MEDIATED BY MEN: ENVIRONMENTAL CHANGE, LAND RESOURCES MANAGEMENT & GENDER IN RURAL KANO, NORTHERN NIGERIA

By

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Abstract

The research examines the way gender relations affect land management and the perception and experience of degradation in two communities in rural Kano, northern Nigeria. Gender plays a central role in the organisation of northern Nigerian society, not least because of the prevalence of wife seclusion and the strict separation of male and female space. The Nigerian government considers desertification and land degradation to be the main environmental issue affecting northern Nigerian communities and links it to poverty and food insecurity, and considerable sums are targeted towards it. Agriculture is the mainstay of rural economies in the region, but women farmers are a minority of the public workforce in agricultural production and the extent of their involvement decreases with increasing seclusion. The study focuses on this minority and examines the interaction of 2 groups of women with natural resources, one secluded and the other non-secluded, their perception of and response to land degradation and their land management practices. The study finds that though gender is an important differentiation, both men's and women's views are influenced by their socio economic positions. The study finds that the women's land management practices are mediated by their relationships with men and with other women. Men act as a cushion to certain aspects of land degradation such as food insecurity, but other important aspects of women's lives such as their social networks and their economic independence are vulnerable. The study also uncovers the centrality of faith in people's experience of and response to environmental change.

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"Glory be to You, we have no knowledge except what you have taught us. Verily, it is You who are the All-Knowing, the All-Wise" Quran 2:32

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Chapter One: Introduction

1.1 Introduction

This research is a study of gender, land management and degradation in two Hausa villages in the drylands of northern Nigeria. It focuses particularly on smallholder farming men and women and the nature of gender relations in the face of land degradation. It includes an examination of resource use, and explores the role of culture and ecology in framing perceptions of land degradation in the two communities. The research is situated in rural Kano, the most populous state in northern Nigeria. Kano is important area of research in northern Nigeria, not least because of its high population densities and history of intensive cultivation going back centuries. This makes the region attractive to researchers of agricultural production and natural resource use, especially in dryland ecosystems. Research has centred on its people-environment dynamics, its dryland characteristics, and its enduring ability to sustain a large population on soils which are inherently not very fertile. Additionally, the prevalence of wife seclusion (*kulle)* in Kano and its environs – a practice which confines women to their homes and restricts their mobility- makes it an interesting study of gender relations.

In much of the developing world women make up a significant percentage of farmers (Whitehead & Kabeer 2001; FAO 2012). Sub Saharan Africa (SSA) especially has the highest average female participation in agriculture, up to 50% and more in some countries with large variations within and between countries (Meinzein-Dick et al 2012; Quisimbing et al 2014). In addition women are also responsible for fetching water and firewood, cooking and almost all other domestic work (FAO 2012). They work the proverbial double day; on the land and in the house. But the northern Nigerian Hausa woman does not fit into this mould. In this region, women are not traditionally farmers, because a woman who farms and works on field is the exception

rather than the rule. It is a region where- in public at least- the traditional role of men as bread-winners and women as homemakers still holds firm (Robson 2006). Women are usually not responsible for fetching water, gathering firewood or growing food. There is a notable separation of female and male domains, and agriculture is on the surface, a male domain. Nevertheless women make important (and often invisible) contributions to agricultural production in rural households. Within the privacy of the domestic sphere women do the bulk of all food processing. They shell groundnuts, thresh, winnow and pound staple grains of millet and sorghum and keep livestock. Some women do work in fields on their own farms and as wage labourers but these are usually poor and unsecluded women whose farming is directly linked to their socioeconomic status (Pierce 2005). In general, women farmers are therefore a minority of the public workforce in agricultural production, and the extent of their involvement diminishes with the rigidity of seclusion practices (Mortimore & Adams 1999). This study focuses on this minority and investigates how their relationship with the environment and their experience of land degradation is mediated by their relations with men, and with other women.

In Kano, the farming landscape is one in which land, trees and livestock are interwoven in a complex landscape of production and are a vital aspect of women's lives as much as men's, in many different and similar ways. In northern Nigeria, gender plays a central role in the organisation of society, and the sexual division of labour and the different roles and responsibilities that result play a part in their interaction with natural resources. In the Kano region, social norms and seclusion practices usually mean that married Muslim Hausa women of child bearing age – at their most productive – are confined to their homes during the day, and only go out when necessary. Their interaction with the environment is mediated by men. In general they have less access to the resources of production such as land and labour, and are poorer than men (Imam, 1993). Women and men fill different positions and have different roles and

responsibilities both in their houses and in the wider society. This separation spills into their interaction with natural resources.

In much research and writing on environmental degradation, it is widely assumed that women are more vulnerable than men because of traditional divisions of labour, and because they often have less access to the resource endowments necessary to adjust to and cope with environmental change (Denton 2002; Dankelman 2010). This may well be the case in certain conditions of gender relations and traditional divisions of labour, such as when women are responsible for food and fuel provision but may be different where they are not. Perception of environmental change, its impacts, and the responses that people make are dependent on the many resource endowments available to them - land, labour, credit, capital and inputs, and even social networks. Often these are gender differentiated. The gendered perception and impact of environmental change does not occur in isolation however, the prevailing social relations and socio economic environment, and institutions play an important role in shaping them.

1.2 Land Degradation in drylands - what's in a name?

Land degradation is complex, contextual (Warren 2002), and somewhat contentious. Its precise definition has been the subject of much debate, and historically, there has been a lack of clarity about what it entails and the exact processes that make up this broad term. According to Blaikie and Brookfield (1987:12), land degradation is a reduction in the land's capability to satisfy a particular use, or a "loss of capability to satisfy demands made on it", usually manifest as reduction in yields of crops, vegetation or livestock. Stocking & Murnaghan (2001) note that it is an umbrella term that refers to land of declining quality and productivity from the land users' perspective and involves processes affecting not only the soil, but also water and vegetation. Indicators of land degradation include soil erosion by wind and water, soil fertility decline, changes in the water table, vegetation loss or decline and loss in biodiversity (Mortimore 2005;

Stringer & Reed 2007). Some of these processes are considered to be irreversible and are ascribed to human actions (Mortimore 2005). An increasingly influential way of describing land degradation is in relation to the ecosystem. Drylands are ecosystems that provide services to the people that live in and depend on them, and degradation is viewed in relation to persistent reduction in the ecosystems capacity to provide services such as food, water, fuel, forage and fodder, culminating in a decline in human wellbeing (MEA 2005). In much of rural Africa, including northern Nigeria, ecosystems are highly valued and recognised by rural people because they play a direct role in livelihoods – provisioning services such as fuel, food, water and fodder, regulating services such as soil fertility and vegetation cover, and have cultural and aesthetic value (Egoh et al. 2012; MEA 2005).

Land degradation in drylands is commonly referred to as desertification. The main characteristic of drylands is their low level of precipitation in the form of rainfall (or snow) and scarcity of water (UN 2011). According to the United Nations, desertification threatens the livelihoods of 2 billion people in the world's drylands and its effects are felt even in non dryland areas of the world, and this makes it one of the world's most pressing environmental issues today (MEA 2005). This view is echoed in northern Nigerian official circles – desertification is seen as the most serious environmental issue in the region, contributing to poverty, food insecurity and even conflict (FGN 2009). The Sahel is the largest stretch of drylands in Africa and the drylands of Nigeria fall within this zone. They occur in the northern part of the country, are home to a third of Nigeria's population and 35% of its area.

For decades the manifestations of environmental change in the drylands of the world have been the subject of debate. Desertification has divided opinion since its rise to prominence in the early 1970s after the devastating Sahel drought in the African drylands which led to the death of thousands of people and animals, and the migration of millions (Agnew & Warren 1996). At the time, agricultural activities, pastoralism and human 'misuse' of the land was largely

blamed for the devastation caused, fuelled by overpopulation, overgrazing and deforestation (Grainger 1990). Desertification invoked images of marching deserts and humans causing deserts to occur through unsustainable use of land (Reynolds & Smith 2002). In the ensuing decades these assumptions began to be challenged by local level empirical studies. Researchers questioned the concept of desertification and widespread regional land degradation (Hellden 1991), its scale and extent (Thomas & Middleton 1994; Rhodes, 1991), and in some cases even its existence (Binns 1990). Particularly, the role of humans in mismanaging the environment through agricultural activities and pastoralism was questioned. The studies emphasized the variability of drylands and the concept that drylands have always been non equilibrium systems, which though unstable were capable of great resilience (Mortimore & Adams 2001; Scoones 1994). After the droughts eased, remote sensing studies showed that the Sahel was recovering its vegetation, the so called 'greening' of the Sahel (Olsson et al. 2005) and highlighted the central role of rainfall variability in Sahelian environment (Hulme et al. 2001). Early debates about land degradation have also centred on the issue of scale and methods of assessment. There appeared to be a disparity between often pessimistic scientific studies of soil nutrients (Stoorvogel & Smaling 1990; Sanchez et al. 1997) and largely optimistic ethnographies of local land use practices and farmer knowledge (Tiffen et al. 1994; Fairhead & Leach, 1996). The former were criticised for large scale extrapolations from small field studies to cover whole regions, and the latter for underestimating the extent of degradation (Andersson et al. 2011).

A United Nations Convention for Desertification (UNCCD) brought into existence in 1994 as a direct result of concerns after the droughts, is one of three main UN conventions on the environment (including biodiversity and climate change) and all three are interrelated (Grainger 2009; Andersson et al. 2011). Global institutions like the United Nations are thought to be largely responsible for institutionalising the concept of widespread land degradation in Africa

and minimising the importance of drivers such as rainfall, in favour of neo Malthusian narratives of overpopulation and human misuse of land through overgrazing and deforestation and soil nutrient depletion (Adger et al., 2001; Mortimore & Harris, 2005; Swift et al., 1996). There is now an understanding that though human activity causes land use change, it does not always lead to degradation. Attributing degradation to single anthropogenic factors like population growth, expansion of cultivation, livestock grazing, and nutrient mining, or climatic factors such as drought and rainfall variability is simplistic (Lambin et al. 2001). Drivers such as population growth and conversion of woodland into farms may induce positive effects such as intensification and soil conservation, rather than degrade land (Tiffen et al. 1994).

In recent times, even the UN rhetoric has shifted from declaring over 70% of drylands are degraded to an acknowledgement that the extent and impact is uncertain (UN 2011). Decades after the Sahel drought, there is now recognition that dryland systems are complex, resilient and variable (Batterbury & Warren 2001; Mortimore & Harris, 2005). The era of 'desertification' is deemed to have passed (Bolwig et al.2009; Mortimore et al. 2009). Nowadays, outside of international political circles and especially in academic circles there is a strong preference for the terms land degradation or dryland degradation over desertification, because of the political baggage and misunderstandings desertification is thought to carry.

Nevertheless, degradation does occur, albeit in specific places at specific times (Bolwig et al. 2009). Scale is particularly crucial, as degradation for a few fields may not mean degradation for the entire village, and local degradation cannot be extrapolated to cover whole regions. What is not in dispute is that where it occurs it has the ability to impact upon rural livelihoods. In Africa, there is emphasis by both researchers and policy makers on soil erosion, soil fertility decline, and also on vegetation loss through agricultural expansion (Reij & Smaling 2008; Lambin et al. 2001). Soil fertility decline is thought to be the major reason sub Saharan Africa is the one region in the world where food production has not improved in the last three decades.

(Sanchez 2002). Smallholder farmers can face the challenge of land degradation because of its impact on food security and agricultural production (Andersson et al. 2011) and land degradation is thought to be a significant problems in some drylands around the world (Stringer and Dougill 2013).

In northern Nigeria today, land degradation is the lens through which environmental change is viewed and environmental issues are framed. According to Mustapha (2003) the concepts of a 'creeping desert' and soil nutrient depletion are the two main concerns that mark official perceptions of the environment in northern Nigeria, and have led to government afforestation programmes which have had little effect in addressing the problems of local land users. Despite the assertion that small holder farmers are resilient in the face of environmental shocks and are still in business decades after the Sahel drought (Mortimore a & Adams, 2001), recent studies have shown that in many parts of the drylands including the Kano region, growing economic and environmental pressures are testing this resilience (Maconachie & Binns, 2006; Maconachie, 2007).

1.2.1 Land Degradation as a social construction

Land degradation has been described at various times as elusive (Andersson et al. 2011) relative (Gray & Morant 2003), contextual (Warren, 2002) and socially constructed (Stocking & Murnaghan 2001) and because different classes of people use and perceive resources in different ways, it is socially defined and perceptual (Blaikie & Brookfield 1987:26). Local land users' perception of environmental change and land degradation are affected by a variety of factors. Location, ecology, type of land users, type of land use, characteristics of the land manager and the resources available to them are all influential considerations. Degradation for one group of land users might mean quite the opposite for another. According to Warren (2002) it can only be assessed "in its spatial, temporal, economic and cultural context". Degradation is

therefore in the eye of the beholder and subject to interpretation. There are social and institutional dimensions of land degradation, and spatial and temporal variation in people's perception and assessment of land degradation (Batterbury 2001; Osbahr & Allan 2003; Scoones 1994). Consequently this leads to what has been called the 'multiple realities' of land degradation because perceptions of local people are multiple and varied (Maconachie 2012a). Conflict and mismatches occur not only between local perceptions of land degradation within a community, but also between land users, scientists and policy makers.

Human and environmental systems are understood to be coupled; land degradation is caused by both biophysical and social drivers (Reynolds et al. 2007). Current land degradation frameworks such as the Dryland Degradation Paradigm (DDP) (Reynolds et al. 2011) emphasize the linkages between ecological and social issues and focus not only on the biophysical but the human aspects as well. They also advocate placing a larger value on local environmental knowledge which is central to many land managers (Nkonya et al. 2011). The type of land manager and their social and economic circumstances determine their responses to degradation. Blaikie and Brookfield (1987) point out that the access to resources and endowments that regulate degradation can vary between groups and this shapes the impact of losses from degradation, and the responses made as a result. What has emerged therefore is that land degradation is a social and economic concept as much as a physical and environmental one, and this further reinforces the premise that environmental relations are social relations. The role of land managers is central, because decision making about the land rests on them, and in the research areas some of these land managers are women, though their decision making is often mediated by men.

1.3 Gender and environmental change

An understanding of the different roles and responsibilities of both men and women is vital in examining their different (and similar) environmental knowledge and the way they perceive

environmental change. But not all women are the same, as they are differentiated by various factors including age and their socio economic status. The heterogeneity of women is a point underlying many of the current approaches to the study of gender and environmental change The gendered nature of access to and control of the natural resources in many rural societies has been acknowledged for decades now (Agarwal 1995, Leach 1994, Jackson 2003, Wangari et al. 1996, Rocheleau & Edmunds 1997, Resurrection & Elmhirst 2008, Nightingale, 2006, Nightingale, 2011).

It has been established that gender is an important variable in environmental change because the different roles and responsibilities that men and women have and because their relations of property and resources affect their experience of the environment. Because gender influences vulnerability to environmental degradation, the impacts of environmental change on both men and women can better be understood by examining gender relations. Gender relations refer to the social construction of men's and women's relations with each other and the power relations inherent therein (Jackson 2003). They influence the use and management of natural resources, creating a two way relationship with environmental change- one shapes and is in turn shaped by the other (Green et al. 1998; Nightingale 2006). In relation to provision of ecosystem services gender differences have been noted in environmental values and in the perception of the environmental change (Hunter et al. 2010). Factors such as age, gender, and locality and education influence people's ability to recognise ecosystem services and the importance they attach to the different types (Hartter 2010).

Despite the widespread recognition of the social constructions of land degradation and how perceptions and responses differ between different types of land users there has not much research on how social differentiation of gender affects it as a whole. Where research includes gendered dimensions, it usually focuses on yield differentials, differences in access to inputs such as fertilizers and seeds, capital and land for production and differences in productivity

(Peterman et al. 2010; Croppenstedt et al. 2013). With respect to land degradation, there have been few studies on gender differentiation, given the different roles and responsibilities and the sometimes stark divisions of labour in natural resource management between men and women. A gendered analysis of any particular form of environmental change such as land degradation must be context specific and reflect the daily lives of a particular group of women (or men) of different ages and class and other categories of social differentiation, and understand that women and men have both similar and different interests in the environment (Jackson 1998). Resurrection & Elmhirst (2008:7) argue for a "context specific and historically nuanced understandings of the relationship between specific groups of women with specific environmental resources... mediated by their complex relationship with men, kin and other social actors". Such an analysis would require an examination of certain concepts; division of labour, responsibilities, incomes and decision making; access to natural resources such as property rights and the right to use of labour, access to capital, the role of formal and informal institutions such as marriage and domestic groups and the micro political economy, division of income and decision making and also a consideration of ecological characteristics of the areas (Carr 2008; Leach et al. 1995; Jackson 1995).

1.4 Research Focus

Nigeria is a particularly relevant case study for land degradation because it is the most densely populated area of the West African Sahel so a relatively high pressure on land and ecosystem services could be anticipated. Secondly it receives little aid from foreign donors due to its oil wealth; aid accounts for just 1% of its GDP (DFID 2009). State investment in the poorer northern half of the country is an important pillar of nation building in post-colonial Nigeria, and it is funded by central government revenues largely financed by the oil industry based in the south. As mentioned earlier, a number of studies of people and environment in northern Nigeria have taken place in the Kano region, where agriculture is the main stay of livelihoods and

majority of farmers are men. These detailed studies have usually focused on these visible male farmers partly because with some rare exceptions such as Longhurst (1982) women are inaccessible to the mainly male researchers. This stark separation of public and private domains has led to some sort of dichotomy in research in northern Nigeria. On one hand studies relating to people's use of the environment, dryland resilience and adaptation in the face of environmental change (Mortimore 1989), agriculture and agricultural intensification (Mortimore & Adams 1999; Mortimore et al. 1999), dryland forestry (Mortimore & Turner 2005), fuelwood use and consumption (Cline-Cole et al. 1990a; Cline-Cole et al. 1990b) and soil nutrient management (Harris, 1998; Mortimore & Harris 2005) have focused on men. By so doing they reflect an understanding of existing gender divides. Mortimore and Adam's (1999) long term study of environmental change in northern Nigeria touched briefly on women, but acknowledged the paucity of data in areas where women were secluded. With respect to trees and forestry, Cline Cole (2000) contends that women in the drylands of northern Nigeria are missing from many forestry discourses despite the importance of trees and tree products to their livelihoods.

On the other hand, research on women tends to focus on examining cultural and social norms and practices such as marriage and divorce (Solivetti 1994) seclusion and mobility (Robson 2000; Imam 1993; Werthmann 2002; Callaway 1984), household trade and economic activities (Schildkrout 1983; Hill 1969) and food processing and women's work (Longhurst 1982). Some research has sought to bridge this gap such as Jackson's (1985) study of secluded and non-secluded Hausa women in an area undergoing a large scale irrigation and commercial farming project and Schroeder's (1987) examination of the women's vulnerability to drought, but there have undoubtedly been many changes in the thirty odd years since then. A more recent study of land degradation in the region included women as a subset of analysis of various social actors, but the analysis focused largely on male farmers' responses (Maconachie 2007).

This study takes place in an era of official rhetoric of widespread environmental change and land degradation in the region and will examine three different aspects of land degradation from the land users' perspective- perception, impact and response. It will adopt the view of land degradation that relates it to a persistent reduction in the goods and services that the dry-land ecosystem provides. These include rainfall, crop yield, fuelwood, tree and tree products, livestock and fodder, soil nutrients and soil fertility. This research focuses on soil, vegetation and on the capacity of the dryland ecosystem to provide goods and services and the perception of the local land users on the environment's ability to do just that. The research works on the hypothesis that perceptions and responses to land degradation is mediated by gender relations at the household and wider community levels and that women and men use the environment (and perceive environmental change) in different ways in relation to the goods and service it provides, and would be affected differently by land degradation and employ different strategies in response to it. These differences (or similarities) are influenced by their different roles and responsibilities in the household and in society and by gender relations, and are rooted in the material realities of their daily livelihoods. These are examined in the context of two communities which though similar in many ways have important differences in ecology as well as in the social construction of gender roles.

The study explores male and female farmers in 2 communities in Kano State. In one community women cultivate fields using hired labour, acting as land managers and farmers by proxy, but do not work on fields. In the second community, women work on fields cultivating their own crops and also as wage labourers. Seclusion there is less strict and there are fewer restrictions on their mobility and type of work they can do. However in both communities, the majority of the men are farmers and women's relationship with the environment is to varying degrees mediated by men. Therefore in a region where traditionally women are not hewers of wood, drawers of water and tillers of soil, the research asks the following questions.

1. What is the official view of land degradation in northern Nigeria and how does it compare to local perceptions? Are the ensuing policies relevant to the needs of farmers?
2. How does the gendered access to resources and division of labour affect men and women farmers' land management practices? Are women more disadvantaged than men by effects of land degradation where it occurs?
3. To what extent does the socio economic, demographic, ecological, and cultural differences such as seclusion among different groups of women farmers shape their natural resource use and access, and perceptions of degradation?

1.5 Thesis Structure

This chapter has introduced the research and the concept of land degradation, explained why the study was undertaken and what makes it relevant, and briefly situated it in the wider literature. The rest of the thesis consists of six chapters:

Chapter Two is the theoretical discussion and literature review. It examines the use of political ecology in studies of land degradation, explores gender and environment theories and emphasizes some key aspects of each that are significant to the study. It traces the history of gender and environment in literature, and reviews various conceptual frameworks which provided the theoretical underpinning of the study.

Chapter Three details the methodology used in the study, and outlines the characteristics of the study sites and the rationale behind the choice of villages, as well as sampling techniques and the techniques used in data collection and analysis. It also addresses issues of ethics and positionality.

Chapter Four situates land degradation in the northern Nigerian context, and examines government and NGO understanding of land degradation and how this is translated into intervention

projects in the community. It also explores the gender differentiated impacts of these programmes.

Chapter Five describes the historical and contextual background to seclusion and presents women and natural resource use in both communities, their agricultural practices, their access to land, labour, division of roles and responsibilities. Finally it examines whether there are gender differences in their environmental knowledge of soil and vegetation and reflects on their farming and off farm livelihood options.

Chapter Six will examine land degradation as understood by men and women in the study villages and what they perceive to be the main ecological problems affecting their livelihoods. It will consider the differences and similarities within these views and explore the importance of these.

Chapter Seven applies the environmental entitlement framework to examine women's access to and control over the vital resources of agricultural production such as land, livestock and fertilisers and the formal and informal institutions that mediate access to these resources. It also examines the importance of off farm livelihoods and social capital in women's livelihoods.

Chapter Eight presents discussions and conclusions of the study. It brings together the findings of the study and identifies the key contributions to knowledge, as well as implications and recommendations for policy.

Chapter Two: Theory & Literature Review

2.1 Introduction

This chapter outlines the theoretical underpinnings of the research, as well as a review of the relevant literature. It is divided into 3 subsections. The first section traces the evolution of political ecology in research on environment, focusing on the influence of discourses and de-construction of orthodox views of environmental change. The second part focuses on gender and environment theories and the aspects of those relevant to the research. The third section explores the concept of the household and women's agency within them. The 3 sections broadly reflect the focal points of this study ranging from the state to the community and finally the household level.

2.2 Political Ecology: Emergence

Political Ecology (PE) emerged as a field of research in the 1970s to address ecological issues within the context of local production and global economic systems (Paulson et al, 2003). It began as a critique of neo Malthusian explanations of environmental change and its causes and effects and developed on the strength of offering alternative explanations for narratives of over-population and degradation prevalent at the time. For much of the 20th century, the concept of equilibrium and balance of nature had dominated ecological studies and environmental re-search. Several influential publications raised the spectre of resource depletion and ecological catastrophe based mainly on Malthusian concepts of overpopulation (Ehrlich & Club 1971; Ehrlich & Holdren 1971; Meadows et al. 1972). In Africa and the Sahel in particular, the drought and famines of early seventies seemed to confirm these fears and crises scenarios. The victims of these droughts and famines were largely thought to be responsible for the degrada-tion of the natural resource base by overgrazing, over cultivation and overpopulation. The trag-edy of the commons (Hardin 1968) had come to pass. Images of starving Africans and refugees were according to Watts (2013: xxvii) 'draped in the sackcloth of Malthusian overpopulation'.

At about the same time, there was an alternative ecological theory developing. While hitherto, notions of equilibrium and climax vegetations and populations governed ecosystem studies, the new ecological principles highlighted the complexity and the spatial and temporal variations inherent in ecosystems such as drylands (Zimmerer 1994; Peet & Watts 1996). This new ecology advocated the concept of dynamic, non-equilibrium systems. Environmental change therefore was not tantamount to environmental degradation.

PE arrived at 'exactly the right moment' as a result of a confluence of several factors according to Robbins (2012), namely; environmental issues such as deforestation and soil degradation were increasingly seen as having global consequences , cultural ecology was no longer considered adequate to explain environmental change; and the growing influence of hazard and disaster research, and of peasant studies. A new approach was needed and political ecology was born. This birth was heralded by Watts (1983a) *Silent Violence*, Blaikie's *Political Economy of Soil Erosion in Developing Countries* (1985) and Blaikie & Brookfield's *Land Degradation & Society* (1987) which are largely considered to be the foundational texts of political ecology (Paulson et al., 2003). In what is its most widely used definition, Blaikie & Brookfield (1987:17) assert that:

> 'Political ecology combines the concerns of ecology and a broadly defined political economy. Together this encompasses the constantly shifting dialectic between society and land based resources, and also between classes and groups within society itself.'

The central notion of political ecology is that in many contemporary environmental problems politics is important in understanding the link between human action and environmental degradation (Bryant 1998). PE was a paradigm shift according to Forsyth (2008), because it allowed researchers to criticise and question scientific and official explanations for environmental issues such as soil degradation. According to Robbins (2010:38)

> 'The lens through which environmental problems are constituted and projected inevitably assigns specific causations and empowers and disempowers different actors. Behind every story of environmental crisis, therefore is a narrative of political and social control.'

Political ecology is also concerned with how power relations are reflected in discourses on ecological processes like deforestation and soil erosion, and how crisis narratives facilitate control of people and environments by powerful actors such as states and international organisations (Robbins 2004; Adger et al. 2001; Bryant 1998; Forsyth 2003, Brookfield & Blaikie 1987). In his comprehensive review of political ecology research, Robbins (2012) identifies the key theses in the wide field of PE. These theses are examined in multiple ways in the various phases of political ecology research that has developed since its emergence. These are described in Table 1 below.

Table 1: Five theses of political ecology and the things they attempt to explain (Source Robbins 2012:22)

Thesis	***What is explained?***	***Relevance***
Degradation and marginalization	*Environmental conditions* (especially degradation) and the reasons for their change	Environmental degradation, long blamed on marginal people, is shown in its larger political and economic context.
Conservation and control	*Conservation outcomes* (especially failures)	Usually viewed as benign, efforts at environmental conservation are shown to have pernicious effects, and sometimes fail, as a result.
Environmental conflict and exclusion	*Access* to the environment and conflicts over exclusion from it (especially natural resources)	Environmental conflicts are show to be part of larger gendered, classed, and raced struggles and vice versa.
Environmental subjects and identity	*Identities* of people and social groups (especially new or emerging ones)	Political identities and social struggles are shown to be linked to basic issues of livelihood and environmental activity.
Political objects and actors	*Socio-political conditions* (especially deeply structured ones)	Political and economic systems are shown to be underpinned and affected by the non -human actors with which they are intertwined.

Robbins elaborates on the five thesis outlined in Table 1. The first thesis views increasing globalisation and market demand as responsible for transforming hitherto sustainable local production systems to environmentally unsustainable ones. In the second thesis, local natural resources are hijacked by states' conservation efforts and local practices are labelled unsustainable In environmental conflict and resolution, groups categorised by gender, ethnicity or class

are pushed in conflict because of scarcity of resources - resources which have been usurped by the state, private firms and wealthy individuals. In the fourth thesis, a change in environmental actions can create new environmental subjects who are connected to each other by their shared environmental actions cutting across social differences such as of race and class. In the political objects and actors thesis, institutions and individuals can become all powerful actors and gain massive influence, and resistance to this power can arise from marginalised actors (Robbins 2012: 23-25)

In its early years political ecology was synonymous with research on land degradation, not least because it is the focus of PE's foundational texts (Blaikie 1985; Blaikie & Brookfield 1987). The multidisciplinary nature of PE was suitable to study the concept of land degradation, because land degradation covers a multitude of disciplines (for example soil science, forestry, and hydrology and plant biology and the social sciences) and much early work centred on rural production systems and environmental change in the third world, where land was a central resource. PE highlighted the multiple perceptions of researchers, governments and local people in issues of land degradation. Later the central concepts of this field focused on the examination of environmental narratives and crises, and the subsequent deconstruction of such narratives. Land degradation has traditionally been associated with environmental narratives, especially that of desertification. The evolution of the research focus of political ecology is discussed next.

2.2.1 Stages of Political Ecology Research

Forsyth (2003) and Jones (2008) identify two broad themes in PE research on environmental change; a structuralist explanation involving capitalism and state policies (Blaikie & Brookfield 1987; Blaikie 1985; Watts 1983a), and a post structuralist one with emphasis of environmental history and the way environmental ideas came into being (Leach & Mearns

1996; Hoben 1995). Much early PE focused on the global south, a so called 'third world political ecology (Bryant & Bailey 1997). The first phase of PE research, from late 1970's to early 1980's (Bryant 1998), focused on structural explanations for environmental change, and were based on neo Marxist concepts of global capitalism and accumulation and the power relations inherent within. Watts, for example, was unashamedly Marxist in his study of famines in northern Nigeria, which according to him, were a product of colonial policies of capitalist production which had undermined rural producers and increased their vulnerability and eroded the moral economy (Watts 1983a; 1983b). Blaikie (1985) and Blaikie and Brookfield (1987) showed how national policies linked to unequal power relations of global capitalism was responsible for the actions of land users -'a chain of explanation' from local to the global level. The 'chain of explanation' outlined changes to soil and vegetation and their economic symptoms, showed how these were connected to land use practices and individual decisions, and how these were in turn affected by state and international forces.

In the early 90's there was a divergence from structuralist explanations of environmental change to a second phase of PE research (Walker 2005; Bryant 1998). The concepts of a 'new ecology' lent itself to poststructuralist era of PE. Studies focused on the examination of discourse, knowledge and power relations (Peet & Watts 1996). Concepts such as carrying capacity of rangelands (Behnke & Scoones 1992), deforestation (Fairhead & Leach 1996) and soil erosion (Zimmerer 1996) were subjected to discourse analysis and the lens of environmental history. This poststructuralist research was based on a mix of ethnographic local level studies of rural production, agricultural systems, forestry and natural resource management. It also focused on discourses and the power relations between actors in environmental issues. This new focus led to the deconstruction of dominant narratives of environmental change especially in Africa, what Leach & Mearns (1996) refer to as received wisdoms. In Guinea Bissau, Fair-

head & Leach (1995) showed that deforestation policies were based on an erroneous assumption that locals were destroying forests, when they were in fact creating them from savannah. Swift (1996) examined how the desertification narrative was based on old colonial assumptions that Africa was drying up and how the narrative serves the interests of three major actors, state governments, usually African, aid bureaucracies like the UN, and some groups of scientists, and provided a convenient meeting point for these groups of actors and gave them legitimacy in dryland policy making (Swift 1996).

Many of these policies were thought to be inadequate because they were based on erroneous assumptions. Hoben (1995:1008) observes that policy narratives are based on 'historically grounded, culturally constructed paradigms that at once describe a problem and prescribe the solution' (Hoben, 1995:1008). He points out that they are more powerful in developing than developed countries, because their environmental policies were promoted first by colonial regimes and then by donor agencies. According to Roe (1991:288) 'the more uncertain things seem at the micro level, the greater the tendency to see the scale of uncertainty at the macro level to be so enormous as to require broad explanatory narratives that can be operationalized into standard approaches with widespread application'. Roe notes how narratives become plausible assertions and their application is justified 'on the basis of long experience and observation' (Roe 1991).

In the African drylands, examination of degradation discourses led to more nuanced explanations of taken for granted degradation and a questioning of policies formed on those basis such as: soil erosion in Niger (Warren et al. 2001), fuelwood and desertification in Mali (Benjaminsen 1993), land degradation in Ivory coast (Basset & Zueli, 1999), degradation in Botswana (Dahlberg 2000), carrying capacity in rangelands of southern Africa (Behnke & Scoones 1992), land degradation and poverty in Swaziland (Stringer 2009), and in northern Nigeria, soil nutrient depletion (Mortimore 2005), the fuelwood gap (Cline Cole 1990) and dryland forestry

(Cline Cole, 1996). For example the influential study by Tiffen et al. (1994), demonstrated that in Machakos, Kenya, increasing populations- far from being a cause of degradation- led to agricultural intensification and innovation, the so called 'Machakos hypothesis'. The hypothesis posits that under certain conditions, there are positive linkages between population growth, environmental conservation and economic output. Population growth can lead to a turnaround in environmental degradation and increase in agricultural output (Tiffen et al. 1994; Mortimore & Tiffen 2004).

In northern Nigeria Mustapha (2003) notes that environmental policy is dominated and shaped by a 'colonial mentality' which is often at odds with the situation on the ground at the local level. This colonial mentality has also been observed to shape environmental policies in other African countries. For example, Carswell (2003) argues that environmental crisis narratives that have their roots in the colonial period still prevail in Uganda and form the basis of contemporary environmental policy making. As Leach & Mearns (1996:9) note the "the ideas that drive contemporary environmental policy making in Africa can be traced back to early colonial times". According to Swift (1996), NGOs, governments, donor agencies and independent "experts" all have their interests served by the existence and persistence of the desertification narrative and these are groups which wield a lot of power. The dislodgement of received wisdom is difficult when it is tied to donor funding, the so called "greening of aid" and NGO funding is often linked to promoting received wisdom (Swift 199; Wood & Lenne 2005).

One received wisdom that relates to populations and vegetation is the fuelwood orthodoxy or the fuelwood gap which suggests that the demand for fuelwood from increasing populations will eventually exceed the ability of natural resources to supply it- a gap between supply and demand (Cline –Cole 1990). Research has called into question the deforestation and fuelwood orthodoxy, especially in Africa (Bassett and Zueli 2000; Benjaminsen 1993; Fairhead & Leach 1996). In Nigeria, deforestation leading to desertification is thought to be largely assumed,

rather than proven (Cline-Cole et al. 1998). On the other hand, more recent research indicates that the reliance of the majority of the population on fuelwood for energy and its effect on land degradation cannot be entirely dismissed (Maconachie et al. 2009). A greening of the Sahel has been observed and rainfall and vegetation trends between 1982 and 2003 showed positive greening trends for some parts of Africa (Herrmann et al. 2005; Olsson et al. 2005).The few areas showing negative trends were concentrated in northern Nigeria and Sudan, i.e. showing less than expected increase in vegetation with rainfall, and it is thought this may be due to human induced changes (Herrmann et al. 2005).

Adger et al 2001 argue that most policy is on land degradation in the drylands is based on the Global Environmental Management (GEM) discourse, whose key themes are that local land users are both victims and culprits in degradation, and scientists and international agencies and the state can provide solutions. These solutions include external interventions through technology and knowledge transfer, and international agreements and regulations such as the UNCCD. A second, populist discourse, they note, sees local people as capable users of land, having the capacity to make good environmental and economic decisions and victims only of foreign and global influences. The critical or 'denial' discourse questions the concept of anthropogenic factors and views dryland degradation as largely a result of climatic factors, while at the same time championing the resilience and adaptive capabilities of local land users (Adger et al, 2001). The key discourses and their concepts are summarised in Table 2.

Table 2: Environmental Discourses: Adapted from Adger at al 2001

Discourses	Key Themes
Global Environmental Management (GEM)	• Land users are causal agents of desertification through over-population and overexploitation • Land users also victims of vicious cycles of poverty and degradation • External interventions needed through transfer of knowledge, technology and finance – by scientists, aid agencies and state • International agreement and regulations key feature of solutions
Populist	• Degradation caused by colonial and neo-colonial exploitation of resources- uneven trade terms and global capitalism • Land users are the victims of such exploitation • External intervention aggravates the problem • Solutions to be found locally
Denial	• Questions the existence and gravity of desertification • Favoured by researchers, marginal policy impact • Resilience and flexibility of land users key feature • Local land users not responsible for degradation

2.2.2 Critique of Political Ecology

Political ecology is so eclectic that it is difficult to say if it is a theory or a method or can only be described as a body of practice (Robbins, 2012). PE as a research field has not been without fierce criticism. It has been challenged at different times as being atheoretical, too broad and undefined, and lacking in politics or lacking in ecology. Because of its integration of diverse fields of study, from agricultural systems to feminist development studies, political ecology research has come under pressure for being too broad. Walker notes that it is 'so diverse in its objectives, epistemologies, and methods,' that it 'lack(s) any single coherent theoretical approach or message' (Walker, 2006). Walker further likens it to an elephant in a room of blind men, each one with a description different from the others.

In the early 90's, there was much criticism of PE as lacking in politics and insensitive to class issues (Peet & Watts, 1996, Moore, 1996). Specifically, Peet & Watts (1996) alluded that much PE research, especially in the edited *Land Degradation & Society (*Blaikie & Brookfield, 1987*)* was 'without politics or an explicit sensitivity to class interest and social struggle' (Peet &

Watts, 1996:8). This lack of micro politics was to be addressed in an improved version of political ecology, a confluence of discourse theory and post structuralism which they called liberation ecologies. The concept of liberation ecologies was influential in subsequent research, and it can be said to have become absorbed into political ecology becoming part and parcel of its development and progression.

On the other hand, subsequent PE research was seen to have overcompensated for earlier criticism of lack of a certain kind of politics by leaving out much of the ecology**.** Some of its most stringent critics such as Vayda and Walters (1999) labelled it "politics without the ecology", because of the emphasis on environmental politics with only a glancing mention of ecology (Vayda and Walters, 1999). Zimmerer & Basset (2003) note that in much of present political ecology research; it is hard to find a convincing fusion of the political and the ecological.

A common challenge to PE is that it presumes a priori association of global capitalism and environmental degradation in developing countries (Walker 2008; Forsyth 2008). Forsyth (2003) posits that many studies in political ecology are quick to dismiss notions of environmental problems such as soil fertility loss associated with positivist research on the environment, and maintains that deconstructions do not mean that environmental problems do not exist and affect lives and livelihoods, or that everything land users do is right and should be justified. Though Forsyth acknowledges that relating science with politics brings accusations of being 'epistemologically relativist', he conceptualises a 'critical' political ecology which integrates local environmental issues with scientific environmental investigation, using science in ways that are 'politically neutral' to integrate biophysical science with social and political constructions (ibid), although the possibility of this political neutrality has been questioned (Robbins, 2010).

In the same vein, Benjaminsen et al. (2010) note that to be relevant, political ecology should be concerned with the examination of all narratives, not only those with neo Malthusian connotations. They demonstrate this critical political ecology in a study of cotton production in Mali, where they found no link between capitalist cash crop production for global markets and loss of soil fertility.

Perhaps the most stinging criticism of political ecology as a research field is that despite its popularity with researchers of environmental issues, it has failed to have any appreciable impact on policies in the regions of studies. Governments, NGO's and environmental agencies have escaped the influence of political ecology research. According to Walker (2006) this may be because political ecologists make little effort to engage policy makers and have largely confined themselves to the academic world. They do not spin their own narrative where it matters in a way to engage the public and have influence the way the others do. The vast range of research that comes under the PE canopy is also a factor in this lack of influence.

However the broad nature of political ecology may be one of the reasons why it holds appeal to researchers on environmental issues. This means that it does not remain static and inflexible, but adapts itself to changing circumstances in global ecology and in this way ensures and maintains its academic relevance.

