Results – Natural Indicators Influencing Land Selection

This chapter introduces results on 'ecosystems' which is the first component in the Berkes and Folke (1998) social-ecological framework (Figure 2-1) guiding this study. To address the first research objective, the results of this chapter identify natural indicators that determine land suitability for different livelihood activities amongst the OvaMbanderu, WaYei and BaTawana. The first section in this chapter discusses the traditional land-uses of the three groups in the pre- and post-independence era. The second section lists natural indicators such as veldt products, soil attributes, water sources, grass, tree, animal and fish species that influenced land selection for different livelihood activities.

The resources are listed in the local names as given by key informants and household respondents. The English and Latin names are from secondary sources (Cole 1995; Ellery & Ellery, 1997; Muller, 2007; Roodt, 1998). However, some of the tables do not have the English and Latin equivalent as they could not be found in the literature referenced. The resources further include characteristics and explanations of the utility of the identified resources. This results chapter further includes a summary of traditional land-use and management styles the three ethnic groups employed to conserve some of the natural resources. Detailed description of conservation and management of land and natural resources is beyond the scope of this study, creating an avenue for future research.

4.1 Land-Use in the Pre and Post-Independence Era

During field work, it became apparent that there was once zoning for different land-uses in and around the villages. In other words, areas that appeared suitable for arable farming and grazing were located in separate locations in the outskirts of the villages. At the time of field work, observed land use was mostly for ploughing, kraaling, grazing livestock and residences in both villages. During the preliminary site visit, both villages showed evidence of the occurrence of fire and use of water from boreholes, rivers and lagoons. Many households in

Toteng had private taps. In Habu, households mainly collected water from communal taps, or Government social institutions such as the school and the *kgotla*. There was no evidence of fishing in either village, probably because field work occurred out of the fishing season which starts on 31st December and ends on 31st April. Field work ran from September to November 2016 which would explain the absence of fishing activities.

According to the responses, traditional knowledge appears to have capacitated basic survival and eased access to natural resources at no cost except personal effort. The OvaMbanderu and BaTawana household respondents stated that as livestock farmers, knowledge of tree and grass species influenced location of cattle-posts. Proximity to pastures with trees and grasses considered fodder made grazing convenient and planned grazing manageable. Furthermore, livestock did not have to wander far away and risk straying or being attacked by predators.

The BaTawana and WaYei household respondents called their ideal ecosystem 'land that contained food' - *'lehatshe le le nang le dijo'*, or 'land that is ripe' - '*lehatshe le le buduleng'*. OvaMbanderu household respondents termed it '*omario-omaua'* - good grazing pastures. Key informants amongst all three ethnic groups called the prospecting process 'looking for life' or '*go batla botshelo*'. The ecosystems were prospected and selected by their perceived potential for providing fodder, fuel, building material, food, agriculture, water and medicines. The responses further suggest that during the pre-independence era, the OvaMbanderu, WaYei and BaTawana had very distinct uses for land for different livelihood activities (Table 4-1).

Some responses by WaYei respondents contradicted each other. Listed land-use of the WaYei during the pre-independence era varied. The younger WaYei mentioned grazing as one of the pre-independence era land-uses of the WaYei. The older informants stressed that WaYei were strictly arable farmers during the pre-independence era. When the inconsistency was raised, older informants mentioned that livestock farming was adopted from the BaTawana and the protectorate administration. Despite the different land-use and management styles, the

informants of the three ethnic groups agreed that quantity, quality and seasons of resources influenced decisions on where to graze, farm, live, collect hunt and fish. The results in this chapter are presented collectively rather than by ethnic group unlike in chapters five and six.

4.1.1 Households perceptions about landscape ecology

Traditional ecological knowledge guided the different ethnic groups to choose locations that capacitated their livelihood activities. The OvaMbanderu household respondents stated that during the pre-independence era, they were mainly livestock farmers and predominately used land for grazing. They preferred land with surface and ground water, tree and grass species considered fodder. The WaYei household respondents explained that they used land predominantly for arable floodplain farming, rain-fed farming, hunting, fishing, and veldt product collection. Their preference was for riverine ecosystems with a variety of abundant natural resources and permanent water sources where they could fish, hunt, floodplain farm, collect veldt products, and navigate.

The BaTawana household respondents indicated they lived collectively amongst people they considered fellow tribesmen. They stated they used land for grazing and rain-fed farming. They therefore preferred three separate settlements that ranged in distance from each other. The three dispersed settlements were selected using specific indicators for each livelihood activity. According to BaTawana key informants, choice of the main residential settlement area called the (*legae)* in the SeTswana language was not influenced by natural resources but access to social networks, economic amenities and organized tribal leadership.

The second BaTawana settlement, (*moraka)* or cattle post, mainly used for grazing and watering livestock, was influenced by availability of surface water, tree and grass species considered livestock fodder. The third settlement - (*masimo)* - or ploughing lands was influenced by fertile soils. According to focus group members, after central Government introduced Land Boards as the district-level authority for land allocations in the post-independence era, Land Board took away the triple settlement system and their freedom to

choose where to subsist. Each Land Board reportedly allocates land using its own criteria, and not by natural resources preferred by each group. According to the respondents, this has resulted in livelihood activities and emphasis on land during the post-independence era being less distinct amongst the various ethnic groups.

Another contradicting finding was that even though household respondents claimed they have lost the freedom to choose where to subsist, activities in the study area observed interaction with the landscape during the time of field work. There were ploughed fields, evidence of grazing, livestock kraals, household implements made out of the listed tree species and houses made out of thatch and clay from termite mounds. This suggests that livelihood activities are still natural resource-based.

Furthermore, in listing indicators for veldt product collection, hunting and fishing, there was an overlap of resources amongst all three ethnic groups. In listing indicators for grazing pastures, the BaTawana and OvaMbanderu as livestock farmers listed similar grass and tree species as fodder. Additionally, the WaYei and BaTawana as the arable farmers preferred the same types of soil for rain-fed farming. It was unclear if the overlaps indicated they had similar knowledge, or if the actual inventory of species and soil types in the two study sites were similar. Or it could have been a result of an exchange of traditional knowledge systems of ethnic groups that had co-existed for generations evolving and creating hybrid institutions.

Table 4-1 depicts pre- and post-independence livelihood activities amongst the three ethnic groups. The large, bold X's signify predominant use, while the small, italicized x's signifiy minimal land-use for each indicated activity. For example, during the pre-independence era, veldt product collection as an important land-use practice amongst all ethnic groups is marked by a big, bold X. In the post-independence era, the practice of veldt product collection, decreased amongst the WaYei and BaTawana. This is indicated by a small, italicised x.

Table 4-1: Pre and post-independence land-use according to key informants

Land-use pre – independence			
	OvaMbanderu	**WaYei**	**BaTawana**
Grazing	**X**		**X**
Floodplain farming.		**X**	
Rain-fed farming.		**X**	**X**
Residence.	**X**	**X**	**X**
Veldt product collection	**X**	**X**	**X**
Hunting.	**X**	**X**	**X**
Fishing.		**X**	*x*
Water for humans and livestock	**X**	**X**	**X**
Land-use post – independence			
	OvaMbanderu	**WaYei**	**BaTawana**
Grazing	**X**	**X**	**X**
Floodplain farming.		*x*	
Rain-fed farming.	*x*	**X**	**X**
Residence.	**X**	**X**	**X**
Veldt product collection	**X**	*x*	*x*
Controlled hunting.	*x*	*x*	*x*
Controlled Fishing.	*x*	*x*	*x*
Water for livestock	**X**	**X**	**X**

4.1.2 Natural resources influencing selection of grazing pastures

The OvaMbanderu and BaTawana household informants stated that knowledge of tree and grass species considered livestock fodder influenced their selection of grazing pastures, location of cattle posts and guided herd size. The two ethnic groups emphasised vastness as a factor for choosing grazing pastures. The OvaMbanderu key informants explained that vastness was necessary for livestock mobility. The BaTawana key informants, on the other hand, explained that because grass grew in patchy plots in the district, vastness ensured livestock had access to grass areas throughout the year. OvaMbanderu key informants on the other hand stressed that pastures had to contain slow, moderate and fast growing grasses. Informants from each group listed characteristics of the preferred grass species as nutritious fodder and their utility to livestock.

At the time of the study, the size and condition of the herds of the OvaMbanderu seemed larger and in better condition than their BaTawana counterparts. When difference in livestock size and numbers was raised, OvaMbanderu key informants attributed this to their livestock

having access to pastures containing slow, moderate and fast-growing grasses. They had chosen cattle posts in areas containing grasses with different growth rates. The informants explained that for as long as it rained, livestock had access to grazing throughout the year with less need for commercial feed. Trees with pods, fruit and leaves within the grazing areas were considered supplements particularly during winter or in drought periods. When listing fruit tree species suitable for fodder, the OvaMbanderu could mainly list them in SeTswana, and not in their language. This was probably because the mentioned trees were not known to the OvaMbanderu prior to their migration to Botswana from Namibia.

In comparison to the OvaMbanderu, the BaTawana did not appear to have as much in-depth knowledge of the characteristics of the grasses. They did not stress the variety of grasses within grazing pastures but instead stressed the abundance of the grass species listed in Table 4-2. They did not emphasize tree and shrub species as preferred fodder within a grazing pasture. The BaTawana informants stated they considered fodder tree and shrub species an added value and in their opinion trees and shrubs did not necessarily influence selection of grazing pastures.

When the key informants were asked about the sources of their knowledge of various grass species, their answers were varied. An elderly OvaMbanderu key informant stated that he had acquired knowledge by observing livestock, '*MaBanderu le MaHerero ga ba kgaogane le dikgomo tsa bone. Ha dikgomo di tsoga, ba tsoga natso, ha di robala, ba robala natso, ha di hula ba di bapisitse! 'Literally* translated, it means the 'OvaMbanderu and OvaHerero do not part with their cattle. When cattle rouse, they rouse with them, when they sleep, they sleep, when they graze, they are beside them.' This confirms that as livestock farmers, they primarily resided in cattle posts near grazing pastures.

Through observations, they learned grazing patterns and preferences of livestock. This may explain why they listed fruit trees as livestock fodder but could not name them in OtjiMbanderu. Differences in emphasis underpinned the different knowledge bases of the

OvaMbanderu and BaTawana regarding: (i) the knowledge of the characteristics of plant species considered fodder (ii) the emphasis on the type of species preferred within a grazing pasture and (iii) the management approach of the grazing pastures.

Some of the BaTawana on the other hand said they learned from their elders. '*Borraarona e ne e le sone sekole sa bogololo. Ne ke rutiwa ke malome, mme gape ke tsena sekole ka ha. E seng sekole sa gompieno se se sa ruteng sepe ka matshelo. Ha ngwana a feila, o nna legodu.*' Literally translated it means, 'Our fathers were the school in the past. I was taught by my uncle, but also went to school. These modern schools teach nothing about life. If a child fails at school, he becomes a thief."

According to the focus group members, since the Land Boards became the new land authority, it uses its own checklist, and individual farmers don't have the freedom to choose grazing pastures. They added that lucrative grazing areas have diminished and herding is no longer practiced. As a result they no longer practice planned grazing in the post-independence era but let their livestock graze freely. In enquiry to what criteria Land Board used, the focus group members could, not itemize what they understood as indicators of the Land Board's checklist. The grass species in Table 4-12, presented across 2 pages below (starting on page 51) are listed from fast- to slow-growing as ordered by the OvaMbanderu key informants.

Table 4-2: Tree and grass species considered fodder pre and post-independence

OtjiMbanderu Name	English Name	SeTswana Name	Latin Name	Utility
GRASS SPECIES				
Onguena	Couch grass	Mothwa	*Cynodon dactylon*	Fast growing, helps cattle quickly regain condition after winter. Enhances milk production.
Ophuka	Bushveld signal grass	Phoka	*Urochloa trichopus,*	Fast growing grass after first rains that enables cattle to quickly regain condition after the winter.
Tjisepa	Branched needle grass		*Triraphis ramosissima*	Fast growing grass before rains, enables cattle to feed on the young grass before the rains when there are more palatable grass. Good indicators of ground water
Okaandjaa	Buffalo grass	Mosekangwetsi	*Cenchrus ciliaris*	Fast growing, good for cattle to feed on before the rains. Good indicators of ground water
Omorondji	Kalahari Sand quick	Motenyane	*Schmidtia pappophoroides*	Moderate growth. Grows well in heavily grazed areas. Good for maintaining cattle condition long term during dry seasons. Indicators of ground water.
Ongumba	Silky Bushman grass	Tshikitshane	*Sipagrotis unilumis var.intermedia/ Stipagrotis unilumis var.uniplumis*	Moderate growing. Grows well in sandy areas, stays greener for longer periods and palatable. Enhances milk production, restores cattle condition after winter. Good indicators of ground water. When long can be used for thatching.
Uyisepa	Finger grass	Tshwaa	*Digitaria eriantha*	Slow growing, hardy and so is valuable in winter. Good for nourishing cattle long term. Indicator of ground water.
Katjondemba	Goose grass/crab grass	Molekangwetsi	*Eleusine indica*	Slow growing and hardy. Good for maintaining cattle condition throughout winter. An indicator of ground water.
Ondeka	Papyrus	Koma	*Cyperus papyrus*	Aquatic grass used for building, sleeping mats. Also a supplement during droughts or dry seasons.
Omukamakama	Broad leaved turpentine Grass	Mokamakama	*Cymbopogon caesius*	Slow growing. Mainly used for thatching, as it is resistant to termites due to a strong taste. Used as backup grazing during droughts or dry season.
		Motagore		Nutritious. Commonly grows in sandy, dry or desert areas.
		Rathete		Palatable. Moderate to slow growing grass, good during dry seasons.
TREE SPECIES FOR FODDER				
Omupanda	Kalahari Apple Leaf	Mohatlha	*Lonchocarpus nelsii*	Fruits and leaves are nutritious and palatable.
Omumborongomba	Lead wood	Motswere	*Combretum imberbe*	Leaves serve as fodder.
Orusu	Umbrella Thorn	Mosu	*Acacia tortillis*	Leaves are good fodder. The sap-*borokhu* is tasty for livestock and humans.
Omotjaara/Omuhama	Purple pod Terminalia	Motsiara	*Terminalia prunioides*	Palatable leaves.
Omundjembere	Brandy bush	Moretlwa	*Grewia flava*	Nutritious and palatable fruit and leaves.
Omunguidi	Shepherd's tree	Motlopi	*Boscia albitrunca*	Nutritious and palatable fruit and leaves.

OtjiMbanderu Name	English Name	SeTswana Name	Latin Name	Utility
	Bird plum	Motsentsela	*Berchemia discolor*	Nutritious and palatable fruit and leaves.
	Rough-leaved raisin berry	Mokgomphata	*Grewia flavescens*	Nutritious and palatable fruit and leaves.
	Marula	Morula	*Sclerocarya birrea*	Nutritious and palatable fruit.
	Sycamore fig	Mochaba	*Ficus sycomorus*	Nutritious and palatable fruit.
	Corky bark monkey orange	Mogorogwane	*Strychnos coccoloides*	Nutritious and palatable fruit.
		Motsotsojane		Nutritious and palatable fruit.
Omujapu	False brandy bush	Mogwana	*Grewia bicolor*	Nutritious and palatable fruit.
Omumbuende	Camel thorn	Mogotlho	*Acacia erioloba*	Bark and pods are supplements.
	Buffalo thorn	Mokgalo	*Ziziphus mucronata*	Leaves are good for small stock especially goats.
	Knobthorn	Mokoba	*Acacia nigrescens*	The leaves when dried are good for calves especially in winter.
	Blade thorn	Mohahu	*Acacia fleckii*	Leaves are good supplements during winter

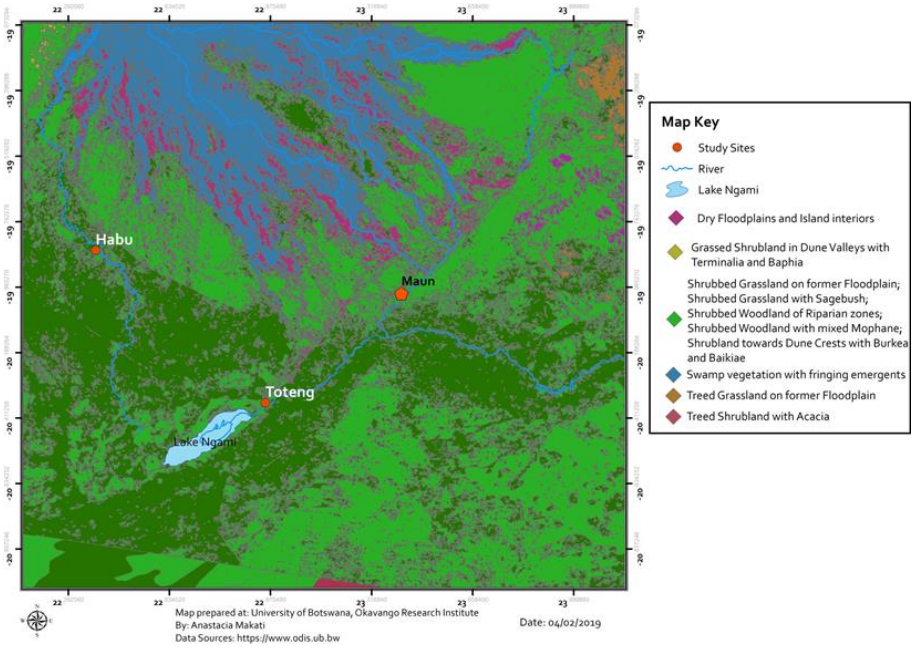


Figure 4-1: Ecosystems map reflecting vegetation types

The two vegetation maps (Figure 4-1 and Figure 4-2) are multi spectral images from the Geographical Information Systems (GIS) lab in the Okavango Research Institute. They were used to verify informants' responses on the ecological aspects of the study. They were mainly at a broader spatial level and therefore, show general ecosystems rather than actual species as outlined in the traditional checklists.