2.2.3 Constructivism in Political Ecology

According to Robbins (2012) a lot of political ecology assesses and interprets not only environmental change, but the impact of *ideas* about environmental change as well. This is where the issue of social construction becomes salient. Robbins contends that most political ecology research lies somewhere between what he calls hard or radical constructivism which contends that social context alone creates nature and power determines facts or truth, and soft constructivism which posits that it is possible for science to reveal the facts about environmental issues like soil erosion or soil fertility, and for social analysis to reveal how these facts are framed

(ibid). According to Robbins, a PE compromise is 'social institutional constructivism'. It is an 'epistemological compromise' that posits that there are different knowledges and experiences, from pastoralists to farmers, soil scientists to biologists, and that 'these knowledges can be adjudicated by incorporating local ways of knowing into a flexible but rigorous scientific framework, which will distil myths from realities and produce better, more emancipatory knowledge' (ibid :129). Robbins acknowledges the risk that such studies carry a preconceived notion of government and capitalist knowledge being constructions, and local farmers' knowledge being the truth.

2.2.4 Environmental Degradation studies in Nigeria

According to Blaikie (2012), much farming systems research over the last 50 years are standard political ecology because they examine, 'multi-disciplinary perspectives on adaptation to environmental change, the market, population growth – all key issues in political ecology but explored from quite different perspectives and disciplinary backgrounds without so much as a mention of PE'. In this vein, a lot of research on the environment and natural resource management in northern Nigeria can be termed PE- retrospectively (Blaikie 2008). One of the classical works of political ecology was Watts (1983a, 1983b) study of famine and food production in northern Nigeria mentioned at the beginning of the chapter. In environmental change the most influential and widely cited work is that of Michael Mortimore and his colleagues. Mortimore's long term studies on the northern Nigerian environment and on the Kano Close settled zone in particular spanned decades, and led to many influential publications. *Adapting to drought* (1989) was based on 13 years of field work after the drought of 1969-1973 and focused on detailing the survival strategies and responses of people to the drought and famine that accompanied it (Mortimore 1989). It was noteworthy in its refusal to place the blame on the local population as was the conventional wisdom at that time. Following other studies that showed the intensification and innovation of agricultural activity as a response to environmental change

and population growth, the so called 'Machakos' hypothesis (Tiffen et al. 1994). *Working the Sahel* (1999), based on the field research of Mortimore and his colleagues in several villages in northern Nigeria has become a bench mark study of dryland systems and livelihoods (Mortimore & Adams 1999). It covered soil fertility management and livelihood strategies and remains an influential study into the socio economic aspect of the dryland environments. The thesis of the book is that degradation in the drylands can be contained, and to a large extent is, by the people of the drylands themselves using the resources and capabilities available to them. Mortimore & Adams contend that an increasing population provides more of the most critical variable in dryland farming which is labour and coupled with indigenous and introduced techniques, creates a sustainable system of intensive agriculture.

Mortimore's research formed part a growing body of literature in the Sahel studying rural farming systems and highlighting the adaptive responses and resilience of local people to environmental change in their use of labour, crop diversity and livelihoods strategies. Related studies focused on the intensification strategies of farmers (Mortimore & Adams, 2001; Mortimore, 1993) and on the relationship between land degradation and population growth (Mortimore, 1993). More recent long term studies directly challenged the concept of desertification in the drylands of northern Nigeria and three other countries in sub Saharan Africa. They contested the concept of desertification as a result of exploitation of natural resources by examining rainfall records, crop yields and population growth patterns over a 40 year period (1960-2000), and concluded that rainfall variability had the most important influence on annual crop yield (Mortimore & Turner 2005; Tiffen & Mortimore 2002). They found no evidence of declining crop yield that was not linked to rainfall variability and their results did not support the theory that increasing populations has led to widespread degradation or a decline in crop yields.

Since desertification is seen largely as degradation of soil and vegetation, soil degradation studies also formed an important aspect of research on environmental change. Such studies usually

involved analysis of physical and chemical properties of soil. Essiet (2001) analysed soil samples from farms in the drylands to examine the sustainability of agriculture, and concluded that sustainability could be maintained as long as measures were taken to conserve the soil against erosion. Other studies into the management of soil fertility on small holder farms, explained how farmers manage nutrient flows into farms and achieve sustainability through crop and livestock integration (Harris 1999; Mortimore & Harris 2005), and the use and management of manure (Harris & Yusuf 2001). Hoffman et al. (2001) also describe how farmers in Zamfara manage soil fertility by combining crop planting patterns and application of farmyard manure and livestock corralling. This is in stark contrast to the long held views that an increasing population leads to environmental degradation by increasing pressure on natural resources to provide food and energy – the neo-Malthusian view.

The conventional wisdom is that increasing populations lead to an increase in wood cutting for energy, and this leads to loss of vegetation. In further deconstructions of this fuelwood orthodoxy, and criticism of policies based on it, Cline Cole et al. (1990a) in their much cited book refuted the theory of a wood fuel gap in their investigation into fuelwood trade, consumption and management in Kano in the 1980s. The study also investigated the socio economic factors that determine fuelwood use, and concluded that on the contrary, there was an annual rise in the tree density between 1972 and 1981 in the densely populated areas of Kano. Further studies on the change in vegetation after conversion of woodland to farmland concluded that this conversion does not necessarily lead to a reduction in vegetation (Mortimore et al. 1999). Cline–Cole (1990b) looked at the fuel wood orthodoxy linking fuelwood use to increasing deforestation and questioned the assumption of a direct linear relationship between population growth and increased consumption of wood. Other variables such as urbanisation and demographic characteristics of the population influence this relationship.

Most of the studies enumerated above share a theme of optimism and acknowledge the adaptation and resilience of local land users, and take the stance that their land use activities do not lead to degradation. This is known as the Boserupian hypothesis after Boserup (1965), who posited that population growth can in many cases have a positive impact on the environment and lead to agricultural intensification and adoption of new technologies, rather than to degradation.

With regards to vegetation, Odihi's (2003) study in the north east noted that socio economic conditions have led to people clearing vast tracts of woodland to make way for new farms as a way of pursuing alternative livelihoods. He argues that deforestation is happening in the north east. Recent studies by Naibbi (2013) and Naibbi & Healey (2013) supports this view. Their analysis of Landsat images of vegetation in the north east areas of Yobe & Borno states show that significant vegetation loss has occurred in the past three decades, and they surmise that fuelwood use by an increasing population , and socio economic stress, as well as rainfall variability are significant drivers of this vegetation loss.

More recent research in the mould of 'critical' political ecology (Forsyth, 2003), Maconachie (2007) examined local people's knowledge and perceptions of environmental change in the urban fringes of Kano, and how these influence their land use decisions and found different interpretations of land degradation by individuals. In the two decades since the earlier cited studies which detailed sustainable land use in Kano, this study found that changing economic and social and demographic conditions may now compel farmers in drylands to unsustainable use of land. Farmers' perceptions regarding vegetation, fuelwood and decline in soil fertility and crop yield, seemed to mirror the so called orthodoxies and suggested that population pressures and land use are negatively affecting environmental change. Maconachie's study is im-

portant because it argues that global economic forces and present economic conditions in Nigeria significantly influence land use decisions of local actors, and may threaten these once resilient systems.

What is largely missing from these studies from northern Nigeria is a gendered perspective of these issues of environmental change. This research uses such a framework of feminist development theory to examine multiple perceptions of land degradation and power relations that govern access to and control of resources within the household.

2.3 Gender in Political Ecology

Feminist development theory is now one of the critical tools of political ecology (Robbins, 2004) but early PE research was criticised for ignoring micro politics between the local land users themselves and within households, and the influence of gender and class relations on issues of environmental change and natural resource management (Peet & Watts, 1996). The examination of the gendered effects of environmental change, gendered construction of environmental knowledge and the effects of environmental policies led to the development of feminist political ecology (Rocheleau et al. 1996). Many of these studies examined how access to and control of natural resources are affected by household relations and politics, and how environmental change affects and is affected by household politics (Nightingale 2003). For example, in Gambia, Schroeder (1999) showed how a change in international intervention policies in local agroforestry affected local and household politics in Gambia, focusing on gendered effects, women's income and access to land and income threatened by their husbands. Feminist political ecology and the research on household power relations will be discussed in more detail later in the chapter.

2.4 Gender & Environment Theories

The publication of Boserup's landmark book on women and economic development (1970) highlighted the central role women in Africa played in agricultural production and the difficulties and constraints they faced in accessing key resources in rural production- land, labour and technology. Women's subordination, she argued, had a direct effect on economic growth and development. This led to the rise of Women in Development (WID) approach, as a way to address the inequality and injustice faced by women in production systems and also lent it intellectual clout. Women had been excluded from development and needed to be brought in (Jackson et al. 1998).

Concern about global environmental issues such as deforestation and desertification, and the ecological disasters of the 70's especially in Africa led to increasing concern about women being the main victims of environmental degradation (Dankelman & Davidson, 1989, Reardon, 1993). The environment and women's role in its conservation became an important factor in global discourse. WID principles of special women only projects were converted to the environmental realm, the so called Women, Environment & Development (WED) perspective (Leach, 2007). Both approaches argued that gendered divisions of labour placed on women the responsibility and duties that gave them a close connection to the environment, and caring for the environment was a natural extension of their domestic duties. Women were seen as a homogenous group, leading almost completely separate lives from men. WED was inspired largely by ecofeminism, the theory that women are closer to nature and have a natural connection to the environment. Some ecofeminists viewed this connection with nature to be 'essentialist' the result of biology, while others viewed it as a social construct, but all saw the natural connection as being universal among women (Leach 2007). Ecofeminism was the dominant theory of gender and environment in the 1980s. WID and WED approaches advocated for the inclusion of women into development projects, with projects targeted specifically at them, and these approaches formed the basis of many international development projects. Some of these

projects had adverse effects, saddling women with the burden of environmental conservation (Leach 1994; Jackson 1993) and in many cases actually increasing their workloads (Agarwal, 1997; Locke 1999).

Criticism and dissatisfaction with the premise of ecofeminism and its manifestation in development projects through WID and WED led to the emergence of GAD (Gender and Environment) theories. The notion of a natural intrinsic connection and a special relationship between women and the environment was debunked by many researchers working in the developing world. The approaches were challenged for treating women as a homogenous group, focusing exclusively on women in isolation and ignoring power relations within households and the dynamics of resource access and control (Jackson, 1993, 1995, Leach, 1994, Agarwal, 1992, Joekes et al., 1995). They also recognised that women were not a universal category and were differentiated by class, age, wealth and status in their interaction with the environment. GAD's conceptual roots lay in socialist feminism (Rathberger 1990), and the idea that the social construction of production and reproduction accounts for women's subordination (Mackintosh, 1981). GAD shifted the focus from roles of women to the relationships between men and women and amongst women themselves, and 'unpacked' women into different categories, each capable of interacting differently with natural resources and the environment (Green at al. 1998). Gender relations are seen as "social constructions of how men and women behave in relation to, and in transaction with, each other, and also signifiers of power relations between men and women" (Kynch 1998:108).

The main idea of the GAD approaches is their contextual emphasis on gender –environment relations rather than universal assumptions (Leach 2007). The most influential approaches of the GAD perspective include feminist environmentalism (Agarwal 1992), feminist political ecology (Rocheleau et al 1996) and a body of work which utilises various aspects of these two

collectively termed Gender, Environment and Development (GED) or more simply, gender analysis (Jackson, 1993, 1995; Leach et al., 1995). Together, these approaches:

> 'share a more historically specific and class disaggregated view of gender in the place of ecofeminist essentialism, a more grounded materialist perspective than the culturalist emphasis in much ecofeminism, an attention to the tensions and contradictions in the ways in which women and men are positioned in their environmental relations, and a rejection of the idealizing impulses of ecofeminism (Jackson, 1998: 314).

GAD theories are not without their critics. According to Singh (2007), the GAD paradigm that governs most feminist research is subjective to the researchers' viewpoint, most of whom are western feminists. She notes that not enough importance is given to local individual women's voices, and the focus is on western values such that local values and culture are under-represented. This has been blamed on the inconsistent use of the term 'gender', often interchangeably with sex citing 'biological essentialism' or 'social construction' whenever convenient, and more importantly on the perception that feminists have viewed as inconsequential the significance of faith and the experience of motherhood in women's lives (Baden & Goetz, 1996).

GAD has also been criticised for ignoring the central role religion plays in the lives of women. According to Adamu (1999), until recently GAD's relationship with faith has been muted, and this oversight has affected its practice on the ground. Religion and development will be discussed in more detail in section 2.5.

2.4.1 Feminist Environmentalism

Feminist environmentalism was coined by Agarwal (1992) to highlight that women's relationship with the environment was not based on the ideology of their essentialist relationship with nature as expressed by ecofeminism (Mies & Shiva, 1993), but on 'material realities'. Their perceived closeness to nature and the environment was not intrinsic to their femaleness but a result of their everyday interactions with natural resources in collecting fuel and growing food. Agarwal demonstrated that in India, women's environmental knowledge reflected their livelihood priorities, for example being more knowledgeable about certain trees because they were useful for fuel and fodder, and men having more knowledge about commercial trees. Moreover

as Jewitt (2002) shows, this knowledge may not be articulated because of cultural and class restrictions and is often mediated by various restrictions on women's mobility. Women's knowledge cannot be considered in complete separation from that of men, and may vary according to property relations, relative mobility and insecurity (Jackson, 1993).

Gendered interaction with the environment and the material aspects of daily life has a significant impact on perceptions of environment and this is mitigated by local contexts (Hunter et al. 2010). Agarwal notes the class-gender effects of environmental degradation and how these may vary across communities based on ecology, divisions of labour and social structure (1992: 137).

2.4.2 Gender Analysis

According to Jackson the aim of gender analysis is to strike a balance between the division of genders and an exclusively materialist analysis which views resources as only material assets and it '...seeks to theorize not just the clear and separate social interests... of men and women but also their deep interdependencies' (1998:315). Central to gender analysis is what Leach (1991) terms a micropolitical economy of gendered resource use. According to Leach et al this refers to:

> 'a 'detailed' unpacking of differences and divisions in activities, responsibilities and rights in processes of natural resource management and use, and an examination of their interaction with gender relations. This allows for the identification of differences between groups of women as well as men, and can be applied over time to examine the interactions between changing gender divisions and environmental change' (Leach et al 1995:4)

So a gender analysis views relations of natural resource use as material as well as social relations. Land, for example is not only a material asset, but symbolises a site where social relations in the household and the wider society are played out (Jackson 2003). It recognises that though women share common experiences from their being women within the same social structure, they are differentiated by many other ways; of class, age, wealth, race or caste, and that the effects of environmental change will affect them in different ways. Women's welfare does not

always depend on that of the environment, sometimes their wellbeing and advantage lies outside of the natural resource base in a wider range of livelihoods such as in markets or in trade or other forms of employment (Green et al. 1998).

2.4.3 Feminist Political Ecology

One of the early criticisms of political ecology is that in its discussions of land users, its environmental subjects 'were overwhelmingly male, rural, third world subjects' (Paulson et al 2003:208). Discussions about the household and gender were largely absent. The emergence of feminist political ecology (FPE) brought a feminist angle to political ecology research. FPE expanded studies to include gendered relations inside households. According to Rocheleau et al. (1996), it brings together various concepts from political ecology, feminist geography and feminist cultural ecology. Feminist political ecology (FPE):

> 'treats gender as a critical variable in shaping resource access and control, interacting with class, caste, race, culture, and ethnicity to shape processes of ecological change, and the struggle of men and women to sustain ecologically viable livelihoods, and the prospects of any community for 'sustainable development'(Rocheleau et al 1996:4).

Central to this thesis is that gender mediates environmental attitudes and action and that social constructions vary according to place, class, and race (Rocheleau, 1995) In its examination of the complex interactions of gender and environment, FPE explores three key themes, gendered environmental rights and responsibilities, gendered knowledge and science, and gendered environmental politics and grassroots activism (Rocheleau et al., 1996). In this way feminist political ecology can be viewed as integrating the materialist perspective of feminist environmentalism and the micro politics of gender analysis.

Environmental knowledge of men and women might be different because they use different spaces in the landscape, or different species for their needs, and some ecosystem goods and services may be more important to women than to men. For example in a livelihood resource mapping study in the forests of Cameroon, women attached importance to resources that were of use to them in the domestic sphere, such as fuelwood, water, fruit trees and home gardens

and showed a wider knowledge about them, while men had a more extended view of the resource landscape; game hunting, agro forestry and cash crops areas dominated their maps, and they paid scant attention to areas used for food crop (Etongo and Glover 2012).

Within political ecology, at the core of most environmental issues are access to, control over and distribution of resources (Nightingale 2008). Access to resources can be controlled by some individuals, and others then gain their own access through them (Ribot and Peluso 2003). In many communities natural resource access is gender differentiated, and often controlled by men. This theme in feminist political ecology incorporates the elements of gender analysis and feminist environmentalism. The gendered impact of development projects and the way they affect household relations and politics and the allocation of resources are important in this regard. Two renowned examples of this are the work of Schroeder (1996, 1999) and Carney (1993) in the Gambia. Both provide interesting illustrations of the intersection of global, local and household politics.

Schroeder describes how international development policy to boost women's agriculture led to a surge in women's gardens and a reworking of gender divisions of labour and responsibilities. The labour intensive nature of the gardens increased demands on their labour and time but the increase in their income was welcomed by women but with it came marital disharmony and increased demands on their income from men. Women's gardens became their 'second husbands' in more ways than one, bringing income and taking up their time and attention (Schroeder 1996). Years later, a change in development policy to reflect global environmental concerns shifted the focus of development agencies from women's gardens to agroforestry (Schroeder 1999). This enabled men to exploit this 'favorable shift in development ideology and practice' (1999) to re-establish claims on land by growing trees on gardens and extending women's existing labour obligations on the gardens to their trees.

Carney (1993) documents how an irrigated rice project aimed at agricultural diversification failed to take into account gender divisions of labour at the local level that designated rice as a female crop. Increasing commercialisation of rice production and the prospect of increased income effectively brought men in and pushed women out to vegetable farming. Men however could still demand rights to women's labour on the rice farms, often at the expense of their vegetable fields. Women protested by withdrawing their labour from irrigated fields.

Jackson's (1985) account of Hausa women on an irrigation project in northern Nigeria illustrated the differential impact of the same development project on two groups of Hausa women, Muslim and non-Muslim. Traditional divisions of labour meant that Muslim women did not work on household fields and non-Muslim women did. The project increased the latters' workload on household farms and meant that they had less time to work on their own private fields and in their traditional beer brewing businesses. Some Muslim Hausa women on the other hand, were able to take advantage of extra work on food processing and increase in raw material for their businesses, and increase their incomes (Jackson 1983).

Elmhirst (2011) notes that despite its trumpeted emergence in the 1990s, FPE failed to gain traction since then because of concerns about feminist labelling of research in some regions, and more crucially the increasing conceptualisation of gender not as a central category, but as just one of many identities such as class, race and ethnicity. In recent times there has been a resurgence of new feminist political ecologies that focuses on the body and women's subjectivity and agency (Elmhirst 2008). Contemporary feminist political ecologists such as Nightingale (2003, 2008) have focused on reciprocal production of gendered subjectivities and environments. She notes that 'ecological conditions in part produce the material and symbolic work practices that constitute gender and other subjectivities, at the same time that the contestation and performance of subjectivities shape ecological change' (2008:32). These studies that

focus on subjectivities take the view that gender derives its meaning from the way it is performed, and it is performed not in isolation, but with other subjectivities such as race and class, and that for example, it is in the performance of gender and caste that environments are produced or changed (Nightingale 2008). Nightingale argues that for gender to be relevant at all in environmental issues, it must be seen as a 'process' that produces these changes and is produced in turn (Resurrection & Elmhirst, 2008) . Gender as performance is influenced by the work of Butler (1988) who considers even sexual difference to be constructed. Butler posits that gender is neither natural nor constructed but an 'act', a performance that is constantly repeated in a right or in a wrong way depending on society (1988: 531).

Leach (1997) argues that though ecofeminist and WID principles that governed international gender- environment perspectives in the later part of the 20th century have all but disappeared, so has the emphasis on gender as understood by the GAD proponents. Gender is seen to have lost its edge (Resurrection & Elmhirst 2008). According to Cornwall (2007: 76), its 'bite' has been dulled by a history of misuse in development projects, and further notes that the issue of power in gender relations has been buried under 'linguistic obfuscations' and that:

> ' 'Gender' has become a catch all term for a plethora of competing meanings and agendas, shorthand for which the longhand has either been forgotten or was never really clear in the first place' (Cornwall 2007:70).

Kandiyoti (1996) credits this to the recognition by development practitioners of local people's conceptions of categories of men and women that they find on the ground, which in many cases accept biological essentialisms. She notes that 'the messiness of social reality has always exceeded the explanatory power of (the) conceptual framework' (1996: 146).

In the redefinition of gender as a process, contemporary FPE may be guilty of the 'linguistic obfuscations' that Cornwall talks about. No doubt sometimes gender is performed in various ways such as when weak men make displays of strength or strong women assume submissive stance , what Harris (2004) refers to as a 'gender masks', used to project proper images of masculinity or femininity (ibid). However, the notion of gender as the construction of men and

women's roles and the power relations that govern remains an important basis for gender and natural resource research.

2.5 Gender & Religion

If gender, ethnicity and class are central to research, so also is religion (Ver Beek, 2000). Though often used to maintain gender inequalities in society, and as a justification for female subordination, faith is relevant to perceptions of well-being and the building of social capital, and the importance of religious lives and identities of women to a gender analysis of the environment cannot be dismissed (Tomalin, 2008).

Religion is considered to be 'one of the most affective and significant markers of identity globally' (Reilly 2014:21). It provides a social identity and influences people's responses to different situations and events. People obtain material and spiritual support through religious rituals and practice. Religion serves a dual function, as a social identity and as an 'unfalsifiable belief system' of great importance to many people. (Ysseldyk et al 2010:60). It is also a key source of the justification of existing gender roles and relations in many societies. Religions have a tendency to support and endorse highly gender differentiated versions of society. Religion is involved in the regulation of sexuality, in biological and social reproduction, family structure and in gender roles, therefore the politics of gender and religion are entangled (Casanova 2009). Patriarchy is a key feature of a majority of the world's religions and conformity to and practice is usually at odds with gender equality (Reilly 2014). Religion has a significant impact on gender relations, and patriarchy affects religious expression and organisation (Rakodi 2012a). Because men have succeeded in usurping the interpretation of religious text, and made it male centric, religion is often used to assert male authority and superiority and justify the oppression of women (Casanova 2009).

In the context of this research, the focus is on the relationship between gender relations and Islam. In societies with a Muslim majority, women are a key factor in the moral and political

imagination (Mir- Hosseini 1996). For the last two centuries the role of family and of women in particular in Muslim societies has been a key element of debates about progress and of development (Haddad 1998). Gender equality is seen to clash with religion and particularly with Islamic belief and practice (Reilly 2014). According to Mahmood (2005:1) 'the vexed relationship between religion and feminism is most manifest in the discussions about Islam'. She attributes this to the historically prickly relationship between Islam and the West, and to the fact that contemporary Islam contests the secular-liberal politics of which feminism has been an important part. Secularism views religion to be at variance with human freedom and favours the restriction of religion to the private sphere (Mahmood 2005).

For the past three decades and since the Islamic revolution in Iran in 1979, and the 9/11 attacks, Islam has increasingly been thrust into the public sphere with the position of women often at the forefront. According to Moghissi (1999:19) for centuries, Muslim women's moral conduct and sexuality has preoccupied Muslim men, and this has been 'translated into institutions, policies, legal practice and personal status codes which determine women's participation in public life'. The reasons for this, Mernissi (1987) contends, is because Islam views women as possessing an active sexuality which is seen as potentially dangerous and disruptive to social order and must be contained.

Islamic symbols such as the veil and practices such as seclusion or purdah serve to reinforce Islam's perceived opposition to women's rights and gender equality. The veil is perhaps the most potent symbol of and the face of global Islam (Mernissi 1987). Imam (1997) notes that cultural contexts play an important role in the practice of Islam around the world and socio-cultural factors have influenced the construction of gender relations in the Muslim world. Imam makes a distinction between seclusion which refers strictly to restriction of movement, and purdah which encompasses segregation as well as dress codes, deference and behaviour. These practices vary across the Muslim world; while seclusion is seen as intrinsic to Islam in parts of

the world such as northern Nigeria, Bangladesh and Sudan, it is not practiced in others such as Malaysia, Indonesia, and Senegal. Polygyny and divorce is commonplace in northern Nigeria but considered shameful in parts of Asia such as India and Bangladesh (Imam 1997).

In many Muslim societies such as in northern Nigeria, sharia law operates alongside civil law, and governs many civil matters including family law, marriage, inheritance, divorce, and child custody. For many Muslim women their religion serves both as a moral code and as a source of identity (Adamu 1999). Muslim women were given rights in Islam fourteen centuries ago that western women achieved only in the last two hundred years; the right to inherit and to own property, to trade and full ownership of their wealth (Haddad 1998). Sharia law though, still affirms the authority of father, brother or husband and the tradition of a male household head is still considered the ideal. Consequently, Islam is seen by many to oppose women's freedom and deny them agency, and is considered at odds with notions of gender equality. In relation to many feminist writings, Mack (2003) notes that

> "…they assume that those who are inspired by religious enthusiasm or fanaticism, or who live under the influence of a religious institution or discipline, have no agency or limited agency, whereas secular society, which locates religious authority and practice outside the spheres of politics or the marketplace, allows for domains of free, autonomous behaviour. Indeed, for the vast majority of intellectuals who view modernity as synonymous with secularization, religion is perceived chiefly as a form of self-estrangement."(Mack 2003:153)

Mahmood (2005) argues that the concept of agency is not only confined to feminist or liberal values. She notes in her detailed and influential examination of pious women in Egypt who exercise agency within their piety that they seem unmoved by notions of feminism, and enthusiastically endorse an ideology that seems to support their subordinate status to men, while at the same time asserting their presence in the male dominated sphere of mosques and religious knowledge (ibid). Women are often able to reinterpret religious traditions, and involvement in religious organisations may provide them with skills and social resources, so religion can both empower and oppress women (Rakodi 2012b).

Though it has often been difficult to reconcile gender equality with women's religious commitments, some Muslim gender activists believe that feminism is compatible with Islam and gender equity can be achieved within an Islamic framework. Mir Hosseini (1999) notes the emergence of an Islamic feminism with its own interpretation of Islamic law. She observes that:

> 'Gender roles and relations, and women's rights are not fixed, not given, not absolute. They are negotiated and changing cultural constructs, produced in response to debates that are now going on throughout the Muslim world, through the voices of women and men who want either to retain or to change the present situation (Mir-Hossieni 1999: 6)'

Mir Hosseini (2006) contends that societies that purport to follow Islamic law and teachings should be based on justice and equality as these are the values intrinsic to Islam, but too often these are not reflected in the laws regulating gender relations. She refers to Islamic feminism as a movement to separate patriarchy from Islamic ideals and sacred texts, and to give way to an egalitarian vision of Islam which enables all Muslim women to make dignified choices.

2.5.1 Religion, Development & Natural Resources

Despite the importance of and centrality of religion to the lives of many men and women, with as much impact on social identity as ethnicity and class, religion has historically been excluded from development discourse (Ver Beek 2000; Rakodi 2012). According to (Ver Beek, 2000:39) development agencies have avoided religion for several reasons: they are wary of openly discussing faith because of their scientific /materialistic perspectives; they tend to adhere to the northern dichotomy between the secular and the sacred; are concerned about imposing their views on locals; and there is a lack of precedence in research practice of including faith.

However within the last decade, research on religion and development has grown considerably. The taboo of development and religion has been broken and it has become almost fashionable to include religion in development practice or scholarship (Jones and Juul Peterson 2011).This

has been because of several factors including the increasing recognition by donors of its importance, the rise of faith based organisations, and the prominence of Islam in particular in the security and foreign policies of donor countries particularly after the 9/11 attacks in the US (Jones & Juul Peterson 2011; Rakodi 2012). A six year research program funded by DFID that focused on the relationship between development and religion in four countries was an important precursor. The program examined the relationship between religions, development and poverty reduction in four countries (Tomalin 2007, Rakodi, 2011). Donors have recognized religion's importance in most countries of the South, an importance which has manifested itself in the increasing importance of faith based organisations (Tomalin 2012).

Since then, many development funding agencies have teamed up with faith communities to achieve the Millennium Development Goals (Deneluin & Rakodi 2011), and included among these goals is environmental sustainability. However, Jones and Juul Peterson (2011:129) describe much of the scholarship that has developed as 'instrumental, narrow and normative'. They argue that it places too much focus on faith based organisations, and is based on normative assumptions because interest is encouraged not by academia or research organizations but by multilateral donors. As a result, they observe, religion is viewed as just another tool to help do better development. GAD and religion have had an uneasy relationship (Adamu 1999) because as noted in the previous section, religion is seen to perpetuate gender inequality and as the basis for female subordination. In addition, WID and GAD have a materialist focus. Nevertheless, religious factors are relevant to many of the concerns of gender and development (Tomalin 2007). Adamu (1994) contends that religion is central to the lives of women and in many Islamic societies, any project that concerns gender relations that does not take into account religious belief is doomed to fail. Tomalin (2006) argues that rights can be discussed within alternative cultural perspectives and still pursue economic, political and social justice in culturally appropriate ways. Deneulin and Rakodi (2011:51) argue that though it is not always

clear how the sacred dimensions of religion and peoples belief in a higher reality can be reflected in development, the knowledge of the meaning that people give to their religious convictions and practice can be used to empower social actors.

In relation to natural resource management, religion and its resources can inform and engage people's environmental beliefs and their actions regarding it (Sherkat & Ellison 2007). In many societies, religion influences perceptions of environmental change and the use or misuse of natural resources and responses are value laden (Hintjens, 1997).Woodrow & Thomas (1994) contend that peoples beliefs about the origins of life and its purpose influences their disposition towards the earth and its natural resources and this can be used to project ecological concern and stewardship. Islamic scriptures enjoin a duty to stewardship and conservation and Islamic laws regulate the ownership and the use of natural resources as sustainability is rooted in Islamic scriptures. Laws governing the use and ownership of land, water and animals are laid down in the sharia. Religion, however, can also be the basis for unequal rights in natural resources access and control. Islamic inheritance laws for example are seen by many to be discriminatory to women giving them half of a man's share of land (Pierce 2005). The relationship between religion, gender and natural resources is therefore complex and contextual, and involves issues of access and control, as well issues of conservation and stewardship.

2.6 Studies of gender & natural resource use

The issue of access to and control of natural resources is central to any analysis of the degradation of those resources, and of environmental change. In the case of land degradation, access to land is gendered in much of the developing world. A change in the quality of the land or its decline as manifested in land degradation will therefore have gendered effects. The literature on the influence of gender on access to and use of natural resources such as agricultural land, forests and trees is extensive. Many studies explore the gendered nature of natural resource use, such as access to and control of trees and forests in agrarian landscapes in Africa and the

unequal power relations therein (Rocheleau & Edmunds 1997; Kiptot & Franzel 2012). Such studies acknowledge that social differentiations such as gender and class have a huge influence on agricultural production and forestry practices in the global South (Leach 1994, Rocheleau 1995, Jackson 1999, Kevane & Gray 1999, Carr 2008, Nightingale 2003). Women tend to spend more time collecting resources for the family than their male counterparts in many rural African communities because of their responsibilities in food production and firewood and water collection (Masika 2002, Denton 2002), so their perceptions and use of natural resources and of change in these resources, may be different from those of men. For example in Wezels (2000) study of gender differentiated perceptions of vegetation in Niger, he noted that women had a better perception about species that were newly introduced or that had increased, while men perceived disappearance or decrease. This he attributed to their different uses of the trees, but also to the fact that many women married into the village from other communities, and were thus less able to discern longer term vegetation change.

Generally in Africa, natural resource use relates to a large extent to agricultural production. In the issue of land degradation as well, agriculture takes central stage, as one of the central manifestations of land degradation is understood to be a diminution of soil fertility, with soil erosion and vegetation change also important. Agricultural production and consumption is significantly influenced by gender (Kevane 2012). Two key drivers in differences in productivity in agricultural production is gender - differentiated access to resources such as land, labour and cash, and access to inputs such as fertiliser, machinery, seeds and extension services.

Women's access to land is subject to their relationship to men, as wives, daughters or mothers (Kevane 1999). Cultural practices dictate who inherits, owns, and manages land. However this varies across regions and cultures, such that while women do not inherit land in some regions, in others they do. A gendered analysis of resource rights such as land is necessary in order to understand the different incentives men and women have toward effective management of

those resources (Jackson, 1993). Security of tenure encourages investment in soil management and conservation (Meinzen-dick et al.1997; Quisimbing & Pandofelli 2010). The lack of formal land rights and insecurity of tenure are often cited as one of the main constraints in the management of female agricultural productivity (Whitehead & Tsikata 2003), because it removes the incentive for women to conserve the land. For example Kevane & Gray (1999) found that in some communities in Burkina Faso women had no direct rights to land, but were able to borrow land from non kin men to cultivate. But they were restricted by issue of land tenure from using male labour and inputs because landlords feared their husbands laying claims to such land. This resulted in lower yields and discouraged women from effective soil fertility management. Similarly in Ghana, Goldstein and Udry's (2008) showed lower yields on women's farms was a result of insecurity of land tenure which led to them having shorter fallows relative to more tenure-secure farmers. They noted that many women's weaker political power meant that they were unable to get long term leases from lineage elders, leading to shorter fallows and lower productivity. In this case because the women did not have connections to secure long term land use they compromised on soil fertility management by fallowing for shorter periods and consequently getting lower yields.

Central to environmental change and its response is the division of labour and responsibilities between men and women both within households and in the wider society. Access to labour or the financial means of acquiring labour are important. Access to and command of labour is also gender differentiated. In cocoa production in Ghana, research shows that poor women are doubly disadvantaged. Due to local customs, they are not allowed to obtain the key productive asset of labour through local labour exchange groups typically used by poorer farmers who are unable to hire labour. They have to pay men to carry out tasks such as felling trees and clearing land which is men's work according to local divisions of labour, but they are also less likely than men to have the cash to pay for such labour (Hill and Vigneri 2010). In some communities

social status and an individual woman's position within a polygamous household for example, also affects women's ability to access credit or rights of return from their own labour among other things. In their study, Due & Gladwin (1991) note that women farmers in Malawi receive credit through their husbands' membership of farmers clubs which make them automatic members, some act as intermediaries for women in accessing basic services. Therefore unmarried women or women in unfavourable polygamous marriages join the farmers club on their own, without male patrons, where their attendance is stigmatised.

Despite the famous assertion of Africa being the region of female farming (Boserup 1970) and up to 50% of the sub Saharan Africa's domestic food supply produced by female small holder farmers (Gladwin, 2002) , studies have consistently shown that female farmers in Africa have much lower agricultural output and yields than men (Quisumbing & Pandolfelli 2010). The studies also show that across the board, female farmers have considerably lower access to the agricultural resources than do men. These resources include fertilisers, extension services, capital, land and labour. The inequality in access to resources for agriculture between men and women despite women undertaking a big role in agricultural production, the so called 'gender gap' (FAO 2011) has been well documented. These productivity differences have been explained by differential access to inputs or specific socioeconomic factors (Quisiumbig et al. 2001; Gilbert & Sakala 2002), lack of labour and animal traction (Holden et al 2001), insecurity of tenure (Goldstein & Udry 2008), and lack of bargaining power (Kevane & Gray 1999).

One of the most oft-cited studies of the gender differences in agricultural productivity is that of Udry (1996). He found that in Burkina Faso, plots managed by women had significantly lower yields than those by men in the same year and with the same crops. He attributed this to lower inputs on the female fields, and not to gender differences or soil quality. Udry's study

was influential because he argued that household production was inefficient, and a redistribution of resources within households - either land from men to women, or inputs from women to men, would increase efficiency and productivity in agricultural production.

Often a combination of several of these factors account for women's low productivity. In their comparative investigation of gender differences in productivity in Nigeria and Uganda, Peterman et al., (2011) examined crop choice, ecology and other variables to determine drivers of productivity differences. They found lower productivity on female owned or managed plots of land, but that ecological, cultural and regional differences produced varied results. Other factors such as access to and quality of inputs, quality of land including topography and soil fertility, and gendered division of labour with respect to agricultural activities all influenced lower productivity for women.

2.6.1 Gender & Soil Fertility Management

The issue of soil fertility is paramount in small holder farming systems in Africa (Gladwin, 2002, Sanchez 2002), and soil fertility decline is generally thought to have replaced soil erosion as the main indicator of degradation in Africa (Warren 2002, Jones 2008). The ability of women to manage soil fertility is influenced by many factors such as household divisions of labour, gendered rules that govern household relations and responsibilities, land tenure, and crucially their access to inputs needed to maintain fertility (Verma 2001). Soil management is therefore dependent on how women and men are able to acquire rights to land and labour.

Access to fertiliser whether organic or inorganic is a key factor in farming. Many studies have shown this access is biased largely in men's favour. In an extensive review of empirical household studies in many developing countries, Peterman et al. (2010) found significant gender inequities, that men had a much higher access to agricultural inputs such as inorganic and organic fertiliser, pesticides, seeds and equipment. The review also noted differences in strategies they use - men were more likely to use soil fertility management techniques such as composting

and mulching. In Ethiopia for example, female and male household heads both used fire in field preparation, but men were more likely to use manure for soil fertility management (Pender & Gebremedhin, 2006). The reasons behind some of these differences are illustrated in an example from Kenya where Mackenzie (1995) shows how in response to fluctuating coffee prices in the world market, women strive to intensify land use on often insufficient land, and forgo soil management practices such as mulching and compost maturing on their farms. She further notes how male outmigration placed additional responsibilities on a woman and compelled her to 'compromise her knowledge as a farmer through the struggle to meet her social responsibilities as a woman' (1995: 210).

In much of the developing world men and women often own different types of livestock and women are responsible for the care of all animals in their households, even those they do not own, and livestock are important for women as they are much easier physical assets to acquire than other property such as land (Kristjanson et al. 2010). In northern Nigeria organic manure is the main source of fertiliser, and the possession of livestock is crucial for maintaining soil fertility. A recent comparative analysis of livestock holdings in northern Nigeria over 20 years found gender differentiation in value of livestock holdings (Dillon and Quiñones, 2010). Men's initial possession of higher value livestock such as cattle and oxen meant that with agricultural intensification raising the value of livestock for manure and for work, their value had risen substantially compared to women's holdings of lower value livestock such as sheep and goats. Similarly, in Botswana, men were more likely to own higher value livestock such as donkeys, horses and cattle, and women goats (Oladele & Monkhei 2008). But the possession of livestock in itself does not automatically grant the use of its products such as milk and manure, as culture or household norms might dictate otherwise (Kristjanson et al. 2010).

In Malawi Gilbert et al. (2002) found significant differences in fertiliser use and access to agricultural extension services between men and women. Though women accounted for 69% of

farmers in Malawi, men owned more livestock, more field areas and had more formal education and used more fertiliser, and had higher levels of land, labour and capital. But they found no significant difference in crop yield once these differences in input were accounted for. Crucially and in line with many other studies (Quisumbing 1996) they found no significant differences in crop yield once they accounted for these differences.

Often it is the lack of cash that prevents women from improving fertility. Whitehead & Kabeer (2001) argue that the small land holdings of women may actually be a reflection of their lack of cash and not land, and contend that access to cash and to labour may be more important to women than land titling. According to them, purchases of inputs are integral to enhancing agricultural productivity, and the fact that women have very little money for these purchases hinders their agriculture. This view is supported by several studies. In Malawi, Uttaro (2002) found gendered dimensions to farmer's decisions to use organic or inorganic fertilisers. In a country where the main crop planted is maize, farmers who plant hybrid need to buy expensive fertiliser for it to thrive. Only 9% farmers were able to pay for all the organic fertiliser they needed and among this tiny percentage, no female headed household could. The study found that even if fertiliser was available in smaller, cheaper bags, female headed households did not have the money to buy them. Despite women's desire to diversify and increase agricultural production, they lacked the financial resources to purchase the crucial inputs of fertilisers, pesticide and seeds, and also to pay for the land and labour they require (Dolan, 2004).

Though generally women may have smaller fields, and in some communities are allocated land of inferior quality for their private cultivation such as non-Muslim Hausa women in northern Nigeria (Jackson 1985), it is not always the case that soils on female fields are inherently of low quality. As Nkedi Kizza et al. (2002) found in Uganda, plots owned by men and women often have the same inherent quality, but women's fields give lower yields due to their inability to afford fertilisers and their lack of access to extension advice.

The importance of these gender gaps is that when they hinder agricultural productivity, they affect poverty reduction, food security and increase the vulnerability of women to the adverse effects of environmental change (Meinzen-Dick 2011). How and to what extent these gaps and inequities disadvantage particular women in particular environments is an important aspect of gender analysis and GAD perspectives generally. For gender analysts, though gender disaggregated data is useful in bringing out disparities, context is vital to any analyses and these associations can be too simplistic and usually fail to explain the how (Jackson 2002). For example the argument that securing women legal rights to land will lead to greater productivity has been challenged. Jackson (2003) questions the usefulness of these efficiency studies when based on land and notes that;

> 'Land of differing value, location, soil type, topography, as well as land with differing tenure and production relations – owned jointly or individually, inherited, purchased, rented, borrowed or share-cropped – will have distinctive kinds of social relations, norms and discourses that pattern their use (Jackson 2003 : 462)

In the same vein Rao (2006) notes that granting land rights to women, an important campaign of many development feminists (Agarwal 1994), may not necessarily lead to improved food security, because of the decline in the contribution of agricultural production to household income in certain parts of India (Rao 2006). She adds that women are usually 'embedded within household and kinship systems' (2006: 190) and that a focus on 'individualistic approaches' might not be in their overall interests.

According to Whitehead & Kabeer (2001), the case that gender relations plays a prominent role in constraining agricultural productivity in Africa has probably been overstated, because many such studies tend to discount intra household relations and behaviour. They contend that these inequalities in allocations of resources and inefficiencies recognized by some researchers might make sense 'when evaluated as the management of complex family relations with positive spin-offs in the enterprise as a whole' (2001: 10). O Laughlin (2007) describes as a myth the notion that if women's productive resources such as land, labour, credit and inputs are same as men's,

households will become more efficient or productive. According to her, gender inequality is not inefficient, and such studies fail to realize that inequality within cooperation may be more acceptable to women than poverty. She further notes that inequalities are not only of gender, but of generation, and that such studies neglect the benefits that women may accrue from being in a cooperative group in which they have a share, even an unequal one. Intra household relations therefore play a crucial role and will be discussed later in the chapter.

It is often argued that this lower capacity makes women more vulnerable to the effects of environmental change and also strengthens existing gender disparities (Denton 2004, Toulmin et al. 2010). The effects of environmental degradation, however, is not distributed uniformly among all women, but are mediated by the social structure in which different women live because they possess different diverse livelihoods such as income generating activities, some women get remittances from husbands or from kin, or may possess assets which they can depend upon (Jackson 1993). The role of institutions such as marriage, social networks and local organisations in mediating the effects of environmental change (whether positively or negatively) is therefore an important consideration in any analysis.

Several concepts that inform the GED theories of women and environment are directly relevant to the research, the notion of the conjugal contract (Whitehead 1991) and several variations of it such as creative conjugality (Jackson 2007), the environmental entitlements framework (Leach et al. 1997, 1999), and gender analysis (Jackson 1995, 2002).

2.7 Environmental Entitlements Framework

An important analytical framework that brings together the concepts of gender theory and natural resource use is the environmental entitlements framework. Environmental entitlements is an approach proposed by Leach et al (1997) as a framework for understanding the way social actors use and access the environment. These actors may be differentiated by class, gender or wealth or even by locality. Environmental entitlement focuses on how diverse constituents of

the environment are used and accessed by different social actors, even in the same community. Leach et al (1997:7) observe that

> 'those with different modes of livelihoods, or who carry different responsibilities within divisions of labour, may need to draw on very different environmental resources and services, and hold different views of what constitutes environmental degradation or improvement in that context'.

The framework is an extension of Sen's entitlement framework in which he emphasises the difference between the existence of a resource, and command of it, and posits that people starve even when there is enough food because they do not have entitlement to that food (Sen, 1982). But while Sen's entitlements analysis was limited to the household and individuals within the household, Leach et al (1997) widened it to include communities and socially differentiated groups of individuals within these communities, and organisations. With regards to environmental change, they argue that communities are not static or undifferentiated, but made up of different groups and individuals, who experience the environment in different ways and whose use of the environment transforms it into different components.The key themes of their framework are *entitlements, endowments, capabilities* and *institutions*. Endowments are rights and resources that social actors possess and may include labour, land and skills, while entitlements refer to the outcome of negotiations among actors. Entitlements refer not only to what an individual has a right to, but to what 'they can have using the totality of rights and opportunities that he or she faces' (Sen 1984:497). They define environmental entitlements as the 'alternative set of utilities derived from environmental goods and services over which social actors have legitimate effective command and which are instrumental in achieving wellbeing' (Leach et al 1999: 233).

Entitlements and endowments are not static but can be changed from one to the other depending on time and context. What may be an endowment at a certain time can be transformed into an entitlement at another (ibid). Endowments (such as livestock) become entitlements (such as

manure) through the process of mapping. Leach et al (1997) introduce the concept of capabilities. These refer to the range of options that people can exercise with their entitlements. People's capabilities are in turn enhanced by their entitlements. Leach et al (1999) further note that gender or age may preclude certain social actors from mobilizing the endowments (such as capital or labour) which they require to make effective use of other endowments (such as land), young men for example or women may be unable to command labour they need to cultivate a piece of land.

A central aspect of the environmental entitlement framework is the role of institutions in mediating access to the environmental resources and their importance in highlighting power relations. Institutions in this case refer to both formal institutions such as organisations and informal ones such as social practices or 'regularised patterns of behaviour that emerge from underlying structures or set of rules in use' (Leach et al 1999: 237). While informal institutions are embedded and slow to change, formal institutions can undergo rapid change (Leach et al., 1997). These institutions can constrain or promote an actor's access to resources. According to Ribot & Peluso (2003), access refers to people's ability to benefit from resources, and is governed by powers that are exercised through various processes and social relations, and this is not static, but can change over time.

Sen (1987) contends that relationships between family members of a household are different from their interactions with others outside. He defines entitlements as bundles of goods which ensue not to the household as a whole but for each household member, and endowments as bundles of ownership for individual household members, with labour being the most common endowment people bring to the mix. The mapping of endowments and entitlements and the strong mediating role of institutions is illustrated in the environmental entitlements framework diagram in Figure 1.

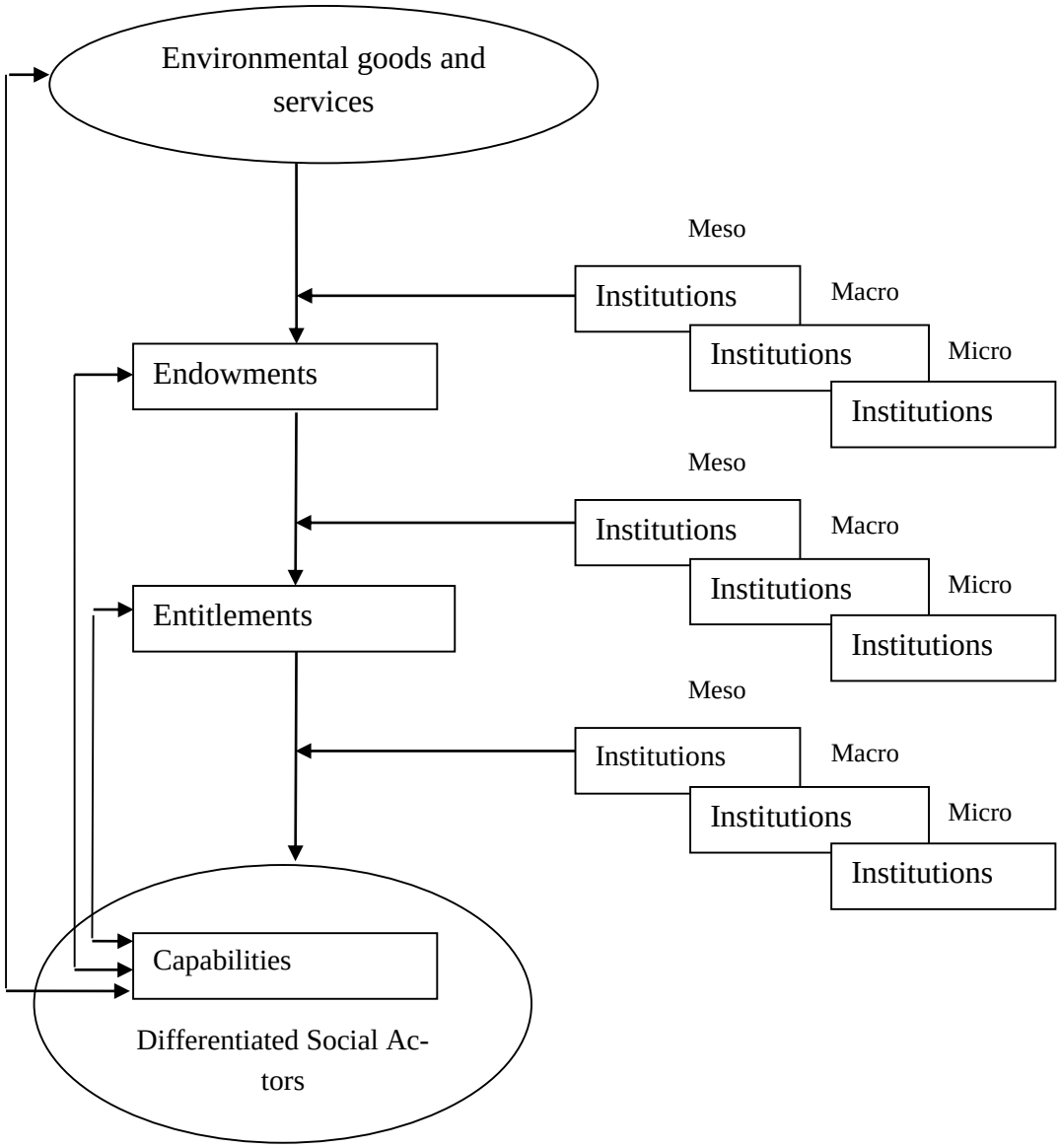

Figure 1: Environmental Entitlements Framework. Adapted from Leach et al. 1999:234.

Though the usefulness of the environmental entitlements framework in studying environmental change has been acknowledged in a number of studies (Stringer 2005, Nunan 2006, Maconachie 2007) studies, examples of its use in research are not widespread. Nunan (2006) examines the gendered dimensions of fishery resources using the environmental entitlement framework. She demonstrates how the fisheries community in Uganda comprises different sub groups dominated by men, who are mainly involved in fishing, and women involved in processing and

trading. Different institutions mediate access to fisheries resources, including informal ones such as unelected traditional leaders, gender relations, relations between boat owners and boat crew, and formal ones such as fisheries legislation and the officers who enforce them. In South Africa, Ntshona et al 2010 show how following land reforms in the post-apartheid period, many people who had legally acquired land rights (endowments) could not transform them into entitlements because of conflicting state and traditional institutional arrangements.

Household relations shape and are shaped by the informal institutions that Leach et al (1999) discuss. Consequently, the next section details the role of the household in environmental change, women's agency in natural resource use and the importance of social capital to women's responses to environmental change.

2.8 The Household

The household is the usual unit of analysis of production and consumption in studies of rural communities. For a long time, the unitary model of the household where members of the household have common preferences and a common budget was assumed to be the norm in studies of developing countries. The unitary model of the household suggests a single altruistic head who is the sole decision maker, deciding who gets what for the joint benefit of the whole household (Kabeer, 1994, Agarwal, 2000). The unitary model also assumes the pooling of all household income and resources. In terms of policies and project interventions, targeting that individual would ensure the whole household benefits. Many development projects did just that, with varying degrees of success (Carney & Watts 1991, Dey 1981). This concept of the household as a joint unit of production was questioned especially in African contexts (Guyer 1986, Jackson 1993). Many studies observed that the unitary model of the household did not adequately capture the way bargaining and competition came into play in rural households, and often failed to take into account individual preferences and intra household distribution of resources, especially their gendered dimensions (Aldermann 1995, Folbre 1986). Consequently,

'collective' household models focused on these individual preferences and the way bargaining is used to reconcile and negotiate them, while not assuming a priori decision making (Quisi-umbing & Maluccio 2003; Jackson 2013). Feminist literature analysed the family not as a site of harmony and democracy, but as one of 'subordination and domination, of sexual hierarchies of many kinds and of conflicts of interests between its members' (Whitehead, 1981:92). But studies also showed that these conflicts do not always define households; rather, cooperation, bargaining and intra household relationships govern access to resources of production. In agri-cultural production especially, cooperation and mutual interdependencies are vital for both women and men (Rao 2006).

Studies portrayed households as collective units in which bargaining takes place and this bar-gaining has considerable influence on many aspects of livelihoods including financial interac-tions. Households do not always pool incomes (Haddad & Hoddinot, 1995) or even risks (Doss, 2013). Household bargaining also gets women access to resources from husbands. In Burkina Faso for example, the relations between a woman and her husband determined the quantity and quality of land she got from her husband, even in a polygynous household (Kevane & Gray, 1999).

The bargaining model is preferred by gender analysts because it reflects diversity of decision making in households, recognises unequal power within it, and views altruism as just one of many reasons decisions are made (Kabeer, 1994, Jackso 2013). Gender and environment stud-ies are partial to the bargaining models of the household, particularly Sen's notion of conflict and cooperation coexisting within the household. Sen (1987) posits that households are sites of both conflict and cooperation, and that persons within a household cooperate in so far as cooperation produces more favourable outcomes for them than non-cooperation. Sen notes the coexistence of 'extensive conflicts' and 'pervasive cooperation' that is captured in household

bargaining. According to him, cooperation involves contribution to the total household possibilities while conflict refers to how the total availabilities are divided among households' members (ibid 1987:13). This cooperation and conflict in households was observed particularly in West African households where wives and husbands though mutually dependent were usually not a combined production unit (Hill 1972; Udry 1996; Doss 2013). Women were often found to engage trade and production on their own account and be compensated for their labour (Guyer 1988; Jones 1986; Whitehead 1981).

In terms of environmental change, the ever changing positions individuals occupy within households (such as of power) mediate interactions with the natural resource base in ways that differ according to contexts, and are significant to understanding environmental change or degradation (Jackson 1993). Bargaining power is thus influenced by the level of what Sen (1987) calls the breakdown position, that is a person's other outside alternatives will determine what she gets in the household, and different alternatives have different impacts on bargaining power. For example, land rights for women are thought to provide them with better treatment from men (Agarwal 1994; Qusuimbing 1994). In the event of environmental shocks such as droughts and famines, women's breakdown positions may be compromised and their bargaining power may decrease, for example women's assets such as jewellery and livestock are usually the first to be sold to adjust to these changes (Agarwal 2000).

Agarwal argues that the influence of bargaining outcomes are not always definite but are subject to individual perceptions and pursuit of self-interest for example in India, brothers' bargaining power lies in an implicit threat of exclusion of sisters if they insist on their share of the land in areas where they are entitled to it (Agarwal 1997). In northern Nigeria, where women have rights to inherit land and in fact often do, land is usually left in the care of brothers, as implicit insurance to guarantee support from brothers in case of divorce, widowhood or old age or whenever they return to natal homes (Ross 1997, Pierce 2005). There are limits to bargaining

within a household however, it always take place within the norms of broader society. Extra-household power can also influence property rights as household dynamics do not exist in isolation but within outside institutions like the market and the state (Agarwal 2000).

One of the determinants of women's bargaining power within a household is the terms of the conjugal contract. The term was coined by Whitehead (1981) to explain how a woman's possession and control over resources which she has produced or earned within a household is governed by her relative power within the household, even when the conjugal household is not the unit of production (for example in the research areas). The conjugal contract refers to 'the terms on which products and incomes produced by the labour of both husband and wife are divided to meet their personal and collective needs' (Whitehead 1981:108). In other words, it is an implicit contract between spouses that governs terms of marital cooperation and rests on what men and women expect from each other based on culture (Jackson 2012b).

A variation of the conjugal contract to reflect its non-static nature is Jackson's 'creative conjugality'. Here, the terms of the contract even if agreed upon, change and are reinterpreted with changing circumstances and the passage of time. Creative conjugality influences the way men and women experience unpredictable environments and cope in different ways with environmental, social, or economic change, and so conjugal contracts can change in circumstances such as change in crop yields or famine or drought (Jackson 2007).

In many parts of the world, the conjugal contract is governed by what Kandiyoti (1988) terms patriarchal bargains. Patriarchal bargains 'indicate the existence of set rules and scripts regulating gender relations, to which both genders accommodate and acquiesce, and which nonetheless can be contested, redefined and renegotiated'(Kandiyoti 1988: 286) . In areas of classic patriarchy, for example, marriage and the conjugal contract between a husband and wife can indicate that a woman restricts her mobility. Classic patriarchy is usually associated with regions of South Asia, North Africa and the Middle East; male provisioning roles are very strong

and marriage and inheritance is strongly patrilineal, and women are largely absent from food production (Kabeer 1994, Razavi & Miller 1995; Meinzein-Dick et al 2012). In Sub Saharan Africa, conjugal ties are thought to be weaker than lineage ties (Kabeer 1994, O'Laughlin 2007) and there is greater female autonomy in agricultural production, where women are usually responsible for feeding their own families, and consequently have some control over their labour and produce. However Kabeer (1994) notes that even in sub-Saharan Africa there are differences between eastern and southern Africa on the one hand, where women pool resources and are obligated to work on household land, and the West African contexts were women have separate accounting and are usually allocated resources such as usufruct rights to land. The primacy of female farming systems of sub Saharan Africa have come under scrutiny however, as another myth of development which ignores the large contributions men make to agricultural production (Whitehead, 1990, Razavi & Miller 1995).

The conjugal contract in Hausa society in northern Nigeria is very strong and its terms are usually strictly adhered to (Adamu 2004). Marriage is the fundamental building block of Hausa society (Barkow 1972; Solivetti 1994), usually based on men as providers of basic material needs, and wives as subordinates of their husbands. Wives strike a bargain with their husbands to restrict their mobility in exchange for maintenance and care (Imam 1993). But within the contract is the understanding that wives have autonomy over their finances and carry out economic activities within the confines of the seclusion. Women use discourses of seclusion to assert their agency, and withdrawal from agricultural work means they can work on their own businesses, get out of hard labour and back breaking farm work and firewood gathering, and develop economic and personal autonomy (Jackson 1998, Adamu 1994), albeit within the prevailing social norms. Seclusion acts as material security and freedom from extra household drudgery that is the enduring image of the rural African woman. However, it also hinders mobility, limits participation in markets and choice of occupation (Kabeer 2001). As Longhurst

(1982) notes, while it puts a 'floor' under women by providing material security, it puts a 'ceiling' on the range of activities they can undertake. It is strongly linked to local conceptions of class and social status and appropriate behaviours of men and women. Kabeer (2001) notes the different costs that seclusion has on different groups of women in her study of the effect of microcredit on secluded and non-secluded women of different classes in Bangladesh. Women from better off households used the loans to trade at home as they had hitherto done, combining the social logic of honour and the economic logic of better returns from household trade. Women with social standing from relatively poorer households paid for seclusion by not working, so microcredit was a godsend to them because it allowed them to trade while secluded. Women in the poorest households were not bothered with the norms of seclusion and had always worked outside the home; the loans enabled them to swap outside work for household trade, which paid better. So a decrease in mobility for some women may be a manifestation of their empowerment. But of course, even if agency is seen in the capacity of women to act in such a way as to prioritise what they value and derive benefit from, it is reasonable to expect that those values and benefits reflect those found in the wider patriarchal society, which is why an increase in income might lead to greater seclusion.

2.9 Agency, Subjectivity & Subject Positions

Researchers view human agency as crucial in influencing individual and household response to environmental change (Brown & Westaway 2011). The bargaining power of women within households is related to their agency, and this is in turn related to their subject positions as wives, mothers, and daughters, and to their subjectivities. Jackson defines subject positions as 'the particular locations within social structures and discourses occupied by women', and subjectivities as the 'mental interior that is both psychological and social' Jackson (2003: 456). She argues that women's subjectivities and their subject positions differentiate their relations with the environment. Some forms of gender inequalities appear to be sanctioned by women

themselves and in many regions women are considered to have ‘internalised’ their subordinate status (Kabeer 1999). According to Sen (1987), women can become accomplices in their deprivation because they lack perception of their self-interests and wellbeing and a concern for the family helps perpetuate their inequality. Agarwal (2000) and Ahmed (2014) disagree however and observe that women can comply with inequalities, without being complicit in sustaining them. Jackson (2003) notes that subjectivities are entangled in the web of intra household relations and distribution of resources, such that women may place a higher value on good conjugal relations and the intimacy, affection and family harmony they provide than on equal rights to the resources of production.

The various ways women exercise agency in conjugal relationships which are sometimes polygamous, and the way their agency affects their relationship with natural resources is important because decision-making ability is vital in the management of natural resources and in responses to environmental change. Women's agency is the ‘ability of women to pursue their own interests despite the pressures of custom, transcendental will or patriarchy’ (Guerin 2013: 76). Gender relations are often portrayed as always putting women at a disadvantage, with women as helpless objects over whom men exact power and domination, but this depiction as passive actors may deny them subjectivity (Jackson, 1998) and stress gender antagonism instead of recognising that cooperation is more important (Kabeer, 2001). Women’s agency is embedded within diverse gender systems and forms of power and can be conceived of not only in terms of resistance to domination but also ‘as a capacity for action that historically specific relations of subordination enable and create’ (Mahood, 2005: 8 cited in Guerin 2013).

Control and autonomy are important elements in environmental decision making and this is where the concept of women’s agency becomes salient. Women can have considerable agency with respect to marital relations and the disposal of their incomes for example, but have much less agency with respect to physical mobility or participation in markets, especially when their

relationship with the natural resource base is not direct. Though agency is related to both human and material resources, access to these resources or financial autonomy does not always translate to agency. To do this they have to be coupled with control of those resources. In most societies, decision making seldom rests on only the man or the woman: usually, there is a hierarchy within households and within society in general which is linked to gender division of roles and responsibilities (Kabeer, 1999). Agency includes decision making powers, as well as other aspects of bargaining such as manipulation, deception and negotiation, resistance and subversion.

Women use different strategies to bargain with men and in so doing challenge male authority in many ways. Implicit bargaining tactics are employed when explicit tactics are precluded by social norms (Agarwal, 2000). In northern Nigeria women use several strategies, such as use of the public arena from which they are largely excluded, usually by the threat of making conjugal disputes public, asking for divorce in courts, or going back to their natal homes. Women have and exercise power despite their social subordination (Adamu, 1994). In Hausa society, there is a strict separation of economic and conjugal interests. Women buy food and ingredients to feed the family from their own stocks with money given by husbands, (Hill, 1972, Schildkrout, 1983). According to Schildkrout (ibid), in this way women effectively extract payment for domestic labour by diverting money given to them by husbands to generate sales for themselves. Women also make use of seclusion practices and discourses of dependence that limit their mobility to get out of hard agricultural labour and develop their individual businesses in a way, Jackson (2007) notes, that perversely grants them greater autonomy.

Sometimes relations between women themselves are more important than heterosexual relations, such as between co-wives living in a household or even wives of brothers living together, especially when women are secluded. Even when they are not, such as among the Yoruba in the Southwest of Nigeria, men may be peripheral to women's lives and their relationships with

other women in the markets where they are traders and in homes where several families live together are much more important to their 'lived experiences', in ways which are both positive and negative (Cornwall, 2007).

The capacity to act in relation to environmental change is related to people's assets, or capitals. The relationships between people, whether kinship based or not, are important assets and are conceptualised in the notion of social capital which is discussed next.

2.10 Social Capital

Societies have always adapted to environmental change and will continue to do so and these adaptations can be by individuals, by the state on their behalf, before the change or in response to single events (Adger, 2005). They do this by using the resources already available to them. The assets people make use of in pursuit of their livelihoods are conceptualised as capitals, and can be social, cultural or natural capitals. According to Bebbington (1999), these capitals are not only a means by which they are able to make a living; they bring meaning to people's lives. He notes that these assets or capitals while assisting in adapting to environmental change or alleviation of poverty are also the foundation of an individual's power to act. Social capital refers to the 'social resources (networks, social claims, social relations, affiliations, associations) upon which people draw when pursuing different livelihood strategies requiring coordinated actions.' (Scoones 1998: 8)

Social capital is usually mentioned in relation to the collective management of natural resources, which is assumed to mitigate against unsustainable use of natural resources. Most social capital literature while recognising individual linkages focuses on collective action (Scoones 1998). However there is an understanding that social capital can be gender differentiated (Molyneux, 2002, Agarwal, 2000). Response to effects of environmental change entails social actors depending on each other by way of their relationships with each other and with

institutions and in this way social capital 'describes relations of trust, reciprocity, and exchange; the evolution of common rules; and the role of networks' (Adger, 2005: 389). According to Pretty & Ward (2001) social capital refers to the notion that social norms and bonds between people are vital for sustaining livelihoods. They identify four central aspects of social capital, relationships based on trust, reciprocity and exchange; common rules, norms and sanctions; and connectedness, networks and groups. These are all found in a very important social resource of women in the research communities, namely lifelong friendships between women. In Hausa society, women have strong natal ties, and are often viewed as strangers in their husbands' communities not least because of the high incidence of divorce which ends in them going back to their parents' homes. As a result, women value their relationships with other women and many of these last even longer than their (often multiple) marriages. It has been suggested that women use the institution of *biki* to make seclusion fluid and flexible (Adamu 1994). Men's exclusion from the domestic arena and the corresponding exclusion of women from public space reinforce female cooperation and foster women's independence.

In their investigation of land degradation in Burkina Faso, Neimejer & Mazuccato (2001) found that people invest heavily in forming and safeguarding social networks, and these networks play a vital role in conservation of the land by providing access to resources of production and minimising the risk associated with decline in crop yield. They identified six major networks of land, labour, cash, cattle, technology, and women's natal networks. Land networks gave people access to land through borrowing agreements, labour networks meant that people could borrow labour from kin and neighbours or mobilise work parties when they needed. Women's natal networks meant they could acquire resources in and from a different community from that in which they were resident. They also noted that though these networks have always existed, their compositions and the roles they play have not remained static. Land borrowing had

increased because of higher populations, labour networks no longer comprised only kin. The increase in women's participation in agricultural production meant that natal networks became more important as places where they could acquire land, seeds, crop proceeds and a place to keep their livestock (ibid).

2.11 Chapter Summary

This chapter has outlined the important theoretical foundations on which this research is based. Political ecology is an appropriate lens in examining perceptions of land degradation, from both official and local perspectives, and the ways in which the state and other agencies shape official intervention on land degradation through its policies. In the context of the research many elements of GAD theories are important such as the emphasis on the heterogeneity of women, and the recognition that gender relations are not always conflicting but cooperation is equally important. The class–gender effects of environmental degradation and the influence of ecology and socio economic circumstances is particularly pertinent outlined in three aspects namely (i) the different social structure of the two study communities regarding seclusion norms; (ii) the socio economic positions and classes of the two sets of farming women in the two communities; and (iii) the role of the ecological characteristics of each village in shaping men and women's perception and response to environmental change.

The intersection of political ecology with gender theories underpins the feminist political ecology perspective of the study. A feminist political ecology framework will focus on other subjectivities of age, class, location and the micro politics of the household, which may be polygamous, and the struggles, negotiations and cooperation that underlie resource control, access and the gendered use of natural resources.

In the context of the research, the concept of entitlements and endowments and how institutions mediate access to them is useful for example in mapping the processes where endowments such

as land and livestock become entitlements and how the institution of seclusion affects environmental resources (Leach et al 1997). The environmental entitlements framework is also useful in examining access to and use of land and the proceeds from land, particularly its focus on institutions. Marriage and seclusion are such informal institutions mediating access to natural resources. Seclusion also ties in with concepts of women's agency and the conjugal contract. Religion comes into play given its strong influence on women's subjectivities on one hand and their access to resources (for example inheritance and marriage laws) on the other. The significance of social capital to women's agricultural activities and the role of agriculture in sustaining and maintaining social networks will be examined.

The next chapter outlines the research design and methodology, and introduces the research communities.

Chapter Three: Methodology

3.1 Introduction

The previous chapter examined the key concepts that the study will apply in examining land degradation from gendered perspectives, vis gender analysis and political ecology. This chapter describes the methodology used in the research; the process of data collection and analysis and the research design. The methodology bridges the key themes of political ecology, gender analysis and agency, and reflects how they are connected. The chapter discusses data collection and analysis, explains the rationale behind the qualitative approach to the research, and the reasons for selecting the particular villages. It also discusses issues of positionality and ethics and considers my situation as an insider outsider. Finally it introduces the research communities and provides background information on the communities and the larger Kano Zone.

3.2 Research Design

The aim of the research was not a positivist examination of the occurrence and extent of land degradation, but a constructivist study of the gendered perspectives of land degradation. Whereas in a positivist methodology a researcher's interpretation is matched with an external reality, the constructivist approach to data collection is to get to the stories people use to describe their own lives by while acknowledging these versions are not always fact or true pictures of reality (Silverman, 2013: 238). Social construction can be useful in studying environmental change. According to Jones (2002), scepticism about the constructivist approach are based on the premise that social construction does not recognise environmental creation and destruction. She argues that social construction is a broad spectrum, and materiality and symbolism of the environment are not mutually exclusive. A moderate social constructivist approach recognises the physical reality of the environment and can be 'both ontologically realist yet epistemologically relativist' (ibid). As shown in Chapter 2, a review of the literature had

thrown up some interesting perspectives on the state and land users' perceptions of land degradation (Maconachie 2007, Mortimore & Adams 1999). Given the connection and interrelatedness between seclusion, mobility and agricultural activity, it was decided that the focus of the research would be on two different sets of women, secluded and non-secluded, in two different communities. Researchers have noted interesting variations on women's farm work and strictness of seclusion practices with increasing remoteness and aridity (Robson 2000, Mortimore & Adams 1999), so within the purview of drylands two relatively different villages were selected within the same state .

The research methods were primarily qualitative and combine conventional approaches such as interviews and focus groups with ethnographic methods such as participant observation, a set of methods regarded as 'the backbone of qualitative research in human geography'(Davies and Dwyer, 2007:257). In addition it includes elements of participatory rural appraisal (PRA) such as transect walks and wealth ranking (Chambers 1994).

The research was designed to show the point of view of different actors from the state to the local. The fieldwork was conducted in 2 phases within the period April 2010 to April 2011. The first phase lasted about 5 months and the second 3 months with a trip back to the UK in between. This was to reflect the wide disparity in people's work, agricultural activity and relationship with natural resources between the wet and dry seasons, and also so as to allow a period of reflection. Kano state was selected for the research because as mentioned in Chapter One, it is the largest and most populous state in northern Nigeria, and its commercial and cultural centre. Within Kano state 2 villages, Yakai and Bemun, were chosen to be the sites of the research. Yakai is about 60km north east of Kano city and Bemun is 20km south west. There were several reasons for the choice of those particular communities and these are detailed below:

- Both villages were typical Hausa communities and broadly represented patterns of land tenure, soils, population and livelihood diversity of the larger Kano area but with sufficient variations in ecology and custom to allow comparisons to be made.
- In terms of amenities they were fairly representative of northern Nigeria villages i.e. no electricity, pipe borne water or tarred roads.
- They had varying aridity; Yakai had significantly less rainfall per annum and was more arid. Both were classified as dryland communities, but Bemun had a longer wet season, so there were some slight differences in main crops planted, dominant vegetation, and soil types.
- They were sufficiently distinctive in their seclusion practices; in Bemun seclusion practices were strict and the norm was that women did not actively farm, while they were more relaxed in Yakai.
- They both had official intervention projects targeted towards tackling land degradation so they were identified officially as vulnerable areas. The presence of an intervention project allowed the appraisal of the significance of such interventions to the people‘s experience of degradation.
- They could be accessed relatively easily from Kano city in a day and back again because I was based in Kano city for the duration of the fieldwork.
- The village heads agreed to the research to be out in their communities

3.3 Qualitative Research

Qualitative research is rich, complex and involves the study of social life in natural settings (Punch 1998:194), and is particularly suited to the study of social relations by examining the perspective of research participants (Flick 2009:12). According to Mason (1996:4) qualitative research:

> ‘aims to produce rounded understandings on the basis of rich, contextual and detailed data. There is more emphasis on holistic forms’ of analysis and explanation in this sense, than on charting surface patterns, trends and correlations’.

Flick (2009) notes that the essential features of qualitative research include the diversity of perspectives of research participants, transparency and reflexivity of the researcher and of the research itself and the choice of appropriate methods and theoretical perspectives. Other features include a contextual setting, an openness to emergent issues, and an ability to convey depth, diversity and complexity (Denzin 2010).

Qualitative research is often portrayed as “subjective” but Silverman (2014) suggests this is a caricature, and cautions against overplaying the dichotomy between quantitative and qualitative methods. The decision to use certain methods and not others may be based on certain criteria, some of more importance than others. Silverman (2013:13) suggests researchers asking themselves if they want to study a phenomenon in detail, or desire to make standardized and systematic comparisons and account for variations.

I chose qualitative methods in collecting my data for a number of reasons. In reading the literature, I found myself drawn to ethnographic studies. This was not a ‘trivial preference’ (Silverman 2013:14). Although not a strong enough reason on its own to eschew quantitative methods, it had a bearing on my research design. I considered qualitative methods were more suited to answer the questions I wanted to pose. I was not after enumeration but was more interested in the why and how. The themes that were relevant to the research, such as my focus on individual women’s perceptions of their natural resource base and their lived experiences in a male dominant agricultural space were best suited to qualitative methods such as participant observation and interviews. Allowing research participants to speak for themselves by telling their stories was something I knew from the onset I wanted to do. Participant observation, focus groups and in-depth interviewing allowed me to engage with the research participants in a way

I felt ticking boxes would not, as the administration of questionnaires usually puts some form of distance between the researcher and the research participants (Punch 1998). The self-reflexive nature of qualitative research (Flick 2009) was important to me as well, because of my positioning as a female member of the society I was researching who was familiar with the complexity of gender relations in the study areas.

One of the main criticisms of a purely qualitative research however, is the problem of reliability or validity. Qualitative data analysis that depends mainly on interviews can run the risk of 'anecdotalism', and one way to counter this is to resist temptation to jump to conclusions by subjecting data to careful scrutiny and to question presumed relationships between trends as much as possible (Silverman 2011:268). Seale and Silverman (1997) suggested that counting events and searching for deviant cases through systematic coding help to counter anecdotalism, as does the use of computer programmes to assist analysis.

Validity is vital in analysis of qualitative data, and triangulation is important in this respect (Tracy 2010). Triangulation is used to tackle questions of internal validity. According to Flick (2009:445) it involves taking different perspectives on an issue under study, by using several methods or theoretical approaches. He notes that this can be done using both quantitative and qualitative methods, or in a qualitative study, can be achieved by a systematic use of different qualitative research methods. Triangulation in this research was through the use of a variety of data collections methods (such as individual interview, focus groups, participant observation) and different groups of research participants (government officials, NGO representatives, local men, and local women) to obtain diverse perspectives from different stakeholders. The use of focus groups and case studies also provided triangulation, as the different information from these methods provided themes and topics of agreement and disagreements.

When different methods produce different data, which could be complementary or even divergent, this does not contradict validity but enables the researcher to explain such divergences

thus strengthening the study (Flick 2009). Reflections on the relevance and contribution of each method to the research findings can act as a quality check on the study and improve validity and reliability.

3.4 First Phase: Wet Season

A review of the academic literature and of available policy documents on land degradation in Nigeria had been carried out before the first foray into the field to discover the prevailing discourses of land degradation from both perspectives. In the field, the first point of contact was the government departments at the federal and regional state levels. The Federal Ministry of Environment is responsible for national environmental policies and was the first point of call in Abuja the national capital. I visited the Ministry and explained the purpose of the research and was able to arrange a meeting with the official in charge of the desertification department. He agreed to be interviewed, and also directed his staff in the department to provide me with any assistance I required. From discussions with the staff, I surmised there were two key personnel in the department, the Director and the coordinating officer for state programs. These two officials were interviewed at the federal level. They provided a list of contacts in the states where there were active intervention projects. They also provided a list of all accredited NGOs that were involved in land degradation issues. Five NGOs were selected from this based on their location and the practicality of getting interviews. At the regional level the Kano state environment ministry provided a list of state projects concerned with land degradation. It was from the list that the study communities were selected. All the interviews with government officials and NGO representatives took place in their offices and were conducted in English which is the official language and typically lasted between 2-3 hours. In general government officials at the federal and state levels were willing to talk and provide access to documents about various programmes and policies that were not available widely, as long as they were

not financial documents. State officials were enthusiastic and expressed desire to provide assistance in any way they could. Federal officials were more guarded and their interviews less detailed. Their actual distance from the field may be responsible for this, being in Abuja the national capital made them far removed from the actual field where research was taking place. Table 3 provides a summary of the first phase of interviews.

Table 3: Key government departments & NGOs interviewed

Departments	Number of people interviewed
Federal Ministry of Environments, Abuja: Department of drought & desertification , Country office for UNCCD	2
Kano State Environment Ministry: Department of ecology & Forestry, Desertification Department Kano State afforestation Programme	4
4 NGOs working on desertification issues	I representative from each

The link to the villages was facilitated by government officials in the Kano State ministry of environment who put me in touch with the agricultural extension officers in the communities. They in turn assisted with introductions to the village heads where the purpose of the research was explained and permission to conduct the studies sought and given. The extension officers were members of the communities and were helpful in identifying key informants. This was done in conjunction with the village heads. The key informants were respected members of each community, well known locally and with good knowledge of farming practices and village goings on.

3.4.1 Community Focus Group Discussions

This phase of the research took place in the farming season. In both communities almost all men identify as farmers, but not all women. With the key informants and the village heads, a list of all household heads and their wives was drawn up. From this list 15 men and 15 women were chosen to participate in focus group discussions. Two focus groups were then convened. The groups were single sex and there was no attempt to convene mixed sex groups as it would

be culturally unacceptable. I decided to use focus group discussions at the beginning of the research to allow introduction to a large number of people, and at the same time to flesh out the topics and questions most relevant to participants. I acted as facilitator assisted by the key informants selected at the start of the research. In all there were 4 focus groups discussions in each community, two before the individual interviews and two at the end. These discussions were not recorded but detailed notes were taken, and the key points raised were noted. These helped in refining topics for the individual interviews. Focus groups are seen as effective in providing a forum for gender issues and feminist research because they provide the opportunity for 'less hierarchical research relationships' (Pini, 2002). They also allow links to be made between individual and collective experiences and can question prevailing beliefs and provide the opportunity for shared recognition of personal issues (Pini, 2002). However, Mosse (1994: 508) notes that they are not neutral but generate 'a context in which the selective presentation of opinion is likely to be exaggerated and where minority or deviant views are likely to be suppressed".

Based on the issues raised at the first focus group discussions, a separate list of all women farmers were drawn up. It was from this list and the initial lists of all the male farmers that the individual interview participants were selected. Much effort was made to avoid bias, as village heads sought to put their best farmers forward. Therefore I made the final selection of farmers myself from the list. After picking a name, I would ask a few questions about the person from the informants, and village heads, and make the final decision myself. Many conjugal units lived together in the same compound, usually a father and sons, or a group of brothers. From these compounds only one man was chosen, and no two women who were co wives were chosen. Polygamy was fairly common in both villages.

3.4.2 Individual Interviews

Interviews were preferred as the main method for the research. This was to generate discussions which could be adapted to the individuals involved. Interviews are important in qualitative research because they are adaptable and responsive. Although interviews are subjective accounts of the researched and not absolute truths, they are useful because they can be treated as a contextual description (Silverman, 2013). In studies of women they are particularly important because they are seen to give significance to women's voices .Their pace and nature can be matched to particular individuals or situations and are able to produce rich and detailed data. Chambers (1994) describes how researchers in Kenya compared results from informal in depth interviews and group discussions with those of a formal survey of 63 households. The survey took thrice as long and though the main results produced were identical the interviews were more coherent and detailed.