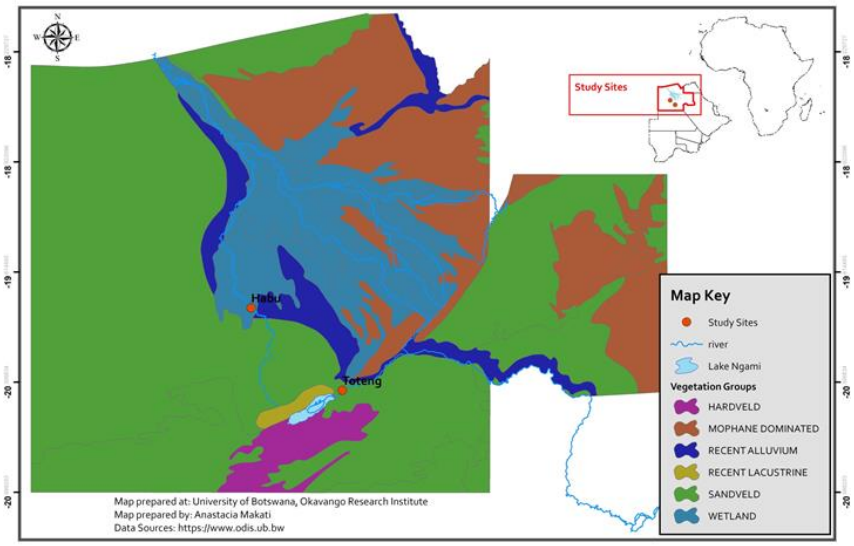


Figure 4-2: Map emphasizing soil types, water sources and vegetation.

4.1.3 Natural resources considered fuel, building material food and medicine.

The traditional ecological knowledge of key informants and household respondents from all three groups enabled them to list different trees species' characteristics and categorise them according to utility as fuel, building material, medicine and food as listed in Table 4-3, which falls across 2 pages (starting on page 566). Some household respondents stated that trees such as *Combretum imberbe* or lead wood are a hard wood that do not wear out easily. It is used to make durable wooden household implements such as troughs for watering livestock and mortars for pounding grain. Other household respondents described trees such as *Boscia albitrunca* as more malleable. They could be shaped to make storage containers for foods and liquids (see Figure 4-4). Conversely, the informants stated that during the post-independence era, wage employment, transport, alternative building material, medicine, food, shade, fuel and technology has made implements easily available.

This reduced the need to know characteristics of tree species, the skill to craft wood into finished products nor the need to live close to listed natural resources. One observation was that the WaYei household respondents and key informants identified most of the natural resources in Table 4-3 in SeTswana instead of their mother tongue. When asked for the names of the natural resources in IshiYei, many of the informants admitted that though they identified themselves as WaYei they did not speak IshiYei. Therefore, there is a difference in the list-lengths in some of the names of the natural resources in IshiYei.

Figure 4-3: Hut built out of termite mound clay and thatched with *Cymbopogon caesius*. Habu village November 2016

Figure 4-4: Pestle and mortar, storage containers and watering trough made out of wood. Toteng September 2016

To confirm some of the species considered indicators of land suitability, a guided walk by an elderly key informant around the study sites enabled observation of many acacia trees. These were photographed in their raw and finished form (See Figure 4.3–4.5). Some of the tree and grass species were considered indicators of groundwater during the pre-independence era. One informant in Habu village identified ground water sources for wells using the buffalo thorn or *Ziziphus mucronata* as an indicator (Figure4-5) in Habu village November 2016.

Figure 4-5: From left to right poles from *combretum imberbe* used to build a kraal. Centre: *Ziziphus Mucronata* used to detect the then dried up ground water aquifer. Purple pod terminalia poles used to make the kraal and provide shade to small stock in the kraal. Habu November 2016

Table 4-3: Veldt products and tree species preferred for fuel, building, food and medicine

OtjMbanderu Name	English Name	SeTswana Name	Latin Name	IshiYei Name	Utility
			Building/Household implements		
		Molemogale			Waterproof grass used for thatching. Indicator of soil fertility in flood plain fields.
		Loto			Hardy grass for thatching. Can be reused as it is not easily attacked by insects
Omuborombuga	Lead wood	Motswere	*Combretum imberbe*		Hardy wood for building, fuel and household implements. Good shade.
Omothaona		Mongana	*Acacia mellifera*		For fuel, building and making fences.
Omombuende	Camel thorn	Mogotlho	*Acacia erioloba*		Hardy wood for building, making poles for kraals and fields, good fuel and good shade.
Omotjaara/Omuhama	Purple pod terminalia	Motsiara	*Terminalia prunioides*		Hardy wood for building, fuel and good shade.
Omuthitu	Silver cluster leaf	Mogonono	*Silver terminalia*		Good for building.
Oruthu	Umbrella Thorn	Mosu	*Acacia tortillis*		Thorny branches used for enclosing kraals or homesteads. Good as fuel and shade.
	Sausage tree	Moporota	*Kigelia africana*		Hardy wood for making dugout canoes, and household implements. Fruit used as antibiotic for skin ailments.
			Medicinal use and indicators of ground water		
	Large fever berry	Motsebe	*Croton megalobotrys*		Good shade, indicator of ground water
Omupanda	Kalahari Apple Leaf	Mohatlha	*Lonchocarpus nelsii*		Wood is good for livestock fractures.
Omothaona		Mongana	*Acacia mellifera*		Roots heal small stock chest/ throat infections.
Omombuende	Camel thorn	Mogotlho	*Acacia erioloba*		Roots heal small stock chest/ throat infections.
	Woolly caper bush	Motawana	*Capparis tomentosa*		Roots used for improving livestock blood circulation and skin conditions.
	Buffalo thorn	Mokgalo	*Ziziphus mucronata*		Indicators of ground water and the fruits when seeped in water make a health tonic.
			Food/Fruit		
	Shepherd's tree	Motlopi	*Boscia albitrunca*		Nutritious fruit for humans. Ever green tree provides good shade and leaves are used as antibiotic.
	Bird plum	Motsentsela	*Berchemia discolor*		Nutritious fruit for humans. Good shade. Roots make purple dye for baskets.
	Rough-leaved raisin berry	Mokgomphata	*Grewia flavescens*		The fruit are nutritious for humans and livestock.
	Marula	Morula	*Sclerocarya birrea*		The fruit are nutritious for human and livestock. The seed makes cooking oil. Good shade.
	Sycamore fig	Mochaba	*Ficus sycomorus*		Nutritious fruit for human.
	Corky bark monkey orange	Mogorogwane	*Strychnos coccoloides*		Nutritious fruit for human.
	False brandy bush	Mogwana	*Grewia bicolor*		Nutritious fruit for humans and livestock. Fruit makes traditional beer (khadi).

OtjMbanderu Name	English Name	SeTswana Name	Latin Name	IshiYei Name	Utility
		Motsotsonjane			Nutritious fruit for human and livestock.
				Tswii	Aquatic potato, nutritious and filling
				Tsita	Edible aquatic reed
	Large sour plum	Moretologa	*Ximenia caffra*		Nutritious fruit for human and livestock.
		Modgoo			An aquatic plant that can be made into rope
	Brandy bush	Moretlwa	*Grewia flava*		Nutritious fruit for human and livestock.
		Leketa			Nutritious wild spinach.
		Letlhaka			Used for building walls
		Rothwe			Nutritious leafy relish like a wild spinach
		Thepe			Nutritious wild spinach.
				Mokonko	Bulb is cooked with meat and broth is hunger suppressant.
	Wild date palm		*Phoenix relanata*	Moxinxha/Tsaro	Nutritious fruit for human and livestock.
	African ebony	Mokutsomo	*Diospyros mespiliformis*		Nutritious fruit for human. Good shade.
	Blue thorn	Moloto	*Acacia erubescens*		Indicators of potable ground water.
	Real fan palm	Mokolwane	*Hyphaene petersiana*		For eating, weaving baskets, mats, brooms, beer strainers, rope.
			Phoenix relanata	Gao	A popular food amongst WaYei.
			Diospyros mespiliformis	Koma	Used for making mats and as a food.
		Mokgotse	*Acacia erubescens*		For making ropes, fishing nets.
	Wild mushrooms	Maboa	*Hyphaene petersiana*		For eating
		Lenyele			Indicators of soil fertility in flood plain fields.
		Mokodi			Indicators of soil fertility in flood plain fields.

4.1.4 Soil attributes influencing location of ploughing fields

In this study the WaYei and BaTawana as the arable farmers during the pre-independence era assessed soil fertility using traditional knowledge to select ploughing fields for capacity to grow food. Some WaYei household respondents and key informants stated that during the pre-independence era, a household typically had a floodplain and a rain-fed field. It was explained that having the two types of fields contributed to productive land use and heightened farmers' ability to produce their own food rather than buy it as a way to ensure food supply for household for the year.

According to WaYei key informants, soil fertility in floodplain fields was indicated by the *mokodi, lenyele* and *molemogale* plants. The informants said that the three aquatic plants only grow in rich, dark fertile soils in lagoons and river beds. A good flood-plain field, according to key informants, had lower ground where water had receded (*lediba)* and higher ground which was normally sandy (*nshimwee)* **(**Figure 4-3**)**. Lower ground was considered richer in fertility and ground moisture suitable for maize, millet and sorghum. Higher ground was regarded suitable for crops that did not require as much ground moisture and fertility such as ground nuts, peas, beans, squashes and watermelons.

Figure 4-3: Lagoons for domestic use and watering livestock and flood plain farms. Habu November 2016

For rain-fed fields, BaTawana and WaYei key informants stated they preferred sandy loamy soil (*mmu wa seloko).* Some household respondents claimed they could distinguish sandy loamy soil by colour and texture. Other household respondents said they observed the condition of wild grasses growing in that soil. If the grasses were tall, green and generally looked healthy, it was assumed the soil was fertile. Other informants asked people they considered experts for guidance. Some chose ploughing fields close to farmers with good harvest with the hopes of getting a similar or better harvest.

Household respondents and key informants claimed that during the post-independence era, the Land Board did not appear to allocate ploughing fields according to soil fertility. However, they added that if they are allocated land lacking soil fertility, the Department of Crops is helpful in teaching them modern techniques to improve soil fertility. The WaYei household respondents in Habu in particular lamented that floodplain farming is not recognised by Government, and explained that fewer fields are being ploughed.

A WaYei household respondent in Toteng with two ploughing field criticized the way land is allocated in the post-independence era. She stressed that cattle-posts and private farmers are mushrooming in areas once used primarily for ploughing and veldt product collection. This has created conflicts amongst livestock owners that are not herding as cattle are constantly eating crops in fields. She added that large stretches of land that are now private fenced farms have closed off access to trees, vegetables once freely accessed for food, thatching, building and fuel. Some OvaMbanderu in Toteng and Habu claimed to have adopted arable farming in the post-independence era to diversify their livelihood and household productivity.

4.1.5 Water sources influencing selection of land during the pre-independence era

During the pre-independence era different types of water sources influenced selection for settlement amongst the three ethnic groups. The OvaMbanderu key informants in particular expressed a preference for ground water extracted from wells, as they claimed surface water

contains various river-borne pathogens that are unhealthy for livestock. Their traditional ecological knowledge enabled them to detect and access ground water using tree and grass species like buffalo thorn, large fever berry, and buffalo grass as indicators. This knowledge heightened their capacity to live in areas considered marginal lands by the WaYei and BaTawana that preferred rivers and other surface water sources. This in turn appears to have fueled the OvaMbanderu's ability to live in the outskirts of the village, have access to vast grazing pastures and still use their traditional institutions.

WaYei key informants on the other hand said that during the pre-independence era, they preferred permanent rivers, lagoons and lakes which were pivotal to fishing and flood plain farming (Figure 4-3). The BaTawana key informants said permanent rivers guided their settlement in the *legae* - main settlement area - where the larger population could extract water in volumes. Cattle posts and ploughing fields were guided by presence of ground water, as well as ponds, pans and depressions that were replenished by rains. The BaTawana household respondents however could not list indicators for ground water as they said they used traditional and professional water diviners whose knowledge was specialized. There were no traditional water diviners in either study site at the time of field work.

Focus group participants applauded some post-independence era developments such as better roads, telephones that had improved mobility and access to facilities in Maun, Gumare and Shakawe. They also commended Government for drilling boreholes all over the country for more regular water supply which they stressed reduced the emphasis of water sources and other natural resources for selection of land for different livelihood activities. Key informants added that Government further subsidizes farmers to drill private boreholes in cattle posts and private farms which eases access to water. Another observation at the time of the study was that many households in Toteng village had private taps. Habu mainly had communal stand pipes and many cattle posts had private diesel powered boreholes.

4.1.6 Animal and fish species influencing ponds and hunting grounds selection

Key informants in all three ethnic groups said that although hunting and fishing formed a complementary part of subsistence existence during the pre-independence era, fish and animal species did not influence land selection. They rather influenced where hunting and fishing activities and expeditions were done. Informants used traditional ecological knowledge to locate different habitats, understand animal behaviour, track, actual hunt, bush craft etc. to determine where to hunt and fish. Skills such as skinning, scaling, gutting, traditional preservation etc. heightened access to game meat and fish to complement household diet.

WaYei household respondents and key informants stressed that their traditional knowledge also guided selection of fishing pools and informed rules of use. They explained that each village had its own fishing pools and natural borders were reportedly known by users in and surrounding villages. In the post-independence era, the Government regulates fishing and hunting activities. They determine when and where hunting and fishing occurs and which species can be fished, hunted or protected. This has done away with traditional hunting, fishing and protection regulations hence eliminating community participation in the use and management of fish and animal species. One Tawana key informant stated that Government adopted the fishing and hunting seasons from traditional fishing and regulations while another stated that fishing regulations were adopted from the Protectorate Government.

4.1.7 Other factors influencing land selection in the pre-independence era

Key informants and household respondents in all ethnic groups stated that, during the pre-independence era, land suitability was not influenced solely by natural resources. Household respondents stated that they prefer to live close to family, people they know or people of similar ethnicity for two main reasons (i) subsistence existence is labour intensive (ii) traditional land tenure systems are based on social norms and culture. Social network are

therefore, important as they ease labour demands shared by relatives. Living close to family preserves culture through shared common customs and attitudes which further heighten solidarity.

According to household respondents, during the post-independence era, Land Board as the land authority allocates ploughing and residential land indiscriminately without considering social networks. Furthermore, when relocation is done for developments, authorities do not replicate the previous setup to maintain the social networks as had been done in the past. A key informant in Toteng gave an example of the people relocated for the expansion of the Maun airport and construction of the bus and taxi rank from Moeti, Mabudutsa and Boyei ward to the outskirts of Maun in Matshwane and Disana wards.

He claimed that neighbours were re-allocated plots in different wards. Consequently, families were separated and allocated plots far away from each other. Families live beside strangers or people of a different ethnicity or under the leadership of a ward Headman they do not know nor have a history with. The focus group participants also said this fragmentation of social networks disrupted solidarity, accelerated the loss of traditional knowledge because information and skills are not easily passed on to the younger generation. Another concern was that they are allocated smaller plots from what they initially had. According to some focus group participants, relocation projects that disregard traditional systems are prevalent countrywide and have resulted in low productivity in subsistence economy. Furthermore, services and new developments such as roads have blocked off access to natural resources once freely available, escalating destitution. Many focus group participants applauded the relocation for elevating their socio-economic status. They claimed it accelerated household development as they were able to move from traditional huts to '*mantlo a sekgoa*'- modern houses with indoor plumbing, and electricity.