Semi structured interviews were chosen for this phase of the research and in total 44 persons were interviewed. These semi structured interviews with men and women provided a general overview of the roles and responsibilities of men and women in the agricultural production process and their perceptions of land degradation; especially declining soil fertility and crop yield. Questions were open ended and a guide was used so as not to miss key questions, but did not follow a strict structure. Interviews took place on farms and in participants' houses. Those which took place on farms were particularly enlightening as the participants could illustrate points with practical examples specific to themselves, such as showing differences in soil types and pointing out crops, tree species and products and farm boundaries.

Standard research practice is to conduct as many interviews as possible until empirical saturation is reached, though this might not always be practical, and it is sometimes the case that it is achieved sooner than thought (Guest et al 2006). Although the initial plan was to interview 20 men and 20 women from each village, it was decided after a couple of weeks to narrow the number to 12 women and 10 men from each village, a total of 44 interviews. The main reason

for this was that it was felt that empirical saturation could, within reason, be reached with that number because of the similar nature of agricultural practices among men and women of the communities. Within the context of the research it was felt that more detailed case studies of several women would provide more contextual information .This was carried out in the second phase of the research and will be discussed in the next section.

The individual interviews with women in particular were constantly interrupted, and as such often took longer than expected, sometimes stretching to several hours. Such interruptions were welcomed because they brought insight into the daily goings on in the lives of women. They consisted of mainly children bringing messages from other women and carrying them back, coming back from errands or from selling food. Many women had to carry out various domestic chores and I actively encouraged them not to let the interviews stop them. The interview guide can be found in Appendix 2.

There were also many informal discussions after the one on one semi private interviews. These were unavoidable; people usually sit in groups, whether it is men resting under trees after prayers or women doing household chores collectively or individually in the centre of compounds. Wide canopied trees inside houses provide relief from the sun and are effectively the living rooms of households for women, men stay underneath trees outside houses or in the *zaure*, the small room at the entrance of most compounds. As much information was acquired in the informal discussions that evolved naturally between different women who came to rest and chat under the neem trees as from the more formal ones, which sometimes felt as if the same answers were being given by many women, but may in fact be an indication of the similarities in their interactions with natural resources.

3.5 Second Phase: Dry Season

For this phase of the research, I decided that case studies were preferred because of their emphasis on context and nuance, and because they would provide an in depth study of some of

the concepts that had come up in the first phase. The dry season was chosen for this phase of the research since the focus would be on individual women and migration is common in the dry season for men, but women typically stay at home. Sampling was purposive and cases were chosen which were deemed relevant to the research questions, and to allow for effective comparisons. The objective of this part of the research was to examine gender relations at the household level, by focusing on intra household relations in the division of labour, responsibility and income in the agricultural production process in specific households and to examine in depth the decision making processes and the management of soil fertility in the case study households.

Information from the first phase allowed the development of questions and more specific issues to be raised. Case study women were chosen from the initial pool of interviewees and sampling was purposive to reflect age differences and to provide sufficient coverage of typologies. Age is a relative concept and all ages given were approximate as many could not tell exactly how old they were. One atypical woman was selected in each village, one who bucked the trend. In both cases, they were women who own many farms and many animals, and were relatively wealthy, through inheritance in one case, and through hard work and entrepreneurship in the other. The first phase had focused on obtaining data from unconnected men and women as separate categories. This phase sought to acknowledge that differentiation in age and socioeconomic categories of various women.

Four women were selected in each of the study villages based on the interviews in the first phase and their willingness to participate. The plan was to select individual women and take their households as the case study but with a particular focus on the women .All the households interviewed were headed by men. As well as obtaining the specific demographics of each household member, for each particular woman and her household, the following methods were used:

- Separate in depth interviews with female and male members of the household: participants were asked about ownership of trees and number of animals for each individual member and how decisions were made in the household and how resources were allocated and shared.
- Oral histories of the women
- Transect walks with both women and men which involved walking around local areas of interest and observing and discussing the importance and uses of vegetation and trees, asking questions, listening, looking at farmlands and measuring them. People pointed out important areas of the landscape and the different services they provided.
- Seasonal Calendars and daily timelines detailing roles and responsibilities of women in the different seasons and the variation of their activities between seasons.

3.5.1 Participant Observation

Participant observation refers to a researcher's involvement in the daily activities of the research participants. To do this many researchers reside in the communities of study for a period of time. This method is believed to provide a rich insight into people's lives and culture and improve both the quality of research data and its interpretation (Bryman 2012). In this regard, the longer time is spent the richer the understanding would be expected to be. It was not particularly practical for me to live in the villages, so I made several day visits with each woman in her household. Ideally I would have preferred to reside in the communities and spend more time with each woman (weeks instead of days and in different seasons), but the lack of running water and the fact that I had young children at home meant that I had to stay in Kano city and make day journeys. However since the cultural practices were familiar to me and I in fact shared many of them, I believe the length of time I spent was adequate to achieve the research objectives.

As mentioned earlier, I spent many hours just sitting with the women inside the houses, chatting informally and observing them in their various interactions and participating in domestic and other activities such as in feeding animals and grain threshing and winnowing. In the dry season, since no women were working on the farms, it was possible to observe women at their other important occupations- cooking and selling food and snacks, craftwork like weaving fans and plates, carding and spinning cotton (which was something only old women did- a dying craft). I also observed men at their other occupations, I visited some men in the local market selling livestock and food stuff, and again old men weaving cotton (old women card and spin the cotton, old men weave it). Wherever I went, I took notes of any interesting conversations I had and I also noted down observations I thought relevant. The informal chats with women happened with my recorder on, but I took care to inform them of that, and explained it would help me remember what was discussed later.

3.5.2 Participatory Rural Appraisal (PRA)

PRA originated as a way of giving voice to local people through their active participation in research (Chambers 1994). Initially lauded as a way for local communities to actively participate and own research, it gained ground in the 90's and is now ubiquitous in research practice in developing countries and actively encouraged by aid agencies and international organisations. As indicated, PRA involves the participation of local people in the research through activities such as mapping, focus groups, wealth ranking, seasonal calendars, transect walks and the use of key informants. PRA is a heterogeneous collection of practices bearing some family resemblances (Cornwall & Pratt 2011). PRA often works on the notion of the impartibility of local knowledge (Jackson, 2002), but in fact it is seldom the case as people in local communities have different priorities and perceptions and hold different positions of power in relation to each other. The neglect of these local power relations are the focus of much criticisms of PRA. PRA techniques may reinforce prevailing social relations of power, and give priority to

the views of the local elite and discriminate against the weak (Mosse 2001, Cooke & Kothari 2001). Women's views and voices could also be underrepresented and their invisibility and lack of authority are translated to PRA processes (Mosse 1994, Cornwall 1998).

Participatory mapping is often regarded as the most widely used method in PRA (Chambers 1994). It was not used in this study because after a few attempts, it was evident local people did not quite grasp its use, and seemed unable to visually construct their environment on paper and probably because they felt they could just show me. I gave participants pencils and paper, to make sketches, but people repeatedly offered to show me actual locations on the ground. PRA used in the research were transect walks, focus groups and wealth ranking.

3.5.3 Transect Walks

Transect walks were carried out with a number of men and women, and participants were very enthusiastic about showing me around. I carried out the transect walks with individual farmers and they proved very useful in giving me a feel of the research area and familiarising me with the natural resources important to livelihoods. Walks began from inside houses, where live-stock were tethered, and then all the way to fields. Participants walked from house to field, showing me trees, farms, farm boundaries and manure heaps and describing land management practices. Participants pointed out which trees were used for what, different soil types, and the different crops they grew. The transect walks allowed physical identification and were very useful to me as they were a vital first hand introduction to the research areas and enabled me to ask questions and learn about the soils and vegetation of the area on farms and off farms. It also allowed me to meet many other people in the community and observe peoples interactions with different people we met in the course of the walks. This visual observation of the ecosys-tem was extremely informative (Binns et al 1997).

3.5.4 Wealth Ranking

Wealth ranking is one of the tools of PRA and is used to explore socio economic differentiation in households within a community and to find out the yardsticks that communities use as an indicator of wealth. It relies mainly on the knowledge community members have of each other's assets, and their perceptions of each other's socio economic standing within the community (Grandin, 1994). It is particularly important because farmers' social status to a large extent governs their relationship with agriculture, their ownership of and access to land, capital and labour and the use they make of crops and livestock. It also affects the seclusion status of women.

Wealth ranking was carried out using the methods outlined by Grandin (1994) but modified slightly to fit the context. In this case, both communities had their local terms for socio economic differentiation, and key informants identified these local terms. The names of people chosen for interviews were written down and were then assigned to the categories the key informants considered them to be. The participants were subsequently asked to verify if they were ranked appropriately. Women and men were ranked differently since they have independent incomes, but there was often a correlation between a woman's wealth and her husband's.

3.6 Data Analysis

All the individual interviews were recorded and transcribed. The interviews with local people were in Hausa, but they were transcribed into English. All the interviews, focus group notes and case study material were transferred to NVivo qualitative analysis software. There are many advantages of using analysis software, not least because compared to the manual method it allows for speedy and easier organisation and retrieval of data.

Although it has been criticised for diminishing the complexity of rich data and being more suited to grounded theory analysis (Bringer at al 2004) it is an invaluable tool for preparing and organising data . It presents a researcher with numerous options of preparing text, coding

and retrieval and the flexibility of trying out different combinations of themes and associations, all without losing any original text.

NVivo was used to code the data relatively quickly. There were some a priori codes that had been guided by the interview questions but as coding progressed, more codes emerged. NVivo also allowed the organisation of the data by attributes. The starting point for analysis of gender is the 'arrangement between the sexes' (Buscatto 2011) and data was divided by gender at first. NVivo makes it easy to categorise data not only by gender but by many other attributes as well. Because numerous attributes can be assigned to each person, data and codes could be retrieved based on a characteristic or attribute that several persons share such as gender, location, age, seclusion status and wealth ranking. The queries tool enabled the researcher to ask questions from the data and explore possible connections for example the responses of secluded women on tree cover change in Bemun, the relationship between wealth ranking and access to fertiliser in the two communities, or that of seclusion status of women to knowledge of soil types.

3.7 Positionality and Power Relations

> 'Reflexivity (is) a strategy for situating knowledges … a means of avoiding the false neutrality and universality of so much academic knowledge. (Rose 1997:306)'

Reflection on the differences and similarities between a researcher and research participants is considered a vital aspect of any research process. Although it is common to assume that if a researcher shares the same culture, race and gender, access will be easy (or easier) and meanings understood and that results will in some way be more legitimate (Merriam et al. 2001), it is now accepted that positionality is much more complex than that (Mellor et al. 2013, Bondi 2003). Similarities as well as differences in age, gender, race, class and culture affect the relationships between a researcher and the research participants and bring up concepts of whether the researcher is an insider or outsider, especially for researchers going back to their countries from universities in the West. Positionality is therefore determined by where an individual is situated in relation to 'the other' (Merriam et al. 2001).

Research cannot be totally objective and must be reflected through the prism of my position, and within the context of this research, one of my positions is that of a practising Muslim woman. Reflexivity in the context of this research would have to recognise my personal view-point of a practising Muslim, a staunch believer in the infallible and divine nature of the Quran and its teachings. I believe I shared this view with many of the participants, at least on the surface. Reading feminist literature as part of a research on gender relations for a practising Muslim was particularly challenging, and criticism of religion in general, and the contention that inequity in access to resources equals subordination and criticism of divine text (such as Islamic inheritance laws and the portrayal of men as protectors of and providers for women) made uncomfortable reading.

Regarding gender relations in Hausa society, some western female researchers have shown a rather one dimensional view of Hausa women variously describing them as 'virtually incarcerated for most of their lives'(Hill 1969) or 'muted subjects' living in a state of ambiguous social polarisation (Callaway 1984), or subordinated by Islam (Schildkrout 1983). Others have shown an understanding of Hausa women that recognises the complex interaction of culture and religion that governs their lives (Jackson 1985, Pittin 1991). Local female researchers such as Adamu (1994, 2008) and Imam (1993) who recognise that these women's lives are no doubt constricted by culture and some interpretations of divine text, at the same time see themselves as advocates of women's rights but not in a way that is incompatible with the teachings of their religion.

The fact that I was conducting research at 'home' meant that I was culturally comfortable. Being a northern Nigerian who shared the same cultural and religious background as the participants, I was not an outsider in a way that a western researcher, a non-Muslim, or someone from the Southern part of Nigeria would be. 'There were silent understandings; culture bound

phrases that did not need interpretation, and non-verbalised answers conveyed with hand gestures and facial expressions' (Johnson-Bailey 1999: 669 cited in Merriam et al 2001).

However, despite similarities of nationality, culture, language and religion, I did not feel like a total insider. I understood and shared many customs and practices, but this did not automatically confer me insider status. As Merriam et al (2001) note, culture is not just a monolithic entity that one belongs to, but comprises myriad social and cultural characteristics some of which an individual may share or not. There may be significant material differences and power differential between researchers and participants (Gilbert, 1994). I was othered in many other ways; I was an urban, western educated, relatively wealthy woman. I was aware of my privilege and so were the participants, a privilege that according to Rose (1997: 307) 'entail(s) greater access both to material resources and to the power inherent in the production of knowledges about others'. My urban status and social class meant that my lived experiences were different from the participants in significant ways (Mellor et al. 2013).

Identifying oneself as an insider does not make a better or worse researcher, just a different one (Corbin, Dwyer & Buckle 2009). In their discussion of the various ways researchers identify with the population they are studying, Corbin et al refer to 'the space between' and contend that a researcher cannot be completely different from or completely the same as a participant. The binary depiction of insider or an outsider 'unduly narrows the range of understanding and experience' (ibid: 60). The very fact of being a researcher transforms an insider, notwithstanding the similarities between her and the researched, into an outsider (Gilbert 1994). I believe I occupied the 'space between'.

Participants in the communities were warm and hospitable, and willing to participate in the research. Everyone approached was willing to talk even when on farms working and thereby wasting time they could ill afford. It was difficult in a communal household to talk to women alone in their rooms. Large communal living generally means privacy is very limited in the

daily lives of both men and women, and people seemed surprised to be interviewed on their own and not as part of a group. Complete privacy was never possible. I speak Hausa fluently, as it is the most widely spoken language in northern Nigeria, although I am ethnically Fulani. Inter marriage between Hausa and Fulani and a common Islamic identity has meant that the lines between Hausa and Fulani are often blurred, and to outsiders, one is often indistinguishable from the other. I spoke the language, but not the lingo and had to ask for explanations of many terms, and being from the city, many agricultural terms were completely new to me.

The power relations present in any form of social relations are also revealed in the interview process (Bondi 2003). Deference and respect was shown to me by both men and women, young and old, which eased somewhat with repeated visits and the longer I did the research, but never vanished completely. As Sultana (2007) notes in her research in rural areas of her home country, Bangladesh, rural people show deference to the educated urban elite, and this was evident in this research as well. But I interviewed urban people as well; government officials and NGO representatives were western educated urban people just like me and there was a different dynamic. All of them except one NGO representative were men, and all interviews were in English. When interviewing government officials and I did not want to come across as pretentious (coming from a university in the West), so I adopted a slight deference. Being a Nigerian I was aware that senior public officials would expect it, especially since they considered it a favour to grant me interviews. I situated myself in an inferior position (Rose 1997) because any other would have hindered my access to them.

Shared identities can have both negative and positive effects on the research process and come with disadvantages and advantages (Bondi 2003). A vital aspect of this particular research was that being a woman gave me unimpeded access to secluded women within their houses and my gender was definitely an advantage, as the bulk of research in northern Nigerian environment

has been undertaken by men, who have limited or no access to women. It will be almost impossible for a man to get such access to the goings on in a Hausa household.

For a woman, research in a visibly patriarchal society can have implications for power relations, as Sultana (2007) notes in her research in Bangladesh where she faced condescension from male elders in her position as a young female. In my case there was none of that, probably because education, whether religious or western is held in high esteem in Hausa society. I could sit with men outside and chat about the government and about politics in a way that did not happen with women in their community. In the rural areas, my western education conferred on me some form of authority and that I was conducting research from a university overseas more so.

One way I think my shared identity as a Muslim may have limited my data collection is in the frequent references to Allah and his will when responding to environmental change and soil fertility or even to socio economic circumstances. People were confident to tell me we trust in Allah as a final answer, and expected that I would fully understand. The fact that I seemed to require more elaboration on such a final answer as this was met with surprise. But in fact I understood exactly what they meant and the myriad range of strategies such a simple answer might encompass.

Power relations also manifest in how data is interpreted and represented, as the research process gives the researcher the ultimate right of interpretation. As Sultana (2007: 382) notes 'knowledge is always partial and representations of knowledges produced through field research embody power relations that the researcher must be aware of in undertaking ethical research'. Positionality will also affect my interpretation of the data. Being Fulani, Muslim and female in having access to women were no doubt a distinct advantage in the study. It may not mean that the information I acquired is more valid than another woman would, but that I interpret it differently, a point that has as much to do with my Islamic identity as my gender.

3.8 Ethical considerations

Consent was given by village heads for the research to take place in their communities. Verbal consents was obtained from rural participants, and signed consent from government and NGO officials who were hesitant when I first showed them but agreed after reading the innocuous forms. It was reiterated time and again that that participants were not obligated to participate and could withdraw at any time, I felt it was necessary in particular for rural participants to feel they had a choice, given that their names had been chosen from lists and I had been taken round to be introduced, but no one withdrew, and people seemed to be happy to be chosen to participate.

It was made clear repeatedly that the participants will be represented anonymously. Many names used in the research are common Hausa names, and as villages are small and populations as well, the names of the villages were changed so as to ensure that complete anonymity was achieved, as it would have been difficult to do so by changing just the names.

Ethical considerations do not only cover practicalities such as anonymity and remuneration but also comportment and respect for participants' values. Much effort was made to show respect to research participants. Recognition of appropriate social norms and customs was easy for me since I shared a similar cultural background and dressed in a similar manner. I wore a burka so as not to look too urban and instantly discovered why it is becoming an increasingly popular form of veiling in northern Nigeria; it was very comfortable and did not restrict movement. The legendary Hausa generosity and treatment of guests was evident. During initial visits, gifts of farm produce were given to me by many men and a few women, which I accepted as it would have been considered extremely rude not to, but that stopped with subsequent visits and as I became a more familiar sight. Though no remuneration was given for participating in the research, I responded by giving a token sum to women I talked to 'to buy sweets for children', as is the custom. It would have been unusual not to, given the fact that I was visibly more affluent. I did it only once or twice though, and never to the men.

Research in rural areas often brings with it the expectation that it is linked to development aid or government funding; I made it clear that I was not a government or an NGO official, or an extension agent, that I was doing research for a university project and my visit will not bring any immediate benefits. I found that I had to I had to constantly repeat this to everyone I spoke to. Nevertheless many people overrode my protestations and expressed the view that it may bring some benefit albeit in the long term. As one farmer in Bemun put it,

> 'Only people with western education become influential in this country, and the fact that you are here means something at least. Maybe one day when you are in government, you will remember that you did research here, and you will remember all the problems we face.'

Perhaps what came as most of a surprise to me was my unease about taking pictures of the people I was researching. They did not mind at all, even the secluded women, but it seemed that I was othering myself by taking pictures of people who I considered the same to me.

Overall I believe the research was a mutually beneficial one. As Green & Thorogood (2004) note research can in many ways be a positive experience for both researcher and participants because people are glad that their concerns and lives are of interest to others and a subject of research.

3.9 The Kano Close Settled Zone

The Kano Close Settled Zone (KCSZ) is a region stretching 100km from metropolitan Kano (Maconachie, 2007:56) and supports populations of up to 350 people per square kilometre (Mortimore and Harris, 2005). According to Harris (1996:13), the KCSZ 'has reached a point in the intensification process where all land is under cultivation, all palatable crop residues are used as fodder, and trees are conserved'. The study areas both lie within this zone.

The KCSZ forms part of the Sudan Savannah region part of the West African drylands. It has a unimodal rainfall regime consisting of a short wet season and a lengthy dry one. Kano is the largest and most populated city in northern Nigeria, and the regional centre of culture and commercial activity. The KCSZ has a population of 6-8 million, with 1.5 of those in Kano city alone. Kano city is the fulcrum of the KCSZ. Annual rainfall varies from 400mm in the north

of the zone to 800mm and more in the southernmost part (Mortimore 1993). Generally it has a short wet season from June to September or October and a long dry season which usually lasts from October to May, but there are variations to this as the length of the wet season diminishes northward. As a result, there are divisions into zones based on the average amount of rainfall they receive; the Sahelian zone has rainfall of 400-600mm and the Sahelo Sudanian zone is wetter with annual average rainfall of 600-800mm and 800-1000mm in some wet years (Hulme 2001). Generally, the drier the area the more variable the rainfall is. In general the seasons are divided into wet and dry seasons, but in actual practice local people divide the year into 4 seasons according to climatic conditions and the activities carried within them. Table 4 details the four seasons known locally as *kaka, bazara, damuna and rani.*

Table 4: Seasons and their variation (Adapted from Maconachie 2007)

Season	Description	Duration
Kaka	Dry & cool, season of the Harmattan winds and haze and average temperatures can drop as low as 21 in December and January the coolest months of the year.	Mid-Nov to February
Bazara	Dry & hot period, a brief transitional period between Harmattan and the wet season. Record the hottest day time temperatures of the year occur in this period, to 40 degrees and average monthly temperatures of 31	February to mid – May
Damuna	Warm & wet period, the period recording over 90% of all rainfall in the year.	Mid-May to Mid-September
Rani	Dry & warm period, follows the end of the rains in September. Average temperatures are the second hottest of the year and relative humidity is high	Sep to mid-November

Soils are former dune sands and freely draining and low in organic matter (Mortimore, 1993). The landscape is dominated by rain fed cultivation with many distinctive trees. These large trees tower over tall stalks of millet and sorghum and shorter bushes of cowpea and groundnut. Farmers, mostly male, can be seen in the fields, sowing and weeding with hoes and ploughs. Livestock are tethered at home in the wet season, and only chickens and guinea fowl wander among the fields.

In the dry season the landscape is bare of crops, save for the farm trees, some with green and leafy canopies even in the absence of rain. Livestock, mainly small ruminants, goats and sheep, browse for fodder among the bare fields. Just before the start of the wet season, mounds of organic fertiliser, known as *taki* can be seen heaped on every farm, waiting for the start of the rains. *Taki* is a composite of animal manure, ash and compound refuse.

Trees are a vital component of the farming practices and most grow naturally on farms and are valued and nurtured. Up to forty different trees have been identified that make up these farm trees and almost all have multiple uses (Yusuf 1996): locust bean, tamarind, mango, shea nuts, baobab, acacias, and a host of others. Trees are mainly indigenous species and have various uses; they provide fodder for animals, nitrogen to soils, timber, fruits and fuelwood, and control soil erosion. They are privately owned and planted and protected by farmers.

The landscape of the KCSZ has been identified as farmed parkland - a distinctive landscape where many tree species are planted or preserved on farms. It is a usually a feature of areas of bush fallow or permanent cultivation and is common in West African drylands (Pullan 1974). Densities of trees in Kano farmed parklands is 12-15 per hectare, or 7-9 in the drier areas and the density is higher near and within the villages because of the use of trees for shade (Cline-Cole et al., 1990b) .

Farmed parklands are most well known in the semi-arid and sub humid parts of Africa. They are a common ecological feature in the drylands of West Africa, and they happen as a result of farmers selectively protecting certain species of trees on farmlands. According to Boffa (1999), they are the foremost agro forestry systems in the semi-arid region of West Africa and represent a substantial area of agricultural landscape. Species composition of parklands varies and can include one, a few or many species of trees (ibid). In Nigeria, they usually consist of varied

species (Cline-Cole et al., 1990a) and include baobabs (*Adansonia digitata),* shea nuts *(Vitellaria paradoxa),* Tamarind, *(Tamarindus indica),* locust bean *(Parkia biglobosa)* and various acacias (ibid).

According to Adams & Mortimore (1999:87) the manicured and park like landscape is a feature of agricultural intensification in the Kano area and arose through the gradual replacement of natural vegetation by a cultural one - woodland is cleared to make new farms, leading to a domestication of trees and of the natural landscape. They note that the ecosystem is a manipulated one, created through manmade modifications of the natural landscape and that farmers have used manual skills and labour to incrementally create a new landscape which 'reflect(s) an optimal spatial allocation of land' (1999:95). The cultural landscape has been created through not only cultivation, but also grazing, fire and the cutting of wood (Yusuf, 1996).

3.10 The Study Villages

The study sites are 2 communities in the KCSZ, Bemun & Yakai, and share many of the typical characteristics of the area. Specific data for the two communities on population densities, rainfall and crop yields were not available, only for the Kano region as a whole. In the region population densities are thought to have risen from 243 to 348 per sq. km over a period of 20 years from 1962 (Adams & Mortimore 1997). Rainfall can be erratic and varies from year to year. For example in 1993 annual rainfall in Kano station was 560mm, but in 1994 it was 895mm (Harris 1996). In recent years rainfall has been good - in 2008 it was 1125mm, in 2009 966mm and in 2010, 1080mm (NIMET 2011).

Bemun is a small village in Dawakin Kudu area of Kano and lies firmly within the inner Kano Close settled Zone, about 20km from Kano city. From there, it is accessed via a tarred road for the most of the way and then a dirt track for about 4 km. Most land in the area is taken up by either houses or farms. In the region people live in mud houses, but there are a few concrete houses with corrugated iron roofing sheets, which are a sign of relative wealth. Fields are small,

usually less than a hectare. Agricultural activity is largely restricted to the short wet season. Millet, sorghum, cowpea and groundnut and maize are the major crops grown on small holdings.

Trees are abundant on farms; mangoes, shea butter, baobab, locust bean, and a host of others. The rainy season starts in May and lasts till October and in this time vegetation is lush, abundant and green. By local accounts the soil is very fertile. There are many commercial farms in the area, a result of men from Kano city buying up farmlands to set up poultries and cattle farms. Local people suggest this is because the area has some of the best soils in the region, but it has also resulted in land scarcity.

Yakai is a village in Gabasawa local government, about 60km north east of Kano city. It lies in the northern part of the close settled zone. It is characterised as semi-arid, with an average rainfall that is lower than that of the inner CSZ. The rainfall and crop yield data for Yakai will be lower than that of the inner Kano zone and population densities would be expected to be lower.

The people of Yakai are predominantly farmers, growing the staples of the region, millet and sorghum, cowpea and groundnuts and also sesame and bambara nuts. Both villages lie in the drylands of Nigeria, known for their erratic rainfall and limited biological productivity, and both have some sort of government intervention program designed to tackle land degradation. In Yakai there is a government owned shelterbelt of eucalyptus and neem trees. The village has one borehole situated in front of the village head's house and another one in the government owned nursery. The River Huda used to run through the village but the water is now merely a trickle since the construction of Jakara dam in a nearby local government area in 1976. Villagers with land near the river use the residual moisture to grow vegetables mainly onions, tomatoes, and some rice. The construction of the dam has had a profound impact on livelihoods in

the village and other neighbouring communities, and three decades on villagers still associate it with the decline in livelihood options.

Bemun is connected to the national grid but like the rest of both rural and urban Nigeria electricity supply is intermittent. Yakai is not connected and has no electricity supply. Bemun has a functioning borehole, but in Yakai the borehole had broken down on my second visit and remained so. Wells inside houses were the main water source in both villages. There was a primary school in both villages, but both lacked a health centre and local people had to go to neighbouring villages for health services.

Table 5 shows some characteristics of the different communities.

Table 5: Characteristics of the study communities

	Yakai	**Bemun**
Population	959	762
Climate & vegetation	Semi-arid , Sudan savannah	Semi-arid, Sudan savannah
Livelihoods	Farming, Trading, crafts	Farming & cattle rearing ,trading, crafts
Crops Grown	millet , sorghum, groundnuts, , cowpea, sesame	millet, sorghum, maize, cowpea, groundnuts, pumpkins , melons, chillies
Government Project	GEF funded integrated project, State government afforestation program (shelterbelt)	State government afforestation program (woodlot)
Ethnic groups	Hausa/Fulani	Hausa/ Fulani

The communities fall somewhere in between the types of female farming described in Chapter Two. They do not mirror the generalised sub Saharan Africa model of female agricultural production and have more in common with the areas of classic patriarchy than the majority of sub Saharan Africa, primarily because of the practice of seclusion. Seclusion practices mirror those in areas of classic patriarchy, with a strong male provisioning role. However, women largely control their own labour, inherit property, trade and control the proceeds of the trade, and are not responsible for feeding themselves or their children. They also maintain strong natal ties

with kin, even though marriages are patrilocal, requiring them to move to their husbands' households and communities sometimes a considerable distance away.

3.11 Chapter Summary

This chapter has detailed the process of research design and data collection, explained why qualitative research was used, and has situated me within the research. It has introduced the wider Kano zone and the two villages where the research takes place. The next chapter examines official perceptions of land degradation and the policies favoured by the government.

Chapter Four: Land degradation: the Nigerian Context

4.1 Introduction

Nigeria is a federation of 36 semi-autonomous states with a combined population estimated at about 170 million and an annual growth rate of 2.8% (UNDP 2009). There are 3 tiers of government, federal, state and local. The federal government plays a strongly central role and is the main actor in national environmental and agricultural policy through the ministries of environment & agriculture. The drylands are found in 11 of the 36 states. All the states have their own ministries of environment and agriculture through which state policies are enacted and carried out. In addition the federal government set up a special fund called the Ecological Fund, and its main objective in the drylands is to fund desertification control programmes. Other actors are local NGOs and UN agencies such as UNDP, FAO and the World Bank. These actors are the drivers of environmental policy with most funding coming from the federal government. At the other end are the farmers and herders and the general population of the drylands, on whose livelihoods policies have a direct impact.

The drylands occur in northern Nigeria. Northern Nigeria is an unofficial designation for the northern half of the country, which is markedly different from the southern part in ecology and culture. This chapter will examine current perspectives of land degradation in the drylands of Nigeria in the content of official policy documents, and by analysis of interviews with government officials and environmental NGOs. It will also examine land policy in Nigeria past and present government initiatives on land degradation, and the implications of the desertification discourse in official and quasi-official circles such as (Nigerian) NGOs, as seen through the practical interventions which they formally justify.

4.2. Agricultural Development in Nigeria

Nigeria gained independence from Britain in 1960, and at the time agriculture was central to its economy. It was the world's largest exporter of groundnuts and a major exporter of palm

oil, cocoa and cotton, most of it produced by smallholders on rural farms (Mortimore 2005). Kano, where this research is situated, was the centre of groundnut production in Nigeria. The colonial British government was financed through the export of these food crops by peasant production which it encouraged through direct taxation, forced cultivation and compulsory quotas (Watts 1983b). In 1963 agriculture accounted for 60% of national income (Watts 1984).

A confluence of several factors in the beginning in the 1960's changed agriculture's prominent role in Nigeria economy. The decline in world food prices in the 1960's significantly reduced income from food exports, the 1967 civil war in the east hurt palm oil exports, and in the north a prolonged drought that began in 1969 led to the famine of 1972-1974 (Watts 1984; Mortimore 1989). The drought, coupled with rosette disease, led to a collapse of the groundnut industry and its cultivation for export ceased altogether by 1975, and it is now grown only for the internal market (Mortimore 1993).

The discovery of oil in the Niger-Delta of Nigeria and the influx of oil revenue in the 1970's dramatically changed the political, social and economic character of the country (Watts 1984). A rise in world petroleum in prices in the 1970's led to an influx of cash to the Nigerian government just as revenue from food exports fell drastically. The agricultural sector was again particularly affected. The oil boom was followed by a rapid urban population boom, large scale construction and infrastructural development, and a surge in imports, all at the expense of agricultural production because many poor producers left farming (Iliya and Swindell 1997). Food imports rose from N1 billion in 1971 to over N7 billion by 1979 (Watts 1984). Rural producers were hardest hit by these food imports. The decline in the food export industry continued throughout the 1970's such that within ten years (from 1970-1980), the agricultural sector was in a shambles (Watts 1984). By 1980 agriculture accounted for only 2.4% of total Nigerian exports and oil 96.1%, and Nigeria became Africa's largest food importer (ibid: 416).

Rural-urban migration intensified as labour was diverted away from the rural economy and from farms by the urban construction boom and land acquisition by the state for agricultural development projects such as dams (Mustapha & Meagher 2000). Several polices such as the introduction of highly subsidized chemical fertilizers further necessitated off farm occupations to afford the fertilisers and other inputs. A decline in world oil prices in the 1980's resulted in economic stagnation and a massive decline in oil revenues. According to Watts (1987), between 1980 and 1982, oil revenue declined from $23 billion to $13 billion dollars. In 1986, the Nigerian government adopted the IMF's structural adjustment programs (SAP). SAP had many impacts on agricultural production and rural households in Nigeria. Reforms led to devaluation, elimination of market boards and reduction of subsidies, but uniquely in the case of Nigeria, it also included a ban on food imports, specifically rice, wheat, barley and maize and maintained fertiliser subsidies. Therefore in theory the government tried to protect agricultural production from the harsh effects of structural adjustment (Mustapha & Meagher 2000). In some ways it was successful, grain production subsequently increased with an expansion of markets to neighbouring countries such as Niger (Andrae and Beckman 1987). But rising prices benefited only wealthy farmers, small scale farmers lost out in part because they lacked the connections to gain access to subsidized inputs and had to buy on the open market (Mustapha and Meagher 1997*).* Some smallholder farmers gained because they were able to rent or sell their farms to wealthier farmers and were paid for wage labouring on the same farms, but these were short term gains (Iliya & Swindell 1997). In effect, agriculture became profitable only for the wealthy, and many urban people with connections to acquire inputs bought farms from rural producers to take advantage of high food prices. The import bans on grain were lifted in 1994 and 1995 and imports rose dramatically and up to the present day, Nigeria still depends heavily on food imports.

In recent times public spending on agriculture has remained very low. Between 2001 and 2005, government spending on agriculture was 1.7% of total expenditure and was among the lowest in all Sub Saharan African countries, despite agriculture contributing between 20-35% of total GDP (Mogues at al 2008). Agricultural imports have continued to rise however, and in 2010 Nigeria spent billions of dollars importing rice, sugar and wheat, all commodities which it produces (Watts 2013).

4.3 SAP & Agriculture

The structural adjustment policies undertaken by many African countries in the 1980's led to increasing diversification from agricultural production becoming the norm (Bryceson 1996). The movement away from agriculture to non-farm based livelihoods has been termed de-agrarianization (Bryceson 1996)

> '…a long-term process of occupational adjustment, income-earning reorientation, social identification and spatial relocation of rural dwellers away from strictly agricultural-based modes of livelihood' (Bryceson, 2002: 726)"

Bryceson argues that the process of de-agrarianization means that non-farm activities, instead of being a traditional seasonal supplement to farming, are increasingly viewed as an alternative to agricultural based livelihood (Bryceson 1996). Bryceson (2002) notes that though diversification can open up opportunities, it also carries financial and personal risks, and disrupts agrarian and family values and was partly responsible for the steady decline in African agricultural exports in the 1980's and 1990's.

Diversification which involves non-farm activities has been a principal feature of dryland environments for centuries. In northern Nigeria, livelihoods have always involved both agricultural and non-agricultural activities, because of the seasonality of farming, and there is a history of labour migration and a mobile male population especially in the dry season. Trade has always been an important income earning activity. Non-farm income from the long dry season

usually provides funds for farming in the wet season such as money for inputs and labour (Mortimore 2001). However the SAP changed the nature and pace of this diversification (Mustapha & Meagher 2000). The economic reforms increased the cost of living and of agricultural inputs and production, and it also increased the importance of non-farm income in agricultural production and in household expenditure (Meagher & Mustapha 1997; Meagher 1999).

The effects of SAP were not only differentiated in terms of socio-economy, but in gendered terms as well. According to Meagher (2000), among wealthy Hausa women a re-agrarianization occurred because commercial agriculture became more profitable. Women from well off households could access land from poorer male farmers or kin, and their off farm occupations and husbands provided funds for labour and input. Poorer women from less well-off households on the other hand could not and were limited to low income non-farm occupations. Groundnut processing was a lucrative business for women, but it all but vanished. These processes affected gender relations in the household especially traditional male provisioning roles. Women increasingly had to contribute to household expenditure by helping husbands with small purchases such as of condiments and soap and seasonings, which had traditionally been paid for by men (Meagher 1999). Meagher found that in this as well, women in poorer households contributed more of their incomes to household expenditure than did better off women.

Fluctuating agricultural policies especially concerning input subsidies have fostered uncertainty and underinvestment in the agricultural sector, and these, coupled with rising population densities, land fragmentation and uncertain climatic conditions have meant that in recent times farmers are continuously engaged in off-farm income earning opportunities on a wide scale (Maconachie 2007, Watts 2013). Trade and employment in the informal urban sector are the largest contributors to extra household incomes and are seen not as a substitute for farming or livestock, but as crucial additions to livelihoods (Mortimore 2001). Mortimore (2001) argues that in northern Nigeria, agricultural and non-farm occupations play a complementary rather

than a competing role in rural livelihoods – albeit an increasingly important one. The importance of off farm livelihoods to men and women and its effect on household gender relations in relation to this study will be discussed further in Chapter 7.

4.4 Land Tenure

Agriculture is the mainstay of rural economies in northern Nigeria. In the rural areas of Kano region, natural resource use is inextricably linked to agriculture and people rely on extensive farmed parklands for the production of both food and fuel.

Land rights in Nigeria are usufruct rights – ultimate ownership formally rests with the state. Land law is based on statutory and customary tenure. The statutory law vests control of all land in the government. The governor of a state is the trustee of all land and issues a certificate of occupancy for 99 years on payment of a nominal fee. Customary law is also recognised and in northern Nigeria, it is loosely based on Sharia law. This kind of tenure is dependent on the village heads recognising an individual's right to land acquired through inheritance or purchase for example. These rights can be protected in lower courts, such as local Sharia courts. However only statutory tenure can be defended or protected in higher state courts. Statutory titles are expensive to acquire, so most rural people have only customary rights to land (Pierce 2005). But because this is the case for majority of the rural population, these rights are recognised by all local inhabitants and actors. It is these customary rights to land that are inherited, bought or borrowed through generations.

State governments can acquire any land for the public good, such as for the construction of roads or for afforestation projects, and only pay compensation for crops, or improvements on the land but not for the land itself (Cline-Cole 1997). Customary tenure is therefore tenuous and does not provide adequate protection because it rests on village heads' recognition of individual rights. Village heads could be appointed politically, and land users have been known to be pressured into selling to wealthy buyers (Mortimore 1989).

4.5 Government Policies on Land Degradation

Some of the more important and recent policy documents on land degradation in the Nigerian drylands include the *National Drought & Desertification Policy* (FGN, 2007), the *National Report on the Implementation of the UNCCD* (FGN, 2005), the *National Action Programme to combat desertification* (FGN, 2001). The neo-Malthusian view that land users contribute to desertification through overpopulation and overexploitation is a theme that occurs in the government documents examined as part of this research, and sets the scene for the policies advocated. Interviews with government officials and NGO representatives also mirror this view, and seldom stray from it. The documents are consistent in their framing of desertification, its causes, manifestations and solutions.

Following in their footsteps is the *National Drought & Desertification Policy* (FGN 2007) which is among the latest policy documents on land degradation, and is meant as a blueprint of how desertification should be addressed. According to the document, drought has worsened and desertification has accelerated in Nigerian drylands, and 30 million people are threatened with famine, poverty and mass migration (FGN 2007). The document is especially important because it was produced by the Federal Ministry of Environment in collaboration with United Nations Development Programme (UNDP), with the help of academic consultants, and also with the collaboration of NGOs. So it can be said to have the input of Nigeria's NGO community, and the academic communities of Nigerian universities who acted as consultants. So in effect it provides a synopsis of academic, official and NGO views in Nigeria.

4.6 Population and Poverty

The main goals stated in the policy are the reduction of the adverse effects of drought and desertification and the reversal of its processes, as well as poverty reduction. Narratives occur within a discourse and refer to particular accounts of an issue produced within that discourse

(Svarstaad et al. 2008). The narratives in this and the two other documents espouse a link between poverty, population growth, land and energy use by local people and environmental degradation. These documents assert that poverty and environmental degradation are strongly linked. Thus the poor degrade the environment because poverty makes them heavily dependent on the natural resources and they put a disproportionate pressure on land. They use firewood primarily because they cannot afford the alternatives, and if the government succeeds in reducing poverty, environmental degradation will reduce. This rather simplistic notion establishes a direct relationship between poverty and environmental degradation.

> Poverty and environmental degradation are strongly interrelated, being at the same time the cause and effect of each other. Drought and desertification induced poverty leads to gross abuse of environmental resources, thereby generating land degradation that leads to desertification, which in turn accentuates poverty (FGN 2007:7)

This view also comes across from the interviews with officials and NGO representatives. Poverty is seen as a key component in environmental degradation. As one government official puts it,

> Most of the people are poor, they live below the poverty line, and people here live on under a dollar a day. So of course poverty adds to the problem of desertification because if the people are poor and they have no other means of livelihood, they go down to the basics. They go into the forests and cut down trees in order to sell firewood which is needed by the populace for their energy requirements. (State government official).

As discussed in chapter two researchers have challenged the claim that poverty leads to degradation as too simplistic and not supported by case study evidence (Gray and Moseley, 2005; Lambin et al.2001a; Stringer 2009; Tiffen and Mortimore 2002). In official views, increasing population pressure is blamed for the decline in the socioeconomic situation and inappropriate land use. The overall message that emerges from this is that desertification occurs due to the exploitation of resources by increasing populations living in poverty, and this is aggravated by drought. This is supported by statements such as the ones below.

> The rapid rate of population increase is exerting pressure on the land's ability to sustain development, thereby encouraging the use of environmentally harmful and economically counterproductive method of exploiting land and associated resources for meeting immediate needs' (FGN 2007)

The population pressure is seen to come not only from people but also from animals, and this pressure leads to overgrazing as illustrated in the interview below:

> ...you know most of the households around here make it their tradition to see that they raise livestock for their livelihoods. This creates pressure from the animals that are being raised. We have a large number of cattle, goats, sheep and whatever, and the population of these animals is increasing yearly and like, you know, this area, the total land surface area does not increase, it stays the same while the population of the animals is increasing yearly (state govt official)

Statements such as the ones above highlight the perceived role of human agency in degradation. Wood extraction for fuel and construction, fuelled by increasing populations and rapid urbanisation are all seen to lead to deforestation. Bush burning to clear land for agriculture, and by herdsmen to stimulate growth of grass is also blamed for deforestation. It is argued that land users sell wood to urban areas to supplement their income, and the removal of wood accelerates degradation of the soil to desert like conditions.

> Deforestation is the major cause of desertification. The extensive population, you know, human and animals depend heavily on the forest. For the animals, their grazing, their feeding, their fodder is usually obtained from this area. As for the human beings, almost 70% of our population depend on firewood for their cooking and heating (federal official).
>
> Human activities such as agriculture, commercial timber logging and local woodcutting have resulted in deforestation, soil degradation and desertification in the drought affected parts of Nigeria. Indiscriminate forest fires aggravate the situation (FGN, 2007:p15)

The narrative that comes across from the interviews and documents is that human activities responsible for desertification are overexploitation, over-grazing, deforestation and faulty irrigation practices, and these are all influenced by population, climate and socioeconomic activities. Land users are also portrayed as victims of their circumstances and in the vicious cycle of poverty and degradation, local land users are therefore victim and culprit at the same time. All these causes are mentioned by official documents, in NGO publications and by the government officials and NGO representatives interviewed.

4.7 The Creeping Desert

The concept of desert encroachment features strongly in the documents as in the statement that 'entire villages and major access roads have been buried under sand dunes in the extreme northern parts of Katsina, Sokoto, Jigawa, Borno & Yobe states'(FGN 2001:11; FGN 2007:1). The NAP is dotted with boxes of facts which are presented in several places in the document. These are meant to lend credence to certain points being made. In one such box, reference is made to Stebbing's tour of West Africa in the dry season of 1934 which raised alarm about the degradation and advance of the Sahara he claimed to have witnessed;

> ' ...the people are living on the edge, not of a volcano, but of a desert whose power is incalculable and whose silent and almost invisible approach must be difficult to estimate...the tract of country now directly threatened by the Sahara..' (Stebbing 1935).

It is interesting to note that while Stebbing's now infamous report has been highly criticised by many scholars as being based on a snapshot view of Africa (Leach and Mearns 1996; Mortimore 1998; Binns 1990; Swift 1996), this statement made over 70 years ago is used by Nigerian official documents to provide supporting evidence for desert encroachment. The idea of the advancing Sahara still holds appeal to Nigerian officials. The Manga grasslands in north eastern Nigeria are famous locally and nationally as visible evidence of desertification in the northeast as declining rainfall has reactivated mobile sand dunes (Mortimore and Turner 2005). Almost all statements on desertification speak of the encroachment of the Sahara, usually based on this famous example of mobile sand dunes. However, Mortimore's detailed study of the Manga grasslands established that though woodland had deteriorated and grassland composition changed, there was no conclusive evidence of soil degradation, and the boundaries of the grasslands were the same in 1969 as in 1937. He also concluded that the evidence for ecological degradation corresponded to declining rainfall (Mortimore 1989).

The view that desertification is a menace and threat to lives and that northern Nigeria is in danger of being swallowed by the desert seems firmly entrenched in the official lexicon of the

environment in northern Nigeria. The framing of desertification as desert encroachment has been refuted even by the UNCCD itself, as it takes pain to stress that desertification is not desert encroachment. But desert encroachment is still an important part of the desertification rhetoric in Nigerian official and NGO circles. Many reports mention an annual 'rate' of desertification, which is put at 0.6km and appears to refer to the distance of desert encroachment annually, but it is unclear how it is arrived at or indeed how it can be measured This figure appears in all the documents analysed and is also mentioned by government officials and is often reported in the media as well. These observations however do not appear to be based on scientific data.

It has been noted that there is often a lack of scientific rigour in the preparation of desertification reports and estimates are often based on subjective opinions (Reynolds et al. 2007; Thomas and Middleton 1994; Verstraete 2011). The lack of reference data is almost glaring in its omission from the official documents. The data with references are physical characteristics and population figures of the various states. This has been noted before in relation to policy making in Nigeria. According to Mosley (1992) rational policy making in Nigeria is constrained by a lack of facts and inadequacies of data that can be trusted, and more resources need to be invested in the collection and reconciliation of data if policy making is to be effective (Mosley 1992).

Long term studies in sub Saharan Africa (Tiffen & Mortimore 2002) have tested the theory of desertification as a result of overexploitation of natural resources by looking at rainfall records, crop yields and population growth patterns over a 40 year period (1960-2000). Results did not support the theory that increasing populations has led to widespread degradation or a decline in crop yields. The study concluded that there was no evidence of large scale irreversible soil degradation, and hence desertification. Population growth had not adversely affected food production and increase in livestock populations, far from degrading land, actually nourishes it

with manure. At the global scale scenarios of degradation and collapse in the human and ecological spheres are often constructed while micro level studies generate more nuanced and counter-intuitive findings based on perceptions and knowledge of the people (UN 2011).

4.8 Government & NGO Influence on Policy on Land Degradation

As noted in the introduction the political structure in Nigeria is 3 tiered, comprising a central federal government, state governments and local governments under the states. Federal and state governments have the power to enact legislation, but not the local governments. Policy making is highly centralized. In environmental matters, the environment ministries at the federal and state levels are responsible for the development of policy, guided by the National Council of environment. The latter also acts as an advisory body to the presidency on environmental matters. Its membership comprises all the environment commissioners from the 36 states. The ministry of environment was created after the return to democracy in 1999 after decades of military rule. The states also have their own environment ministries. The media are also important actors in policy making. In the environment in northern Nigeria, desertification has been highlighted as a danger by the media.

Ukiwo (2003) notes that Nigeria's political history underlies its policy environment, and the history of military rule has made the executive arm very powerful, because during military rule, the executive arm of government had the legislative and judiciary powers as well. He notes that the 'central role of the state in capital accumulation has made the policy environment a contested terrain in which different social forces and interest groups have struggled for inclusion and control' (Ukiwo 2003: 2).

4.8.1 NGOs & Land Degradation

The UNCCD negotiations were inclusive of NGOs because of the conventions focus on sustainable development. As a result, NGOs feature significantly in the desertification discourse

in sub Saharan Africa, including Nigeria. Carr & Humphreys (2000) argue that land degradation does not significantly affect the economic interest of governments and that may be why the UNCCD gives a large role to NGOs and community participation in the implementation of the convention.

Nigeria's present political environment provides NGOs with the room to operate freely. Prior to the 1990s there was an absence of a strong NGO culture in Nigeria, primarily because of the constraints placed on their existence and operation by authoritarian military governments, but this changed in the nineties as many NGOs were formed in the lead up to the UNCED in 1992 (Thomas 2001).

Many NGOs from developing countries were invited to the desertification convention negotiations and 48 NGOs participated (Carr et al 2001). Most NGOs in Nigeria are based in the Southern part of the country. Surprisingly perhaps, of the 10 NGOs accredited to the UNCCD, only one, Savannah Conservation, is in northern Nigeria. As desertification is land degradation in the drylands, which are in the northern Nigeria, this may be an indication of Thomas' (2001) assertion that NGOs in Nigeria are driven by practical realities rather than ideals. In this case, the realities may be the prominence and recognition given to desertification in discussions of the environment in Nigerian official circles and the media.

There is clearly collaboration between some NGOs and the government as alluded to in official documents and also in NGO publications (FGN 2005; NEST 1997). NEST has provided advisory and technical assistance to the environment ministry on land degradation, and it presently does the same on climate change. So some NGOs can be said to be part of the official establishment. Their views echo those found in the official government documents, and their publications also mirror this view. It was in collaboration with the government that NEST produced a handbook on desertification awareness in both English and Hausa, the vernacular of the drylands (NEST 1997).

4.9 The Policy of Afforestation

According to Mustapha (2003) the 'creeping desert' and soil depletion are the two main concerns that mark official perceptions of the environment in northern Nigeria, and have led to questionable afforestation programmes which had had little effect in addressing the problems of local land users. The centrality of afforestation as one of the main components of official desertification control in Nigeria is clear from official documents and from interviews. In 2005, the then Nigerian president, at a summit of African heads of state called for the planting of a wall of trees across the Sahel to stop desertification, the so called "Great Green Wall for the Sahara and Sahel Initiative" (GGWSSI). Its initial focus was a large scale regional tree planting initiative but its focus has shifted to sustainable land management and is now funded by the European Union, in collaboration with the African Union and the Food & Agriculture Organisation. To lend further credence to the colonial origins of recent environmental polices the concept of a vast shelterbelt across the Sahel was one of Stebbing's recommendations in his report on the encroaching Sahara (Stebbing 1935). These large scale afforestation programmes are a central component of the desertification narrative, the solution of choice for the government. At the national level, it has been translated into the greenbelt programme which has the lion share of funds allocated to desertification in Nigeria (FGN 2005).

Two dominant issues emerge on the policies about desertification. Afforestation and the use of alternative energy and woodstoves were seen to be the best policy measures to deal with desertification. It is not surprising that the focus is on these since deforestation plays a central role in the desertification discourse in Nigeria.

> Obviously wherever you go if you want to tackle the problem of desertification, you have to do afforestation work. (State government official)

The afforestation policies can be summarised threefold; agro forestry, shelterbelts and woodlots. All involve the planting of trees provided by government and other agencies. Agro forestry

involves farmers planting trees on their farms together with their usual crops. Shelterbelts are rows of trees on the borders of communities to act as windbreaks, with crops grown in between the belts, and woodlots are plantations of trees grown specifically to provide fuelwood.

> We the government have been establishing woodlots which dry easily so that it can supply fuelwood energy to the inhabitants to minimise the indiscriminate felling of trees and at the same time to rehabilitate degraded land (federal government official)

The popularity of afforestation among governments and local and international NGOs as a solution to land degradation is noted by Odihi (2003). He notes the paradox of increasing deforestation in areas where afforestation is a priority, in the drylands of Nigeria, and the ubiquity of jingles in the media, and the annual rituals of tree planting campaigns in Northern Nigeria. His 5 year survey of 610 households in North eastern Nigeria from 1991 to1996 found a very high awareness of afforestation, and a reluctant participation by members of the public, largely for some sort of reward or because they felt there would be consequences if they didn't. But he found that farmers on their own practised agro forestry but preferred different species to the ones that were popular in the programs.

It is in the implementation of these afforestation programs that women get a mention in the government discussion of land degradation. Primarily as a source of labour for the raising seedlings, and for planting trees. There is a recognition of their relationship with trees, and because they are responsible for cooking, fuel efficient stoves are targeted at them.

The emphasis on afforestation goes hand in hand with providing alternative sources of energy. Provision of alternative sources of energy is seen as a way to reduce deforestation and there is an assumption that this would encourage people to switch energy sources away from fuelwood, thus preserving trees. One NGO's work involved the introduction of smokeless coal to rural communities as an alternative to wood. There was a consensus among those interviewed that if other sources of energy such as electricity were widely available, deforestation would stop.

> One other thing you see is the issue of electricity in Nigeria. If you put electricity in Nigeria, 24-7, most of these problems will be wiped out. This is because the people that cut down trees and bring it down to

> the urban areas will reduce it. This is because they can use electricity to boil water for tea, to cook food, and all these kind of things (NGO Rep)

The use of fuelwood therefore comes across as something that is done because of the lack of alternatives due to economic reasons. So people use fuelwood because they have to, not because they want to. Closely linked to this is the promotion of fuel efficient stoves, which was mentioned by almost all those interviewed. Fuel efficient stoves are meant to replace the traditional stoves or three stone fireplaces common in the drylands, which are seen to use too much firewood, and are therefore 'inefficient'.

1500km of shelterbelts and 40000 hectares of woodlots have been established in the Nigerian drylands under afforestation programmes as a response to deforestation and desertification (Cline-Cole 1997). Cline-Cole notes that the continued use of exotic species at the expense of indigenous ones is counterproductive because fuelwood consumers actually prefer indigenous species. Cline-Cole concludes that they have had limited success and impact because of this, and other issues such as land tenure and personnel shortages. He also observes that the superior knowledge of farmers on the ecology and management of trees, though for long acknowledged by researchers, has not been reflected or recognised by these programmes.

The colonial period saw the implementation of certain policies in agriculture and forestry in the drylands and these interventionist policies still persist (Cline Cole 1996; Mustapha & Meagher 2000) Mustapha (2003) highlights this by tracing the development of official perceptions that farmers do not protect trees to a colonial edict, the Forestry Rule no. 48, that sought to stop local people from lopping off branches on their farm trees without permits. This predictably met with much resistance, and local people stopped planting trees, since the rule effectively denied them access to their own trees. It was meant to preserve forests but had the opposite effect, and further reinforced colonial perceptions that locals had no interest in pre-

serving farm trees. This perception still persists today. Government policy emphasises promotion of agroforestry as something local farmers should be encouraged to do, without acknowledging that it has been a central component of dryland agriculture in northern Nigeria. Carswell (2003) similarly observes this in Uganda as well, where government agencies have presented indigenous practices of agroforestry as something new and an initiative of the government extension agencies. The promotion of agroforestry as something to be introduced and encouraged also comes across in government policy and in both NGO and official views,

> We used to have trees on farms and in open areas and these are indigenous trees, not exotic trees. There is need for policy to be formulated that would encourage people to safeguard trees that are coming up naturally because they are the trees of the environment, not trees that you bring from other places. And because that programme is slow, its time consuming and it takes money, you need to have people to send to local governments, to every ward and to every village to identify certain areas and secure them (state government official).

It is possible that that both NGOs and the government officials stress these afforestation efforts because they are visible and quantifiable- x number of seedlings raised and x number of trees planted, and distributed to x number of farmers. This enables justification of the funds used, as there is much fanfare when these projects are launched, with top government officials attending the start of afforestation projects, and much publicity and mention in media. One of the more important aspects of the afforestation programmes is the raising of seedlings in nurseries, and distribution of young plants to the public. Both government officials and NGO's talked about raising seedlings for free distribution. There is a focus on the number of seedlings raised and how many trees planted, both by government officials and NGOs. Quantity is equated with success.

> Now we are raising about 600,000 assorted seedlings on a yearly basis and these seedlings after being raised in a project nursery we have about 9 nurseries spread about the state. And these 600,000 seedlings are assorted ... These seedlings are the best type of trees to be promoted in those localities (state government official)

More effective means of dealing with land degradation may not be not be as quantifiable. The lack of access to knowledge and current research might also be a problem, as government officials and NGOs seem unaware of emergent notions in academic and donor circles about degradation. In their examination of the crisis rhetoric in Nigeria, Milligan & Binns (2007) argue that a greater awareness of research and improved access to data will not automatically translate into more appropriate policy making, partly because of the weakness of supporting state structures in Nigeria and shortage of financial and human capital. They note the absence of strategic planning and consensus building between trained civil servants and politicians in the policy making process and how this leads to top down and ad-hoc strategy development by the government. The struggle to control national resources has resulted in 'formal rules of policy making (being) superseded by informality and expediency' (Ukiwo 2003:13).

Policies do not appear to be formulated or even implemented with input from the local population. Policies are formed in Abuja and Kano and villages chosen from a central location, and then local people are basically informed that their village has been chosen to host a government project, with all the attendant attention. Local people are thankful for any government attention or projects, as it focuses attention on their communities, albeit for a short time. It also holds out a promise that their concerns will be addressed and provides a few jobs for local people. So local people agree with narratives espoused by officials because they have learned that it is beneficial for them to do so (Hoben 1995). Whether these succeed in tackling degradation is another matter. On one hand, the policies posit a participatory rhetoric to tick the boxes, but the reality is far different. It will be important to see how these views on the causes of land degradation and its effects on socio economic livelihoods stand up to local scrutiny. This is because whatever policies are formulated and implemented are guided by the outlook of the policy makers on the nature of the problem.

4.10 The Participatory Rhetoric

The importance of indigenous knowledge in environmental management is an important argument in political ecology research, because such knowledge stems from prolonged and personal interaction with the ecosystems, and local people are best placed to understand and regulate it (Bryant 1998). The UNCCD is seen as a convention that promotes local participation, in theory at least (Stringer 2008; Grainger 2009). The need for local participation in policies is continuously stressed in official documents and by those interviewed. Statements such as the one below highlight the importance of local knowledge and practices, although the programmes outlined do not clearly show how they can be included.

> 'Farmers and herders in the drylands of Nigeria have always existed in a precarious balance with the harsh and inhospitable environment, dominated by risk and uncertainty. They have evolved over the years some traditional response mechanisms of coping with such risk and uncertainty in managing their environment. Emphasis should therefore be on building on existing knowledge and capacity.'(NAP 2001: 25)

and

> 'The local populations are always involved in policy development and implementation. This has been achieved through periodic rural participatory dialogue.'(NAP 2005, p.22)

Both statements talk in participatory terms about using indigenous knowledge and involving local land users in decisions. In response to questions about the level of community involvement and consultation on the projects several of those interviewed stressed that community participation was essential to the success of the policies and projects. There was much talk about the need to involve local people in government projects. Farmers own initiatives, if they exist, were not mentioned.

> The concept is that the only way you can check desertification is to involve the people to whom the resources matter, their way of life, their livelihood is tied to these resources and so there is no way you would protect these resources from degradation without involving them (NGO Rep).

Related to this is the issue of farmer awareness and education, or lack of it. On the one hand, there is a perception that farmers are intelligent and knowledgeable about their land, and on the

other, an attitude that they need to be trained and educated and enlightened about land degradation. This came across from both NGO representatives and government officials.

> You also need to work on their attitude, their attitude has to change and there also has to be legislation that will empower whatever form of management there is in place. There also has to a community development, a community incentive (NGO Rep).

> But the issue is that the majority of them they do not know the gravity of the problem in the long run. They just see it as something that will just come and they move away from the area to another place, not knowing that it can meet them up wherever they went (federal government official).

An example of such a programme is the pilot project on rangelands, which according to the NAP review is designed to 'demonstrate to communities in the drylands technologies for establishing rangelands' (NAP 2005, p.29) in a bid to improve the carrying capacity of the grazing lands, and to make pastoralists sedentary. However carrying capacity is thought to be an inaccurate determinant of rangeland capacity in the drylands, as it is based on an equilibrium paradigm which is inappropriate to drylands (Batterbury and Warren 2001). The number of animals that can be supported by drylands is not static, but variable because of the ecosystem (Herrmann and Hutchinson 2005). Trying to persuade pastoralists to become sedentary is also an example of the type of policies that overlook the environments natural strength by proposing alternative livelihood options (Stringer 2009). Other programmes such as the development of a drought forecasting and early warning system are crucial since it recognises the central role of drought in the decisions made by land users.

There has emerged in the last decade new lines of thinking and better understanding of dryland environments that is not defined by desertification. This new paradigm in scientific and increasingly in donor circles better articulates the complexity and resilience of dryland environments. However, it appears policies in Nigeria have not changed accordingly, or only superficially, to address or conform to changes in research. The UN recognizes that environmental sustainability and poverty reduction are intricately linked (UN 2011). While some aspects of

policy have changed, for example to place a greater emphasis on poverty reduction, the underlying assumptions behind the policies remain the same. This has seemingly led to old solutions in new bottles. An example of this is the Integrated Ecosystem Management Project (IEM-Niger-Nigeria) in the transboundary areas of Nigeria & Niger, which is funded by the Global Environment Facility (GEF) and is aimed at sustainable management of natural resources and improving livelihoods in the areas it covers. It posits a holistic approach to natural resource management, giving priority to community ownership and management of the projects. Yakai community, one of the study sites of the research lies in the area, and hosts one such initiative. On the ground, the manifestation of this was a fruit orchard and a borehole to serve the orchard, and local people acknowledged its minimal impact on the community. The next sections will discuss the study sites.

4.11 Local Views on Afforestation

Most men in Bemun were aware of the government woodlot on the edge of the village, and had a general idea of the governments focus on planting trees. According to government officials, its main use is to provide wood for the communities in the area and to discourage indiscriminate tree cutting. There was bemusement however as to why this was needed in an area where locals perceived no decline in vegetation and no scarcity of fuelwood.

> We don't have zaizayar kasa (erosion) like they do over there in Danbatta and Jigawa. They have shelterbelts to protect them from the wind, but we don't need them over here. We have trees everywhere so we don't have a problem. I don't know why the government planted the trees over here, but there must be a reason. Since they made all that efforts, there must be a benefit to it (Shehu)

Many commented that it was a concept that was foreign to them. It was apparent that it was not a woodlot that the community felt had much to do with them. There was no sense of ownership or involvement, only an acknowledgement that is it was a concept borne out of 'modern' as opposed to local knowledge.

> I think the plantation was set up because it is useful to have trees. You people with western education say that it reduces wind erosion and the Sahara. So I guess that is why they were planted (Isyaku)

The woodlot appeared to be of use to only a few people, a few men attested to buying wood when the local government carried out the occasional coppicing of the trees, but this was an irregular occurrence and not a majority view. At best they see the woodlot as something that belongs to the government and not the community, with marginal benefits. According to a local resident:

> I see them cutting down the trees sometimes and loading them in vehicles. I don't know where they take them to. I have no relationship with the plantation. I know of people who have earned a little money from helping to cut down the trees, but that is all I know. I don't really know why the plantation was established. All we say here is they cleared a perfectly good woodland and planted another (Abdurrahman)

So what did the women think of the government woodlot in the village, the government's effort to increase tree cover and provide a source of wood? Although all the women knew of the government woodlot, most of them did not know what it was for, as illustrated by some of their comments:

> I have heard of the plantation but I have never been there, and I don't know why it was planted. I don't know its use (Hauwa)

And

> The government woodlots are not our concern. I think the trees were planted to surround the school. But that is all. We do not get our wood from there (Hajara)

In Yakai, all the men and women knew about the government afforestation programs. Yakai was hosting a UN funded natural resource management project implemented by the government, and there was a state government funded nursery for eucalyptus trees as well. One man commented:

> I have not seen the benefits of the plantation. It has only brought loss to us. They collected my farm for the purpose of the shelterbelt and I have received no compensation for it.. When they took the farm, I was not told what it would be for. It was after they had planted the trees that they told us it would be to protect us from the desert. (Ahmadu)

Yakai women were also aware of the project, but were unsure about its purpose.

> I know they plant trees but I have no idea what they are for. I think it is to have more trees in the village (Asiya).

4.12 Chapter Summary

The chapter has comprehensively revealed the government perspectives and official views on land degradation. At the academic and international (stakeholder) level, there is a growing realisation that present dryland policies based on large scale intervention programmes such as the afforestation programmes need to change to better reflect the needs of the people, both men and women. A new paradigm of dryland development has been proposed (Mortimore 2005; 2009; Mortimore and Tiffen 2004; Reynolds et al. 2007), based on the resilience of dryland populations and not on the desertification narrative. This new approach advocates that policy priorities must focus instead on the knowledge, skills and innovations that dryland populations possess on land use. The official narrative in Nigeria alludes to participation and local knowledge, but the dominance of the GEM logic and the evidence of top-down interventions show that this new paradigm is yet to make inroads into policy and intervention practice in Nigeria. The next 3 chapters explore community and household level views on land degradation.

Chapter Five: Women & Agriculture

5.1 Introduction

Any research on northern Nigerian society and environment, and of its women, must of necessity take into account the practice of seclusion. Interaction with the environment and the use of natural resources is highly gendered, due to the separation of men and women's space in much of Hausa land. Though farming is a largely a man's job; this has not always been the case, as history and religion have been responsible for shaping attitudes to agriculture. Hausa women's relationship with agriculture therefore has to be examined in the context of history, religion and culture.

The practice of seclusion is largely responsible for the rarity of women's visible involvement in agriculture in the Kano region. Seclusion is known as *'kulle'*, a Hausa word literally meaning 'locked up' or 'to lock up'. It refers to the widespread practice of married women being confined to their houses throughout the day, venturing out only when necessary, usually to visit friends and relatives and on occasions of births, deaths and weddings, or for other essential visits such as to hospitals, and even then only with the consent of their husbands. They do not go to the market, work on the fields, and in most cases don't even fetch water if the wells are outside. The practice usually applies only to married women of fertile age, and not unmarried girls, divorced women, widows, or women who are post menopause. Though not all Hausa women are wives, societal norms dictate that all have been or expect to be at some point, usually more than once. Divorce rates are high, but so are remarriages.

This chapter will introduce agricultural livelihoods in the study communities and the roles women and men play in agriculture and natural resource use. The chapter will trace the way religion and various historical events have shaped the relationship between women, seclusion,

agriculture and the land in the region, and examine the way it has shaped and produced gendered divisions of labour in agriculture and in natural resource use in general. It will consider the various ways women have access to and control land and labour and examine how traditional divisions of labour are manifest in the household and in agricultural production. Gender divisions of labour and responsibilities at the household and community level shape environmental knowledge and the way men and women experience environmental change and are considered to be crucial elements of a gender analysis of environmental change (Jackson, 1995, Leach, 1995)

5.2 Livelihoods & Agriculture in the two communities

Land use in both Yakai and Bemun is mostly agricultural. Soils are sandy and silty and the vegetation consists of shrubs and grasses, and trees dispersed on farms. Farming in both communities is an integrated system of crops, trees and livestock and takes place in the rainy season. The growing season is short on account of the short rainy season, usually lasting from May/June to September. For the remaining months of the year there is virtually no rainfall, therefore agricultural activity is restricted to the short wet season. Trees are a vital component of the farming practices, most grow naturally on farms, and are valued and nurtured. Livestock are vital and consist of small ruminants; sheep, goats, and chickens and are found in nearly every household. Their manure, mixed with compound refuse, provides the vital organic fertiliser known as *taki* that is the bedrock of smallholder agriculture in the region. In the rainy season the livestock are kept tethered at home, in the dry season they are allowed out to feed on crop residues and shrubs. A few farmers have donkeys and cattle, and the ownership of cattle is generally an indication of wealth. Fuelwood is obtained from trees grown on farmlands, usually dead trees and branches of living trees. Rarely is a living tree cut down for fuelwood.

In this region as Pierce (2003:139) notes, 'the orthodoxies of gender interact with the processes of agricultural production'. Gender relations are a central factor in agricultural relations, and this affects agricultural practices, as well as the access and control of the resources of production, including land, labour, capital and access to technology and extension services. Though there are variations of ecology and custom between Yakai and Bemun discussed in the previous chapter, the agricultural practices and livelihoods of their men mirror those of rural Hausaland that has been extensively discussed in the literature (Mortimore & Adams 1991, Harris 2005). Men's agricultural practices in both villages are broadly similar and are outlined together; it is the women's practice of agriculture that differs within the context of the research.

The two communities of Yakai and Bemun are generally similar in the makeup of their populations; they differ in one important aspect in relation to the research. In Yakai, women work on the land as farmers, while in Bemun, women do not work on farms, but are farmers by proxy. They hire young men to farm on their fields, but self-identify as farmers. There may be several reasons for this difference, but it is safe to say that Yakai women are the ones breaking the norm for the Kano region.

5.2.1 The Men: Farmers & Breadwinners

In both villages, the men are the heads of households, and there were very few female headed households. Islam practices govern family life, and men are expected to be the breadwinners and caretakers of their family, and are responsible for the provision of food, fuel and household expenditure. All domestic chores and childcare are done by the women. People live in compounds consisting of occasionally one, but more commonly several households. Most of the houses are built with mud walls and thatched roofs, with a few houses having corrugated iron roofs, a sign of wealth. A household typically comprises a man, his wife or wives and children. Heads of the households living in the same compound are related to each other and are usually a man and his sons or brothers.

The men of Yakai and Bemun are predominantly farmers, as is the case in most of rural northern Nigeria. Agriculture is not large scale or commercial but mainly subsistence. Men farm chiefly to feed their families, and sell their crops only if there is a surplus or an urgent need for cash. Ideally they estimate that they have enough of the staple crops of millet and sorghum to feed their families before any crops are sold, though in practice this is not always feasible. All the men cultivated the staple crops of millet and sorghum, intercropped with groundnuts, cowpea and a variety of lesser other crops, but millet and sorghum were recognised to be the most important crops. In Bemun maize is an important additional crop, while in Yakai, sesame is recently increasingly grown. Generally, groundnuts and cowpea are sold more than millet or sorghum. In Bemun, so is maize.

Most men farm on fields they inherited and/or purchased and occasionally borrowed. In both villages, inheritance is the main form of land ownership for men. At the time of the study, most had more than one field, the number ranged from one up to ten. Farm holdings in rural Nigeria are typically small and fragmented, and the average size of a farm in Kano is 0.3ha (Essiet, 2001). As is typical in the region, the fields were small and dispersed around the village, such that a man would work on one of his fields and then walk some distance to work on another. Islamic inheritance laws are usually responsible for this fragmentation when land is divided among heirs. The laws also mean that men get twice as much as their female siblings. Although in theory women do inherit land, it is often the practice that land is divided only among male heirs. In both villages, it was acknowledged that in cases where women do inherit land, it is usually farmed by men. The average number of fields owned by the men interviewed was 4 in Yakai and 3 in Bemun. The forms of land tenure and customary inheritance practices will be discussed in detail later in the chapter.

Men farm individually or in a cooperative unit with male relatives known as *gandu,* usually a man and his sons or less commonly, brothers. Even men that farm on family land also have

small individual plots of their own carved out, known as *gayauna*. The yield from *gayauna* are for the men to do as they wish with and is often sold for cash, rather than kept for household consumption, especially if the men are unmarried. In Yakai, young men planted sesame on their *gayauna* and this was sold at harvest time. The proceeds are used to buy motorcycles or fund their wedding expenses for example. Some young men also work as wage labourers on other farms, usually in the afternoons after working on their family farms. The use of wage labourers is an important, though expensive, part of agricultural practice. Most men acknowledged that during the peak weeding periods they hired wage labourers if they could afford it.

Most men kept the usual livestock of sheep and goats, and either kept a few cattle or aspired to. Cattle are valued for their manure and their use as work bulls. Donkeys are valued for transporting manure among other things, but they are not a very common sight, though they used to be. Motorcycles have largely replaced them, especially in Bemun. In Yakai, the ox-cart is a more common sight than motorcycles or donkeys, owing largely to its more remote location. The ownership of a motorcycle is valuable in rural areas, and especially so in Yakai which is a remote village difficult to access by cars. No men owned a car in any of the villages, but this was hardly surprising as rural areas are largely poor, and cars are a luxury even in urban areas.

Though farming is the predominant occupation, it is not the only one, on account of the relatively short growing season. The farming season takes up roughly half a year from planting to harvest, and for the other half, almost all men have other occupations. Dry season farming is practiced in Yakai on a very small scale by farmers lucky to have land near the river bed, but not in Bemun. In Bemun the predominant alternative occupation was trading in regional markets usually in vegetables, grain and livestock. Farmers sold produce in the weekly markets in nearby towns of Dawakin Kudu on Tuesdays and Kura on Fridays. In both villages men pursued other occupations during both the wet and dry seasons and were barbers, hunters, civil

servants, land agents, farm labourers, weavers, and shop traders, quran teachers, imams, and many others.

5.2.2 Women & Agriculture

In the areas of study, where the ideal of the male as provider holds firm, women are not expected to be farmers, but caretakers of the home and of children. Agriculture is not considered as central to the livelihoods of women as to men's. As noted before, there are certain important events that have shaped these conceptions of women and agriculture. The jihad and subsequent creation of the Sokoto caliphate profoundly affected women's positions and role in society including their interaction with natural resources. British colonial conquest in 1903 led to the abolition of slavery and the spread of seclusion practices. Later on the prohibition of women owning farms and property and the repeal of this prohibition 31 years later also had important implications for women's agriculture. More recently the economic reforms and structural adjustment programmes of the eighties and nineties discussed in the previous chapter also had a gendered effect on agriculture. In this decade, the introduction of Sharia law in Kano and other northern states and recent increase in the strictness of religious practice and state regulation of morality in Kano region has implications for women, and may affect natural resource management.

5.3 The origins and history of seclusion

The origins of seclusion are generally thought to lie in the influence of Islam. However, it was only in the early twentieth century that seclusion came to be widespread and the norm in Muslim northern Nigeria. Even so, its strict form is mainly practised among the Hausa and settled Fulani, and not in other Muslim ethnic groups like the Kanuri in the north east and the pastoral Fulani. Similarly it is not practised in Hausa communities of neighbouring Niger and not among the non-Muslim Hausa. How and why it came to be entrenched in northern Nigeria Hausa society particularly has been a matter of much debate and comment. By some accounts some

of the most restrictive forms of it in the Islamic world is practised here (Callaway 1984; Hill 1977; Schildkrout 1983).

In early Hausa history women were powerful, held political positions and were the high priestesses of the pre Islamic Hausa religion, the *Bori* practiced by the pagan Hausa (Smith 1960). The sixteenth century was the peak of women's power, after which there was a steady decline corresponding to the rise of Islam (Callaway 1987). Between the 8th and 12th century Hausa land came into contact with Islam through travelling Arab traders and migrating Fulani scholars, and by the fifteenth century there were many Fulani Islamic scholars in the royal courts of Hausa states, and many chiefs accepted Islam (Yeld 1960). One such Hausa chief was Muhammad Rumfa, a ruler of Kano in the fifteenth century, who is said to have established the first oriental-style harem in the region and introduced seclusion (Hogben 1967:101). Seclusion then was the preserve of the ruling classes, who could afford to do away with their women's agricultural labour. The gradual spread of Islam did not completely eliminate the *Bori* cult though, and by the 19th century, Islam as practised in Hausa land had many elements of *Bori* practices. The non-Muslim Hausa, known as *maguzawa*, are still found in contemporary northern Nigeria, though they are a small minority.

The Jihad (holy war) of 1804 brought change and reform to Hausa land. Its leader Shehu Uthman dan Fodio was from the Fulani ethnic group many of whom had migrated to Hausa land. The Jihads main aim was to purify the practice of Islam, and eliminate pagan influences. The Jihad was a pivotal event in the history of Hausaland, as it led to the establishment of the Sokoto caliphate, and Hausa rulers being replaced with Fulani emirs (Last 1967). This led to a Fulani ruling class and the gradual assimilation of Fulani culture into Hausa. Today, many parts of northern Nigeria are denoted as Hausa/Fulani. Though there remains a minority distinct Fulani ethnic group, many of the earlier Fulani ruling families now speak Hausa.

The Hausa commoners largely welcomed the jihad, and it improved the status of common Hausa woman, established the Islamic rights of women to education, to inherit and own property (Hiskett 1973). The Jihad brought together warring Hausa states under one political banner, with the Shehu at the head and by all accounts 'rule was just and law was observed' (Hogben 1967: 55).

The Jihad and its aftermath are crucial in the examination of women's lives in northern Nigeria. Prior to the Islamic jihad, Hausa women participated in markets, but Muslim Fulani practised seclusion and did not gather firewood or work on farms , only slave men and women did (Hiskett 1973:26). In short seclusion was practised only by Fulani women and royal Hausa women, and then only in the cities, where the impact of the Jihad was greatest. Slavery was common in 19th century Hausa land and according to Lovejoy (1978), the Sokoto caliphate had one of the largest slave populations in the world, running into several millions, the majority of whom were women who participated in agriculture, craftwork as well as domestic chores.

The leader of the Jihad preferred seclusion for women and it was practised in his own household though not in the wider community (Boyd and Last 1985). It therefore came to be seen as the ideal of piety and social standing for women to aspire to (Imam 1993). So it is safe to conclude that after the Jihad, seclusion was practised in the cities, but it was largely limited to scholars, the upper class and royalty. Gradually with increasing wealth, more women practiced seclusion as it was a visible symbol of social status.

The Sokoto Caliphate lasted for almost a century, until it ended with the arrival of the British and conquest in 1903, and northern Nigeria became a British protectorate. The slave trade was abolished by the British, but slaveholding was still legal until 1936. The British chose to rule indirectly, preferring to maintain local political and power structures.

There is some contention as to whether free Hausa women worked on fields prior to the abolition of slavery. The more common view is that free women generally did not farm. M.G Smith

(1954) comments, as does Lovejoy, that only slave women worked on fields. Lovejoy (2005: 31) quotes an ancient Hausa poem: 'farm work is not becoming for a wife you know, she is free, you may not put her to hoe grass'. Imam (1993) challenges their assertion that free women did no farm work, as in her view it was impracticable that all households had slaves. What is in agreement though is that traditional divisions of labour meant that women were responsible for most food processing; winnowing, threshing and grinding grain, spinning cotton and shelling nuts, and were engaged in craftwork. They still are.

5.3.1 The spread of seclusion

It was during British colonial rule that seclusion spread to become a practice of the general population. Several reasons have been advocated for this 'generalisation' of seclusion (Imam 1993) in the first half of the 20th century-religion; economy and social status - and both are rooted in the particular history and changing social order of the colonial period in northern Nigeria. According to M.G Smith (1954:22), seclusion had an economic basis and the abolition of slavery led to former female slaves abandoning agricultural field work and wood gathering as an assertion of their new social status as free women. But he does not explain why a withdrawal from fields necessitated a move into seclusion, given that the general population did not practice seclusion at the time. Polly Hill (1977:84) ,while noting that there may be other reasons for adoption of seclusion such as rural people's imitation of 'sophisticated' city people, argues that the high water table and donkeys made seclusion possible, because they enabled wells to be dug inside houses and donkeys replaced women in their 'traditional role of beasts of burden'. Porter (1989) credits demography and the groundnut boom. According to her, the central location of Hausa land led to a boom in groundnut and cotton production and greater wealth to pay for farm labour, and abolition of slavery meant there was a surplus of male labour available. Female labour on the field was therefore not essential; women were thus able to devote their time to processing these crops, things that were traditionally done at home.