4.2 Land Management in the Pre and Post-Independence Era

During the pre-independence era, communities relied mainly on land and its resources for their survival. Household respondents and key informants also confirmed that land and its natural resources during that time were considered their property. The community had the authority to determine how land would be used, managed and developed. Various strategies were devised in attempt to access the resources from season to season. Focus group members lamented that many Government post-independence era initiatives, accelerate land degradation because monitoring is poor. The informants claim that their exclusion as users from the planning and implementation process is evident in the fact that the role of monitoring and ensuring compliance is still unfilled.

Furthermore, focus groups stressed that in the post-independence era, natural resource depletion is exacerbated by users originating from other areas and commercial users that do not comply with local rules. The household respondents and key informants stated that '*batswakwa'* outsiders do not need the community's permission to access or use natural resources as they can gain user rights from Government offices in Maun. The new residents and commercial users are sometimes said to be oblivious or disinterested in local rules and so don't feel the need to conform.

Commercial users are people that come into the areas to harvest resources for profit. Supposedly their greed is accelerating natural resource depletion as harvesting is not based on need from season to season but by economic profit. The informants reported that commercial harvesters extract as much as possible and do not consider species, age, size, growth rate or best harvesting method. This exacerbates natural resource depletion. A list of pre-independence traditional land management approaches of the three ethnic groups is outlined in Table 4-4.

Table 4-4: Traditional land management in the pre-independence era

	Desired Outcomes	OvaMbanderu	WaYei	BaTawana
Grazing Pastures	Reduce overgrazing. Conserve grass and tree species.	Traditional rotational grazing. Control livestock movement.	N/A	Controlled grazing from village interior to exterior. Harvesting rules.
Residential Land	Settle land disputes. Avoid double allocation. Reduce land degradation. Minimize natural resources depletion. Ensure future generations had access to land.	Core males' role. Several witnesses in the hamlet/ward. Residences build in a semi-circular pattern facing kraal. Burial sites considered ancestral rights.	Tribal leaders' role. Scattered autonomous homesteads Shared resource management. Setting aside areas for fields and homes.	Tribal leaders' role. Several witnesses in the hamlet/ward. Homesteads in three different locations.
Veldt Product Collection	Minimize resource depletion.	Harvesting directly behind individual residence.	Harvesting between homesteads and outskirts of village.	Specific harvest rules on various veldt products.
Rain-fed Farming	Fertilize ploughing fields	N/A	Owning several rain fed fields. Allowing infertile fields time to fallow.	Owning several rain fed fields. Allowing infertile fields time to lie fallow.
Floodplain farming	Fertilize ploughing fields	NA	Owning several floodplain and rain fed arable fields. Alternating ploughing each field.	N/A
Hunting	Conserving animal species. Minimize overhunting.	Hunting taboos. Hunting only what they could carry back to the homestead. Hunting seasons in winter.	Defining and designating hunting grounds. Hunting seasons in winter.	Traditional conservation with totemic system. Hunting seasons in winter.
Fishing	Control overfishing. Minimize conflict with other users. Conserve fish.	N/A	Defined fishing pools for members. Fishing seasons. Fish traps for different fish size.	Fishing in designated areas.

4.2.1 OvaMbanderu traditional land management

OvaMbanderu key informants stated that in the pre-independence era, their primary aim was to ensure their livestock had access to grazing from season to season. To conserve grazing pastures, the OvaMbanderu key informants explained their traditional form of grazing revolved around a vast grazing area called an *ekondua rimue* in the OtjiMbanderu language.

It was subdivided into two distinct plots. Depressions or pans replenished by rain marked the temporary pasture called the *ohambo.* The permanent pasture called the *onganda* was generally near permanent water such as rivers, man-made reticulation wells or boreholes. The key informants stated that grazing rotated between the two pastures during the dry and rainy seasons. This rotational grazing system allowed one pastures to fallow per season and this the respondents say reduced overgrazing, conserved tree and grass species. To further preserve grazing pastures and veldt products, key informants and household respondents said that OvaMbanderu residences were carefully designed in a semi-circle facing the kraal to control human and livestock movement. Livestock grazing occurred behind and beyond the kraal while veldt products were collected behind the huts. Hunting was in areas beyond the dual grazing pastures in uninhabited locations considered rich in game and wild birds.

4.2.2 WaYei traditional land management

According to the WaYei key informants, during the pre-independence era, the WaYei led a highly diversified livelihood system and were highly mobile to access natural resources available at different seasons. People are said to have moved temporarily to various locations throughout the year depending on the resources available during that season. Responses suggest their traditional ecological knowledge moulded livelihood activities and improved their adaptive capacity to the volatile environmental shocks of the Okavango Delta.

The informants said only ripe and ready natural resource were collected or consumed to minimise waste. One household respondent stated that in winter they hunted and fished, repaired fences, cleared and fertilized ploughing fields. After winter, they ploughed floodplain fields first and then rain-fed fields. After the rains, they weeded and harvested the two types of fields. Household utensils were made at home. To manage fishing pools, users marked boundaries with natural landmarks such as termite mounds, trees, other lagoons and devised rules of use and types of fishing nets to be used. Mechanisms to ensure compliance

and penalties were based on cultural norms. According to key informants, hunting grounds were typically distant from the main settlement and did not have concrete rules of use, nor exclusive user rights and could be shared with other villagers.

4.2.3 BaTawana traditional land management

According to the BaTawana key informants, management style varied based on the natural resources in each of the triple settlements during the pre-independence era. In the *legae,* traditional ecological knowledge fuelled conservation of veldt products. Specific areas were designated for collecting veldt products in the ward. Key informants stressed that not everyone could collect veldt products in other areas without permission from the ward head. Only residents living within those wards could harvest them, using agreed-upon techniques and rules. Some rules for harvesting fruits were that only ripe fruits could be harvested by plucking. Moreover, whole branches or leaves were not to be broken. To harvest wild spinach, only leaves were to be broken off rather than uprooting the whole plant. These rules were meant to keep the plant alive, and also to enable new leaves to regrow throughout the season and for the plants to drop seeds for new crops for the new season.

The household respondents further added that building material such as termite-mound clay was collected from inactive termite mounds. This ensured that the reproductive cycle of termites was not disrupted. Alternatively, clay was harvested from the base of the active mounds, which enabled termites to rebuild the mounds with little disturbance. Termites *'dinthwa'* which were also considered a rich form of protein, were collected during the rainy season, stored and eaten sparingly throughout the year. One female household respondent ridiculed young people that spray termites and consider them pests instead of being a source of food and producers of free building materials in the form of building clay.

To conserve trees and enable them to re-grow there were specific rules for cutting logs. Male household respondents stressed that one rule was to only cut straight branches appropriate for

building. The log was sized and chopped off from the waist up. To minimize overgrazing, household respondents stated that in the cattle posts and ploughing land, homesteads were sporadically scattered and each was surrounded by an undeveloped large radius containing veldt products. These spaces were considered grazing for calves and small stock which kept them safe from predators and from wandering far from the residence. The space was also used for collecting wild spinach, fruit and firewood.

To prevent overgrazing in cattle-posts, BaTawana household respondents said that users demarcated exterior borders of their grazing pasture and actively managed them by herding. Herders drove livestock out in the morning and back before sunset at agreed upon time. Users planned grazing movements by strategically dividing grazing pastures into tracts called *thotana* that were grazed in phases from the interior to the exterior of the village. To conserve fish, BaTawana and WaYei focus groups explained that the fishing and hunting season was during the winter after breeding season.

To ensure compliance to rules during the pre-independence era, individual members of the community had the authority to confront, round up, penalize, mediate, warn or present offenders to the tribal leadership. Amongst the BaTawana, age regiments referred to as the *Basimane ba Kgosi* in the SeTswana language were the main enforcers according to one key informant. They were men of varying age and marital status with special skills allegedly authorized to fine or lash offenders depending on the offence.

To conserve a variety of animal species on a household level, A MoTawana key informant explained the concept of '*sereto'* or totemic system. In this system each family has a particular animal they consider sacred. It is regarded like a deity and family members are prohibited from hunting, harming or eating it. The informant stated his totem was an antelope known as a kudu. He explained that his family like other BaTswana families from his generation respected totems and therefore, did not hunt, nor eat their totems. He bemoaned

the fact that the young generation has lost reverence for the totemic system. He explained that their unruliness and lack of accountability was retribution for having eating their ‘gods’.

4.3 Traditional Property Rights

The previous sections have explained how users identified desired tracts of land, used and managed them to conserve resources. The three ethnic groups appear to have three kinds of traditional property regimes with slight variations classified according to users during the pre-independence era. They included: 1) land used exclusively by individuals, family and neighbours; 2) land-used and shared by a group of neighbours and the entire village; 3) and land shared with neighbouring villages.

According to key informants in all three ethnic groups, land rights were determined by a bottom-up process. The procedure for gaining access to land exclusively for family use began with approaching the nearest neighbour for permission to reside, graze, or plough beside him. If the neighbour agreed, he gave tentative consent and sought approval from neighbouring household heads. If the other household heads agreed, they acted as witnesses, approved the ‘application’ and presented the new applicant to the leader of the collective hamlet/ward.

Thereafter, the village head was informed of the allocation as a formality. According to household respondents amongst the three groups, witnesses rather than written records confirmed rights. They added that once land was allocated it was for used exclusively by the family to whom it had been allocated. New applicants could also participate in devising land-use and management rules they used depending on their knowledge and skill on natural resources. All land-use and management decisions were controlled by male household heads.

The key informants and household respondents’ understanding of what an allocation meant during the pre-independence era is similar to what is recounted in literature. The informants' explanation is that land belonged to the community. However, once an individual singled out tracts of land he desired for the exclusive use of his family, those tracts of land were

considered private property and ceased to belong to the community unless the owners renounced their rights. Amongst all three groups, once land was allocated to a family or individual for residence, ploughing or kraaling animals, the applicant automatically gained access to resources on communal land.

They could graze, collect veldt products, fish, water and hunt, without restraint as long as they followed the established rules. Some of the rules have been discussed in sections 4.2. WaYei and BaTawana key informants called areas where veldt product collection, hunting and fishing activities occurred *dikhuti*. They explained that they were used for camping during hunting and fishing. Skinning, drying, smoking, cleaning game meat and fish during expeditions was done in *dikhuti* before returning home. Household respondents and key informants explained that in *dikhuti*, no one had any rights. Anyone could collect resources, hunt, or fish without restraint. Possession rather than user rights determined extraction in these areas. The key informants added that harvesting in *dikhuti* was subject to abuse or overharvesting, as no one monitored them. However, users generally used rules based on their culture.

According to key informants and household respondents, since Botswana became a republic in 1966, any terms and interpretation of land-use and management is done without consideration of many cultural norms. According to focus group members, Land Board's issuance of written documents to confirm customary land right was mistaken for official recognition that the allocated tract of land belonged to them. Moreover, they were confused by the fact that the common law leases had duration. They claimed they were further confused that it was not explained to whom the rights revert to at the end of the lease period.

All the focus group members felt that documentation of land rights was meaningless as Government continues to have the ultimate rights, even when users have legal documentation. This was cemented when authorities told them that they could be relocated

from their plots at any time to give way for new developments. They gave examples of the relocation projects in Maun which they stress made land rights insecure in the post-independence era.

Focus group members reported that when land authority was vested in the community during the pre-independence era they were never forced to move. Their only comfort is that in the post-independence era they know they can take Government to court if they don't agree on remuneration terms in the event of repossession. In the new land tenure systems, participants stated that the terms Land Board uses such as 'belonging to the tribe' are vague because it is unclear whom the tribe members exactly are and what 'belonging to' means to Land Board. They added that even where policy states land is tribal, the state has authority and not the tribe.

These uncertainties left many of the informants apathetic regarding active participation in conservation efforts to maintain ecosystem resilience. They stated they were not willing to look after land that belonged to Government as they did not see any direct benefits. They added that if asked to participate in conservation efforts they would expect remuneration. One household respondent stated, '*Goromente ke ene mong a lehatshe. Ha a batla re mo thusa go le tlhokomela, a a re duela jaaka mabereki a yone a mangwe*.' – 'Government owns land, if she wants our help, she must pay us like her other civil servants.'

Even though diverse pre-independence traditional land tenure systems have been replaced by a standard national land tenure system, not all informants were averse to this development. Some focus group participants claimed that Government is impartial, and brings a new order allocating plots in neat rows rather than scattered clusters like in the pre-independence era.

4.4 Chapter Summary

This chapter has identified checklists that are used by the OvaMbanderu, WaYei and BaTawana ethnic groups to identify land suitable for various livelihood activities. When

prospecting for land, individuals seemingly relied on specific natural resources they considered life-giving, containing food, fodder, medicine, building material etc. that they considered suitable for various livelihood activities. The resources in the checklists were known by vernacular language names, characteristics, benefits and seasons in which they were available. The resources therefore, served as a traditional checklist that guided the prospecting process.

Vastness and proximity to social networks were other factors that influenced land selection during the pre-independence era. Access, use and management of resources were based on common culture, knowledge and skills of the members in each group. This made it easier for collective action such as conserving natural resources from season to season. It also cemented trust which is a big component of traditional institutions as it fuelled compliance. In the post-independence era, individuals have lost the freedom to select land. Moreover, technology, wage employment and mainstream education has minimised dependence on natural resources. This, they stress has accelerated the loss of traditional knowledge skills once passed onto the younger generation.

Traditional ecological knowledge capacitated individuals and families to subsist at little to no cost. They could grow their own food, collect, fish or hunt rather than having to spend money. They were able to build houses using free raw materials and individual or collective effort. These survival skills were also passed on to the younger generation which perpetuated survival skills between generations. Furthermore, for as long as natural resources were available and users knew the utility of the resources and how to process them into needs and wants, it reduced gaps between rich and poor.

Traditional knowledge therefore enabled users to be active participants in conserving resources they needed from season to season. This could complement current global conservation efforts. Dependence of natural resources and active participation in conservation

seems to have diminished amongst users in the post-independence era. It appears that the OvaMbanderu managed to maintain the same land-use although a few adopted arable farming. Amongst the WaYei the younger generation have adopted livestock farming and it appears the WaYei and BaTawana land-use is less distinct as they both practice arable and pastoral farming.

5 Results - Traditional Institutional Arrangements

The previous chapter addressed the first research objective, providing an outline of natural resources that influenced land selection for different livelihood activities. The chapter also gave insights to how checklists moulded land-use, management and traditional land tenure systems of the three groups. Chapters five and six results address the second research objective. The focus is on 'people' as the second component in the Berkes et al. (1998) social-ecological framework guiding this study. This chapter specifically discusses characteristics of individuals who made decisions about land-use and management, their skills, roles, hierarchy and various levels they arranged themselves to govern land and natural resources before and after independence.

5.1 Household Level Institutional Arrangements

According to OvaMbanderu, WaYei and BaTawana key informants, the household was the lowest but most important unit that made decisions about land during the pre-independence era. The household structure was mainly responsible for access, use and management of land and natural resources for the family's exclusive use, and that which was shared with neighbouring households. People reportedly gained land-use and management knowledge and life skills from this level. Furthermore, the household was where decision-making on all levels of land-use and management were initiated.

At household level they played a large role in enforcing village level land use and management rules. Household respondents stressed that the composition of household members was generally of people with biological ties. According to the responses, the hierarchy into which the three ethnic groups ordered themselves do not differ significantly during the pre-independence era (Table 5-1). Ancestors were in the top tier, followed by a male household head and a variety of men and women in the lower tiers, then children in the bottom tier (Table 5-1).

Table 5-1: Pre-independence household structure and membership pre-independence

OvaMbanderu		WaYei	BaTawana
*Ancestors (*Ovakuru*)		*Ancestors *Okwaa*	*Ancestors *Badimo*
Male Household Head (*Papaa*)	Female Household Head *(Mamaa)*	House hold Head *(Sheeto)*	Household Head (*Rre*)
Younger brothers	Younger wives	Adolescent sons, brothers and nephews	Wife
Nephews and adolescent sons	Unmarried sisters-in-law	Wives of *Sheeto* Children	Household head's adolescent sons
	Children	Unborn descendants	Unmarried brothers

According to key informants, there is no corresponding institutional arrangement at the household level for the post- independence era, because households are supposedly excluded from decision-making in land-use and management. Moreover, focus group members stated that in the post-independence era, household members are a mixture of people with biological and non-biological ties. The post-independence hierarchy does not include deities except amongst the OvaMbanderu. The hierarchy is neither as defined nor uniform amongst any of the ethnic groups like during the pre-independence era. They stressed that in the post-independence era the household head is not necessarily a married male. Finally, household respondents stated that the Land Board does not consider ancestral sites as automatic land rights for descendants.