Imam (1993) credits particular developments in the political economy of colonial northern Nigeria and its policies in particular. The socio-economic structure of Hausa society was profoundly affected by the strict and inflexible colonial taxation policies, and unlike pre-colonial times when taxes could be paid in grain, they had to be paid in cash (Watts 1983). Imam (1993) argues that tax officials who were invariably men could not gain access to houses where women were secluded and therefore could not ascertain the number of people living in a household. In this way household heads that were responsible for paying taxes of every presumed productive person in the house could reduce their tax burdens, and the seclusion incentive strengthened. (Imam 1993:154). She further notes that other factors were: increasing pressure on land for cash cropping and forest reserves which had an impact on women's foraging activities; the colonial focus on groundnut and cotton production, whose processing was traditionally women's work and led to their withdrawal from fields to concentrate on them; and importantly, the entrenchment of a visible Muslim identity as a means of resistance to Christian British rule. Imam concludes that:

> "It was the combined interactions of the economic changes of colonialism with its concentration on production for export and increased taxation, together with the resistance to this in the cultural ideological sphere by focussing on constructing a Muslim identity, and using those ideologies to also resist the colonial administration, which resulted in a generalisation of both the ideal and the practice of seclusion." (Imam, 1993: 156)

Whatever is the reason for its generalisation and for its continuation - religion, prestige and social status or economy, seclusion has had a profound effect on northern Nigerian society and in the daily lives of women, not least in its segregation of male and female space and definition of gender roles, including environmental ones. Thus access to and use of natural resources is gendered. Seclusion affects mobility, participation in the formal economy, in politics, and in agriculture. It has increased the separation of the sexes (Barkow 1972) and supports a distinct

segregation between the world of women and men, such that while it is common for a woman to spend the whole day without venturing out, in contrast, men are like "apologetic visitors in their own home" (Robson 2002). Its effect has been largely economic– transforming Hausa farming women into craft and trade women, and young girls into retailers of their mothers' wares (Barkow (1972). The use of their children's labour is crucial to secluded women, as they are their link to the consumers of their wares. Hill's view is that seclusion exacerbates rural poverty because it fails to utilise female agricultural labour (Hill 1977:84). It has had important material consequences. Marriage and seclusion puts a 'floor' under women and guarantees their shelter and food, while at the same time putting a 'ceiling' on their access to environmental knowledge and influences that will impact their economic activities (Longhurst 1982).

In their seclusion and segregation from men, Hausa women are seen by Callaway (1984) as living their lives in a state of 'ambiguous social polarisation' , because at the same time they also control the domestic sphere, engage in economic activity (albeit in their homes) and maintain extensive social networks. According to Imam (1993) and Robson (2000) both men and women are responsible for sustaining seclusion. Imam posits that wives strike a bargain with their husbands where a woman's material security and freedom from farm related labour is upheld, and both their social statuses confirmed. Robson's assertion is that intimidation and social sanction, as well as women's desire to be seen as good women, sustains it. Pierce (2003) also refers to this concept of 'good women' and 'caretaker men' supported by 'rising religiosity' in northern Nigeria. Werthmann (2002) notes that for many women it is a sign of 'conspicuous leisure', piety and respectability. Men on the other hand fear loss of prestige if their wives are not secluded. Seclusion is a visible sign that they are able to fulfil their role as breadwinner, and male prestige is seen to be more at stake than females' (Yeld 1960; Barkow 1972).

5.3.2 Seclusion & Agriculture

It has been noted that though seclusion is generally subscribed to in theory, the strictness of its practice varies according to individual circumstances; age, wealth, status, ecology and environment. The environment plays a role in the variation of seclusion. In a study of four farming villages in northern Nigeria, Mortimore and Adams (1999) noted that the strictness of seclusion declined as aridity increased. In some drier areas groundwater tables are low, and agriculture is not very viable and so seclusion is not practicable. In dispersed villages where subsistence is meagre, seclusion is unaffordable as all labour is needed to make a living, and there is little market for trade; some people are therefore too poor to seclude (Robson 2000).

In the two research communities, seclusion is seen as the norm for married women. In Bemun nearly all married women were secluded and did no field work, except post-menopausal women (the very old). Only men could be seen working on fields, and occasionally an older woman weeding a field or balancing fruits on her head. In Yakai on the other hand, though seclusion is seen as the ideal for married women, many women were not secluded at all, and worked visibly in fields. It was usual to see groups of women wage labouring in fields. This is an important distinction between the two communities in the context of the research.

Seclusion can only take place if women participate in it, and it has been claimed that women agree to the practice in part to avoid the heavy manual labour and toil of subsistence agriculture**.** According to M.G. Smith, it 'implies leisure, with no fetching of wood and water from a distance and no farm work and this allows the women to pursue their own crafts and petty trade, the proceeds of which are their personal property' (Smith 1955: 50) . Callaway (1984) also observes that some women believe they are better off than non-secluded women who work in fields and then still have to do domestic chores as well, with no time for other profitable activities.

5.3.3 The Influence of Islam

Religion played and still plays a major role in seclusion. Though for centuries Islam has been the major religion widespread seclusion is relatively recent. Islam's sanction of seclusion is usually attributed to certain verses in the Quran, one of which addressed the wives of the Prophet. As with most other Quranic verses it is subject to interpretation. The wives of the Prophet are the Islamic ideal, and verses in the Quran which have addressed them directly have often been interpreted to apply to all women.

Many scholars place a strong emphasis on the religious sanction for seclusion and the perceived subordination of women in northern Nigeria. Schildkrout (1983) asserts that seclusion is religiously sanctioned, and sees Islam as stressing men's 'superiority and dominance' and women's 'subordination and inferiority'. Both Schildkrout & Callaway (1987:9) view seclusion as a way of controlling female sexuality and protecting society from its supposed danger. Imam (1993) does not perceive the control of sexuality as connected to seclusion in the way that Callaway does. Unlike in other Muslim cultures the notion of family honour or shame is largely absent, and in any case seclusion generally applies mainly to married women and not all women.

In the research areas, all the elements of seclusion discussed in the literature were present. In both communities, seclusion for women - and in the case of Yakai, non-seclusion as well - was constantly referred to as *a'lada* (custom or tradition) by most women. It has become the way of the people, something that is accepted and not questioned.

In Yakai, women frequently said '*ba'a tsare mu ba'*- (we have not been confined, or we have not been secluded). In their case at least they believe seclusion to be something to be imposed by men. Men on the other hand invoked religion as the main reason for seclusion. According to them, religion did not sanction women's participation in farm work. This was particularly so in Bemun where women farmed by proxy and were effectively farm managers. Seclusion was strict and only post-menopausal women could work on fields; even poor women did not

farm. In this village then, age and not socio- economic status had the most bearing on seclusion as it pertained to farm work. Isyaku, a farmer in Bemun with two secluded wives comments:

> Since I was born here, I have never known women who farm, no matter how poor their husbands are. Only men and children do. It's not our way. Our religion does not permit that men and women work together on the farms.

Seclusion as status symbol is further lent credence by the following statement from a husband in Yakai on the question of his wife farming, in a village where it is recognised as customary for many women to.

> I cannot allow it. I have told her that farming is not something that the religion allows her to do, to go out in the sun and do hard work, since I can provide for her. And Allah has enabled me to provide for her (Yakubu)

5.4 Division of Labour

Women and men fill different positions and have different roles and responsibilities both in their houses and in the wider society. This separation spills into their interaction with natural resources. An understanding of the different roles and responsibilities of both men and women is vital in examining their different (and similar) environmental knowledge and the way they perceive environmental change. The division of labour in agricultural production is quite distinct between the sexes and differs somewhat between the two villages. In the areas of domestic work, food processing, trade and craft, the two villages are quite similar in the sexual and age related division of labour. It is in the area of agricultural production that they differ.

In Bemun where married women are secluded, men are responsible for all agricultural production tasks. The pre-planting tasks of farm clearance and transport of manure are exclusively male tasks. So are ploughing, weeding, planting, and ridging. In all these tasks they may be aided by children, usually boys. Predictably, since these are tasks in the field, women are not involved in the activities related to growing food. In Yakai, women work in fields, but only do certain tasks-planting, weeding, and harvesting. They do not clear farms or plough. Both

men and women take part in harvesting in both villages. Women are involved in all aspects of harvesting in Yakai, but in Bemun only unmarried and old women are, and even then, only in harvests of non-staple crops like groundnut and cowpea and chilli peppers. Wage labour on farms is done by men and women in Yakai, but only men in Bemun.

Food processing is largely the preserve of women. They are responsible for threshing, winnowing and pounding grain. In both villages women also hire out their labour to do these tasks for others. The processing of other crops such as groundnuts, peppers are done by women. Both villages have a grain mill which is operated by men.

Domestic work is almost exclusively the domain of women, aided by children. They cook, clean and are responsible for all childcare. Children are mostly responsible for fetching water from outside the house but if the houses have wells, women and children do. In Yakai, women fetch water from wells and boreholes outside their houses, but not in Bemun where only children and young men were observed fetching water outside.

Generally women are responsible for feeding and watering livestock for the duration they are tethered at home. Men and children bring grass from the fields during the rainy season. Livestock are left untendered at other times to wander in the fields during the day and find their way back home in the evenings. But once at home, their care is done by women.

Men are responsible for providing firewood. They cut down trees and branches and grain stalks and transport them back home, or pay to have those done. In Yakai, some women carry firewood from fields to houses, but in general don't cut wood. Foraging and picking fruits and berries are done by men, women and children in Yakai, but mainly children and old women in Bemun.

There are exceptions to these sexual divisions of labour. Gender is not the only form of differentiation, the division of labour is also age related, albeit to a lesser extent. Old women in Bemun behave like the women in Yakai in that they also plant, weed and harvest. They are

able to transgress these gender boundaries and have a certain degree of freedom in what to do regarding fieldwork. Spinning and weaving of cotton is only done by old people; women spin and men weave-mainly because these tasks have lost the importance they once had and are a dying craft. Children are also not bound by these divisions, although as they grow older they naturally incline towards their sexually segregated tasks. Young girls in particular help out at home with childcare and sale of food, and young boys work on the farm, although it is possible to see both girls and boys on farms or in the house. Children- both boys and girls- are a common sight carrying animal fodder and grass from field to house, and also fruits and berries. Even though harvest is carried out by both men and women, there is a division according to the crops harvested. Grain harvest is carried out by men, while beans and groundnut, and some other crops such as peppers and Bambara nuts are harvested by women mainly, though not exclusively. The divisions of labour are illustrated in Table 6.

Table 6: Division of tasks in Yakai & Bemun

Tasks	Yakai	Bemun
Food Production		
Farm clearance	Men	Men
Transport of manure	Men	Men
Ploughing	Men	Men
Ridging	Men & Women	Men
Planting	Men & Women	Men
Weeding	Men & Women	Men
Harvest	Men & Women	Mainly Men
Pesticide application	n/a	Men
Transport of crops	Mainly Men	Men
Farm wage labour	Men & Women	Men
Food Processing		
Threshing	Mainly Women	Mainly Women
Winnowing	Women	Women
Pounding	Women	Women
Shelling	Women	Women
Domestic work		
Childcare	Women	Women
Cooking	Women	Women
Cleaning	Women	Women
House repairs and maintenance	Men	Men
Trade Craftwork		
Cotton Spinning	n/a	Women
Cotton weaving	n/a	Men
Fan, rope and plate making	Women	Women
	Women	Women

In off farm occupations there is also a sexual division of labour. Men are butchers, hunters, land agents, and trade in livestock, grain and vegetables in markets. Women are also traders at home, where they sell small quantities of grain, vegetables and condiments on a very small scale. Their main trade is in snacks and cooked food, using their children as vendors. Unsurprisingly, this is the exclusive preserve of women in both villages, just as outdoor market trading is for men. Government occupations such as teaching, extension agents, and work on government projects such as the shelterbelt in Yakai and the woodlot in Bemun are filled only by men. The only exception is vaccine administration which requires access into houses, and this can only be done by women. Midwifery is also an exclusively female occupation, but both men and women can be herbalists.

5.5 Land Acquisition

Access to land is a prerequisite to being a farming woman and can be temporary or permanent. There are a number of ways that women would acquire land. Permanent ownership happens through inheritance, gift or purchase, and temporary ownership could be through borrowing or renting (*aro*) and pledges (*jingina).* In this regard access is different from ownership (Ribot & Pelusi 2003). In general, the most common forms of land acquisition in the Kano region and in both communities are inheritance (*gado*), borrowing/renting (*aro*), purchase (*saye*) or pledge (*jingina*) (Ross 1997; Pierce 2005). *Jingina* is when land is pledged as collateral for a loan, to be given back once the loan is fully paid. While most men acquired land for cultivation through inheritance and sometimes purchase, for all but one woman interviewed in Yakai, and three women interviewed in Bemun, land access was temporary, usually *aro* . Inheritance in both villages follows the Islamic tradition of women inheriting half as much as their male siblings. Fragmentation of the land is commonplace, because of the free market in land, monetisation of the rural economy and inheritance practices (Mortimore & Adams 1999).

5.6 The farming women of Bemun: Farmers by proxy

In Bemun, 12 women were interviewed, out of whom 10 were in seclusion and 2 were not. The latter 2 were both post-menopausal women who had been in seclusion pre menopause. As discussed in section 5.3, there is a relaxing of seclusion norms for married women who are no longer in their reproductive phase. A major factor regarding the women's relationship to agriculture is that in Bemun, with the exception of old women, women do not work in fields. They hire farm labourers, usually young men, to work on land that they own or have acquired through other means. These women identify as farmers though, because they provide resources for others to do the work even if they did not physically work on the farms. In effect they are farm managers. Old women are an exception, as their freedom from seclusion means they can choose to farm and work on fields themselves if they so wish. Although it is not the custom of the

village that women work on the land, old women have a degree of freedom and can usually do as they wish.

A woman acquires a plot of land through any of the means listed above in section 5.3. Out of 12 women, one had inherited 4 fields, but farmed only one; 3 others had purchased land, one had been gifted land by her husband, 3 rented from local people and 5 women borrowed from husbands. If she intends to farm, she would have started making preparations before the rainy season by saving from her trade or other occupation known as *sana'a* or by selling some of her livestock. *Sana'a* refers to the wide range of off-farm occupations that many Hausa women do. It includes craftwork, sale of snacks and cooked food and household trading. She then hires labourers from the village, her husband or other male relative is usually the go between in these transactions. Money is paid to the young men for all the work involved in production including planting, weeding, ridging, and harvesting. These wage labourers are paid daily wages and there is a going rate each farming season. In 2011 it was N100 per hour for all tasks (e.g. planting, weeding), except ridging which was N150 (about $1) an hour.

Work is undertaken in shifts from roughly 8-12 in the morning, 2-4 and 4-6 in the afternoon. Some labourers work all 3 shifts and some only one. A woman pays for as much work to be done as she can afford. Husbands and children sometimes help out but this is not often as they work on their own farms. It is not only women that hire labourers though - a lot of the labour in farming operations is expended on weeding, and it is usual to see teams of farm labourers working on fields. Labourers are usually men who don't have land of their own or young men who work on family farms at other times or sometimes even farmers with land, looking to earn money.

For the farming women of Bemun, the road to a crop yield requires an injection of cash, sometimes to acquire land through renting, purchase (rarely), but mostly to pay for farm labour. The sum of money paid when renting a field is known as '*goro*'. Most of the investment goes toward

labour costs, and also towards the cost of *taki* and sometimes fertiliser. The substantial cash investment in labour required means that only women with a successful business and the means to acquire cash can take part in farming - farming is a business for women with means. The land is fertile, trees grow abundantly, they have access to *taki* and poultry manure from the commercial farms around and the rains are good.

Women finance their farming in a variety of ways, from savings from their *sana'a* and from the sale of their livestock. Women in Bemun keep many livestock - guinea fowls, chickens, goats, and sheep and for farming women the ownership of livestock is particularly essential. Livestock breed and multiply. As well as providing *taki,* they are easily sold and bring a substantial amount of money to finance agricultural production. Bemun's proximity to Kano also means they have access to a large market and can command good prices. Most women sell livestock only as a last resort though, because a sold ewe or nanny goat is one that cannot breed. The primary use of livestock for women is thus as a means of savings, a form of mobile banks (Mortimore 2009), while at the same time providing *taki* for the household.

5.7 The farming women of Yakai

12 women were interviewed in Yakai. All of them were unsecluded women who worked in fields they borrowed, rented, or in one case owned. The women cultivate the staple crops of the area and all the women cultivated 2 or more crops. Millet was the most common crop grown (*gero*), interspersed with either cowpea (*wake*) or groundnuts (*gyada)*. The other crops mentioned were sesame (*ridi*), bambara nuts (*gurjiya*), and sorghum (*dawa*). All the women kept animals; chickens, goats and a few sheep. Cattle ownership was quite a good indicator of wealth and only a few people in Yakai owned cattle, usually work bulls used on ox ploughs. Only 1 woman, Duwa, had cattle, 2 oxen used on ox ploughs. This was quite unusual; she was the only woman in the village to own cattle. She was also the only woman who farmed not because her husband was not well off but as a profitable venture.

These women are able to farm because it is the custom of the village that women are able to work on the land. In general, only poor women work on fields. They farm because their husbands are poor, so cannot afford to keep them at home in seclusion. Seclusion is seen at once as a status symbol and as a restriction of freedom by those who farm. They may revel in their relative freedom of movement compared to their secluded friends, but they also envy them their freedom from the `hot sun'.

One woman, Habiba, mentioned she was not originally from Yakai, and where she came from women didn't farm, so she did not. For others however, such as Gambo and Aisha, despite coming from villages where women did not farm, they adapted to the Yakai practice of farming women. The presumption in the literature about women preferring household trade to fieldwork (Imam 1993, Callaway 1984, Jackson 1985) seemed to hold true in both villages. Women expressed a preference for trade at home than work in the fields because working in the fields was a visible sign of their and their husband's economic status, and was extremely hard work that brought barely adequate returns if at all. But in most cases, their non-seclusion was a result of their economic circumstances. The concept of being too poor to seclude was an important factor in the agricultural activities of the women in Yakai. Generally poor women, including some of the women interviewed also engaged in agricultural wage labour, hiring out their labour to others usually for planting, weeding and harvesting.

> In my case, if my husband says stop, I will stop, and if he says carry on, I will. But he won't say it because he is poor. I farm because I have to. But if my husband says rest and I will take care of everything, of course I will stop farming. Everybody loves a rest except those who can't get it. We are people of little means. If I had money and my husband too, then I won't farm. (Gambo)

The financial investment needed to farm by the women in Yakai is not as substantial as that of Bemun women discussed in section 5.5. Many women in Yakai also keep livestock primarily as savings, but livestock sale by unsecluded women in Yakai is not as important to farm finance, since their labour costs are much lower. They are able to contribute their own labour on their fields usually for planting and weeding, and can also be paid for wage labouring for these

same tasks. They do have to pay for some farm tasks however such as land clearing, ploughing and ridging which are seen as men's work.

5.8 Gendered Crops

While most studies of Africa show women farm for food to feed the family while men concentrate on cash crops, in the region there is not such a distinction. Food crops and cash crops are grown by both men and women, though there are some preferences shown by men and women. There appears to be no exclusive men's or women's crop in both villages as such.

Men have to plant millet and sorghum or because they are the staple crops used to feed the family, they plant all the other crops as well, but millet and sorghum are the kings of crops. In Bemun, women expressed a preference for certain crops because of certain reasons. Women prefer cowpea, maize and groundnuts because these were the ones which could be considered cash crops, although they are consumed as well. Cowpea and groundnuts are the top crops for women, because they sell them and they are the raw materials for most of the business of food and snack preparation. Pumpkins are also a favourite of the women of Bemun because they grow fast, can be harvested early, sold and the money ploughed back into the farm before the farming season is over. They can also yield a double crop in a single rainy season. Yakai women consider millet, sorghum and sesame to be men's crops, though not exclusively, since they admit to planting these crops themselves. Bambara nuts are considered to be women's crops, and are hardly grown by men. The decision on what to plant is made according to a woman's individual circumstances, the land she has, what she intends the crop for, and the availability of financial resources to pay for the inputs.

A more useful concept would appear to be a gendered *use* of crops. As Carr (2008) notes in Ghana, agricultural strategies can be gendered, in which women and men emphasise certain crops and have different motivations for planting crops - for sale, for consumption or for both to varying degrees. In this study, production roles mean women produce for their own needs

first and the household is not a primary consideration. A useful generalisation is that men grow crops to feed the household and women grow crops that would best suit their economic needs at the time. There are exceptions to this generalisation of course. Young men with no families to feed, can exercise choice on what to grow on their individual plots, and women responsible for feeding households would have less choice .

One important distinction between the women of Yakai and Bemun is that women in Bemun have no granaries to store their crops. This is the custom of the community as a result of the prevailing social norms that positions only men as farmers and providers. In Yakai, women who are farmers have their own individual granaries within the household compounds, can store their crops, and sell them at a later time. The availability of storage space would seem to influence the type of crops grown, particularly for the women of Bemun, whose lack of storage facilities means that they would eschew grain in favour of cowpea and groundnuts.

5.9 Why Women Farm: Materiality & Reciprocity *(Bukata and Biki)*

> My husband is poor, if you have a husband with means; there is no need to farm. You can occupy yourself with trade at home. If a man cannot fulfil a woman's material needs then he has to let her do whatever she can on her own. I would prefer not to farm, not to have to go out and work under the sun. Everybody loves the shade, don't they? But I have *bukata* and I have *biki*. (Halima)

There are several reasons why women engage in agriculture when the norm dictates that they ought not to. Hausa women famously value their financial independence. As Mack (1991:125) notes "a Hausa woman of child bearing age without a trade is an anomaly". Women have festivities to attend; births, weddings, and other occasions are very important socially especially in this region were seclusion is practised, and it is customary, almost obligatory to bear gifts typically of money or food crops. So while farming for women is almost always on a much smaller scale than men, it usually guarantees a crop at harvest time that might be used in a

variety of ways. In response to why she worked on her field, a woman said simply *bukata da biki,* roughly translated as material need and bond friendship.

Bukata would cover personal needs for cosmetics, clothes, money to spend at births, weddings and naming ceremonies, and importantly as dowry for daughters. Women are responsible for ensuring that when their daughters gets married they have '*kayan daki'* (literally room things), often used by the daughters as start-up capital for their own trade. A woman spends years accumulating such things, so when a daughter get married, she is not found wanting. For a secluded woman in Bemun, Hansatu, one of these *bukata* is to pay for her daughters schooling which her conjugal contract stipulated she did, while her husband paid for their sons' schooling. For the women of Yakai, although farming is a means of providing for their day to day needs and provides them with an additional albeit a small income, it appears that given a choice, the women of Yakai would prefer another means of doing that. There was a general consensus that trading is preferable to farming, and almost all the women interviewed would prefer to have some capital to concentrate and expand on their home based businesses. Many of the women farmers actually do have some trade that they do at home, mostly to do with selling cooked meals and snacks and trading in small amounts of food stuff and homemade snacks. Some women also worked as wage labourers to earn extra income.

The socioeconomic status of the women in the two communities influences their form of agricultural practices and the yield resulting from that production. For the non-secluded farmers in Yakai, their low socioeconomic status gives them the freedom of mobility required for them to actively participate in agriculture. The form of agriculture that they are able to participate in is the hard, labouring one, without the wherewithal to employ wage labour except for those tasks that are by social norms only carried out by men such as ridging. It is unsurprising then that given a better opportunity, they would not engage in agriculture or wage labour, but would prefer to trade at home.

Bemun women's agriculture by contrast requires a substantial investment of cash. So why do women in Bemun go through the trouble of acquiring land, hiring labourers and investing in agriculture? As one woman put it, *Don lada ake sallah - It is to gain a reward that you pray*. Farming is regarded as a profitable business, one of many others that they engage in. Crop yield is sold or used in the food business, and both bring profit and financial independence. As a result women expressed a preference for cowpea and groundnuts, crops which are traditionally sold. As one woman put it, if farming did not bring a profit, they would not bother since it is not their responsibility to feed the house. For the women of Bemun who participate in own account farming, their higher socioeconomic status, and ability to hire and pay for wage labour for all agricultural tasks, means that they enter into food production entirely as another avenue of turning a profit. In essence farming is another *sana'a* one in of many options in the 'productive bricolage' (Batterbury 2001) that underlies so many dryland livelihoods, as every single woman had another primary occupation. But precisely because they have to hire wage labour and pay for all tasks in production, their output is also limited. But for Bemun women unlike Yakai women, agricultural production is one of many options that they actively choose to pursue.

5.10 Helping out (Taimako)

In both villages almost all the women interviewed said they farmed or managed farms to earn money to take care of their various needs - clothes, cosmetics and expenses for children's weddings, gifts for friends and relatives and even school fees for children in Hansatu's case. Of the 12 women interviewed in Yakai village, only 2 farmed as a principal means of sustenance for their families, in Bemun none did. In Yakai, Binta, an old woman whose husband was old and deaf, and who had no living children, had to work on her husband's farm to feed herself and her husband. Jummalo, a young widow with a teenage son and four younger children who were not old enough to work on the land also worked on her deceased husband's farm to provide

food for the children. In this community, the women who work on the land come from the lower end of the social scale. This is a general reflection of the economic realities of the community itself. Many women in this community also work on farms as wage labourers, but the labour is confined to tasks which are not exclusively male tasks such as land clearing and ridging, or wood cutting.

Some women acknowledged that they sometimes did help their husbands out with crops if the household stocks ran low if they could. This appears to be a recent phenomenon. In both communities this pitching in is referred to as *taimako* (helping out). This notion of helping out, using their income to buy goods for the household and even using their grain is part of the 'pitching in' that Meagher (2000) notes is on the rise in many parts of rural Hausaland.. The increase in the incidence of helping out and its effect on gender relations will be discussed in more detail in Chapter Seven.

5.11 Farming as a Sana'a – women's economic activities

All the women in Yakai and in Bemun had other occupations apart from farming, and these could be considered their main occupations in both cases. The weaving of fans and dish covers was quite common as well as selling snacks and cooked food and pressing groundnut oil. Some of these occupations have considerably higher returns than others. Groundnut oil processing is particularly lucrative, but in turn requires a considerable injection of capital to begin with. But it should be qualified that these businesses in craft and cooked food and snacks are all relatively small scale. This means that women have to work exceptionally hard to make a profit.

In Bemun, one of the women was also routinely employed during the polio vaccinations several times a year. The sale of crops also brings savings which can be used to buy more livestock. A fully grown sheep can sell for about N7000 or N8000, young fowls for N300 each and the grown ones for up to N800.

So while in Yakai women appeared to farm because they had to, in Bemun, they did so because they wanted to. This is an important distinction and it is related to seclusion status. The foray into agriculture for women has been explained in terms of the reagrarianisation of agriculture following the economic policies after structural adjustment in the 1990's discussed in the previous chapter. As discussed before, wealthy male farmers were able to take advantage of structural adjustment policies to expand agricultural production, poorer farmers on the other hand were hurt badly, not being able to afford the increase in price of inputs and were forced out of agriculture. Well off women who were so inclined found an entry point into agriculture as they could borrow or purchase land and labour that had suddenly become available, as well as pay to become farmers even if by proxy i.e. farm managers such as the ones in Bemun (Meagher 1999).

5.12 Access to Land

As noted in Chapter Two, across Africa, gender mediates access to land, and this appears to cut across national, ethnic and cultural boundaries (Kevane & Gray 2012). While in many parts of Africa, it is customary for men to allocate land to their wives for the production of food, in the research area there is no such obligation since women are not responsible for growing food. Allocation of land by a husband is mainly for the woman use to generate income, and occurs only usually when man has little resources to cultivate that land.

In the study areas, whereas rights to land are often through inheritance, access is commonly through marriage, but this is temporary and tenuous and rests on the conjugal contract. The conjugal unit is an important means of acquiring access to land, if not ownership, through negotiations between a man and his wife or wives and marital relations are sometimes the most important determinant of access to land. Because women are able to inherit land in northern Nigeria, the situation is somewhat different. A woman may own land but not have access to it, and have access and cultivate land that she does not own.

In Bemun, women's access to land through *aro* is the most common. A number of women farm or manage plots of land that they borrow from their husbands or from others in the village. When land is borrowed from others not their husbands, a sum of money is usually exchanged before land is given, depending on the size of the land. This is known locally as *goro*. Another form is *kashe muraba* (literally divide and we share), which is a form of share cropping in which the land owner is given a third of the yield at harvest. Inheritance and *jingina* are also mentioned, but it seems they are not as common as *goro* or *aro.* Land is also purchased, and 3 women interviewed had purchased land in the village. Money is exchanged for *aro* in Bemun and not in Yakai probably because in Bemun, land is more fertile and thus relatively scarce, and the higher population density and its proximity to urban areas means there is less of it to borrow. Its proximity to Kano also means that there is a demand for land even from city dwellers as evidenced from the number of commercial farms in the area.

In Yakai, *Aro* is also the most common form of land tenure for the women interviewed. Many borrowed land from their husbands, and a couple of women had borrowed land from other people in the village. Both deals had been negotiated by their husbands. Only one of the women interviewed owned her land, and she was the exception among those interviewed in all aspects. Women used the term *aro* even for land that belonged to their husbands. In fact out of 12 women, 8 had borrowed the land from their husbands; none had been given as a gift. This might reflect the separation of economic and material possessions in the domestic sphere which has been well documented in Hausa society.

All the women interviewed in Yakai cultivated a single field except one who had 5, two of which were inherited, two purchased and one pledged to her in return for a loan. 2 other women mentioned that they had inherited land, but they could not have it because it was with their male relatives, these same women worked on land borrowed from their husbands. One of them was a native of the village so the land she inherited was in the village, while the other had

married into the village, so presumably the land was in her home village. Both had no direct access to land they owned. Co wives who coexist on a friendly basis often pool resources to buy land and farm together. They can buy a piece of land and divide it, borrow, or even farm it together and share proceeds. In Bemun, two co wives did just that.

Muslim Hausa women are able to inherit land; Islamic maliki law divides land between male and female heirs, with a female getting half of a male's share. In practice though, women are usually given the cash value of the land. Increasingly however, with the rise in the value of land, women are staking and enforcing their claims on land itself. Virilocal marriages however mean that though women may own land in theory, in practice they rarely work on their own land, but might be given a share of the yield. Access through inheritance has increased (Ross 1990) because wealthy women have the resources and connections to pursue claims. Women can access land to cultivate through borrowing or from husbands, relatives or other unrelated people. Gifts of land to women are more uncommon. In both villages, only one old widow Uwar Shehu had been gifted land by her husband before his death. In an area of increasing land scarcity, economic conditions or illness might preclude many men from effectively farming all the land they have and women are able to borrow land. Land purchase by women is rare generally but wealthy women in both villages did; 3 women in Bemun had purchased land, while only one in Yakai had.

Interests in ownership are separate from interests in cultivation; a cultivator of land is not necessarily its owner. Women often delay their claims to land, they may live elsewhere, or they use this delay as insurance to enable them to count on continued support from brothers, or to bolster their return and care from male relatives in old age or divorce. Delaying claims is a form of ensuring brothers have a stake in their welfare.

Pierce (2003, 2005) uses the lens of female inheritance to study normative forms of gender identity in northern Nigeria. In 1923 the then Emir of Kano prohibited women from inheriting

property, namely houses and farms, ostensibly to prevent them from becoming immoral, an almost inevitable progression from female independence, according to the opinion of the time. Independent women were seen as a clear and present danger to social order. Even today Pierce (2003) contends that female independence is still viewed as undesirable in Hausa society. Pierce argues that because prohibition started with houses, the real reason was so the emirate could acquire these properties for patronage and control, because female property passed to the treasury. The proclamation, he adds, led to an increase in female destitution especially among elderly women who no longer had entitlement to proceeds of agriculture from male relatives that their ownership of property hitherto entitled them to, 'the implicit bargain'. Changing economic conditions had hit households hard and male relatives could no longer afford to be overly generous. The prohibition was overturned in 1954 by a new Emir citing female destitution as a result of men's evasion of their responsibilities to elderly sisters and widows. Non inheritance had resulted in women's destitution because women lost access to the means of production that even if they did not use, gave them leverage. The legal means to accessing the products of agricultural production for women was ownership of farms, but it was not a lack of land that made the women poor, it was lack of male relatives to take care of them (Pierce 2003, 2005). Access to land therefore does not automatically mean access to means of production (Whitehead & Kabeer 2001).

5.13 Access to Labour

The deployment of family labour is critical is smallholder farming systems. Mortimore & Adams (1996, 2001) identify labour as the key constraint in dryland farming systems. They contend that decisions made at the household level about which crops to grow, which fields to till and the management of the tasks are all decisions on how to allocate labour. Usually, agricultural labour is possible through a series of affective relationships such as father and son and working and living together, or brothers farming together and this is based on expectations, i.e.

a father expects that his son will work on his farm, or a husband expects that his wife will help with harvesting (Pierce 2005). Secluded women rely on hired labour for all the tasks on the farm, but can occasionally call upon son's or husbands labour as a favour. They are unable to utilise their own labour own fields. Unsecluded women can work on their fields but usually have to hire labourers to carry out the male tasks of ridging and land clearing. Family members such as sons and husbands are not obligated to work on women's fields, men practically own the rights to household male labour, but not to their wives labour.

While in much of the rest of Africa women's unpaid female labour is crucial for farming, it is not the case in this region where the sight of a woman bent over in a field is an immediate indication of her social status. Religious and cultural practices limit the use of female labour on fields. However households differ in the ways this is applied and conjugal contracts are important determinants in access to female labour and to children's labour as well. Typically women control their daughters labour and men their sons. Daughters are invaluable as traders in the public sphere before they are married, while sons' labour is critical on fields.

5.14 Environmental Knowledge

A central aspect of a gender analysis of environmental change is the examination of the environmental knowledge of men and women, and also different men and women. Environmental knowledge includes knowledge of soil types and characteristics, vegetation-including trees, shrubs and grasses, their different uses and types, soil fertility and quality, land use and conservation strategies. A farmer's most important interaction is with the soil, as farming in the region is an integration of trees, crops, and livestock and the soil is the bedrock of all these. Farmer's knowledge of soil types and characteristics is important and this knowledge is a cross between knowledge and everyday practice (WinklerPrins & Sandor 2003), so it might be expected that the more farmers interact with the environment, the greater knowledge about it they should have. Given the division of labour in the areas, differentiations of age and gender matter

in environmental knowledge. Respondents were questioned about their knowledge of soils and vegetation individually and in gender differentiated focus groups.

5.14.1 Soil Knowledge

In separate focus group discussions men and women identified soil types and properties in the two villages. Soil names largely reflected their physical characteristics such as colour and texture. In both villages sandy soil is known by many names, *Jigawa, Rairayi, Farar kasa, Fara fara* all refer to the same type of soil according to respondents. It is the most common soil in Yakai, but g*argari* /j*an* g*argari* or *jarKasa* is more common in Bemun and it is considered to be more fertile. The details of this identification is illustrated in Table 7 and 8 for both communities.

Table 7: Soil types identified by men and women in Bemun and their characteristics

	Soil Type	**Description**	**Crops Suited**
Women	Jigawa/Rairayi/Fara	Sandy, white	Millet/ Local cowpea
	Tapo	Muddy, Dark	Rice/Sorghum
	Jangargari/Jar Kasa	Red, very fertile	Pumpkins, improved cowpea, maize, groundnuts Suitable for most crops,
Men	Jigawa/Rairayi	Sandy, white	Millet/Groundnut/Sorghum
	Tapo,	Muddy ,dark,	Rice/Sorghum
	Gargari/ Jangargari	Red, moist/fertile	Maize, pumpkins, groundnuts,
	Tsakuwa/Burji	Stony	Not suited to most crops/ Gurjiya
	Kitsendamo	Sticky , moist, not local to Bemun	Suited to most crops

Table 8: Soil types by men and women in Yakai and their characteristics

	Soil Type	Description	Crops Suited
Women	Jigawa/Fara fara	Sandy, white	Millet, cowpea, groundnuts
	Tapo	Muddy, fertile	Rice, sorghum, vegetables
Men	Jigawa/Rairayi	Sandy, white	Millet, cowpea, sesame, groundnuts
	Tapo	Muddy, high water retention, dark	Rice, onions ,okra sorghum, vegetables
	Jangargari	Red soil, not local to village	Suitable for most crops

In Bemun, women identified 3 soil types and men identified 5. Both focus groups were able to identify the same types of soils and what they grew. Rairayi or Jigawa, Tapo, and Gargari or Jar Kasa was identified by both groups. Both men and women showed similar knowledge about the characteristics of the soil and what was most suitable to grow on these soils. But men identified 2 more types, and both were not local to the area or not suited to crop growth. According to both groups, *Gargari* was the most predominant soil in Bemun, and that was one reason why they perceived the soil to be very fertile. Both men and women acknowledged that soil types on a single plot could be different. A single plot of land could have different characteristics, and the farmer's knowledge of their field was important in determining how best to utilise it. Some women described soils as being soft soil (*Kasa mai laushi)* or warm soil or cold soil (*Kasa mai sanyi*) or stony soil (*kasa mai tsakuwa).*

In Yakai, men identified 3 soil types and women 2. Though all soil types were considered important in their own ways, both male and female focus groups considered the *Tapo* to be more fertile and capable of growing a wider variety of crops. Discussions revealed *korama* or *tapo* was thought to be more fertile, though more difficult to handle. As a result of this men mentioned that women were not able to farm on the t*apo* successfully, but this was widely

refuted by the women. *Tapo* soil was found by the river bed and was considered the best place to own land. The river had dried up as a result of the construction of the Jakara dam upstream, but there was still enough residual moisture on the river bed to make it prime land to own. Only one woman interviewed owned land on the *korama* in the village. Only men mentioned *jan-gargari* which they say was found south of the village soil, although they conceded that most of the soil in the village was *jigawa or rairayi*.

5.14.2 Knowledge of trees

In Hausa land, trees are separate property from the land on which they grow, so it is possible to own the land but not the trees on the land. A person can sell a piece of land and retain the trees, and this arrangement also holds true for temporary ownership. The importance of trees to agricultural activities and to wider livelihoods was apparent in both areas and among both men and women. Both men and women saw a difference between the important trees and use of trees on farms. The principal use of the trees mentioned by the women was to provide shade and to produce fruits to eat and sell. Among all the focus groups, the top four trees mentioned were the same, *mangwaro (mango), dorawa,(locust bean) tsamiya (tamarind) and kuka (bao-bab).* The importance of these trees is apparent as they are the trees mentioned by both female and male respondents when asked about important trees. It is easy to see why because all four are found in appreciable quantities in both research sites, They have multiple uses, as food, fuelwood, fruits for sale, beans to grind and make condiments, leaves to make soup and to sell. For example, many women in both villages mentioned the locust bean tree (*dorawa*) as being particularly valuable because of its many uses. It provided shade, had edible fruit and the seeds could be made into a local seasoning. When asked whether the trees had any benefit to the farm itself, one answer topped the list-shade.