5.1.1 Roles of ancestors at household level during the pre-independence era

During the pre-independence era, ancestors, as deceased family members, were considered members of the household. They were in the top tier (Table 5-1) amongst all three ethnic groups. The key informants stated that ancestors were part of a long tradition of looking after descendants or younger subjects. This tradition was expected to be carried on by the living. The primary role of the ancestors was to guide the welfare of their descendants even though they were dead. Key informants justified ancestral worship because they believed that land and its resources were created by ancestors. They further explained that as subsistence existence was totally dependent on weather variability, land and its resources, ancestors were

believed responsible for fertility, abundant natural resources, family welfare, harvest, livestock conditions and natural phenomenon. Ancestral worship was therefore, considered necessary to appease the gods. Finally, ancestors were believed to be the source of all knowledge and skills. They were believed to 'guide' descendants through different mediums to evade danger, adapt and amend rules in times of environmental threats.

5.1.2 Roles of OvaMbanderu ancestors at household level

According to the OvaMbanderu key informants, the additional role of ancestor in the top tier (Table 5-2) was to secure living and unborn descendants grazing pastures. In traditional OvaMbanderu land tenure, burial grounds were automatically considered land rights. In the post-independence era, the key informants stressed that ancestors are still considered part of the household membership. They are supposedly consulted daily by male household heads and are believed to safeguard family members and livestock welfare (see Figure 5-1).

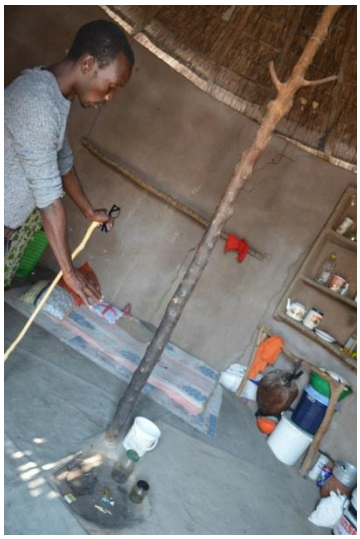


Figure 5-1: Ancestral shrines in the post-independence era. Toteng village September 2016.

Although OvaMbanderu still practice ancestral worship in the post-independence era, household respondents stated that the Land Board does not automatically consider burial sites ancestral land rights. One female household respondent celebrated this change, stressing that it opened land rights to OvaMbanderu women and reduced male household heads from hoarding land that females were previously denied access to under claims that it was a traditional male right.

5.1.3 Roles of WaYei ancestors at household level

WaYei key informants and household respondents claimed that during the pre-independence era, the role of the ancestors *Okwaa* in the top tier (Table 5-2) were to give wisdom to various household members. The ancestors further gave healing powers specifically to the male household heads. Household respondents stressed that when prospecting for land, ancestors guided them to new pastures for residence, ploughing or grazing. Abandoned fields and homes '*matlotla'* were automatically considered living descendants' rights.

Table 5-2: Ancestors pre and post- independence roles

Ancestors Role	**Roles**	**Post- independence Roles**
OvaMbanderu Ancestors (*Ovakuru*)*	Secure ancestral grazing rights for descendants. Guide descendants to lucrative grazing grounds. Safeguard the homestead, members and livestock. Guide descendants to ground aquifers. Protect members and livestock.	Secure ancestral grazing rights for descendants. Guide descendants to lucrative grazing grounds. Safeguard the homestead, members and livestock. Guide descendants to ground aquifers. Protect members and livestock.
WaYei Ancestors (Okwaa)*	Lead descendants to fertile soils. Lead descendants to good fishing pools and hunting grounds. Give household heads healing powers. Teach predecessors utility of veldt products. Protect household members, land and belongings. Protect members with bad conduct.	Been replaced by Christianity
BaTawana Ancestors (*Badimo*)*	Lead descendants to fertile soils. Protect family members, livestock and belongings in all three settlements.	Been replaced by Christianity

In the post-independence era, the WaYei key informants added that the Christian God has replaced ancestors. However, God is not considered a household member. He supposedly plays the same roles as ancestors during the pre-independence era. Conversely, household members that converted to Christianity claim they would not occupy abandoned fields and homesteads for fear of ancestral presence. They explained that they believe that as long as users had not relinquished their rights, ancestors stayed in their descendants' homes and fields even if the homes or fields are abandoned. They were believed to still guard and ward off 'intruders'.

5.1.4 Roles of BaTawana ancestors at household level

The BaTawana key informants and household respondents claimed that the role of ancestors *Badimo* in the top tier (Table 5-2) was to guard fields and homes. Like the WaYei, the BaTawana key informants added that, during the post-independence era, the Christian God replaced ancestors. The Christian God plays the same roles as ancestors but is not considered a household member. Similarly, the BaTawana converts stated they would not occupy abandoned fields or homesteads called '*matlotla'* in SeTswana language; for fear of ancestral presence. The respondents however, stated in the post-independence era, Land Board allows them to claim ancestral ploughing and residential lands.

5.2 Roles of Male Household Heads in Land-Use and Management

According to the household respondents and key informants in all three ethnic groups, during the pre-independence era, the eldest male in the tier after ancestors was the household head (Table 5-1). The BaTawana key informants pointed out that male household heads were not just responsible for decision making on land-use for the family. They also participated in the general social, political, cultural and economic well-being of the family. Men were therefore, expected to have leadership skills and be knowledgeable on traditional laws and customs.

Household respondents stated that the primary role of the household head was to provide for the family (Table 5-3). During the pre-independence era, providing for the family meant having access to and living off land. If the male household head had not inherited land from his father, he prospected for it. For this role, he was expected to know characteristics of natural resources suitable for different livelihood activities. He therefore, had to be well travelled, know the layout of the land well, and be physically fit to prospect in different places. He was also expected to have some hunting or fishing ability necessary for complementing family provisions.

The key informants added that once an individual secured land for residence and farming, for his family, he was expected to develop and actively use it. He became its custodian and it was considered his family's private property. The household head determined the land-use rules, taught them to other members of the household, and ensured they were followed. For this role, he needed to be familiar with land-use and management rules and practices. These he would have learned from his parents, peers, from observation, or by trial and error. On his death, other household members used the same rules or adapted them, if necessary. The other roles of household heads were to witness land applications, transfers, cancellations, and settle land disputes within the hamlet/ward.

Household respondents stated that household heads also defined borders of allocated land using natural landmarks. He was the primary link between his household members and the rest of the community. This created communication channels where he learned community land-use rules and conveyed them or other messages to his household. He also relayed responses, updates and feedback from his household members to the rest of the community. For this role, he was expected to have good interpersonal and communication skills. According to key informants, in the post-independence era, the household head no longer plays a role in land-use except to secure access to land for the family.

The difference is that the household head no longer prospects for land but applies for land from Government instead. With the household head no long participating in devising, implementing or adapting land-use rules, the household respondents mentioned they are expected to follow rules devised by the Government and convey them to their families. The key informants said that this exclusion has resulted in lack of knowledge about use and management rules, poor implementation and monitoring of rules. Household respondents complained that they are often allocated fields with low soil fertility, private ranches with poor grazing and little to no veldt products for subsistence. Residential plots are also allocated far away from social networks. This has reportedly heightened social ills such as loneliness, substance abuse and general social disorder.

5.2.1 Roles of OvaMbanderu male household heads

According to OvaMbanderu key informants; there were two types of household structures during the pre-independence era, depending on the marital status of the members. If household members were married, there were two household heads in parallel structures; a man called the *Papaa* in one arrangement and the principal wife called the *Mamma* in another (Table 5-1). Despite the parallel structures, the key informants added that the man was the ultimate head and decision-maker. A household with a widower or a single man, on the other hand had one household head. The primary role of the OvaMbanderu male household head was to secure access to communal grazing and watering rights. Once granted communal rights, he secured access to exclusive rights for residential and kraaling for the family. Skills required for this role are covered in Table 5-3.

5.2.2 Roles of WaYei male household heads

According to the key informants, the primary role of the male household head amongst the WaYei was to secure land for the family. If the household head was the first person to establish a hamlet, he became the title holder of that hamlet and thereafter, his position was

inherited by his male descendants. According to the key informants, after establishing a hamlet the household head was responsible for allocating residential and ploughing land to latter applicants. Access to residential and ploughing fields automatically secured access to communal resources for fishing, hunting and veldt product collection. New applicants were automatically subservient to him.

5.2.3 Roles of BaTawana male household heads

The roles of the BaTawana male household do not differ significantly from those discussed in section 5.2 and those listed in Table 5-3, and therefore, the functions are not repeated here.

Table 5-3: Pre-independence roles of male household heads

Second tier of household members	Roles	Pre-independence skills	Post- independence roles	Post-independence skills
OvaMbanderu Male Household Head (*Papaa*)	Intercede with ancestors. Secure grazing rights for livestock. Secure residential land for family. Teach younger men land management skills. Devise processes for communal grazing. Acquire land for family. Collect veldt products Organize hunting expeditions.	Knowledge of tree and grass species. Leadership skills Animal husbandry. Owning large herds of cattle. Physical fitness. Hunting, tracking, habitats, bush craft. Riding, skinning ability	Apply for land from Land Board.	Limited knowledge of tree and grasses. Poor leadership skills. Basic animal husbandry. Mix of wage employment and livestock owner. Poor physical fitness Limited hunting ability. Varied riding ability.
WaYei Male Household Head (*Sheeto*)	Secure land for family. Devise land tenure rules. Witnessing land transfers, applications and cancellations. Approving or rejecting applications. Monitoring land-use in communal areas. Define fishing and hunting boundaries. Fishing/Hunting Teaching HH members farming skills. Fencing and ploughing fields. Maintain fences Cutting poles for house roofs and walls Helping resolve land disputes	Leadership skills. Knowledge of traditional land tenure. Knowledge of traditional law and customs. Knowledge of fish, animals, habitats. Hunting, fishing, scaling, tracking, bush craft, skinning, meat and fish preservation Knowledge of various farming methods. Knowledge of soil attributes. Good interpersonal skills.	Apply for land from Land Board.	Poor leadership skills. Limited knowledge of traditional land tenure. No knowledge of traditional laws and customs. No knowledge of traditional land tenure. Limited knowledge of fish, animal, tree and grasses. Poor farming ability. Little to no knowledge of soils. Reasonable interpersonal skills.
BaTawana Male Household Head (Rre) Interpersonal skills	Securing rights in triple settlement. Fishing/Hunting Veldt product collection Developing all settlements. Teaching skills and relaying messages to household members on ward/village issues. Monitoring land-use in communal areas. Ploughing family fields Approving or rejecting applications. Witnessing transfers, cancellations Helping resolve land disputes. Determined livestock grazing	Construction skills. Habitats, fish and animal species Hunting, fishing, tracking, bush craft. Skinning, meat and fish preservation Knowledge of tree and grass species Knowledge of soil attributes. Knowledge of traditional law and customs. Knowledge of traditional land tenure. Knowledge of farming methods. Livestock husbandry	Apply for land from Land Board.	Limited to no construction skills. Poor knowledge of fish and animal species Poor knowledge of trees and grasses. Poor knowledge of soils. Limited to no knowledge of traditional laws and customs. No knowledge of traditional land tenure. Limited knowledge of farming.

5.3 Roles of Other Men at Household Level

According to the key informants, during the pre-independence era, subsistence communities lived in extended families made up of members of different ages. The men in the third tier of the household hierarchy (Table 5-1) were of varying age or marital status. Their main roles were to support the household head in daily traditional male duties (Table 5-4). For this, they were expected to possess skills similar to those of the household head such as prospecting for suitable land, and devising and implementing land-use rules. They were therefore, groomed to be active participants and decision-makers from an early age. Their other role was to monitor compliance in communal areas.

The focus group members explained that, in the post-independence era, younger men do not participate in land-use and management. They stated that current formal education curricula do not cover topics relevant to subsistence. This omission in obligatory mainstream education was attributed to why younger men in the post-independence era, currently have limited to no skills in subsistence activities. Some focus group participants stated that lifestyles have changed to a more cash focused economy. There is therefore, no longer a need for learning subsistence skills. Other participants stressed that limited employment leaves young men with no subsistence skills and poor academia ability prone to poverty.

Table 5-4: Pre-independence roles of other men in the household.

Third tier of household members	Roles	Pre-independence skills	Post - independence roles	Post-independence skills
OvaMbanderu Younger brothers, sons, nephews.	Support male HHH in male roles grazing stewards. Monitor communal grazing pastures.	Basic animal husbandry. Physical fitness. Riding ability. Knowledge of tree and grass species. Hunting, fishing, tracking, bush craft. Skinning, meat and fish preservation	Support male HHH in male roles	Basic animal husbandry. Varied physical fitness. Varied riding ability. Varied knowledge of grasses and trees
WaYei adolescent sons**,** brothers, nephews, unrelated men living in the home.	Support male HHH in male roles.	SAME AS HOUSEHOLD HEAD	Varied depending on their age, if they had their own plot or HH membership of homestead they lived in.	Varies according to individual's age, place of residence, livelihood activity of the family and individual employment status.
BaTawana Grandparents, parents, aunts and uncles (Botsadi**).** **BaTawana** adolescent sons.	Teaching younger family members traditional land tenure. Advising family members. Support other household heads manage Shared land and resources within the hamlet and village.	SAME AS HOUSEHOLD	Varied depending on their age, if they had their own plot or HH membership of homestead they lived in.	Varies according to individual's age, place of residence, livelihood activity of the family and individual employment status.

5.3.1 Roles of other OvaMbanderu men at household level

The OvaMbanderu focus groups explained that traditionally, younger men that were not household heads were responsible for herding and grazing livestock during the pre-independence era. Their role was chiefly grazing stewardship during the rainy and dry seasons as part of the traditional rotational grazing process. Conversely, in the post-independence era, they attend school at the age they would have been herding. The informants stressed that this resulted in young OvaMbanderu men with poor animal husbandry skills, little ecological knowledge and limited grazing pasture management.

5.3.2 Roles of other WaYei and BaTawana men at household level

The roles of the other WaYei and BaTawana male do not differ significantly from those discussed in section 5.3 and those listed in Table 5-3.

5.3.3 Roles of women at household level

During the pre-independence era, women were in the last tier of the household hierarchy (Table 5-1). Amongst all three ethnic groups, their roles, according to household respondents, were primarily in building and maintaining the homestead. Additionally, they were responsible for teaching and supervising younger women and children on various household roles. They were chiefly responsible for grooming the younger household members on etiquette and social conduct. WaYei and BaTawana women were also responsible for weeding, maintaining and harvesting ploughing fields. For this role, they were expected to know soil attributes, farming skills, and be familiar with various veldt products.

When asked if women were allowed to own land during the pre-independence era, the answers were slightly varied. Female WaYei household respondents explained that a woman only had access to land if she was married. The male household respondents, however, said that single women could have access to land if they were industrious. Amongst the BaTawana, however, it appears women did not have access to land during the pre-

independence era. One comment by a male, MoTawana key informant in Toteng village confirmed that BaTawana women did not have land rights. He stated that, **"***Bogologolo, mosadi e ne e le ngwana. O ne a tlhokomelwa ke rraagwe, kana monna wa gagwe. O ne a sa tlhoke lehatshe ka gore o ne a lema masimo a ga gabo*'-'in the past a woman was a child. She was taken care of by her father or husband; she didn't need her own land, because she ploughed her family's fields'.

According to female OvaMbanderu household respondents, a married OvaMbanderu woman was a parallel household or sole household head simply because she owned cattle (see Table 5-5). She however, did not have any authority on land-use and management. Widowed or single older OvaMbanderu women that were household heads, therefore, delegated grazing, herding and watering roles to grown-up sons, younger brothers or nephews. Their roles were the same as the WaYei and BaTawana women. They also tended small stock and collected various veldt products (Table 5-5).

According to many female household respondents, women were keen observers. They worked in the fields and travelled long distances to collect firewood, building materials, medicine, wild fruits, and vegetables. They were therefore well informed about the condition of the land and its resources. This information was informally passed onto the men as part of their daily discussions and that was how they influenced decisions. In the post-independence era, women play a more active role in land-use and management as Government employees.

Table 5-5: Pre-independence roles of women in land management

	Roles	Pre-independence skills	Post-independence roles	Post-independence skills
OvaMbanderu Principal Wife *(Mamma)*	Build and maintain the homestead. Milk livestock Tend small stock. Teach younger women collection skills. Collect veldt products sustainably.	Traditional Building Milking. Animal husbandry Knowledge of traditional women's roles Knowledge of tree species	Apply for land for family Tend small stock	Varied building skills. Milking Animal husbandry. Knowledge of traditional roles. Varied knowledge of trees.
Wives of WaYei household head	Build and maintain the residence Preparing field for ploughing Ploughing, weeding Harvesting crops Storing some of the harvest Selecting seeds for next season Protecting crops from pests Preserving seed and some crops Fishing. Collecting veldt products Teaching younger household members social etiquette.	Building Knowledge of floodplain and rain-fed farming methods. Knowledge of soil attributes Knowledge of fish and animal species Knowledge of tree and grass species. Knowledge of traditional law and customs.	Apply for land for family	Varied building ability Limited knowledge of traditional farming. Little to no knowledge of soils. Limited knowledge of fish. Limited knowledge of trees and grasses, No knowledge of traditional laws.
Wives of BaTawana Household head	Help build houses in the three settlements and maintain them Collect veldt products. Sow, weed, harvest, and divide harvest according to seed, food. Barter or sell surplus harvest. Feed household members. Teach younger women and girls female roles	Building Knowledge of soil attributes Knowledge of rain-fed farming methods. Knowledge of fish and animal species Knowledge of tree and grass species. Knowledge of traditional law and customs.	Help build houses in the three settlements and maintain them. Teach younger women and girls female roles	Varied building skills. Varied knowledge of soils. Varied knowledge of rain-fed farming. Limited knowledge of fish and animals. Limited knowledge of trees and grasses. Limited knowledge of traditions
Junior wives and Unmarried sisters of Male household head.	Support Principal Wife. Building	Basic animal husbandry		Varies according to individual

5.4 Chapter Summary

During the pre-independence era, the household was the primary institutional arrangement. All land-use and natural resources rules and decisions were learned, devised and enforced at this level. Tracts of land once allocated to an individual or family was considered private property unless the owners relinquished their rights. This meant that owners could transfer or change plots if they so desired. Users participated in devising and enforcing land-use and management rules. Decisions on access, use and management were a bottom up process stemming from the household. Gender, special skills and knowledge, individual acceptance by other household heads and active usage appear to have been the main criteria for inclusion in decision-making at the household level. Household composition amongst all three groups included ancestors, biologically related men women and children.

They all played roles in use, monitoring and reporting the state of land and resources to members higher up in the hierarchy. Inclusion in decision-making at this level, however placed major emphasis on gender marital status, knowledge and skill. To be decision makers, men had to have land rights, be knowledgeable on natural resources and be active land user. Even though women were knowledgeable and active land and natural resource users, they did not have land rights, except if they were married or living with their brothers or fathers. They were excluded in decision-making, but could influence decision with their input. In the post-independence era, the household no longer plays a role in land-use or management. Christianity, western education and wage employment have modified the traditional hierarchy and roles once associated with subsistence existence. More women play a more active role in land-use and management as Government employees. Focus group members stated that the erosion of the household in the post-independence era has weakened the role of compliance to rules. Consequently Government seems to have lost out on players that could support it device and enforce rules and ensure compliance, in the post-independence era.

6 Results – Hamlet, Ward and Village level Institutional Arrangements

The previous chapter discussed people involved in decision-making at the household level as the first and lowest institutional arrangement in the pre-independence eras. This last chapter focuses on 'people' responsible for decisions at the second and third institutional arrangement levels. The two arrangements were primarily responsible for land shared by the neighbouring homesteads and the entire village. Amongst the three ethnic groups, hamlet/ward members formed the second institutional arrangement aggregating neighbouring male household heads.

The highest and final level was a village or settlement arrangement which aggregated tribal leaders and decision-makers. The previous chapter discussed the results of the pre- and post-independence era concurrently. Post-independence conditions are discussed at the end of each section because according to the key informants in the three ethnic groups, there are no post-independence roles for hamlet and ward members. The results of the pre- and post-independence eras are therefore presented separately.

6.1 Hamlet and Ward Level Pre-Independence Structure and Roles

Key informants stressed that during the pre-independence era, access to land for exclusive family use and access to shared land and natural resources within defined borders enabled the household to live off the land, without burdening the rest of the community. Hamlets or wards were made up of autonomous neighbouring homesteads within defined borders within a settlement or a village.

At hamlet and ward level, the role of household heads was chiefly for communal land-use and management using agreed-upon rules. According to the key informants and household respondents, decision-making at this level was strictly done by male household heads considered competent by their peers. The skills required for this role, were similar to those on the household level discussed in the previous chapter. Members structured themselves in an order from highest to lowest in terms of influence in decision-making (Table 6-1).

Table 6-1: Pre-independence hamlet and ward level composition.

Hamlet/Ward Decision-making Body Membership		
OvaMbanderu	**WaYei**	**BaTawana**
Leader chosen by other household heads. (*Omutarere*)	Hamlet head (*Oshikati)*	Ward Headman (*Kgosana*)
Male Household Heads (*Papaa*)	Male House hold heads *(Sheeto)*	*Basimane ba Kgosi (Adult men with special skills)*
Sons, nephews, hired hands and unmarried adult men living in the household.	Adult men and women specializing in veld product collection.	Male Household Heads (*BoRre*).

6.1.1 OvaMbanderu pre-independence structure and roles at hamlet level

During the pre-independence era, hamlet membership amongst the OvaMbanderu was a three tier structure (Table 6-1). According to the OvaMbanderu key informants, *ozonganda* is the name of several neighbouring homesteads in the OtjiMbanderu language. The informants stressed that traditionally, they did not have chieftainship in Botswana, so the *ozonganda* was their highest traditional institution. At *ozonganda* level, members governed using consensus and so the male household heads were the core decision-makers. Criteria for inclusion in the decision-making body were (i) gender (ii) residing in the hamlet (iii) owning livestock and (iv) to a lesser extent, being a blood relation. The collective role of the male household heads was to determine grazing capacity, grazing and watering movements during the dry and wet seasons.

The individual perceived as the most competent and had excellent leadership skills was informally selected by his peers as the 'leader' in the hamlet. According to the key informants, selected leaders fiercely defended their position by maintaining good relationships with other members and keeping large herd numbers in good condition. There were no monetary benefits for the leader, nor was the position permanent or hereditary. Being selected leader by peers was considered prestigious enough. The respondents reported that if other individuals in the group portrayed better leadership skills or livestock husbandry,

loyalty shifted to the new individual without notice. The primary role of the leader during the pre-independence era was to determine grazing and watering movements (Table 6-2).

Table 6-2: Pre and post-independence OvaMbanderu hamlet composition, skills and roles

Hamlet members	Pre and Post-independence roles	Pre and Post-independence skills
Selected hamlet leader	Host discussions on shared grazing pasture. Mentor other farmers Determine grazing and water movements.	Leadership skills Interpersonal skills Excellent animal husbandry
Male household heads	Plan labour and provision needs for their herds Collect and or supervise veldt products collection. Oversee grazing movements. Identify ground water aquifers. Assess new applicants in hamlet. Participate in hunting expeditions. Witnessing new land applications, transfers and cancellations. Helping resolve land disputes.	Knowledge of tree and grass species Knowledge of traditional land tenure. Hunting ability. Knowledge of animal species. Knowledge of traditional land tenure. Knowledge of traditional law and customs.
Adolescent sons, brothers	Grazing stewardship in temporary grazing pastures.	Support male household heads in male roles.

For this role, he was expected to know different tree and grass species, their characteristics, and benefits to livestock. He was expected to excel in animal husbandry, especially in livestock maladies and their treatments. One of his roles as the chosen leader was to host discussions at the beginning and end of each rainy and dry season. As host and leader, he was expected to be generous with refreshments, ideas and knowledge. His secondary role was to mentor other farmers and help them improve their livestock numbers and condition.

According to the household respondents, the primary roles of the household heads in the tier below the hamlet head (Table 6-2) were to plan labour and provision needs when livestock was relocated during the dry and wet season. The role of younger men in the bottom tier was that of grazing stewardship. They followed water and grazing plans as presented by the core males. During the post-independence era, responses suggest the hamlet structure has been maintained with three changes. There is no longer a third tier for the adolescent sons and brothers, as most of them aspire to acquire mainstream skills. The age of children attending school coincides with the age that they would have been active grazing stewards.

Government developments such as fences, private ranches and mines have reduced grazing pastures. Consequently, dual grazing is no longer practiced and the role of grazing stewardship has been eroded.

6.1.2 WaYei pre-independence structure and roles at hamlet level

The WaYei key informants explained that in the pre-independence era, neighbouring homesteads were called a *mozana* or *thotana* in the IshiYei language. These were typically scattered satellite hamlets linked to a parent homestead they had initially broken from. Criteria for inclusion of decision makers on the WaYei hamlet level were (i) gender, (ii) residence in the hamlet, (iii) being an active farmer and (iv) competence in other subsistence activities. According to the key informants, membership on this level was a three tier structure (Table 6-3).

At the apex of the tier was a married man called an *oshikati* - this means parent in the IshiYei language. He was typically the first person or descendant of the person that had settled, cultivated and established the hamlet. This automatically gained him his primary role of total land rights enabling him to grant access to new applicants, devise land and natural resource rules and ensure compliance. Skills expected of the *oshikati* were leadership qualities, knowledge of soil attributes for floodplain and rain-fed farming, competence in farming, fishing, veldt product collection, hunting and knowledge of traditional medicine.

The hamlet head had to know the location, approximate quantity, quality and seasonality of various veldt products. He was also expected to know the families living within his and other hamlets and vacant tracts of land in the hamlet in relation to occupied plots. This reportedly informed decision-making in terms of granting or rejecting new applications. Like amongst the OvaMbanderu, WaYei key informants explained that the hamlet head position had no monetary gain except prestige from recognition by peers.

Table 6-3: Pre and post -independence WaYei hamlet composition, skills and roles.

Hamlet members	Pre-independence roles	Pre-independence skills	Post-independence roles	Post-independence skills
Hamlet leader (O*shikati)*	Determined hamlet borders. Communicated range of borders to main homestead for approval. Granted land rights to new applicants. Determined land and natural resource rules. Monitored hamlet to ensure compliance to rules. Penalized offenders. Settled land disputes within his hamlet and in other hamlets.	Know the layout of the village. Know borders of hamlets. Good interpersonal skills. Knowledge of traditional land tenure laws. Knowledge of veldt products and general ecology Be mobile and physically fit. Have good leadership skills and knowledge of traditional land tenure. Understanding of cultural norms.	**Not involved in land use at hamlet level.**	**Knowledge of entire village varies.** **Not know all hamlets borders are known.** **Interpersonal skills vary.** **Knowledge of traditional land tenure laws varies.** **Knowledge of veldt products and general ecology varies.** **Mobility and physically fitness varies.** **Poor leadership skills and limited knowledge of traditional land tenure.**
Male household heads (*Sheeto*)	Supported the *oshikati* to govern land and natural resource in hamlet.	Know the layout of the village. Know borders of hamlets Good interpersonal skills. Knowledge of traditional land tenure laws. Knowledge of veldt products and general ecology Be mobile and physically fit. Have good leadership skills and knowledge of traditional land tenure.	**Not involved in land use at hamlet level.**	**Knowledge of village layout varies** **Does not know all the hamlets.** **Poor interpersonal skills.** **Poor knowledge of traditional land tenure laws.** **Poor knowledge of veldt products and general ecology.** **Mobility and physically fitness varies.** **Leadership skills and knowledge of traditional land tenure varies.**
Adolescent sons, brothers	Supported male household head in male roles in shared land and resources within the hamlet.	Know the layout of the village. Know borders of hamlets. Knowledge of veldt products and general ecology. Be mobile and physically fit. Deference to authority.		**Poor knowledge of village layout.** **Hamlets not well known.** **Limited knowledge of veldt products and general ecology.** **Limited mobility and poor physical fitness.** **Supposedly rebellious.**

According to the key informants, the hamlet head had to be consistent, exemplary, competent, and have excellent interpersonal skills as perceived by his peers. Unlike amongst the OvaMbanderu, the WaYei key informants stressed that the hamlet head never lost his position. If other members perceived him unfair or incompetent, his position continued to be morally respected, but he was subtly dishonoured in that other men met in secret and made final decisions in his absence. He was presented with the decisions as a formality, but not for his input. His position was also hereditary to his oldest son. However, even if his son inherited the position, loyalty and respect was not automatic. It was based on his merit.

Key informants explained that the second tier in the WaYei hamlet (Table 6-3) was made up of male household heads within the hamlet. Hierarchy in this tier was guided by age and the order they had moved into the hamlet. Older household heads and those who settled earlier held the more senior positions in the hierarchy. The role of the male household heads was to support the *oshikati* in governing land and natural resources within their hamlet. They collectively made decisions about their hamlet in an open forum at the home of the *oshikati*. The third tier and bottom tier was made up of adolescent sons whose role was to support the household heads and work closely with the assortment of men and women with expertise in various subsistence activities. That way the adolescent boys learned skills such as fishing, hunting, traditional medicine, farming, and veldt product collection.

6.1.3 BaTawana pre-independence structure and roles at ward level

According to the key informants and household respondents, although BaTawana had a triple settlement system, the three tier structure (Table 6-4) was mainly functional in the (*legae)* main settlement. Homesteads in the cattle post (*moraka)* and ploughing fields (*masimo),* formed their own informal structures. Hierarchy in the cattle post and ploughing field was guided by: the (i) order in which the families had moved in (ii) the position they held in the main village or (iii) farming competence. They made decisions by consensus but were

ultimately accountable to their ward Headman and village Chief in the main village. According to the key informants, criteria for inclusion in the BaTawana ward membership were: 1) being a resident in the village 2) gender 3) post- pubescent age 4) being married or being of marrying age and 5) practical ecological knowledge.

The ward Headman was concurrently a household head and presided over all male household heads within his ward. He is called a *Kgosana* in the SeTswana language which literally means little or younger Chief. According to the key informants, he was traditionally appointed by the village Chief to rule the ward on his behalf. For this role (Table 6-4), his expected characteristics and skills were: (i) loyalty to the Chief, (ii) good leadership skills, (iii) hardworking, (iv) competence on land and natural resources, (v) knowledgeable on traditional law, land tenure and customs, (vi) mobility within his ward and the village.

According to key informants, mobility was also an informal way of monitoring. It kept the ward Headman updated on social and environmental conditions in the ward and village. It also made the ward Headman accessible to his subjects for guidance when necessary. His secondary role was to link his ward members to the Chief and general tribal leadership. His position as ward Headman was hereditary to his eldest son.

Table 6-4: Pre and post-independence BaTawana ward composition roles and skills

Ward members	Pre-independence roles	Pre-independence skills	Post-independence roles	Post-independence skills
Ward Headman (*Kgosana*)	Zoning the new village with the rest of tribal leadership Doing the residential layout of his ward. Determined land and natural resource rules. Granting land rights to new applicants. Monitored ward to ensure compliance to rules. Penalizing offenders. Settling land disputes within his ward and in other wards. Rule residents in his ward on behalf of the village Chief. Linking his subjects with the Chief. Loyalty to the Chief Keep the Chief updated on land rights within his ward.	Knowing the land and its natural resources. Physical fitness. Knowing traditional land tenure. Being mobile and well-travelled. Good leadership skills. Good interpersonal skills. Being loyal to the village Chief.	Rule residents in his ward on behalf of Government**.** Knowing traditional law and custom Good leadership skills	Literacy Competence in civil service
Age regiments	Enforcing the laws Supporting the ward Head govern land and natural resource in hamlet.	Knowing the land and its natural resources. Physical fitness. Knowing traditional land tenure. Being mobile and well-travelled. Good leadership skills. Good interpersonal skills. Being loyal to the Chief.	Fragmented institution that no longer plays a role in land tenure.	Many of them still have skills they were trained on during initiation ceremonies and as community members. Though their skills are not called for in the post-independence era they claim they still know their ecosystems and traditional tenure. .
Male household heads	Supports the ward Head govern land and natural resource in hamlet.	Knowing the land and its natural resources. Physical fitness. Knowing traditional land tenure. Being mobile and well-travelled. Good leadership skills. Good interpersonal skills.	No longer plays a role on the ward level.	HHH born before independence still had their traditional knowledge and skills.

According to the BaTawana key informants, the tier beneath the ward Headman (Table 6-4), comprised men of varying age and marital status referred to as the *Basimane ba Kgosi* - age regiments. Their role, according to a key informant, was law enforcement: '*Basimane ba kgosi e ne e le matlho, ditsebe, diatla le dinao tsa kgosi'* - 'age regiments were the Chief's eyes, ears and limbs.' They had undergone male initiation and had learnt survival skills, traditional male roles and special practical skills such as road making, firefighting, mediation, ground water divination, traditional laws, combat, and hunting. Their primary role was community service according to their skill, supporting tribal leadership formulate and enforcing tribal rules through active monitoring of ward activities. In addition to the skills learned during initiation ceremonies, they were expected to be physically fit and principled and have the courage to confront, round up, penalize, mediate, warn or present offenders to the Headman or Chief.