Table 9: Identification of useful vegetation by men and women in Bemun

	Trees	Use
Women	Dorawa Mangwaro Kuka Tsamiya Sabara Kargo Maina	Eat fruit, Sell bean , Shade Eat/Sell fruits, Shade Eat/Sell leaves & fruit Eat/Sell Medicinal Shade/Firewood
Men	Dorawa Mangwaro Kuka Tsamiya Kanya Kargo Marke Maina	Eat/ Sell, Shade Eat/Sell fruits, Shade Eat/sell leaves & fruit Eat/Sell Eat/Sell fruits, Burn Burn Burn Building Material

Table 10: Identification of useful vegetation by men and women in Yakai

	Trees	Use
Women	Dorawa Mangwaro Tsamiya Kuka Dinya Kadanya Zogale Lalle	Eat, Sell Eat, Sell Eat, Sell Eat, Sell Eat,Sell Eat, Sell Eat, Sell Sell, Cosmetic
Men	Dorawa Mangwaro Maina Kuka Tsamiya Kanya Kargo Dinya Sabara	Eat/ Sell, Shade Eat/Sell fruits, Shade Shade, Building Eat/sell leaves & fruit Eat/Sell Eat/Sell fruits, Burn Burn

5.15 Chapter Summary

This chapter has described the farming systems of men and women in both villages. It has explored the differences and similarities in access to land and labour and the way seclusion

affects the kinds of agriculture women take part in, as on-field farmers in Yakai and as farm managers in Bemun. The reasons that women farm have also been discussed. In both villages women's knowledge in both areas were more local and closer to home, and men's more widespread, though women's was not as limited as might be thought. The different spaces that men and women inhabit can result in gender differentiated knowledge about the environment, and can explain men's more widespread and women's more local knowledge (Agarwal 2000; Jewitt 2000). Differential access to land, where men have more permanent rights and women borrow land, and restrictions on women's mobility can act as barriers to the accumulation of environmental knowledge. It also suggests that men have wider knowledge than women about many agricultural processes. In the study areas this appears to be the case. Many of the interviews suggest that for the women of Bemun, a lot of agricultural information is second hand information. They do not work on fields but know which soils are suited to which crops. The deficiencies in their environmental knowledge of soil and its characteristics, though apparent, was not as advanced as would be assumed for people who do not work in fields. This suggests that because women invest their money and resources in agriculture, they learn about it. Most of this information is gleaned from their husbands and their male relatives and from their admittedly limited forays unto fields to 'see what is being done'. These forays usually happen at the end of particular tasks, such as a scheduled weeding week, after planting has been done or when land has been cleared at the start of the season. Women spoke at length about what kind of soil they had on the plots borrowed from their husbands. Restrictions on women's mobility affect their accumulation of environmental and agro ecological knowledge, and spatial restrictions including the fields as men's space does so as well.

In the next chapter, local women's and men's perception of environmental change and land degradation is examined, and comparison made to the official perceptions discussed in Chapter Four.

Chapter Six: Local Perceptions of Land Degradation

6.1 Introduction

This chapter examines the normative characteristics of land degradation from the land users' perspectives. It includes an examination of the perceptions of land degradation from men and women in both villages and considers whether these perceptions are gendered. Using gender analysis, the differences between men's and women's perceptions of land degradation are examined in the two villages. Farmers are major actors in processes of environmental and agricultural change (Scoones 2001) and evaluations of degradation can differ between villages, and even between fields in the same village (Warren, 2002). The chapter will discuss perceptions of changes to soil fertility and crop yield, vegetation change and rainfall. Using gender disaggregated data, it concludes by exploring the differences and similarities between the perceptions of women and men in the 2 study villages and considers the factors which influence these perceptions including ecology, socioeconomic conditions and culture.

6.2 Perceptions of Soil Fertility

6.2.1 Yakai Women

The main manifestation of environmental change, according to almost all the women interviewed, is the reduction in the productivity of the land and consequently in the crop yield over time. They perceived the soil to have been more fertile in the past, and now in the words of one woman it had gone 'cold'. However, most women believed the soils of Yakai were inherently not very fertile anyway and had always required *taki* or fertiliser to yield a decent crop. A female farmer commented;

> The crop yield has definitely decreased. In the years past, before times changed, a woman could get a whole rumbu (granary) of grain from her harvest, hers alone, from 1 or more farms. Beans, gurjiya, even groundnuts. But now times have changed the soil changes according to the times and by the will of Allah. It is just like the cows for the herders. When the pasture is good you get good milk from the cows, and when it is not, you don't. When Allah opens up his blessings, we farm and get a lot, and when the land is cold, and there is no fertiliser, we don't get much yield. If she has money, she buys taki, if not she farms in vain. You have to put taki or fertilizer, if you don't want to waste your time. It has always been the case that you need *taki* to farm. (Gambo)

Soil fertility however was not the only determinant of crop yield. Rainfall was crucial, according to the women. Rainfall determined the crop yield, and there was nothing they could do about the amount of rainfall in any given year, it was an independent variable that they had no control over (Mortimore 1989). However, while they believed that rainfall was the most important variable in determining crop yield in a given year, they attributed crop yield decline over time to a number of other factors. According to the interviews, the lack of *taki* and the unavailability and cost of fertiliser were central to soil fertility. There were conflicting answers as to whether they thought there had been a decline in average rainfall over the years which would explain the decrease in yields, since they believe (and rightly so) that rainfall is the main determinant of crop yield in a single season. Everyone agreed on the year to year variability of rainfall being a constant characteristic of the drylands. Some years the rains were good and some years they were not. Yields were perceived to vary from year to year depending on the amount of rainfall and a particular woman's circumstances. None of the women interviewed believed that any factor other than divine will could influence the amount of rainfall. As one woman put it:

> If we have a good rainy season then our yield is good, and if the rainy season is not good, how can you get a good yield even with all the taki in the world. So it is in the hands of Allah. Everything is in his Hands, even our lives. (Dije)

There are variables which they have control over though, and these are the factors in which they perceive to be a change. The amount of *taki* and fertiliser that is applied on the farms depends on the woman's personal circumstances and financial resources, and so when crop yield is seen to either decrease or increase trend wise, it is those two variables of *taki* and fertiliser that are brought into account. So while absolute yields in a given year are seen to depend on the amount of rainfall and on a woman's access to access to inputs especially taki. Though they acknowledge the usefulness and desirability of inorganic fertiliser, in terms of access and cost, they are hardly ever in a position to get it, so its importance in practical terms

is negligible. *Taki is* more accessible because women are able to buy it from others, but even then often in insufficient quantities.

Out of 12 women interviewed only one felt that her crop yield had increased in the last 10 years and this she attributed to a change in her ability to hire labour and not to the condition of the natural resources.

Apart from *taki* and fertiliser, other factors were suggested as contributing to a decline in soil fertility and crop yield. Some of the reasons given for this are constant farming and decline in water resources. The soil was described in such terms as tired, dead, or cold. Women perceive a decline in the availability of *taki* and consequently a decline in soil fertility, mainly because less of it is available to buy from other people. Most of the women had no access to household *taki* produced at home as illustrated in the following comment;

> The taki is for the man of the house. Why don't I use it? Well that is the way it is, he is the one feeding the house isn't he? Taki is for the maigida (head of the house). It doesn't matter who the animals belong to the taki is for the maigida (Aisha)

Though women attach significant weight to *taki* and fertiliser as determinants of yield, their access to both these vital components of the farming system is restricted, first by societal norms and customs, and secondly by economic circumstances. Discussions revealed that in Yakai, household *taki* belongs solely to the man or men of the household. All the women interviewed owned livestock; goats, sheep and chickens, and were chiefly responsible for the care and feeding of the animals tethered at home during the farming season. But as is the custom in the community, every farming season household *taki* is applied to the men's farms and women purchased for their farming needs.

6.2.2 Yakai Men

There was a strong consensus among the men of Yakai about soil fertility levels and their effect on crop yield. Just like the women, the majority of the men interviewed perceived a decline in soil fertility and crop yield. Soil is described as being 'dead', 'tired' or even 'disturbed'. Men complained that there was a marked decline in yield, and that they produced significantly less

food than they did in the past and this applied particularly to the main food crops of millet and sorghum. And just like some of the women, the male farmers expressed the decline in crop yield in the number of *damis* (bundles) of grain produced. Farmers acknowledged increasingly the number of *damis* of grain they produced were not sufficient to feed their families for a whole year. According to them, this was not the case in the past. Farmers gave a variety of reasons for the perceived decline in soil fertility and subsequently in crop yield. Constant farming on a piece of land due to a reduction in fallow, an increase in population, dam construction, sign of the times, wind erosion, and constant ploughing. Many men believed that the continuous farming yearly on a piece of land reduced its fertility; a form of soil nutrient mining. They also acknowledged that an increasing population put a strain on existing finite land resources. A quote from Umaru, a middle-aged male farmer articulates some of these reasons:

> I do not really know what caused the soil fertility to decline. It might be that there has been too much farming going on. The land was much stronger in the past, and did not need so much taki, or even fertiliser. In the past a piece of land could go for 5 years without being farmed, but now Allah has swelled the population, so much that the land we have is not sufficient for everyone. If a piece of land is not allowed to fallow for 1 or 2 years but is farmed continuously year after year, then of course the yield will not be good, unless you apply a lot of taki or some fertiliser. (Umaru)

Farmers also linked the issue of soil fertility and crop yield to the availability of taki and fertiliser. Consequently they felt that to get a good yield, they had to use much more *taki* than they did in the past, and to supplement it with fertiliser when they could. It appears that availability of *taki* and fertiliser is the biggest single issue that the farmers believe they face in relation to soil fertility.

> The taki we have is not enough to go round all our farms. We need fertiliser to supplement the taki, but many times, it doesn't come on time or we don't get it since the soil is no longer fertile, we need to apply fertilizer for us to get high yield. (Kabiru)

Many men mentioned the decline in livelihoods brought about by the damming of the river Huda upstream and how that affected village life, especially in the dry season. According to several men, Yakai used to be a hub of dry season activity including fishing and dry season farming of rice and vegetables, but this has significantly declined as a result of cutting off the water supply. Although the Jakara dam was constructed in 1976, its impact on the livelihoods

of the villages is still being mentioned, especially by the older farmers interviewed. One respondent believed this has also had an effect on soil quality:

> I think the main reason (for soil fertility decline) is because of the cutting off of the water to the village because of the dam built at Wasai**.** In the dry season, we used to farm vegetables and also some cassava in the "korama". But now because of the dam, the land is not fertile anymore and we cannot do any dry season farming. (Yunusa)

In much of the drylands, seasonal flooding of wetlands (*fadamas*) offers employment in the dry season through cultivation of crops such as vegetables, sugarcane and rice, and enable smallholders to engage in year round agriculture using residual moisture (Turner 1994). In Yakai, construction of the dam led to a significant reduction in the water available downstream. As was the case in many other communities in Kano dry season agriculture and the economic opportunities it provided was consequently lost. Large scale irrigation projects were part of a broader push by the then governments for a green revolution approach to development that focused on large scale solutions in its drive to expand and develop agriculture, and these often failed to live up to their expectations and eventually caused more harm than good to many smallholder farmers (Adams 1985). Many of them had relied on residual moisture farming to provide income through the long dry seasons and this largely disappeared, and had substantial impact on communities downstream by adversely affecting fishing and agriculture (Barbier & Thompson, 1998). In Yakai the loss of this dry season activity appears to have had a profound effect on the livelihood options of many residents.

6.2.3 Bemun Women

There was no indication that the women interviewed in Bemun perceived a decline in soil fertility at all. They considered their crop yield to have increased because of increased inputs of *taki* and chicken manure and small quantities of fertiliser. Ten of the women interviewed had been farming for 6 years or less, only since 2005. Only the two older women had been farming for longer than 10 years. The women had only started investing in farming because of a confluence of certain factors; mainly the availability of poultry manure from nearby commercial

poultry farms, most of which are recent ventures. A major difference between the two communities is that in Bemun, it is common for women farmers to have some access to the household *taki*. They keep their livestock with their husbands' and are largely responsible for their care, and in some cases are able to appropriate their share. For most of the farming women of Bemun, agriculture is a profitable business, one they would not engage in if the returns were not good. It is unsurprising therefore that they perceive crop yield to be increasing. Many commented that soil in their area was good soil; it was good for farming, as long as a woman had the resources to farm.

> The land in this area is good land. It produces as much as you put into it. If you pay for adequate weeding and put taki, you will get a good yield. Any woman who has the resources can farm and get a good yield (Hajara)

Variations in crop yield are attributed chiefly to rainfall and availability of financial resources and not to soil conditions.

> This year's harvest is much better than the previous year's. The reason is that last year there was a problem with the rains. The rains came and we planted, but then they stopped. And it all dried up. When the rains came back, those that could be replanted were replanted, but many others had dried up. Millet was ruined because you cannot transplant millet (Aisha)

Although declining soil fertility was not a concern for the women of Bemun, the scarcity and cost of fertiliser and certainly was. Many of the women bemoaned their lack of access to fertiliser. Pests were also a problem for the farming women particularly because of their focus on growing groundnuts and cowpea, crops which are traditionally more prone to problems with pests than the local grain. As a result women also had to spend money on pesticides and pay men to apply them to their farms. The cost of this, and for all other agricultural work which they had to pay for since they could not work on fields, and the cost and availability of agricultural inputs were the preoccupation of the farming women in Bemun. Land degradation - defined by vegetation change and soil degradation - did not appear to be an immediate problem to them. More pressing to them was the ability to garner enough resources for wages, manure, and sometimes fertiliser to get good yields and make a profit.

6.2.4 Bemun Men

While the women of Bemun believed that crop yields were increasing, many men felt that the crop yield had certainly decreased, i.e. the productivity of the land has declined over the years. There is a similarity between their statements and those in Yakai about less damis of crop gotten from the same piece of land. This is illustrated in the following comment.

> Crop yield has definitely decreased. In the past here on this piece of land, I could get 10 dami of millet, but now I have to work very hard to get even five. The reason is simple, Allah has said that one day where you used to get 70 dami of grain, and you will struggle to get seven. Everything Allah says will come to pass. (Yahaya)

Various reasons were proffered for declining yields - change in rainfall patterns, lack of sufficient *taki* and fertiliser, and even divine retribution for societal immorality. Many men blamed *zamani* (the times). Though easy to dismiss, it seems to be a deeply and widely held belief that increased immorality and injustice in the society affects the productivity of the land because it affects rainfall, and leads to decreased yield. This 'moral thesis' (Mortimore 1989) underpinned many of the interviews. Many believe that human action can and does influence rainfall patterns, but not in the conventional sense, such as in the comment below;

> People now are more corrupt and sins are plenty, so the land suffers. It used to be that rainfall was sufficient. You could go for ten days after a bout of rainfall still reaping its benefits. But now there are a many sins in the world, even murders are commonplace now. So it has affected everything including farming. But this is all from Allah. It is his punishment, what you get now from the land cannot be compared to what you got before. (Danladi)

The importance of inputs- taki, fertiliser, seed varieties, and technology came through in many discussions. Some men believe that certain factors can mitigate decline in crop yield, and can even be turned to improved yield. New seed varieties and the availability of poultry manure from commercial ventures have meant that farmers are able to increase their inputs into the land. It seems productivity has declined for those farmers with less access to these inputs. Farmers acknowledge that crop varieties have also changed, and the increased focus on maize and other crops attests to that. According to one farmer:

> The crops we grow here have changed. It used to be just sorghum and millet but the maize now gives a very good yield. Farming is much improved now because of the improved seeds. And the extension officers provide good advice as well. We use what we know, and what they know as well, and then we get a double gain. For example, when we plant maize, we used to space them out and put up to 4 seeds

> in a hole, but they told us to plant them close together with just 1 seed. And now, where we used to get 2 bags, we get 5 (Bala).

One thing of note though is that many male farmers both actually think that the soil does not change - that it is not the inherent properties of the soil that have changed per se, but external conditions that have affected the way they interact with the land. Somewhat contradictorily men who see an increase in crop yield and those who perceive a decrease both feel the soil itself has not got much to do with it. The soil in the village is seen as (relatively) fertile soil, which with the right inputs, will produce a good yield. Effectively, the soil produces an output commensurate with the inputs- organic, labour, financial resource- that is put into it. Some of the men comment:

> There is nothing wrong with the soil, it has remained the same. The rainfall has decreased though, so that has affected our yield. Times have changed, but the soil does not change, only the times (Yahaya).

The minority of farmers who acknowledged that their crop yields had increased attributed it to other external factors;

> Our yield has increased, but it has nothing to do with the soil, it is due to hard work .In other places where there is a lot of land, you can leave your land to rest for a year and farm another. But here we have to farm the same land every year, work hard at it, and change the type of crops we plant. Fortunately, pesticides and fertilisers help, but they all need money, they don't come cheap (Isyaku)

6.3 Comparisons of Perceptions

In both communities women's relations with natural resources and their involvement in agriculture is impossible without the involvement of men. In Bemun, where almost all the women farm by proxy this relationship is mediated by men to a much larger extent than in Yakai, where they actually work on fields. This mediation cuts across their access to inputs of agriculture such as *taki*, fertiliser, seed varieties, and resources of land and labour, and is influenced by the traditional divisions of labour. Among the men and women of both communities, the most consistent answer to the question of crop yield was its variability, especially the phrase, 'some years there is more and some years there is less'. Uncertainty appears to be the norm, as is the

case in most dryland communities. Rainfall variability is crucial and responses about fluctuating crop yields mirrored the variability of rainfall.

In Yakai, both men and women perceive there to be a marked decline in crop yields and this is blamed on a number of similar things by both men and women. Men mentioned about getting 20 bundles of grain in the past and now getting just 10 while women mentioned getting 5 or 3 bundles. This is a vivid reflection of their differential access to land and size of land holdings, and also differential access to other resources. Women emphasized the agency of nature – rainfall when talking about crop yield, and men emphasized human agency- constant farming, and cost and availability of fertilisers. This also reflects differential access, women have little access to *taki*, and fertiliser, so they play a smaller role in their farming output than rainfall. Men own *taki* and have a somewhat erratic access to subsidised fertiliser, so this has a greater effect on their crop yield than it does on the women's. Women in both communities share a complete lack of access to subsidised fertiliser. Though women in Bemun buy fertilisers in the market when they can, in Yakai they hardly do. Bemun women's was more a question of access to inputs, while in Yakai, it was lack of resources to buy the inputs as well as lack of access. Women in Bemun have some access to household *taki*, in Yakai they rarely do.

These differences also reflect the typology of farmers in the villages – women farmers in Bemun are relatively well off, they have to be to expend the considerable resources needed to farm, especially to pay for wage labour; while in Yakai women who farm are poorer women with fewer alternatives, and work the land themselves. Bemun women's perception of good yields is a reflection of the opportunities they have and also of choice. While they make a conscious choice to farm to make a profit, Yakai women feel they have to farm to earn some income. The proximity of Bemun to larger markets in neighbouring towns and to Kano city, and the remoteness of Yakai also affect these perceptions. In Bemun there are other options for

improving soil fertility management; urban waste from Kano known as *shara*, and poultry manure from nearby commercial ventures are available options. Higher annual rainfall also means better growing conditions.

An important difference between the two villages is that in Yakai the degradation of water resources has had a profound effect on livelihoods. Land degradation here is evinced by the degradation of water resources and the activities and livelihood options associated with it such as fishing and dry season farming.

Gender is an important factor in these perceptions because it determines access to those external factors that influence perceptions of degradation in both communities. The important elements of these perceptions and their relationship to gender are discussed below. They include rainfall, and ecology, religion, inputs of *taki* and fertiliser, land, labour, cultural factors and management strategies.

6.4 Rainfall

The most common refrain about rainfall and indeed about crop yield in both communities was *'sometimes there is more and sometimes there is less'.* This is unsurprising since the defining characteristic of drylands is low, erratic and highly variable rainfall. This spatial and temporal variation is the most important determinant of environmental change in the drylands, and Mortimore and Adams (1999:191) note that this is evinced by the smallholders themselves. Much has been written about rainfall variability in drylands and in the Sahel in particular. With regards to the Sahel there is no normal rainfall, what is important is not its mean, but its temporal and spatial variability (Hulme, 2001). Since the beginning of the 20th century there have been several droughts in the Sahel and the 1970's and 1980s were particularly dry. Three decades of increasing dryness and a decrease in rainfall of up to 30% from the 60's to the 90's culminated in severe droughts in 1973, 1984 and 1990 (Sissoko et al. 2011). Crop production relies on the amount and timing of precipitation. As a result, farmers in the region are involved in the

complex process every year of negotiating the rain, and rainfall variability is the dominant environmental risk facing smallholders in the region (Mortimore & Adams, 1999). In both communities they acknowledged the variability of rainfall and its effect on yield. Implicit in this is an acceptance that there is precious little they can do about it.

> Sometimes the rains come and we plant, but then Allah reduces the amount of rain such that they stop growing, and the crops dry. Sometimes Allah brings bountiful rain, and sometimes not. When the rains are good, the yield is high and when they are not the yield is low. When the rainfall is low, or it is late, the seeds do not grow as they should. They start to grow, and then the rain stops, and that becomes a loss. (Yakubu)

It has been suggested that climate variability can exacerbate degradation where there are failures in resource management (Hulme and Kelly 1993). After three decades of rainfall decline in the Sahel from the 1960's to late 1990's, rainfall increased at the turn of the century leading to the so called greening of the Sahel, but uncertainty and variability still remains the norm. Changes in rainfall and its distribution impacts heavily on the farmers because the timing of the start and the end of rainy season and the adequacy of the rainfall are the most critical driving forces of Sahelian production systems (Mortimore & Adams 1999:55). Local people's conceptualisation of soil fertility often correlates with the variability of rainfall in that importance of soil nutrients to soil fertility diminishes when the rainfall is good, and when rainfall is poor the soil nutrients become more important to farmers (Manu et al. 1991). Mortimore notes rainfall is the main variable beyond farmers control in agricultural production and reduction in rainfall could be a factor contributing to degradation. Since declining rainfall is an important factor in environmental change in drylands of Nigeria, climate change will be an important determinant of land degradation in northern Nigeria. However, even though the decline in rainfall and severe droughts of three decades 'are among the most undisputed and largest recent climate changes recognized by the climate research community' (Dai et al., 2004: 1323), the prediction for future rainfall trends in the region is for the most part uncertain (Morton 2007, Mearns and Norton 2010, Bolwig et al. 2009). Rainfall could have a greater influence on land degradation

and its perceptions than land use itself - a case of under precipitation rather than overexploitation (Tiffen and Mortimore 2002).

Since both men and women ascribed rainfall patterns and abundance to divine will, the influence of faith and belief on environmental concerns will be considered next.

6.5 The moral thesis

Common to almost all the respondents is the referral to the will of Allah in relation to the environment. This is clearly part of the response and coping mechanisms to the uncertainty of agricultural livelihoods in both communities. One the reasons proffered for declining yields and change in rainfall patterns was divine retribution for societal immorality. Many men blamed *zamani* (the times). Though easy to dismiss it seems to be a deeply and widely held belief that increased immorality and injustice in the society affects the productivity of the land because it affects rainfall, and leads to decreased yield. This sense of fatalism and resignation - that it was meant to be - underlined many of the interviews. Many believe that human action can and does influence rainfall patterns, but not in the conventional sense, as the comments below suggest:

> The rainfall itself has decreased. It is not like it used to be. This is because as I said before, times have changed. There is too much inequality in the world. Some have too much and others too little. There are also too many sins and sinners. In the cities and villages, people commit sins that could destroy towns if not for the mercy and promise of Allah. Allah forgives everything except injustice. And there is injustice in the land (Bala)

The Islamic belief system is assumed to support fatalism about the environment (Hintjens, 1997). This attribution of environmental changes to the divine i.e. 'moral thesis' is not new, and probably to be expected in area where Islam and its practice are deeply inscribed in people's everyday lives. At the time of the droughts and progressive decline of yields and famine of 1972-1974, many people saw it as a punishment for sins of bribery and corruption, prostitution, unmarried women, and a decline in charitable giving and as a warning from God for society to mend its ways (Mortimore, 1989). However as Mortimore further notes this presumed passivity may reveal the powerlessness of local people in the face of forces over which they

have no control, but in no way implied inactivity in those that they could and "the omnipotence of God excluded neither self-reliance nor social criticism" (1989:81). Similar evidence from East Africa showed that farmers consider rainfall to be from God and therefore unpredictable, so attribute declining harvests more to drought by divine will than to human induced degradations (Slegers 2008). In both examples, farmers remain largely proactive and ready to take advantage of the start of the rains.

The mention of societal ills was prevalent among mainly male farmers in both villages. Though women acknowledged that rainfall was in the hands of God, they did not mention immorality for the decline in crop yield. This might be because historically women have been part of the societal ills mentioned, and women can hardly be expected to blame themselves. But an important point in this research is that not one man mentioned the immorality of women. The focus was on the corruption and injustice, which is the reflection of the general view of government and the tough economic situations farmers face. When farmers see shortage of inputs and scarcity of fertilisers, it is the incompetence of leadership and *zalunci* (oppression) they stress. Immoral women are no longer the evokers of God's wrath on the environment, corrupt leaders, violence and oppression are – reasons which are a contemporary reflection of the political realities of northern Nigeria.

6.6 Importance of Inputs

Factors such as labour and capital play a major role in perceptions of soil fertility, but the most important determinant of yields that a farmer can control are *taki* and inorganic fertilisers and the importance of these two vital inputs are discussed below.

6.6.1 Taki

According to Mortimore et al (1990) a crucial objective of smallholder farmers land use is the maintenance of fertility of their soils. At present, livestock production is the strongest link in smallholder farming system in northern Nigeria, because of the production of *taki*, and because

farming is low input and low output. The issue of soil fertility is paramount in small holder farming systems in Africa and access to fertiliser whether organic or inorganic is a key factor in farming (Gladwin 2002). Many studies have shown this access is biased largely in men's favour. In northern Nigeria organic manure is the main source of fertiliser, and the possession of livestock is crucial for maintaining soil fertility.

Only 3 of the women interviewed in Yakai had access to their household stock of this vital resource. Duwa, one of the women, owned cows as well as small ruminants. The other two were the de facto head of their households; Jummalo was a widow with five children and Binta was old woman with no children and an invalid husband; both were responsible for feeding their families. As a result women applied *taki* only when they could afford to buy it and mentioned it was increasingly becoming more difficult to acquire. They also acknowledged that without *taki* or fertiliser, their yields were not substantial. One possible explanation for this is that in an area of lower rainfall, all available inputs of *taki* need to be allocated to the farms that feed the household and these are typically men's farms. One man in Yakai dismissed women's farming as a waste of time because they have no access to *taki* and have no money to purchase any. In Bemun a majority of the women respondents had access to some household *taki*, some of these women paid for the taki, others did not.

6.6.2 Fertiliser

Low fertiliser use is regarded as one of the major constraints of smallholder agriculture in Nigeria. There was a consensus among all farmers, men and women, that *taki* alone is no longer enough. Fertiliser is seen as a chemical gold, the magic elixir that transforms soil and results in a good crop yield. All believed that without fertiliser, yields will remain low, and indeed often are, because inorganic fertiliser is expensive, often unavailable or and available in insufficient quantities. Every man interviewed felt that with enough fertiliser, yields would improve

dramatically and that even though *taki* was not sufficient anymore the addition of fertiliser was capable of making up the deficiency.

There are yearly allocations of subsidised fertiliser to every ward from the local government, but farmers complained that most times, it is too little, too late. They are then forced to buy the fertiliser at market rates, which are unaffordable for many of the farmers. At any rate, no farmer interviewed was wealthy enough to buy enough fertiliser for his farms. There were bitter complaints about this and about the process of allocation by the local government. The following comments illustrate farmers' frustrations at their inability to acquire what they perceive to be a crucial input into their farming:

> The fertiliser allocated to us does not get to us. They say they make the fertiliser available for the benefit of the poor farmers, but the poor do not get it. This year I haven't gotten a single grain of fertiliser. And you know farming cannot thrive without fertiliser. Even in the past, we had to use manure to get a good yield. Now it is fertiliser we have to apply, because the manure is not always enough. The farmers, especially the young ones, do not rear as many cattle as before. (Ahmadu)

and

> The case of the government fertiliser is troubling because you pay for it and don't receive it. If I am given 3 bowls of fertiliser, how will that suffice? How am I going to apply it on 5 farms? It is not even enough for 1 farm, let alone 5. So we have to rely on the taki, and even that is not enough for the farms. You have to be clever when applying it. The government says it will give us fertiliser and in the end we just get 3 bowls. I think last year it was just 2 bowls. (Abdurrahhman)

Fertiliser application by the women was very rare primarily because of its high cost and unavailability. In Yakai out of 12 women, only Duwa mentioned regularly applying small quantities of fertiliser to her farms and she was not a typical woman farmer in the village, in many aspects she was an exception because she owned two oxen, had access to household *taki* and had land which she had inherited from her father.

And in Bemun, Hansatu says

> We prefer fertilizer to apply on our farms, but it is not always available. If we don't get it to buy, we give up, and just use the chicken manure or the *taki* from the animals, and if Allah wills we will get a good yield. If we are lucky and the fertilizer becomes available, we buy 2 or 4 bowls of it. But if it is expensive, we leave it alone.

Chemical fertilisers are widely promoted by rural development programmes and in government policies as a way to improve soil fertility, but have proved unsustainable mainly because most

farmers cannot afford them and as a result its use is still at a minimum among smallholder farmers (Maconachie 2007). It is at minimum not due to the lack of acceptance of its usefulness and benefit but due to two major things - availability and cost. This observation is substantiated by all the interviewees. All the farmers, both men and women, would prefer to get more fertiliser if it was available at an affordable price. The Nigerian government's fertiliser policy has been erratic at best. Subsidies on fertiliser is a central component of the Nigerian government's agricultural policy. After the structural adjustment programmes and economic reforms in the 1980's and the removal of fertiliser subsidies, countrywide consumption fell from 460,000 metric tonnes in 1994 to 100,000 metric tonnes in 1999 (Liverpool-Tasie et al. 2010). Partial subsidies were resumed in 1999. The high price is as a result of the parallel sale of subsidised and free market fertilisers, and this is seen to provide an avenue for illegal diversion for corrupt officials. The corruption of government officials especially is blamed for its scarcity. Fertiliser access and government ineptitude are often linked. Farmers believe that subsidised fertiliser meant for them is often diverted to markets. This particular complaint was a constant refrain in many of the interviews and is a general observation among farmers in other parts of Nigeria**.** For example Kolawole (2013) contends that in south-western Nigeria government officials are seen as corrupt and favour their cronies in fertiliser distribution and thus fertiliser ends up being sold at exorbitant prices.

As Adamu, a farmer in Bemun put it:

> The government has deceived us and brought their fertilizer, and convinced us to accept it, and then have restricted its availability. Thank God we haven't let go of our traditional manure, or we would have been lost. If we had depended solely on the government's fertilizer, we would truly be lost, because now there is never any fertilizer. There are too many corrupt people, the government may provide it, but some people will not distribute it to those who need it, but would hoard it. We know it and we have seen it. And Allah will not let them get away with it; their day of reckoning will come.

The men of Bemun just like all the other groups believe that fertiliser is vital for improved yield, if they could have access to it. Many do not, and those who do are only able to apply minute quantities. Its scarcity and cost make it out of the reach of all but wealthier farmers in

any appreciable quantity, but that did not stop all farmers interviewed from bringing up the issue of fertiliser. It is interesting that although from the interviews it appears to contribute very little of the inputs farmers make into their farming, it looms disproportionately in their minds. One farmer gives a hint as to why this is the case:

> The main problem I have is that the manure does not work as well as the fertilizer. No matter how much of it we apply, it is just not as effective as the fertilizer. A handful of fertilizer will give you a better yield than a barrow of manure. But it is difficult to get, and it is expensive even when available. (Muhammadu)

And

> In the past fertiliser was more abundant, but now it is no longer possible for a woman to get fertiliser because it is expensive. Even the one the government brings now is not enough for the men; several men have to share a bag between them. If even a man gets just 1 or 2 kwano (bowls) of fertiliser, how would a woman get any? So the yield has declined. If there was more fertiliser the yield would improve (Habiba,)

Because the small holder farming system is a low input low output one, some researchers in the area contend that fertiliser use in not viable under present conditions (Harris 1996, 1999; Mortimore 2005) argues that increased fertiliser use is not sustainable because of logistical difficulties and uncertain government policy and cost. Maconachie (2007) and Harris consider fertiliser use insignificant to the small holder farming system in northern Nigeria because of its minimal use. It may be used in very little quantities, but its perceived insignificance by researchers is belied by farmers' insistence on its usefulness and contribution to soil fertility. Its significance may be underestimated by many of the researchers in the KCSZ who often have a somewhat idealistic view of the use of organic fertiliser and may overestimate its capability of sustaining the drylands.

In their quest for inorganic fertiliser farmers are in no way rejecting the use or importance of *taki*. In fact many farmers maintain that a mixture of both organic and inorganic fertilisers is best for maintaining soil nutrients. Many suggest that a combination of organic and inorganic fertilisers is the realistic scenario to maintain soil fertility in Africa (Tipilda et al. 2008; Ko-

lawole 2013; Vanlauwe & Giller 2006), an approach known as integrated soil fertility management (ISFM). ISFM articulates the maximum use of all available fertilisation strategies, both organic and inorganic.

6.7 The relevance of gender to perceptions

Farmers recognise complex interactions of yield, soil fertility and technology, so their perceptions may reflect changes in social and economic factors differs from farmer to farmer (Gray & Morant 2003). This familiar refrain of a lack of agricultural assets and means to purchase inputs for women discussed in chapter two is also evident in the research areas. Agricultural production is seen by many women as a way of generating income, but many women lack the resources such as land, and the capital needed to acquire inputs like organic and inorganic fertiliser. These same constraints also apply to the men in the research areas, more so in Yakai. But women are constrained by their sex to access to labour and technology as well as to extension services.

In Bemun women farmers do buy small quantities of fertiliser, but in Yakai they rarely do. This is a function of their different socioeconomic conditions, women farmers in Bemun are more well off in general so would have the cash to buy small quantities. As is the case with *taki*, proximity to urban areas and to markets favours Bemun with regards to availability, and the relative remoteness of Yakai means there would be less fertiliser available to buy anyhow.

A succinct comment from a male farmer sums up the different issues of soil fertility management. 'It is what you put in the soil, and what Allah brings from the sky'. Gender is an important factor governing what goes in the soil. The lack of access that women have to these resources of *taki* and fertiliser makes them vulnerable to effects of environmental change and hinders their ability to adapt or adjust (Schroeder 1987). However men are affected by these same limitations and vulnerabilities as well. They are also affected by environmental degradation

and share with women the indignities of economic and social oppression and of poverty (Demetriades and Esplen, 2008)

6.8 The Role of the Land Manager

Soil fertility management and management of the whole growing cycle depend on a number of factors as has already been discussed. Variations in the quality of soil could be inherent or caused by its use and management (Essiet 2001). Changes in soil fertility therefore often are 'nested within a variety of social, political and economic factors that clearly encourage or prohibit investment in the land' (Maconachie 2007:103). Throughout the study, the inherent properties of the soil were not viewed as being vital as the external inputs, and it was up to the individual farmer to maximise his yield through any means possible, including inputs of labour, nutrients and farm management. Social considerations play a huge part especially given the complex mediation of men in all aspects of women's agriculture in both communities. Crucial decision making about what to grow is usually made by women themselves. Separate income streams and complete ownership of their agricultural produce mean that women are able to make many vital decisions independently but are dependent on men for the execution of these decisions. Socioeconomic factors are clearly the driving forces in management of soil fertility. The abilities and attitudes of farmers are important influences on their vulnerability to degradation. Blaikie & Brookfield (1987) emphasized the role of the land manager in issues of land degradation but in this women face more constraints than men. The dependence of soil fertility management on the socioeconomic conditions of the farmer and their access to vital resources is the crucial element affecting the viability of female farming in the two areas.

6.9 Vegetation Change

Dryland farmers are also foresters and trees and their management are an integral part of agricultural production (Cline Cole 1997). As noted before, the landscape has been identified as farmed parkland - a distinctive landscape where many tree species are planted or preserved on

farms. Farmed parkland provides vital resources to livelihoods of local people. Trees are seen as separate resources from the land on which they stand, and trees and land can belong to different owners. They are highly valued and can be sold on their own, while land is retained and vice versa, trees can be retained when land is sold.

6.9.1. Yakai Women's perception of vegetation change

More than half the women interviewed believed there to be a decline in the tree cover in the area, and this they firmly attributed to anthropogenic causes, mainly people cutting down trees to sell them. They suggest that this had happened more often in the past but had been declining in recent years.

> I think there has been a decrease in the number of trees here. It used to be that there was a lot more trees here. But people started bringing big machines to cut them down, and trucks to take them away. In the past dorawa was left to bring forth its fruit and we ate them and used the seeds for *kalwa*. But people love money more than they love trees now (Gambo).

It seems that the decrease of vegetation is attributed more to economic conditions and peoples need for money than to natural causes. However even women who perceived a decrease in tree cover said they did not have any difficulty getting firewood; it was available when they needed it. So even though they thought the decrease in the number was to satisfy a demand for fire-wood, the demand was not believed to be local. The perception of a decrease in tree cover was not overwhelming however. Other women suggested an apparent increase in the number of trees in the area, both in the village and on farms. For women who perceived an increase, it was also largely due to the government programme of planting trees although natural factors also came into play as observed by one woman:

> I think the number of trees are increasing, especially the Maina tree, because the birds are spreading it around. It used to be seen only in the village, but now you see many Maina trees on farms, because of the birds. The trees only decrease when they are cut down, but others grow and replace them. And also the government is planting more trees, so I think the trees are increasing (Dije)

However, in focus group discussions as well the majority view was that there was no significant decline in tree cover. They perceive an increase in certain species, such as *maina* trees, and no decline in others, such as *cediya*, and *durumi*. This apparent contradiction with majority of the

individual views may be because in the focus group, discussion about trees and vegetation might have brought the tree planting campaign of the government to mind and they answered accordingly, while personal circumstances influenced individual interviews.

6.9.2 Yakai Men's Perception of Vegetation Change

A majority of the men interviewed expressed the view that natural vegetation was declining for a variety of reasons. The most common reason given was people cutting down trees to sell for firewood, or selling their trees to others who then cut them down. A second reason given was the clearing of previously uncultivated land to make way for new farms. However, several men interviewed were at pains to mention that they personally did not cut down trees, because they knew the value of trees, even though they knew people who did. This suggests men are more aware of the government projects in the village and the problems they purport to address, especially the emphasis on planting new trees and protecting old ones.

> There has been a decrease definitely, because when you go round places where there used to be trees, you find that there are not much more now. And it is a shame, because where the trees exist, the crops grow better because they shield them from the effect of the wind. Yes, where there are trees, the crops are better than the one without trees near it. (Saleh)

Just like the women, male farmers in Yakai also considered vegetation change to be related to species of trees. One reason given for this is that certain species are able to increase without interference while others need nurturing.

> The number of kargo trees have not decreased, because kargo grows on its own and does not require attention, even birds can disperse the seeds and you can find them growing. But the mango trees require attention and nurturing, so they are not as plentiful as they used to be (Yunusa)

Several of the men interviewed saw a connection between tree cover on a farm and productivity. They believed that loss of tree cover had a negative effect on farms, in particular by exposing crops to the effect of wind.

6.9.3 Bemun Women's Perception of Vegetation Change

The women of Bemun perceive no decline in tree cover in their village and surrounding ones. In fact they believe that many tree species are thriving, and even increasing. They acknowledge that trees are cut down sometimes, but only dead trees and trees which have grown too big and

are stripped back in the process of farm clearing known as *sassabe*. Among the women of Bemun therefore, the overwhelming opinion is that tree cover is not declining, and tree resources-wood, fruits, medicine-are ample. Casual observation showed that indeed farms have many trees of various species.

> No the number of trees have not decreased. We are blessed with many trees here. Even though we cut them for firewood, many of them grow back. You will see many trees around when we go out to see the farms (Aisha)

The provision of fulewood is the husband's responsibility in Bemun. Many women acknowledged that they (or more accurately their husbands) do not buy firewood for household use and have never had to.

> We do not buy firewood here, not in these parts. We have more than enough for our needs. Why would a man let his wife buy firewood, when he can get it from his farm? We use a lot of wood in our cooking because it is plentiful, someone coming from the city might even think we are wasteful. (Mairo)

Apart from fulewood, women's use of trees in Bemun centres primarily on their use of tree products such as berries and fruits, nuts and tree barks. When questioned about any change in the availability of these products, women were of the general consensus that they are still plentiful, and there was no decline over the years. They still were able to obtain and process fruits, berries and nuts such as locust bean, shea butter and mangoes. 10 out of 12 women confirmed that there was no decline in the quantity of tree products they got. The 2 dissenters were older women who felt that things were much more abundant in the past when they were girls, a period of time the other women were not at liberty to comment on. One older woman noted that though there used to be a greater abundance of some particular tree species such as Rimi and Goruba when she was younger, tree cover itself had not declined.

> There are some trees that were more plentiful in the past. When I was a young woman, there were a lot more *Rimi* and *Goruba*. *Darbejiya* is more plentiful now and it does provide a lot of shade especially here at home – Uwar Iya)

6.9.4 Bemun Men's Perception of Vegetation Change

The men of Bemun hold similar views about vegetation change to their women. In general, they do not believe that tree cover is declining. Their responsibility as fuel providers means

that men would to a certain extent associate vegetation change with the availability of fuel-wood.