According to the key informants and household respondents, the role of household heads in the tier beneath age-regiments at hamlet level (Table 6-4), was to support the ward Headman and age regiments on rule formulation and law enforcement. The household respondents stressed that as household heads they were presided over by the ward Headman, whom they were accountable to. The ward Headman was in turn accountable to the village Chief/Kgosi. This provided constant and seamless channels of communication from village to household level that formed a network of knowledge sharing. According to key informants not all household heads made decisions on the hamlet/ward level. They had to demonstrate leadership skills and competence through knowledge of land and natural resources, traditional land tenure, etc. If a household head was perceived as lacking required skills, he was subtly excluded from decision making and presented with decisions in a public forum.

6.1.4 Hamlet and ward level post-independence structure and roles

The key informants explained that the hamlet/ward membership structures and roles have changed with post-independence developments. In the post-independence era, the position and roles of the hamlet heads have been absorbed into the national tribal administration. They no longer have authority on land and natural resource use. The household respondents and key informants stated that one of the biggest changes in the post-independence era is that the ward Headman is no longer appointed by the village Chief.

As a result, the Headmen is not accountable to the village Chief, but to the new head of the district in the national Government structure - the District Commissioner. Headmen are elected in a process similar to political elections, where the candidate with the most votes is appointed. Once they have been elected, they reportedly become part of the civil service with a standard job description. According to focus group members, criteria for selection of ward Heads do not emphasize marital status, gender, leadership skills, relationship to the chief, or special knowledge about traditional customs. Any man or woman with minimum literacy and competence as stipulated by the civil service can be a ward Headman in the post-independence era.

The informants stated that ward Headmen do not have any authority and are not groomed in land use. They are supposedly limited to endorsing land applications and transfers in their wards. One ward head stressed that tribal leadership is mainly ceremonial, '*Bogosi, ga e sa tlhole e le Bogosi! Re badirela puso jaanong*.' - 'tribal leadership is no longer royalty; we are currently just paid civil servants.' According to some ward Headmen, Government does not even consult them nor solicit their opinions for new developments within their ward. Instead they are presented with finalised decisions.

Age regiments and household heads no longer participate at ward level during the post-independence era. Some household respondents stated that their input is solicited, but is never adopted. One household respondent stated, '*Le ha re ka tlhola re buile, ga go hetoge sepe. Pele ga Land Board e tsaya taolo ya lehatshe re ne re na le seabe mo tirisong ya lehatshe, malatsing a xa!'*- 'even if we offer our input, nothing changes. Prior to Land Board, we had a say in land use …nowadays nothing'. According to key informants, this change has severed communication channels between the household, ward and village leaders.

6.2 Village Level Pre-Independence Structure and Roles

This section discusses the people involved in land-use and management at the village level which was the highest and final traditional land-use and management institution, during the pre - and post-independence era. As mentioned, the OvaMbanderu key informants stressed that historically they did not have a chief after they migrated to Botswana between 1890 and 1904. Furthermore, they mainly lived in cattle posts which do not have a formal village level arrangement. This section therefore, does not include the OvaMbanderu and assumes that those that lived in villages were assimilated into BaTawana village level structures. Table 6-5 solely presents the village level membership amongst the WaYei and BaTawana. At this level membership aggregates the household and hamlet/ward structures as described by key informants.

It does need to be mentioned though that in Habu village, several household respondents amongst all ethnic groups expressed more cohesive co-existence than those in Toteng village. In Toteng members were much more segregated and even with central leadership structure. This might have to do with the fact that in Habu they are more isolated and collective cooperation was needed in terms of transport, labour, networks etc. unlike those of Toteng village. Toteng village is located near a busy road, to Maun, the administrative centre of Ngamiland.

Table 6-5 : Pre-independence village structures

Membership in village level representation			
WaYei	**BaTswana**		
	Ancestors (*Badimo*)		
Village leader (*Oshikati omukuru*)	Village Chief (*Kgosi*)		
	Channel 1	*Channel 2*	*Channel 3*
Hamlet heads (*Oshikati)* Affluent men/ individuals with special skills	Elderly uncles and brothers; medicine man; Chief's mother	Age Regiments (*Basimane Ba Kgosi*)	Ward Heads (*Kgosana*)
Household heads (*Sheeto*)			Household Heads (Bo*Rre*)

6.2.1 WaYei pre-independence structure and roles at village level

According to the WaYei key informants, during the pre-independence era, decision-makers at village level comprised three tiers (Table 6-5). These formed a tribal council of elders known as *oyeqhaaa.* They were usually elder, married, male household and hamlet heads, ranging in age, experience, special knowledge and skills. The leader was the oldest and wealthiest man in the village addressed as *Oshikati Omukuru,* which means oldest parent in the IshiYei language.

According to the household respondents, *Oshikati Omukuru* was usually biologically related to many of the hamlet heads in the second tier. Within the village, his hamlet had the highest population as he typically would have been the first person to establish the parent hamlet from which all the satellite hamlets had broken from. Alternatively, he would have inherited the position from his father. Key informants stated that the position of the *Oshikati Omukuru* was equivalent to that of a village Chief. His skills and roles were similar to those of the hamlet head discussed in the previous section but at a village level. He was considered the overall mediator and advisor to all hamlet heads.

Talents and skills expected of the *Oshikati Omukuru* were wisdom, leadership, and good interpersonal skills. His roles included determining residential and farming boundaries for

new hamlets and communal land shared by all the hamlets within his borders. For this role, he was expected to know the layout of the land, and natural resources in the various tracts of land. In addition, it was necessary for the *Oshikati Omukuru* to be physically fit and mobile to travel constantly to inspect different pockets of land for expansion and suitability for different livelihood activities. Key informants stated that the second tier in Table 6-5 comprised various hamlet heads and household heads with economic status, natural resource knowledge or medicinal expertise. Their hierarchy was guided by the order in which they had established their own satellite hamlets independent from the parent hamlet.

According to key informants, the roles of male household heads in the last tier were mainly as advisors and not decision-making. They informally informed village level decisions through input, opinions or updates on an 'as needed' basis. This was similar to the role women played at household level. Meetings by tribal leadership were determined by the beginning and end of farming, veldt product collection, fishing, and hunting seasons.

6.2.2 BaTawana pre-independence structure and roles at village level

According to key informants, prior to independence, *Bogosi*, a SeTswana word meaning tribal leadership, was the highest and most important structure in the village. At this level members structured themselves in four tiers (Table 6-5) presided by *Badimo*/ancestors in the top tier. The ancestors were believed to be a lineage of deceased Chiefs from which the Chief in the second tier was a descendant. According to key informants, one role of the ancestors at the village level was to guide their reign through their ruling heir.

Informants reported that a Chief with an imposing but respected sense of presence was a sign that the ancestors reigned through him. The key informants called this *seriti* literally meaning a shadow or sense of presence, described as an aura, status, or commanding presence that leaders possess. The ancestors' other roles on the village level included safeguarding their subjects welfare.

The village Chief called a *Kgosi* which means king in the SeTswana language was on the second tier. He was the overall leader of the village and his primary role was to maintain law and order and ensure the welfare of his subjects. According to key informants, his roles in the pre-independence era depended on whether he needed to establish a new village or had inherited the position from his deceased father. If he needed to establish a new village, the Chief sent knowledgeable men -usually age regiments- to prospect for suitable land. For this role, he needed to have a team of loyal, knowledgeable men to do the initial prospecting. Once they found a location they considered suitable, the Chief reportedly verified the new area to confirm suitability. For this role, he had to be physically fit and able to travel long distances to new locations, have strong leadership skills, and be knowledgeable about land and natural resources.

If he differed with his team's opinions, he could explain why the new location was not suitable. Furthermore, he could lose credibility if he missed cues and endorsed a location suitable that later turned out unsuitable. If he approved the new location, he mobilized his ward Hheadmen and age regiments to help zone the new village. They determined where residential, grazing, hunting, and fishing and veldt product collection activities would occur, based on the ecological makeup of the location. The key informants stressed that great care was taken to replicate the residential layout of the previous village to maintain social networks.

It was essential for orientation and enabled the community to navigate easier and feel more settled in the new village. For this role the Chief needed to be fair, have good interpersonal skills, be exemplary, know his subjects, where they lived, and in which ward. According to key informants, the roles of the Chief in an established village were to continue maintaining law and order and the welfare of the subjects. He also granted water rights, assigned age regiments to drill community wells or boreholes, controlled bush fires, and settled land

disputes. He declared the beginning and end of the ploughing, harvesting, fishing, hunting and collecting seasons. For this role he needed to understand weather patterns, ecology, and the flow of seasons throughout the year and how they affected livelihood activities.

As the village leader, he received grain after the harvest season, or certain parts of game meat after a successful hunt. He was expected to share these gifts with various members of the community mostly the poor, or those who had had a poor harvest, refugees or visitors from other villages. He therefore, preserved some of the meat and stored some of the grain he received for this use. For this role he was expected to be generous and compassionate to all his subjects. He was also expected to have foresight and long term vision.

An elderly household respondent explained that if the Chief was perceived as unfair, or his elders were unable to control him, his subjects broke away and established a new settlement under their preferred ruler. Or they sought refuge under the rule of another Chief their considered more stable. It was considered a dishonour to lose subjects, but was emphasized as a form of checks and balance to keep the Chief accountable and to maintain his people's interest. Communication channels on a village level were reportedly open to various community members. For this, the Chief was constantly present in the village or at the *kgotla* where he could be approached by any of his subjects.

According to key informants, although the third tier had three sets of people on the same level, they had different roles and communication channels with the Chief (Table 6-5). The Chief's brothers and elderly uncles were additional human checks and balances placed to groom and advise him and ensured he ruled justly and fairly. For this role, they needed to be skilled in traditional laws and customs, historical events, good interpersonal skills, be impartial and bold enough to reprimand or correct the Chief when it was necessary.

Members of age regiments - *Basimane ba kgosi* at village level, were usually men that had undergone initiation with the Chief and were his personal enforcement body. Their roles and skills were similar to those discussed in Section 6.1.3 but, on a village level. He sometimes appointed them as land overseers. Ward Headmen also discussed in the previous section were leaders of all wards that headed the village wards. These were men that the Chief had handpicked or inherited from his father's reign and he trusted. Their skills and roles were similar to those at the ward level but at the village level. They were accountable to the Chief and acted as a link between him and the subjects in their wards.

The household respondents mentioned that although household heads were included in the village structure, they were in the fourth and final tier and generally did not make decisions. According to WaYei and OvaMbanderu key informants, mainly male household heads from recognized ethnic groups were acknowledged in the village structure. They explained that this is because during the pre-independence era, some BaTawana tribes regarded groups that were not of Tswana ancestry as inferior and, therefore, did not allow them to participate in decision-making at the village level. This was confirmed by several WaYei household informants that said the term '*Bathwana'* was used to refer to them. The term '*Bathwana'* literally means little or lesser people.

The informants explained that the term suggested that members from groups not of Tswana ancestry were not fully-fledged people. Some of the OvaMbanderu household respondents said they never felt they had a voice at village level talks. They stated that those that had participated in the past were reproached with comments like "*Motamma o itse eng ka lehatshe?*" Literally translates to "What does a *Motamma* know about land?" *Motamma* is a derogatory term that BaTawana used to refer to people of OvaHerero and OvaMbanderu ethnicities.

Nevertheless, they claimed they occasionally provided information that guided decisions. Generally, meetings that required the attendance of all representatives of the village level arrangement were structured at the beginning and end of the ploughing, harvesting, collection, and hunting seasons. In addition to structured channels, an elderly informant that had served as a headman explained that the Chief privately consulted select men and women. They had no particular 'office' but these were people the Chief trusted and regarded as his private confidants.

6.2.3 Post-independence village structure and roles

According to the key informants, *Chiefdom* is the highest and longest standing traditional institution. Since the Government took over land allocation from the tribal leadership, Chiefs have no authority on land-use in the post-independence era. One of the key informants stated that exclusion of tribal leadership in land allocation and appointment of Land Boards as the new authority in the post-independence era has had repercussions on the traditional systems. It automatically eliminated the community and all the lower level traditional institutions that once participated in traditional land tenure.

One other major change, according to the key informants, is the introduction of the Chieftainship Act in 1966 in the post-independence era. It is said to have eroded and redefined the roles and powers of tribal leadership. According to key informants, at independence, the Government seemingly included tribal leadership at the inception of Land Boards. The inclusion was, however, of one individual - the Chief and not the entire institution of *bogosi* as designed and understood by the ethnic groups. The Chief was appointed as an ex-officio member and was not allowed to vote. This automatically put him in a subordinate position to other members in Land Board. Finally, they phased out the Chief's position in land-use and management but maintained Chiefs as salaried Government employees.

In the post-independence era, the Chief, is regarded as a senior civil servant, has a fixed salary, a job description and is accountable to the District Commissioner - a paid civilian and the Minister - a politician. Key informants expressed despair at the redefined position of a Chief with a job description. Some key informants stated that by being a salaried employee, accountability has changed to his employers because the Government systems are his new checks and balances. He can be fired, disciplined or suspended by Government. The informant stated that this has forced the Chief to shift his focus to personal interest rather than to the welfare of his people.

The key informants further complained that the new Government stipulations do not stress vital skills needed for a Chief such as leadership and knowledge. They added that in the traditional structures, the Chiefs were groomed for their role from birth. Key informants complained that many Chiefs in the post-independence era are elected or appointed in an approach similar to political election or job application. The informants pointed out that the new appointment has resulted in incompetent leaders because it emphasizes literacy for appointing Chiefs. The informants stated that the Government does not select nor groom Chiefs for leadership, compassion or generosity. According to them, Chiefs in the post-independence era are literate administrators with poor interpersonal skills, no practical skills, limited knowledge on land-use and management. As a result they make poor decisions and are not recognized nor respected by their communities.

Key informants that once served as land overseers added that in order to level neutrality, current land overseers are chosen from their village of origin while Land Board officers originating from different districts are assigned to various villages in Botswana. The informant pointed out that the household, ward and village heads traditional structure and roles are carried out by various Government departments. The informants described the

Government departments as '*beng ba lehatshe'* meaning the 'owners/authorities of land', implying the Government structures as exclusive and elitist.

6.3 Chapter Summary

During the pre-independence era, people who made decisions on communal land were separated into two different structures (hamlet/ward and village). The hamlet/ward was the second institutional arrangement aggregating all male household heads. The members primarily made decisions within the borders of the village. Their decisions were informed by updates from women and unmarried men in their households. Amongst the OvaMbanderu, the hamlet leader was appointed by other household heads based on his competence as a farmer and leadership skills. The WaYei hamlet leader was the person who had established the hamlet, or inherited the position from his predecessors. The BaTawana ward Head was appointed by the village Chief, based on their relationship. The structure and roles of the hamlet/ward appear similar to that of the household structure but on a hamlet/ward level. The main difference is that, ancestors were not perceived members on this level. Criteria for inclusion for decision-making at hamlet/ward level included relationship to the Chief, special skills and knowledge.

The village was the highest and final level that combined all decision makers in the village, during the pre-independence era. Amongst the WaYei, decision-makers for land-use and management at village level comprised three tiers. Amongst the BaTawana, they structured themselves in four tiers, which included ancestors believed to be a lineage of deceased Chiefs. Amongst both groups, decision-makers on a village level were typically married, male household heads that ranged in age, experience, special knowledge, and skills. They were groomed at their respective levels on skills and knowledge in land and natural resource use. Their skills and roles were similar to that of hamlet heads, except on a village scale. Emphasis at this level was on communal land used by the entire village.

In the post-independence era, the Government has taken over land allocation from tribal leadership and village structures and redistributed it amongst different government departments. The 1966 Chieftainship Act redefined the position of Chief and so they are no longer an authority in land-use. Most Chiefs are supposedly elected in a process similar to political elections. Informants pointed out that traits such as good leadership skills, compassion, and generosity are no longer emphasized. Having lost authority over land and its resources, the Chief's primary role of devising land-use and management rules has been eroded. The 1968 Tribal Land Act, amongst other legislative instruments, guides land and natural resource use and management.

The focus group members celebrated the fact that unlike during the pre-independence era, more women play a more active role in land and natural resource use and management in the post-independence Government structures. They say that this might have to do with the fact that knowledge and skills were a big factor in the criteria for inclusion in decision making in traditional institutions. In all three groups studied, women displayed grounded knowledge on land-use which the informants say women still display in the post-independence era. Recognition of special skills and knowledge may be one reason why there is very little resistance to women in decision making roles in Botswana Government and traditional structure.

7 Discussion

The findings of this study offer community specific solutions to national and global effects caused by increased direct and indirect uses of natural resources. Although traditional systems have been used for generations, traditional knowledge seems to have gained recognition when planners acknowledged that science does not have all the answers to issues such as natural resource depletion, land degradation and high poverty levels. This study can particularly be aligned with Botswana Government's recognition of the role traditional knowledge can play in the 'sustainable management of natural and cultural resources' and in 'facilitating communication, and local-level decision-making in agriculture, health care, food preparation, education, natural-resource management, and a host of other activities" (Government of Botswana, 2009, 2017). The study also offers practical insights on how the Government's expressed intentions can be implemented.

Ngamiland is lagging behind in economic development despite its natural resource endowment and Botswana's status as a high, middle income country. With a human development index of 0.717, ranking it 101 out of 189 countries (Statistics Botswana, 2018; UNDP, 2018), there appears to be limited concrete factors explaining the discrepancy between the national economic development and the district's high poverty levels. Amidst stereotypes and biases about traditional systems (Chambers et al., 1989), the disregard for Ngamiland's cultural and ecological heterogeny in national legislative instruments appears to be one of the elements.

It is important to determine roles and approaches that traditional land-use and management institutions play(ed) in rural livelihoods. Therefore, more country specific research needs to be intensified to determine other existing traditional knowledge systems undocumented or ignored in the past. The findings can cultivate a culture of knowledge sharing locally, regionally and internationally. In order to avoid repeating the same mistakes, research needs

to establish how subsistence communities were previously reached, who and how they were communicated with, the challenges, results of those interactions and current standpoints between various groups and Government.

Traditional knowledge is undeniably complex. In order to better understand the peculiarities of traditional institutions, Hodgson's (2006) and Neale's (1987) definitions of institutions were used in this study as it offers a concurrent players and processes lens rather than solely as processes, as popularly advocated for by scholars such as North (1990). This viewpoint is critical for Government's plans to ensure they do not just adopt processes and exclude players when incorporating traditional institutions.

To further heighten understanding of traditional knowledge, the Berkes et al. (1998) social-ecological framework (Figure 2-2) was used to determine roles and responses of local traditional land-use and management institutions to rural livelihoods on a community level. This helped demonstrate the evolving relationship local people have with land. To view the utility of traditional knowledge on a district or national level, the principles that were suggested as determinants of a country's stability by Berkes et al. (1998) were utilised. These are: (i) the extent that policy incorporates traditional systems of its people, (ii) the wealth of its ecology, (iii) a secure land tenure system, (iv) and visionary leadership were used in this study.

The value of traditional knowledge in the current era is therefore applicable in the following areas: (i) knowledge sharing, (ii) conservation strategies, (iii) ways to reduce land degradation, (iv) practical skills to minimize vulnerability between generations, and (v) potential players the Government can engage with to improve ecosystem resilience. Leach, Mearns, and Scoones (1999) suggest that institutions operate best when designed to manage natural resources at micro, meso and macro levels simultaneously.

7.1 Land-Use and Management Institutions in Ecosystems

Subsistence communities use natural resources, their knowledge and skill to secure needs and wants through farming, fishing, hunting, gathering or a combination of the activities (Nietschmann, 1970; Schoar, 2010; Zubrow, 1972). The Botswana Government identified 'agriculture, health care, food preparation, education, natural-resource management, etc.' as specific areas in which traditional knowledge could be incorporated (Government of Botswana, 2017). The specified areas are goals to alleviate rural poverty and promote sustainable resource management. They arguably coincide with benefits of traditional land-use and management based on the phrases informants used to describe land prospecting process and desired tracts of land. The phrases 'looking for life', '*go batla botshelo*', land that contains food', or 'land that is ripe' and 'good grazing pastures', confirm that suitable land was selected on its ability to provide basic needs.

It is therefore, crucial for planners seeking ways to alleviate poverty amongst rural communities to understand ecosystems containing natural resources required by different communities and try where possible to match them. This would enable them to harness existing social and ecological capital to empower people to fend for themselves rather than allocate or relocate to lands they cannot live off and increasingly depend on Government aid. The statements describing ideal ecosystems reinforce that (i) the importance of land lies more in its resources than its spatial extent and (ii) that subsistence communities have criteria to qualify land suitability. If subsistence communities are allocated land they consider unsuitable to survive or denied authority to use their knowledge to use and manage, they are unlikely to use the land as expected.

Therefore, if Land Boards know various traditional land-use and management styles and adopts them where possible, this could reduce arbitrary allocations and aid zoning to match them better with different livelihood activities. Land shortages during the post-independence

era and increasing reports of unproductive land, has cost implications for Government (Magole, 2009). Furthermore, the Government could use this knowledge to improve land-use and management and enable decision making at community level by recognizing users as experts and partners. There are examples in literature confirming how subsistence communities that have lost access to ancestral land and the authority to use their traditional knowledge and skills, live in abject poverty, lost their dignity and are separated from society (Franklin, 1967).

Despite these realities, various traditional land-use and management approaches are not recognized by the Botswana Government particularly those that are unique to ethnic groups that are not of Tswana descent. For example, the OvaMbanderu historically prefer land with good grazing and vastness for traditional rotational purposes (Almagor, 1980). During the pre-independence era, Chief Sekgoma Letsholathebe granted them access to cattle posts with vast grazing (Vivelo, 1977). In the post-independence era, the Government introduced cordon fences, privatised ranches and other developments that reduced the vast pastures that the OvaMbanderu and other ethnic groups historically used and managed (Magole, 2003; Daily News, 2012).

The developments eroded planned grazing patterns and veldt product collection. Livestock is currently congested into one location, migratory routes and access to veldt products once freely available is blocked. This has resulted in overgrazing, overharvesting and loss of access to free natural resources once used for food, medicine, fuel, building material etc. While such disruptions affected all ethnic groups living in the area, the OvaMbanderu appear to have felt the effects more strongly because their livelihoods are more tightly focused on livestock, as compared to the BaTawana, who also grew crops. These developments contradict Botswana Government's aim to alleviate rural poverty and promote sustainable resource management by incorporating traditional knowledge in 'agriculture, health care,

food preparation, education, natural-resource management, etc.' (Government of Botswana, 2017).

Another example of Government's disregard for current diverse cultural livelihoods in the post-independence era is the forced relocation of residents from the wetland areas of Etsha 13 village in 2011 where the WaYei are among the numerous residents that permanently settled in (Shinn, 2016). The WaYei traditionally practice flood plain and dry land farming concurrently as an adaptation to the variability of the Okavango Delta floods. Studies confirm that yields from flood plain farming are higher than from rain-fed farming (Motsumi, Magole, & Kgathi, 2012; Shinn, 2016).

However, the Government does recognize flood plain farming and hence does not offer subsidies or compensation for damaged crops in flood plain fields (Bendsen & Motsholapheko, 2003). Although the WaYei continued to practice flood plain farming, the forced relocation will result in them solely practicing rain-fed arable farming. They will ultimately lose adaptive capacity, especially if rain-fed farms fail. Moving people from lands they are familiar with can have adverse effects resulting in communities losing access to natural resources that once complemented their diet. Detachment from familiar ecological settings further erodes efficiency of good traditional land practices, inhibits efficiency of traditional knowledge needed for survival, and may lead to high poverty levels.

On the basis of the fieldwork, there were several livelihood activities such as ploughing, grazing, kraals and huts built or being built out of the listed natural resources. These were practiced by various households and this contradicted informant's claims that they had lost the freedom to choose where to subsist. Despite the contradictions, the observations confirm that livelihood activities that are natural resource-based are still actively practiced in the post-independence era. This suggests that the Government has not eroded all traditional land-use activities, or it confirm that Government has poor monitoring.

Alongside natural resources that determined land suitability, this study shows that social networks are equally as important. One focus group participant stated she would not invest energy and time in developing land far away from her kin or land she did not like. Such statements are insights why allocated plots are often not used, occupied or developed. It suggests that people are unlikely to develop plots if they perceive the costs to outweigh the benefits. The statement also stresses that (i) land productivity is highly dependent on social networks, so it is important for people to be allocated land around people they know, related to or of the same ethnicity.

A lesson that Government can learn from traditional systems is its recognition of social networks particularly in relocation projects. For example in the pre-independence era, respondents stress that when the BaTawana relocated to a new village, tribal leadership took the time to replicate residential layout from the previous settlement. This claim is also confirmed in literature (Schapera, 1994; Tlou, 1985). Recognition of social networks seem to be lacking in the post-independence era, as evidenced by the relocation of residents of Etsha 13 and the Maun relocation project for the expansion of the airport and construction of the bus and taxi rank. Ignoring social networks in the post-independence era appears to have fragmented the ward/hamlet level that played a pivotal role in communal use and management.

In this study, there were conflicting opinions about how land was used during the pre-independence era particularly amongst the WaYei. The younger informants mentioned grazing as one of the land-uses. However, the older informants stressed that WaYei were strictly arable farmers. The statements challenge the bias that traditional knowledge is static. Some literature depicts WaYei distinctly as cultivators in the early 1900s (Stigand, 1923**).** This appears to have changed over time due to a combination of interaction with other cultures, education, modern technology etc. (Sutherland, 1980; Tlou, 1985). Although both

periods were during the pre-independence era, it suggests that older respondents may be referring to times before the arrival of the BaTawana, while the younger respondents capture the period after livestock had been introduced to the WaYei.

It appears the WaYei over time adopted livestock farming and diversified their land-use. This practice is called creative syncretism which results in hybrid institutions that users may consider 'traditional' with continued use (Berk & Galvan, 2009). Therefore, when planners research traditional knowledge, it is important not to limit the lens to ethnicity and historic traditions but consider hybrid institutions adopted over time. Other disagreements between younger and older informants were the effects of mainstream education on traditional systems. Older informants said it had diminished the efficiency of traditional knowledge while younger informants stressed it had improved the technical efficiency of traditional systems.

Many older informants stressed that they do not use traditional checklists for securing land during the post-independence era because they have lost the freedom to select land and have to contend with what they are allocated by the Government. The younger informants further stated that developments such as technology and wage employment have reduced reliance on natural resources and therefore, minimised the need for freedom to select land based on traditional checklists. The reasons for these disagreements could be generational differences, personal preferences, ethnic differences or a shift reflecting Western education as the sole knowledge source.

Pennington & Harpending (1991) stated that the OvaMbanderu arrived impoverished when they first migrated from Namibia in 1890 and 1904. In one generation, they reared cattle herds that were better than those of the BaTawana. During field work it was observed that the OvaMbanderu had larger cattle herds that seemed in better condition than those of the BaTawana. One OvaMbanderu informant attributed this difference to the fact that the

OvaMbanderu reside with their cattle and manage them closely using retained traditional knowledge and skills despite influxes of technology, wage employment and mainstream education. They stressed that BaTawana leave their cattle herds in the care of herd boys while they live in the city and have abandoned effective traditional practices for good livestock rearing.

However, the OvaMbanderu informant was sceptical of their continued good condition of livestock herds due to the triple settlement unique to BaTswana that is increasingly being imposed countrywide. The informant's claim implies that it is necessary to examine the merits and demerits of Botswana's mono-ethnic philosophy and assess its impact on household productivity amongst all ethnic groups. This reinforces a need to enhance coherent systems that stimulate land tenure security at a community level, rather than maintaining a national view point that may be counter-productive for communities.

7.2 Local Knowledge of Ecosystems

Government's development initiatives have recognized the need to address environmental issues in order to achieve sustainable development. The state advocates for sustainable economic growth and development that takes into consideration efficient use of both renewable and non-renewable resources, equitable distribution of assets, community participation in natural resource management, animal conservation, poverty eradication, and minimum land, water and air pollution (Government of Botswana, 2009). In this study traditional ecological knowledge of the three groups can support such Government initiatives. The content of traditional checklists outlined in chapters five and six list more than 60 (sixty) different tree and grass species once used for human and livestock survival. The checklists are (i) a concrete tool of the ecological wealth of the two study sites, (ii) a guide of the resources and ecosystems each subsistence group needs to survive (iii) an inventory of the

traditional expertise capable of categorizing natural resources according to food, fodder, health and shelter.

It is crucial to note that these checklists were devised, adapted and implemented by people with specific knowledge and skills. Users reportedly had to know where specific trees and grass species were located, the seasons they were available, carrying and harvesting capacity of communal areas etc. This wealth of traditional ecological skills and knowledge required for subsistence existence enhanced their ability to use natural resources for basic needs and reduced vulnerability. This concurs with Zimmerman's (1933) viewpoint that 'knowledge is truly the mother of all resources.' If subsistence communities are authorised to use land and their traditional systems using their traditional knowledge, it potentially diversifies economies and stimulates knowledge and skills sharing.

In comparison with the vegetation maps obtained from the Okavango Research Institute GIS laboratory using modern equipment, the traditional checklists are more detailed. The informants knew seasons when resources were available, their characteristics and utility to daily life. Contrary to popular belief that subsistence communities are ignorant, the checklists demonstrate they are capable experts that can complement conservation efforts. For Government to obtain information with the same level of accuracy, they need to acquire special type of remote sensing equipment which is reportedly very expensive to procure. Traditional expertise would be much cheaper but offer accurate information like the expensive equipment needed for the same level of detail. If traditional experts are engaged, they could update natural resource inventories and improve village level conservation efforts at a reasonable cost.

Traditional ecological knowledge of natural resources enabled communities to devise practical and functional management approaches to access resources from season to season.

This was pivotal to management and conservation of the resources. The breadth and depth imply that subsistence communities understood aspects of the dynamics of ecosystem functions, which is critical for building ecosystem resilience (Olsson, 2003).

The traditional checklists are not ad hoc and irrational but a systematic tool that integrated social practices and ecological systems needed for survival in the past and can be useful in the current era. The checklists are therefore, a comprehensive resource driving other Berkes et al. (1998) determinants for a country's national stability. They give insights into (i) the traditional ecological systems of people (ii) various areas' ecological wealth (iii) conditions needed for a secure land tenure system, (iv) and visionary leadership**.**

Traditional ecological knowledge enabled OvaMbanderu to detect and access ground water using tree and grass species as indicators. This knowledge heightened their capacity to live in areas considered marginal by the other groups that preferred to live near rivers and other forms of surface water. Skills such as these could be harnessed to accommodate population growth in the post –independence era so that developments in marginal lands could be facilitated using traditional knowledge.

Traditional institutions would complement conservation efforts in Government departments such as Department of Wildlife and National Parks, Department of Environmental Affairs, Department of Forestry and Range Resources, Land Board, Department of Agriculture etc. In Canada, scientists have forged partnerships with native Canadians to update natural resource inventories, animal population, migration and patterns (Davis & Wagner, 2003). The Government may therefore, benefit from collaboration and knowledge sharing with traditional experts, particularly in monitoring which is reportedly minimal amongst Government departments.

Amongst the three groups, the BaTawana household informants were able to list most natural resource indicators in their mother tongue. A surprising result in this study was that in

comparison with the other two ethnic groups, the WaYei performed very poorly in identifying natural resources in their language, IshiYei. Many listed natural resources were mainly in the OtjiMbanderu and SeTswana languages. It was unexpected because the WaYei are historically associated with diverse livelihood activities based on an extensive knowledge and use of natural resources (Meyer & Bendsen, 2003; Stigand, 1923).

Another surprise was that although the OtjiMbanderu stressed that trees were among the indicators used for land selection, they could mainly list tree species they considered fuel, timber and those which detected groundwater in their language OtjiMbanderu. They were unable to list many trees utilised for food and medicine. It was surprising because they had explained that tree pods, berries and leaves are complementary fodder.

The reasons for the minimal list of natural resources in IshiYei may imply that IshiYei, as one of the minority group languages, and the knowledge it once encapsulated, is at risk of being lost. It may also indicate that over time livelihood activities have evolved to became more cash centred than natural resource based which may have reduced the utility of natural resources to WaYei traditional livelihoods (Zimmerman, 1933). It may confirm the OvaMbanderu's claims that lack of resistance to external influences such as adoption of dominance cultures accelerates loss of traditional knowledge.

The reason for the lack of names of certain trees amongst the OvaMbanderu may be due to the fact they are originally from Namibia, having arrived in Botswana between 1890 and 1904 (Gewald, 2002), they may not have known the listed shrubs in their country of origin. They may have only learned their use as fodder through observing livestock preferences. Therefore, they would have known and primarily valued certain tree species they understood to be food, fodder and medicine sources (Zimmerman, 1933).

It is unclear whether the lack of vernacular names is a reflection of low interest in or use of particular natural resources amongst the WaYei and OvaMbanderu (Zimmerer, 2014).

Alternatively, it could indicate losses of traditional knowledge in the two study sites or there might be a broader loss. If it represents a broader loss, there are consequences for robust traditional land and resource management. This is assumed to be more of a reflection of cultural homogenisation (see Cassidy & Barnes 2012) rather than ethnic differences in resource utility value as other scholars would put it (Zimmerman, 1933, Zimmerer, 2014).

Another surprising result was that the older generations amongst all three ethnic groups had more subsistence skills compared to those born after independence. Current global statistics on youth unemployment are alarmingly high particularly in Botswana (Scarpetta, Sonnet, & Manfredi, 2010; Sechele, 2017**,** UNDP, 2018**).** The common causes are limited jobs for an excessive supply of graduates for white collar jobs, and an inadequate supply of practical skills for agriculture, construction and other informal sectors (Okafor, 2011; Sechele, 2017, Mago, 2014).

One of the benefits associated with traditional knowledge is its emphasis on minimising vulnerability between generations. It endowed younger members in society with age specific skills on physical and psycho-social competence for survival in adult life (Bock, 2017). The rates and reasons of youth unemployment imply that mainstream education as the primary knowledge source, has excluded subsistence skills from the curricula. As a result, practical survival skills are not being passed between generations and exacerbating vulnerability amongst the youth.

Although traditional knowledge may not offer youth paid income, it could uplift their livelihood security. It could enable youth to subsist on natural resources which are free instead of hoping for paid employment while becoming victims of social and economic ills. Accompanying the decline of traditional knowledge amongst youth are all its benefits, such as ability to fend for oneself, the promotion of dignity, lessons on natural resources

stimulating productive land-use, social sustainability etc. It is therefore, crucial for traditional knowledge to be inculcated amongst youth at as early an age as is possible.

If robust practical knowledge is not passed on between generations, using learning institutions and parental guidance, it further compromises a country's national social, economic and political stability. One informant implied that the lack of practical knowledge amongst youth is because parents are not passing it on. If this is the case the current generation has limited skills and no understanding of natural resources and ecosystem functions. If they are not taught about conservation, they are likely to exacerbate natural resource depletion, which would compromise ecosystem sustainability and aggravate poverty.

In the event of a national economic downturn, it is unlikely that the youth would be partners in sustainable resource use or lead a sustainable subsistence existence. This suggests that perhaps another principle missing from the factors that Berkes et al. (1998) contends are vital for a country's stability is the, 'extent that a country empowers the younger generations with practical survival skills.' For traditional knowledge to be effective it needs to permeate all sectors of the economy. It is vital for all decision-makers, rural farmers and youth to know about improved use and management of natural resources. Sustainable use and management cannot be done without knowledge of the environment.

7.3 Traditional Property Rights in the Post-Independence Era

Rights of access, use, transfer; inheritance and ownership of land in the traditional systems were based on norms and gave users a sense of security in the pre-independence era. Other Berkes et al. (1998) principles for national stability (iii) a secure land tenure system, (iv) and visionary leadership support why it is important for traditional land-use and management institutions to be based on people's culture as they would understand them better. During the colonial era, legal documents were introduced in Africa because the colonial administration

considered traditional rights too insecure (Kalabamu, 2000). Conversely, key informants stress that they find legal documents in the post-independence era insecure as the terms are not clearly articulated. Various contentious issues emerging from contrasting interpretation of the land tenure systems are prevalent country wide creating tensions between users and Government.

For example, they explain that in the pre-independence era, traditional property rights were not ambiguous. Informants understood that during the pre-independence era, although land was collectively owned by the tribe once a family was allocated a specific tract of land, it ceased to belong to the community and became an exclusive family possession 'for perpetuity' unless the family relinquished their rights. They explained meant that land could not be re-possessed unless the family committed a heinous crime. This claim is confirmed by Schapera (1994) and Kalabamu (2000). The duration of perpetuity is part of the *right of avail* concept common in traditional tenures in Africa that gave people a sense of security (Kalabamu 2000).

The Land Board has replaced the traditional duration of perpetuity with fifty or ninety nine years in the post-independence era - depending on the type of lease. The time span was derived from the Bible (Deininger & Feder, 2001) which moulded the Roman/Dutch Law system that Botswana's current land tenure systems adopted. There is no clarity as to what happens at the end of the stipulated duration. Botswana celebrated fifty years of independence in 2016; and it is unclear what has happened to leases that lapsed at the end of fifty years.

In the traditional land tenure systems, land was commonly passed on to the eldest, living, male heir (Kalabamu, 2000; Larson, 1989; Sutherland, 1980). It may explain why in the post-independence era ancestral rights are still used as a land claim. Some informants claimed that abandoned plots would not be developed even when re-allocated due to a belief that previous

owners or their descendant may return to re-claim them as ancestral rights. These polar interpretations of ownership based on traditional land tenure and Roman Dutch Law, market capitalism, and traditional land tenure of groups of Tswana ancestry fuel tensions between Land Boards and users.

Exclusion of tribal leadership in land allocation and appointment of Land Boards as the new authority in the post-independence era automatically eliminated the community and all the lower level traditional institutions that once played a significant role in traditional land tenure. It could be said this was the beginning of the power struggles between the Government and traditional land-use and management institutions. At the inception of Land Boards, the Government seemingly included tribal leadership. The inclusion was, not of the entire *bogosi* institution as designed and understood by the users. The Chief was appointed as an ex-officio member.

The Chief could not vote, which automatically put him in a subordinate position to other members in the new land-use and management framework. Finally, the position of Chiefs was phased out and Chiefs although salaried Government employees no longer play a role in national land-use and management. As a result, control of land has shifted to the hands of a select few in Government offices rather than in the collective control of the community like in the traditional system. This concurs with Bornegrim & Collin (2010)'s viewpoint that institutions that control land have full control of a society's economic and social resources. It reinforces the need for visionary leadership to be secured; it needs to members comprise the Government, planners and traditional institutions in order to improve land tenure security between users and Land Boards.

7.4 Traditional Institutional Arrangements at Household, Ward and Village Levels

Scholars stress that good governance structures determine who makes decisions, identify which resources need to be made resilient, for whom resilience is managed, and why, when

and how interventions will be made (Lebel et al., 2006). The results indicate that, during the pre-independence structures, the three ethnic groups had many of these elements. Each institutional arrangement had a hierarchy, a leader and lower level members. Members understood the spatial level/s and scales they were responsible for.

The household made decisions on land allocated for exclusive family use and the hamlet/ward level primarily made decisions on shared land and natural resources within their hamlet/ward and borders of the village. The highest institutional arrangement (village level) aggregated the lower governance structures and allowed for decisions on communal land within the borders of the village. Patterns of interaction were engaged in a seamless two - way system from household to village level. This design distributed labour, and enabled different groups to manage various levels within different ecosystems, and to share decision making power. The general community also knew the hierarchy and the roles of the individuals at each level.

Although it is unclear if the arrangements were implicit or explicit, the results suggest that pre-independence traditional institutional arrangements facilitated local level decision-making. Governance seems characterized by regular communication between various levels of users that the current national system can benefit from. The multiple levels of institutional arrangements also characterizes a design that managed ecosystems at micro, meso and macro levels concurrently coinciding with principles of good governance according to Leach, Mearns, & Scoones (1999). This management system is comparable to that of Swedish and Canadian fishing societies that collectively managed large expanses of water and coral resources. They assigned different players at various social-ecological scales to manage ecosystems and their services (Berkes & Seixas, 2005).

Visionary leadership is attributed to Botswana's social, economic, ecological and political stability. However in Botswana's current national land governance, tribal leadership and all

community governance structures have little authority for land governance. The Government strategically consolidates the assortment of traditional structures under the BaTswana (Datta & Murray, 1989) using the pre-independence approach that the mono-ethnic concept introduced. With the traditional land-use and management institutions nested under BaTswana tribal leadership in the post-independence era, central Government became the sole authority. Conversely, there is no mitigation for traditional institutions to be more relevant or be more productive. This created an elitist, top-down approach, which is different from the pre-independence inclusive, bottom-up approach (Rose, 2002). It appears to have inhibited adaptation of the various traditional land-use and management institutions which would explain why some planners consider them outdated. Current development strategies created an effect in which many rural communities see themselves as part of the problem instead of being part of the solution in sustainable natural resource programs.

Control over land gives people who control its access to those resources a source of power. This suggests that one of the motivations for controlling land and its resources is absolute power. It can be assumed the Government wanted to initially standardize systems to ease administrative challenges, and it can be assumed that they now realize the shortfalls of the one size fits all approach. Incorporating traditional knowledge suggests that some players may lose power. What is unclear is how incorporating traditional systems will be implemented without disrupting Government structures and how some elites that may lose power will be approached.

While traditional systems may contain systematic, rational and robust qualities, some are arguably outdated. During the pre-independence era, it was evident that knowledge was the crucial trait for inclusion in all levels of decision-making. The results confirm that women were knowledgeable on land and natural resource use but, were nevertheless excluded from decision-making. Instead they mainly made decision on veldt products or could mainly

inform decisions when their expertise was solicited. These findings are consistent with the view that "gender is constructed through the practices of power" (Radtke and Stam, 1994) and that gender roles determined or shaped the power distribution in the traditional structures in Ngamiland. This viewpoint nevertheless, seems prevalent in other parts of the world, when men are supposedly more liberal.

In many east African countries traditional patriarchal institutions forbid women to hold any land rights or positions of authority. Power dynamics are characterized by unequal gender relations as women's rights groups' battle for land rights and representation in the political arena (Razavi, 2007; Tripp, 2004). Individuals will position themselves to control land and its resources at the exclusion of others using gender, age, special skills, knowledge, and socio, economic or political status. This confirms that despite international pressure and modern times there are barriers inherited from traditional knowledge that exclude certain individuals from decision making institutions. Some communities are not open to new information or a new way of doing things.

Nevertheless, Botswana can gain insights from neighbouring countries such as Namibia and South Africa that are heterogeneous and applauded for being functionally democratic. As part of nation building, they constitutionally recognize their different ethnic groups, various leadership structures, languages, traditional, customary law, ethnicities' political and judicial systems, etc. (Düsing, 2002). The two countries did not integrate traditional knowledge as a single intervention, but divided implementation into short, medium- and long-term phases and made assessments of individual and collective capacities of key stakeholders in each phase (Düsing, 2002).

7.5 Conclusions and Policy Implications

Traditional land-use and management institutions in this study appear to possess many traits that promoted good land governance that can contribute to improving land and natural

resources use and management in the current era. This can be possible if users have decision-makers powers at various levels, are engaged in two-way dialogues with each other and the Government, compromise and take time to address challenges.

There is still a lot that is unknown about the extent that top-down blanket policies, technology, mainstream education, religion, floods, droughts, rainfall variability, wage employment, intergenerational preferences and cultural change have had on traditional knowledge. These external influences may be perceived as threats or assets to traditional land-use and management institutions. Traditional institutions therefore, need to be assessed if they have adapted and what contributions are relevant in the current era.

In the past, national level land strategies have been counter-productive and meaningless on local levels because the legislative instruments treated traditional system as homogeneous rather than distinct systems. Although the current Government structures lack traditional players as originally designed in the traditional arrangements, Government are a major asset for a macro level perspective in future roll out plans.

Government's commitment to incorporating traditional knowledge is expressed in National Development Plans 10 and 11 (Government of Botswana 20019; 2017) and cemented by their commission of the development of an Indigenous Knowledge Policy Implementation and Monitoring Policy (Government of Botswana 2017). The Policy contains concrete suggestions of how and where traditional knowledge can be adopted nationwide (Centre for Scientific Research Indigenous Knowledge and Innovation, 2014). The Indigenous Knowledge Policy Implementation Plan is however still at draft level, has not been approved and therefore, remains unimplemented.

To determine what changes need to be done, how they will be done, and establish what directions to take, it is important for each country to take stock of what it knows about its peoples' and the gaps. This study has confirmed that local traditional land-use and

management institutions are unique. Incorporation of traditional knowledge implies there will be new and emerging partnerships particularly from previously excluded groups. If these are structured at different levels they make room for multiple traditional land-use and management based on communities' norms in order to be inclusive of Botswana's diverse cultures.

Criteria for inclusion creates platforms for synergies or trade-offs amongst key players. Trust is necessary for institutional cohesion. It appears to have been more concrete on a community level rather than between the traditional and the modern system. To develop cohesion and trust Land Board could customize leases by basing rights of access, use, transfer; inheritance and ownership of land on traditional norms of the various groups rather than solely on international systems. To further improve land tenure security, Land Board could reinstate norms such as the concept of 'perpetuity' which gave communities a sense of security rather than insist on leases having a stipulated duration with no clarity what happens at the end of the lease period.

Despite the fact that the study was carried out in two different villages with seemingly different ecosystems, differences in the traditional institutions were minimal. The resources considered food, fodder; building material, medicine and fuel by the OvaMbanderu, WaYei and BaTawana in Toteng were the same as their counterparts in Habu. The networks however differed in Habu village, in that the ethnic groups expressed better cohesion than those in Toteng village despite their different background. This implied more overlap in livelihood activities in Habu.

A collaborative effort of local and mainstream players can give an updated count of resources listed in the checklist, their exact locations, users, intensity, threat or opportunities etc. to help mitigate conservation efforts. What was unknown at the time of study is the count of listed resources, the danger of extinction and its current threats. This can be addressed by engaging

users that know each resource use and management approach from season to season. A dialogue with players that devised the checklists can further help Government identify how national level land tenure systems inhibited traditional land tenure institutions to avoid duplication and identify compatibilities. That way sound traditional practice can be incorporated and be protected from future erosion by legislative instruments.

A resilient socio-economic system is described as one that copes with or adapts to new developments in the event of change (Berkes et al., 1998). In this study, the OvaMbanderu stood out as the most resilient. Despite their rotational grazing system being affected, they are counted amongst the wealthy livestock farmers in Ngamiland District (Pennington & Harpending, 1991). This might have to do with the fact that they maintained their culture, and live mainly in remote cattle posts containing the ecological wealth needed for their livelihood activities. The fact that they are able to practice aspects of their traditional land tenure without major constraints suggests that Government monitoring is poor especially in remote areas.

Government's interest in incorporating traditional knowledge is already articulated in policy. However, linking policy to actual practice requires detail as there will be different implications of those links at all levels. To determine different implications, the development plan needs to address core challenges, stimulate concrete actions, and ascertain mutual collaborations on a community, village, district and national level. Issues that need to be addressed include criteria for inclusion in decision-making in order to build and retain community trust which currently seems lacking. This study covers just three subsistence groups in Ngamiland. Comprehensive inventories of the various traditional systems country-wide could unearth an assortment of other resilient traditional systems.

In the traditional systems, members were expected to have practical knowledge of land and natural resources, accountability to lower subjects and leadership skills. Checks and balances

were created to stimulate individual competence as perceived by the community. Current systems tribal and national leadership allegedly have minimal checks and balances and therefore do not instil competence. Decision makers are also considered self-serving, deficient in practical land and natural resource knowledge, lacking leadership skills and accountability for the people they serve.

It is therefore, important to outline how new developments will enhance or harm all stakeholders in an open forum to reduce scepticism. Stakeholders need to work collectively to ensure the right balance of competent players is met and that measures, to create tools that build capable institutions are in place. It is imperative that attempts to bridge the different institutions create systems that are factual and based on communities' norms and beliefs as well as consistent with Government practices and policies. If innovation is necessary, this should not be imposed in a top-down approach like it has been done in the past. It needs to be adopted by the community structures if they think the innovation will be beneficial.

Furthermore, traditional land-use and management can only be efficient if there is (i) ecological wealth (ii) natural resources interpreted as commodities for different livelihood activities (iii) users with skill and capacity to convert the natural resources into commodities sustainably (iv) users with process and structures to devise, access, use, management and monitoring at different scales (v) authority to use land and resources based on cultural skills.

Traditional land-use and management institutions are complex but coherent. They are however, peculiar to specific social and ecological settings. They are therefore, more likely to effectively address issues at a community level rather than nationally. To gain understanding of their multi-facets traditional land-use and management institutions need to be viewed as processes and players. Planners also need to engage with users in planning and implementation to avoid introducing legislative instruments that inhibit the innovation of traditional knowledge.

Although national, regional and international policies influence country interventions, it is important for developing countries to harness their own traditional knowledge systems for practical solutions rather than adopt solutions that worked in other countries but may not necessarily be applicable to their own situations. Botswana is geographically big, with a low population and an assortment of subsistence communities. Ngamiland District has abundant natural resources. Botswana's youth unemployment rate is however the highest in southern Africa and almost triple that of global youth unemployment. Traditional knowledge is a vital resource for Botswana youth from which to learn subsistence skills as one way to reduce their vulnerability.

Natural resource depletion, land degradation and loss of traditional knowledge are mounting worldwide (Berkes et al., 2000). Youth are amongst the many global users directly and indirectly depending on natural resources. They are therefore, key players in ensuring that land and natural resources are sustainably used for their countries' continued social, economic and ecological stability. Government can gain insights from traditional systems to reduce vulnerability amongst youth by ensuring that traditional systems, skills and knowledge are taught from a young age for youth competence in livelihood activities in adult life. If taught in primary school and tertiary institutions, traditional systems will permeate all sectors of the economy and make a substantial contribution to sustainable development amongst youth. This will not be the case when it is only offered as an elective at tertiary level.

Incorporation of traditional knowledge process is potentially expensive and time consuming. However, it creates an important, but challenging prospect for improved local and national stability. It is nonetheless important and overdue which, with visionary leadership, collective will and cooperation, is doable.

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