> Firewood is always available, and I have never had any problem acquiring it. Some people north of here buy firewood, but we have enough (Umar)

They were also well aware that though this might not be a pressing concern for them, it could be a problem in other areas and were careful to stress that this was a characteristic feature of their locality. One farmer comments:

> We have a lot of trees in this area, despite the fact that many are cut down for firewood. We have been blessed with many trees and a good soil. I have not noticed a decrease in trees because even when we cut down the trees there are already others growing that will replace them. Trees grow very quickly in these parts. When we go to other places, we are surprised at how few trees they have got. (Shehu Ado).

It was apparent from their comments that they are aware of the often touted government position about local land users wasting tree resources and indiscriminately cutting down trees, and are indignant at this:

> There is no decrease in the number of trees here. We do not destroy trees here; it is a wrong assumption that is sometimes made. I would think that if I cut down this *neem* tree here for example, I would deprive myself of shade. If I cut down that *dorawa*, where will I get *kalwa* from? So we think before we cut down a tree, it is not a decision that we make lightly. If we lose trees, then we lose a lot. But sometimes there are too many trees on a farm, and we cut them down to give our crops breathing space so they can grow (Isyaku)

However some men conceded that there has been a change in the landscape because land around the village which used to be common resources has been sold off and woodland has been cleared to make way for new farms. This presumably would have led to a substantial change in landscape in the area, but it did not seem to have impacted greatly on their ability to provide fuelwood.

> There used to be a forest close to this village where we get firewood. Anyone can get firewood from there, but they have now been cleared of most of the trees and are now farms. Now we have to rely only on our farms for firewood. The leaders have all sold the forests, the village head, the local government chairman, the mai unguwa have all sold off the land, and they have been turned into farms. We used to load donkeys with wood from the forests (Danladi)

6.9.5 Comparison: Men & Women's Perception of Vegetation Change

The general view among both men and women of Yakai is of a general decrease in tree cover and both groups attribute it to human agency- mainly economic conditions forcing people to

cut down their trees to sell. This perception of the influence of economic conditions on vegetation change appears to be widespread in the Kano Close Settled Zone, as noted by Maconachie & Binns (2006). Both men and women in Yakai perceived an increase only in a few species of trees, mainly the *maina*, and the increase is attributed to both natural and human factors. However women in the focus group placed emphasis on the increase in some species of trees. In Wezels (2000) study of gender differentiated perceptions of vegetation in Niger, he noted that women had a better perception about species that were newly introduced or that had increased, while men perceived disappearance or decrease. According to him, one of the reasons for this might be because marriages are virilocal, and many women were not indigenous to the villages and so would be less aware of a decrease or disappearance. While this was not as clear cut in Yakai, women did indeed emphasize increases in species more than men. Another main difference was that men acknowledged that woodland being cleared to make way for farms contributed significantly to vegetation decrease, a factor not mentioned by the women. In fact the conversion of woodland to farmland is the main factor in woodland degradation in the drylands according to researchers (Mortimore & Turner 2005; Cline Cole 1990b).

In discussing the impacts of vegetation change, women's focus was on the tree produce, while men emphasized the value of trees against wind erosion. It is interesting however that majority of the men and women saw no significant decline in the availability of fuelwood despite their perceptions of decrease.

In Bemun the overwhelming perception was that vegetation is not decreasing at all but in fact is increasing. Both men and women believe trees are thriving and farm trees provide sufficient fuelwood and other produce. Though some men did concede that woodland was being cleared to make way for farms, and they were no longer able to get wood from forests, this did not seem to have a significant impact on the availability of fuelwood for majority of the men, as their farm trees were sufficient in providing it. Research into fuelwood in the Kano Zone has

documented increase in trees in areas close to urban centres and of high population densities (Cline Cole et al. 1987; Cline-Cole 1990). According to Maconachie there is concern in the Kano Close settled zone about a decline in certain species, especially closer to urban areas. And despite a recognition that the landscape has changed, local peoples' livelihoods had not been affected significantly by the change in the characteristics of vegetation cover in woodland.

6.9.6 Vegetation Change in Yakai Vs Bemun

In general, both men and women in Yakai perceived a decrease in vegetation, while in Bemun, both men and women believed trees were thriving. Men in both villages commented on woodland being cleared to make way for farms, and in both villages women did not mention this. A somewhat obvious explanation for this is that women are not involved in clearing land because of their limited access to it. As explained in the previous chapter, because of the gendered access to land, women depend primarily on *aro* to acquire land, and much less often on gifts and inheritance. While they may be aware that woodland clearance occurs, it is relatively insignificant to their own agricultural practices. Men in Yakai placed a lot of value on the importance of trees as wind buffers on farms than in Bemun. Here ecology clearly plays a part. Vegetation is more abundant and farm tree density higher in Bemun than in Yakai which might explain why soil erosion by wind is not perceived to be a problem in Bemun but is in Yakai.

6.10 Comparisons of official and local perceptions of degradation

In Chapter Four it was shown that official perceptions of degradation are firmly rooted in the GEM view discussed in Chapter Two (section 2.2.1). Local people are blamed for unsustainable land use, while at the same time being victims of degradation and in need of external interventions. If the past two decades of research have revealed dryland complexities and variability, and debunked the orthodoxy behind much degradation scenarios, this has not been reflected in official views of degradation in Nigeria. Policy makers still adhere to neo Malthusian scenarios in the Nigerian drylands.

In this chapter, local people's perceptions in Bemun and Yakai however are more nuanced and varied. They do not see themselves as responsible for degradation; they perceive soil and vegetation degradation as locally specific, and variable according to their own circumstances. Yakai men and women believed yields to be declining, and in Bemun some men perceived a decline while in general women did not. In the study they considered inherent soil fertility unchanged (which ties in with the scientific findings) but yields are lower due to other factors. They are only higher with fertiliser, so the issue of soil fertility replenishment is more important to the farmers than the soils' inherent qualities, an observation that has been noted elsewhere (Harris 1998). Perceptions of environmental change is intrinsically linked to social political and economic realities of local people. Farmers recognise intricate connections of soil fertility, inputs and yield and technology, so their perceptions may reflect changes in social and economic factors that differs from farmer to farmer (Osbahr & Allan 2003; Maconachie 2012). What is apparent from this study is that farmers are more interested in the inputs they can make into the soil than its inherent properties. One important aspect in this research, and is perhaps not acknowledged enough in previous research, is the importance of organic fertilisers to farmers. Farmers control soil inputs and consider inorganic fertilisers to be an important factor in their farming. *Taki* they are able to buy and generate themselves, but without access to inorganic fertilisers, farmers, both men and women, believe that farming is going to be increasingly difficult and more livelihood diversification inevitable.

Results from empirical studies of soil nutrients in the KCSZ suggest that nutrient mining is not taking place in the soils of the Kano Close Settled Zone and that there is no empirical evidence of a drop in soil fertility (Mortimore 1993; Hoffmann et al., 2001; Mortimore and Harris 2005; Maconachie, 2012). Nutrient balance is maintained through the use of *taki*, intercropping with legumes and nutrient deposition from harmattan wind but farmers still perceived a decline in soil fertility. Soil nutrient balances remain unchanged, and run contrary to even local people's

perception of a drop in soil fertility. This disparity in scientific studies and local perceptions are not confined to the KCSZ but occur in other dryland regions of Africa as well (Dahlberg 2000; Gray & Morant 2003; Stocking & Murnaghan 2001). This may be because empirical studies of soil nutrients provide only a partial picture of soil fertility, and external and broader concerns affect farmers' perceptions of their soils. In this study a majority of the participants bemoaned their farms' inability to produce as much yield as it did in the past. But they also acknowledged that the inputs into agriculture have declined. This is similar to what Maconachie (2007) and Hoffman (2001) have noted , different social actors in the KCSZ evaluate their resource base differently and local perceptions of the loss in soil fertility is related to the increasing difficulty in getting both inorganic and organic fertilisers and are related to individual broad concerns such as decreased wellbeing and increased livelihood stresses. Apart from *taki* and fertilisers, pests, crop and livestock diseases and rainfall variability can also affect yields and be as much an important influence in farmers' perceptions as inputs of inorganic or organic fertilisers (Maconachie 2012).

Regarding vegetation, as noted in Chapter Two, Hermann et al (2005) in their survey of vegetation observed that while in the Sahel as a whole evidence suggests that vegetation is recovering, human activity may be a contributing factor in the observed insufficient greening in northern Nigeria despite increases in rainfall. A more recent study by Naibbi (2013) used a time series analysis of Landsat satellite images of the North-Eastern part of Nigeria (NEN) covering a period of about three decades, and found a significant reduction in vegetation. He notes that deforestation is occurring in the north east, and one possible reason, he argues, is the use of fuelwood by majority of the population of northern Nigeria both urban and rural, mainly due to lack of alternative energy sources in the region. Mortimore (2000) has observed that expansion of small scale farming may be the driving force of deforestation in the drylands of Nigeria. According to Odihi (2003), in the northern dry belt of Nigeria, further north east of

the KCSZ where rainfall is much lower and population densities are smaller, socio economic conditions have pushed people out of other occupations into agriculture as a means of livelihood, often involving clearing large tracts of land. These same socio economic factors are responsible for the fuelwood use which Naibbi & Healey (2013) found is significant in deforestation in the north east of Nigeria, the same region as Odihi's (2003) study. In the Kano zone however, Maconachie (2006:134) contends that though pockets of degradation exist, widespread woodland degradation may not be occurring.

Official perceptions are therefore guilty of a one size fits all, extrapolating degradation and deforestation in some parts of the drylands which may account for results from Hermann et al (2005) and Naibbi & Healey (2013), to other parts of the drylands such as the KCSZ which may not be experiencing it on such a scale . Another aspect is attributing this deforestation to local farmers who the research finds actively invest in conservation of the soil and of trees, albeit with considerable constraints on their abilities to do so, instead of the commercial fuelwood marketers who drive large-scale cutting (Naibbi & Healey 2013). While land clearing for farming is taking place in north east (Odihi 2003), in the KCSZ most available land is under cultivation and this has been the case for the past three decades (Harris 1996; Mortimore & Harris 2005). Officials therefore need to investigate and localise degradation so appropriate policies can be applied in the places where they would have the most impact, and not deploy the same interventions everywhere as in in the large scale afforestation projects the government and NGOs promote in the Nigerian drylands as a whole.

6.11 Chapter Summary

The chapter has shown that in both villages, men and women's perceptions of land degradation is related to their gender, their socioeconomic circumstances, and also to ecological characteristics of their particular environment. Food and fuel are undoubtedly two of the most important

goods the ecosystem provides, and a steady decline in the yield of crop was an important indicator of a decline in ecosystem services. There are differences and similarities between how women in both villages view land degradation and the factors that account for their differences and similarities- e.g. ecology and socioeconomic conditions. Both men and women focus on the importance of agricultural inputs to soil fertility. The 'good' soils in Bemun and the fact that better off women farm and so would have the cash to purchase inputs ensure that Bemun women do not perceive a decline in fertility, though some men, constrained by economic circumstances do. In Yakai, drier ecology and remoteness to markets are importance influences on perceptions. Unsecluded women farmers are poor, and perceive soil fertility decline because they lack the means to improve fertility. The most important indicator of land degradation mentioned in the study was decline in soil fertility and crop yield.

Chapter Seven: Environmental Entitlements, Households & Natural Resources

7.1 Introduction

Some of the political ecology literature discussed in chapter two focused on the negotiations and struggles involved in gaining access to resources. Feminist political ecology (FPE) offers useful insights into household relations where conjugality and the family are crucial sites for politics, and access to natural resources is negotiated depending on relationships. Marriage can be a site of conflict between man and wife (or wives) or between co-wives themselves but it can also be a site of cooperation in access to scarce resources in a way that enhances food security in often uncertain climatic conditions. In this chapter, I use the environmental entitlements framework to map entitlements to land and to livestock and explore the capabilities they provide. I also examine the participation of different social actors and some particular institutional arrangements that influence natural resource management. The institutional focus of the environmental entitlements framework highlights power relations even within the household. I explore the politics governing such access for women in different households. The chapter also examines the role of off farm livelihoods in gender relations especially in conjugal units. Finally it discusses the two way relationship between social capital and women's resources.

7.2 Environmental Entitlements: Land

The participation of different social actors in the environment and natural resource management is influenced by particular institutional arrangements and leads to different uses of the environment (Leach et al 1997). One of the features of the environmental entitlements framework is that it focuses not solely on natural resources, but also on the human institutions that govern the management of these resources.

Land rights and land access are both endowments that can be transformed into entitlements and this usually involves a variety of negotiations, informal, and formal arrangements. Figure 2 illustrates the mapping process. Men, women farmers, women farm managers, wage labourers, land agents and village heads constitute some of the social actors in the management of land.

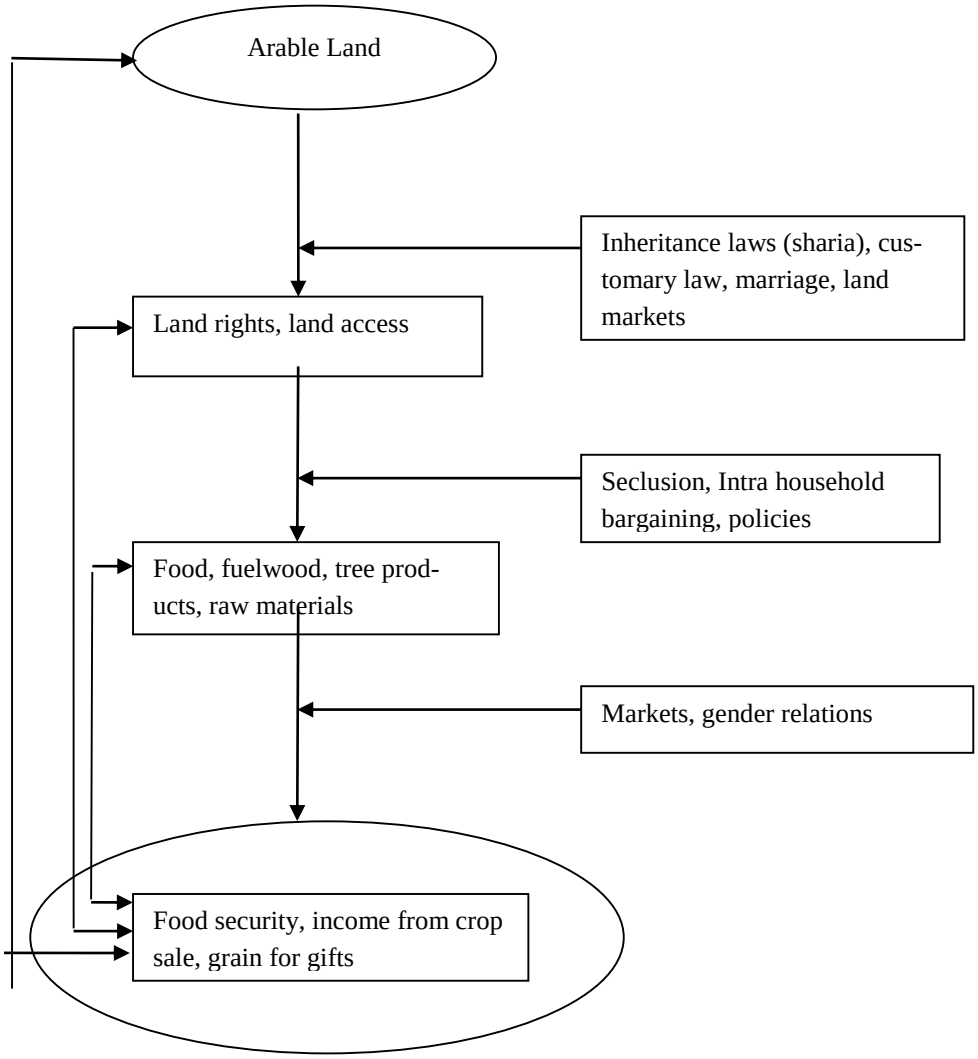

Figure 2: Environmental entitlements mapping: Land

Land only becomes an endowment when people get access or rights over them. In the study area, rights could be outright ownership through inheritance and purchase, or access through renting or borrowing. For the majority of the women in the study, land access was through borrowing from husbands, or renting, and for majority of the men, land rights were acquired through inheritance. Marriage is therefore an institution that transforms land from an environmental resource to an endowment for many women. For men, but not women, land can also be allocated by village heads (*dagaci*) but as mentioned before, all arable land in the Kano zone is already cultivated (Harris 1996; Mortimore & Harris 2005), so the importance of village heads in land allocation has decreased significantly. However they still act as arbiters of land disputes. The customary courts which follow sharia law are an important and final arbiter of customary land matters. As mentioned in section 4.4, in rural areas statutory land rights are rare partly because they are expensive to acquire, but also because the lower courts recognize the customary land rights and allocations which have guided land matters for generations. In addition higher courts only recognize statutory tenure, and they are not present in many rural areas. Land markets are another important institution, and land can be rented or purchased by both men and women from one another but unsurprisingly, many more men than women have land to rent out or sell.

Land access and land rights provide entitlements of crops to feed households and raw material for trade and craft, such as food and snack businesses for women. Because the landscape of the Kano close settled zone is farmed parkland, arable land also includes trees. Entitlements from land can thus include valuable trees such as locust bean, baobab and shea nut, and the products of those trees which provide fruits, food and raw materials for snacks, condiments and for craft work as well. Trees can be owned separately, thus they may not constitute an entitlement to owners or users of the land on which they grow. This is where negotiations and informal arrangements come into play. When land is sold or inherited, a separate purchase may also be

made of the trees on the land. When land is rented, trees may or may not be not included, in many cases access to trees and tree products usually accrue to the owner of the land.

Entitlements derived from land can depend on access to other endowments such as labour. For example the secluded women in Bemun can only cultivate crops if they can hire the labour to do it on their behalf. They may have land rights or access, but without access to labour they are unable to transform them.

For women, land rights may bring different entitlements from land access. Women who own land but do not cultivate usually leave land with male kin, and this entitles them to maintenance when they are divorced or widowed. They may provide share cropping entitlements to women. Hansatu, a woman farm manger in Bemun, illustrates some of these connections between rights, access and entitlements:

> I own my own farm, I inherited it from my father. When he died his farms were shared out amongst us. So I gave the farms out to my uncles to farm, because I can't do it myself and all my children are in school. I have one I kept for myself and I take care of my children's schooling needs with it. I don't give my uncles any money or resources to farm. The arrangement is that they use my land and give me a third of the yield. I have many farms and I don't have the resources to work on them myself that is the reason I took just a small portion…I have many trees on my farm. Even the trees on the farms that my uncles use belong to me, and I use the fruits as I wish.

Capabilities from land entitlements include cash from the sale of farm produce. Cash from crop sales belong to women to dispose of as they wish and is used for different purposes such as clothes, cosmetics and livestock. Women use grain and other crops as gifts to maintain their relations with other women and with kin. A few women also contribute their grain to household food stocks. In relation to grain and other crops from cultivation, a woman from Yakai sums it up:

> 'Some we eat, some we sell, and some we give as gifts".

For men and a few women where applicable, cash from sale or renting out land may be used to purchase inputs to improve fertility on other fields. Women's trade is confined to the household, and market trade is exclusively a male domain. Women can sell grain from the household or can delegate men to sell for them in formal markets, or employ middle men. Women's access to markets is mediated by men, and markets and prices for crops influence the income farmers earn from crop sale. The mediating effects of marriage and markets will be discussed in more detail later in the chapter.

7.3 Environmental Entitlements: Livestock

In terms of land management and soil fertility, land and livestock endowments are linked. Livestock are certainly one of women's most important endowments. They are easier to obtain than land and unlike in land inheritance matters, gender is no barrier to acquiring livestock. They are an important resource as well as a means of accumulating wealth throughout the KCSZ, and certainly in the two study sites all the women research participants had some livestock. Livestock become endowments through purchase and inheritance and when existing livestock give birth - a self-perpetuating endowment. Sometimes women take care of livestock for relatives from the city for example, in return for a share in the offspring, two women in the study did. Meagher's (1999) study in northern Nigeria found that income from livestock sale was a negligible part of women's total income, but in the research area it was an important part. In this study in some households, women own the majority of livestock, Duwa in Yakai had as many livestock as her husband and three sons combined. There is some gender differentiation in the ownership of higher value livestock, both women and men own sheep, goats and chickens, but rarely do women own cows or donkeys. The ownership of such higher value livestock such as cows, donkeys and the occasional horse is an important indigenous indicator of wealth, and in reality only a few men own these animals as well.

In both communities, women are the main caretakers of livestock which are tethered at home, but they are fed from stalks and grass mainly from men's fields, and both men and women are responsible for buying feed in the dry season. This is usually negotiated at the household level. Access to some entitlements of livestock is mediated by informal institutions such as social norms and customs. Livestock trade in markets is exclusive to men but women do not have any difficulty in selling livestock. Middlemen mediate their access to markets by selling livestock as well as crops for a commission. Unsecluded women may interact directly with middle men but for secluded women there is an extra layer of remove and husbands or other male kin handle the transactions.

The main entitlements derived from livestock is cash income from sale, eggs from chickens and guinea fowls, transport and traction and hire of same for cash, and the manure from sheep, goats and cows that is main component of *taki*. Only sick animals are slaughtered for meat, people usually acquire their meat from butchers. As mentioned in Chapter five, for the unsecluded women of Yakai *taki* is not an entitlement from their livestock endowment, social norms act as the informal institution that mediate access to manure from their own animals. But as evidenced by the case of Duwa, power relations within the domestic sphere, as well as a woman's subject position influence the distribution of manure. Unusually for Yakai women, Duwa gets *taki* from her house to apply on her farms, this might be because her bargaining power within the household is substantial. Duwa is the only woman in the village to own cows. She is the only wife of her husband and wealthy within her own right. In this case her breakdown position of having the most valued livestock (cows) means she can appropriate a share of the household *taki*. The lions share still goes to her husband's farm though because he is still responsible for food provision.

Binta is an older Yakai woman who is the de facto head of the household due to her husband's incapacity and who has no living children, so all *taki* accrues to her. For all the other women

participants in Yakai, *taki* was not an entitlement they could benefit from, the number of livestock they owned notwithstanding. Only a few men had cattle and the decline in Fulani herdsmen bringing cattle to browse on farmlands meant that most manure is from small ruminants which many women possess. Gambo explains:

> We have sheep and goats in this house. Some belong to my husband, some to me and some to my sons and their wives. But the taki is for my husband, because that is what we do here. We cannot practice what is not our custom. *It's with your village grass, and not another's, that you make fences*.

The mapping of livestock environmental entitlements is illustrated in Figure 3.

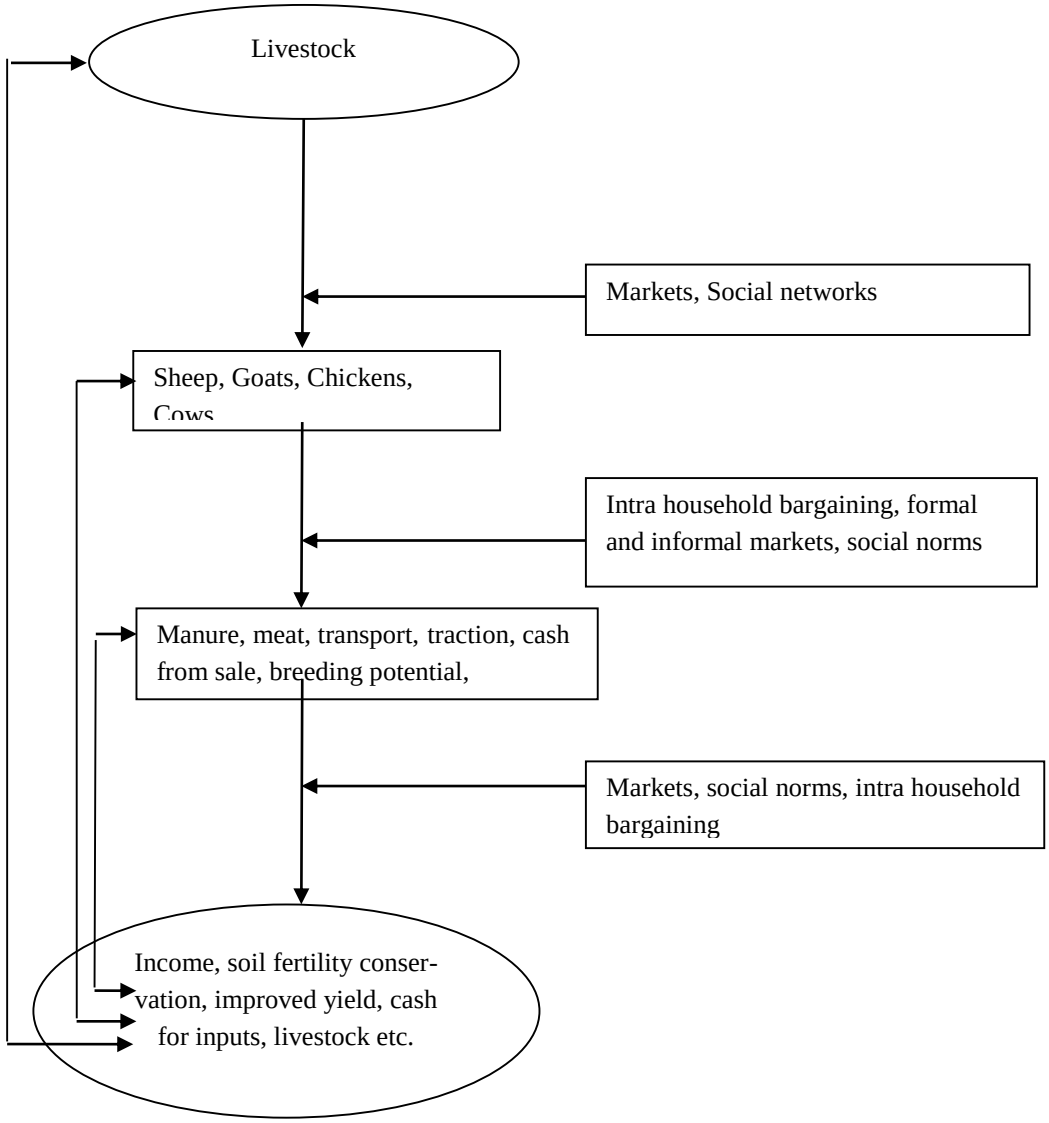

Figure 3: Environmental entitlements: Livestock

In general in both villages *taki* is understood a male entitlement. *Taki* goes to husbands even though women farm and require it because for the most part they cannot afford inorganic fertilisers. But social norms and local customs prevents many of them from accessing this vital entitlement from their livestock. Crucially this lack of access is one that is accepted by women, and understood to be necessary for household food security. Men's fields feed the household and priority is given to the maintenance of their fertility because this ensures food security for the household. Men's fields are also the main source of *harawa* (grain stalks) and grasses used to feed livestock. This division of labour is seen as part of the cooperation needed to ensure household food security (Whitehead & Kabeer 2001).

The main capabilities that livestock entitlement provide is income and the conservation of soil fertility. Income from sale funds the purchase of inputs into agriculture for both farming men and women. In fact women in Bemun cite income from livestock sale as making the main contribution to their agricultural funding. It finances the vital endowment of labour women require to manage farms. It also pays for labour for Yakai women in those tasks that are exclusively male such as ploughing and ridging.

Women in the study areas insist that decision making about livestock sale and occasionally slaughter depends entirely on them, and disposal of the income from such sale rests with them. However their lack of participation in markets means that the price they get from livestock markets is negotiated by either husbands or a male relative.

The institutions described above that mediate access to and control of land and livestock and the entitlements derived from them operate at different levels- micro, meso and macro (Leach et al 1999). Gender relations within households constitute these micro institutions operating at the local level, and markets can be considered a meso institution. The following section examines marriage as an institution, and the other micro institutions within marriage itself such as polygyny.

7.4 Marriage and Its Institutions

> Understanding the complex overlapping rights and obligations, and competing interests between household members — that is to say, the relations of domination within the household and the cultural representations that produce and reproduce these power relations — is a critical starting point in understanding the politics, and the points of resistance" (Carney & Watts 1990:217)

Within feminist political ecology the conjugal unit and the wider family are seen as important sites for politics where negotiations for resource access takes place. There are also other institutions within marriage itself such as polygyny and seclusion, and the end of marriages because of divorce or death presents its own complexity. Access to resources within marriage is temporary, divorce or widowhood may end it. Widows with children can benefit from their inheritance. A husband has nothing to lose when he gives part of his land to wife or wives, the arrangement is temporary, it provides his wife with an income, which though is hers can be used to help him out with loans or relieve some obligations of his to provide. A secluded woman in Bemun explains:

> I do not work in fields but I go sometimes to see work that is being done for me. If the men so wish they can even stop us from this type of farming. We only do it because they do not object to it. The moment they object, we have to stop. But they do not mind, in fact they even encourage us to do it because our success is also theirs. (Hauwa)

7.4.1 Polygyny

The presence of co wives sometimes creates conflict in the allocation of resources (Kevane & Gray 1999). Polygyny can have mixed effects on the efficiency of agricultural production in household depending on cultural contexts (Akresh et al 2012). But as discussed earlier land is the main resource a husband can provide, and it is not a gift, it is usually borrowed from a husband for a certain amount of time, and often because he is incapable of cultivating that field due to lack of inputs. In polygynous households co-wives relationships are often marked by conflict, but cooperation also takes place to achieve pragmatic goals especially when they rely on each other for emotional support (Akresh et al. 2012). This is certainly the case for the women in the research area who live with each other all day in their households virtually devoid

of male presence. Some examples of this cooperation are illustrated below, using some of the case study households in the research.

In Bemun, Aisha is the first wife of her husband Bala and is childless. Her co-wife has five children, the last a 10 month old baby girl whom Aisha is fostering in the same household. Her co-wife does not manage a farm. Their husband is a farmer who also sells vegetables in a weekly market. According to her, he brings the unsold stock to both Aisha and her co wife to sell at home. Aisha borrowed a field from her husband, part of land that he had purchased, and not the household fields that he cultivates in *gandu* (cooperative cultivation) with his brothers. Aisha explains:

> 'I have a farm close to my house which I borrowed from my husband. He can't give it to me as a gift because I am not his only wife so I borrow it and farm.

It appears that giving Aisha a field to cultivate and not her co wife is not a matter of conflict in the household, primarily because her co-wife does not manage a farm. Aisha is responsible for all other inputs, and labour is an especially costly investment. The more important matter is the sale of vegetables which is a *sana'a* (trade). In this the stock of vegetables is shared between Aisha and her co-wife. It would be unusual for Bala to capitalize one wife's trade and not the other's. A preference for the first wife in the allocation of agricultural resources is not evident, it seems more a matter of any wife seizing the opportunity to cultivate, but it cannot be dismissed entirely. For example Bala's statement about Aisha's farming:

> I can travel anytime I want and rest assured that Aisha will be able to take care of any emergencies while I am away. That is why I encourage her in all her occupations, even in farming.

Part of this encouragement entails providing her with land when he can, and acting as the go between for hired labour. But it also involves contributing his labour on her field. During one visit, Bala was weeding her pumpkin field. Aisha has goats, sheep and chickens, and so does her co-wife and these animals are tethered together and all contribute to the household pool of

taki. Aisha receives some *taki* from the household pool which she supplements with poultry manure and some inorganic fertilizer. Her co-wife does not receive *taki*. But she is involved in livestock care along with Aisha and all other women in the compound. So ostensibly because she is a farm manager Aisha benefits from the allocation of land and labour from her husband, and some *taki* from the household pool - all resources that her co-wife does not share in. It could well be that she is able to manage a farm precisely because she has this access and not the other way round. Aisha has an excellent relationship with her co-wife, as evidenced by her raising her baby so there appears to be no conflict between the two women over this.

Where wives have the wherewithal and a man has the land to give, sharing is an option. For example Hauwa & Hajara are two co-wives in Bemun. Hauwa is the second wife but had previously been married in a town called Kura, where she still manages a farm borrowed from a Kura local with her current co wife. In the village though, they had other arrangements. Hauwa explains:

> I work with my co wife to farm, we cooperate. Sometimes we put money together and borrow a farm and plant on the farm, for example our rice farm in Kura. The farms we have here in the village are separated, we borrowed them from our husband, the one behind our house is mine and hers is in front. We have another farm here that we bought together, a man in the village was going to marry off one of his daughters and we put money together and bought it, and then divided it into two. We both plant maize on it.

The cooperation between the two women is evident in the statement and allows them to access resources that would otherwise be beyond their capabilities. Hadiza on the other hand is a Bemun woman who rented land from her senior co-wife for which she paid a token sum of money, just like she would to a person outside the household. If she had borrowed it from her husband, she would not have had to pay.

7.4.2 Where there is no husband: Divorce & Widowhood

There was no divorced woman among the participants in the study. Although divorce rates are very high, remarriage is almost inevitable after divorce. Among the 24 women participants, 8 had previous marriages. In cases of divorce, women usually return to their natal homes, where

parents or brothers are responsible for their maintenance for the usually short period before they marry again. The ownership of land guarantees maintenance, especially land that is in possession of brothers or kin. Young widows are expected to remarry, old widows live with their children, usually sons if they have them, and enjoy many freedoms.

For example Uwar Iya is an old widow who works on her small field just behind her house in Bemun. In a community where women do not work on fields, she does the planting, weeding and much other work on her small field. She was her husband's only wife and was given the land as a gift by him before he died, but this is unusual, she was the only woman among the women participants in the study to acquire land in that way.. She grows cotton on the field, and spins it into thread which she sells.

Jummalo is a middle aged widow in Yakai who works with her son Yakubu on her deceased husband's fields to grow the household food. Interestingly she lived in a compound with her deceased husband's older brother, and normally it would be expected that he would feed the household. However Jummai said her husband and his brother did not farm together before his death and this explains why. Jummalo is waiting for her son to get married and assume responsibility for his siblings, so she can get married again or move back to her parents' home in the neighbouring state of Jigawa.

Binta in Yakai, though not a widow is a poor de facto household head. She is the main provider in her household comprising her old and deaf husband and she works on his field. Her husband is in poor health and they have no living children.

All three women described above are not secluded, but their situations differ. Uwar Iya lives in relative affluence, farming because she wants to, and her son Shehu provides inputs and labour. Her widowhood has not brought about a drop in her in living standards. Jummalo on the other hand has young children to feed and has no choice but to farm. Binta has to provide

for herself and her husband. She sometimes works as a wage labourer, weeding and planting on fields to earn money. This takes time and labour away from her own field and as a result she is very poor, and complained that she struggles to survive the whole year, often having to rely on relatives and neighbours for food in times of need.

7.4.3 Age Differentiation

Even among married women, their ages and stages in their lifecycle has an important effect on their positioning regarding agricultural production and natural resource use. Out of the 24 women interviewed for the research in Yakai to Bemun, none was below 30, even though ages given were approximate guesses. In an area where marriage begins at 14 years or younger, and where the birth rate is high, it is difficult for young married women to farm or manage farms primarily because of childbirth and care. In addition, if they are poor, they would not have the time to work on fields. Agriculture and its management is predominantly for middle aged women with no young children to take care of.

Older women are free from the restrictions of seclusion, and are usually exempt from much domestic labour, especially if they live in compounds with sons and daughters-in-law who cook for them, and have grandchildren to run errands for them. For Uwar Iya in Bemun, her age allows her to use her labour resources even though when she was married she was in seclusion. Because of her age as well, even the male farming tasks are arranged and paid for by her son.

7.5 Markets

Formal markets are meso institutions where gender plays a central role. As mentioned before, an important capability that women's agricultural activities provides is cash from sale of live-stock and crops. Secluded or not, Hausa women do not trade in the formal daily or weekly markets and as a result, women do not directly control some of the negotiations which bring money. Participation in markets in Hausa northern Nigeria is gendered, governed by social

norms and regulations about what is acceptable and about women's roles in public space. Hansatu explains;

> When I want to sell my crops, my husband gives a trusted person to take to the market, and my money is brought to me, after he takes a commission (Hansatu)

Because they sell their farm produce and livestock, or buy crops for their trades, market prices can have a large influence on women's wellbeing. In other parts of Africa as well, such as in Malawi and Uganda, women are constrained in their access to market systems even when social norms do not exclude them, and men participate in formal markets and control commodities that generate higher revenue (Njuki et al. 2011).

Household trade is a female domain though, but is usually on a small scale compared to men's market trading. Polly Hill (1969) famously termed Hausa women's household trade a 'honey comb market' as it is made up of cells of women with buyers moving from one house to the other, and argues that though each woman sells individually, as a group, they represent a proper market place. This informal market place plays a central role in the diversification of women's livelihoods and their off farm activities which will be discussed next.

7.6 Off-farm Livelihoods

Agriculture is only one in a suite of livelihood strategies that women and men engage in. Diversification from farming is a survival strategy, as well as a means of accumulation for households and individuals (Bryceson 2000). Diversification is not new, it has always been an integral part of dryland livelihoods (Mortimore 2005). It has to be, the actual wet season is short and many of these off farm occupations continue throughout the dry season. Dry season occupations are vital to sustain the agricultural production of the wet season. Women and men engage in multiple livelihood occupations and diversify as a strategy towards risk aversion.

Farmers are not just farmers but have a 'bricolage' of livelihoods occupations which include agriculture, livestock, markets and dry season migration (Batterbury 2001). They are traders,

craftsmen and women, labourers, teachers, religious scholars, midwives and barbers. Men migrate to cities to work during the dry season after the harvest, a process known as *cin rani* literally 'eating the dry season'. It is an important income earner for many men and is a vital way of sustaining households and also capitalising the next growing season. Women do not migrate, but benefit from remittances.

The importance of non-farm income cannot be overestimated. Without exception, all the 24 women in both villages had other occupations apart from agricultural production. Only four male farmers out of a total of 20 in both villages mention that farming is their only occupation, everyone else had another occupation. While for most men it is often the primary occupation in the wet season, for women, it is often not.

Table 11 illustrates the diverse range of income-generating activities in which the 24 women in both villages engage in, from household trade to wage labour.

Table 11: Women's economic activities

Occupation (Sana'a)	**Number of women engaged in it**
Midwifery	1
Polio Vaccination	1
Traditional medicine	1
Snack making & sale	14
Household trading (Grain)	3
Household Trading (condiments, vegetables, soap, etc)	6
Sale of cooked food	9
Craft work (Rope making, Fan weaving)	4
Cotton Spinning	2
Crop processing (threshing, winnowing)	6
Groundnut oil processing	2
Hair Dressing	1
Wage laboring	4 (Yakai Only)

The most common activity as seen from Table 11 is the making and sale of snacks (boiled nuts, bean cakes, rice cakes, groundnut balls) and related to that the sale of cooked food. These are

prepared at home and given to daughters or female wards to hawk in the community or in a group in the village square. Some women combine both snack making and cooked food. Grain and household essentials are sold from the household. Wage labouring on fields is confined to Yakai where it is socially acceptable.

Examples of multiple occupations from some of the men and women in the study illustrate the variety of livelihood strategies in households. Aisha is a polio worker and processes groundnuts into oil, and locust beans into *daddawa*, a local spice. Aisha's husband Bala is a land agent and a vegetable trader in a weekly market. Zulai and Saa are co wives who manage separate farms both borrowed from their husband. In addition Zulai sells household items such as groundnut oil, salt and spices. Saa makes beancakes to sell and therefore grows cowpeas for the cakes. She buys groundnut oil for frying the cakes from Zulai sometimes on credit. Jummalo makes rice cakes, Gambo sells cooked food and works as a wage labourer on farms. Her husband Yahaya is a tailor. Hauwa sells soap, salt and other household necessities, and her co wife Hajara sells cooked food and weaves fans for sale. Uwar Iya spins cotton, sells thread and processes grain. Her son Shehu is the imam of the local mosque, sews turbans for sale and in the dry season works as a day labourer in nearby Dawaki. In addition all these women and men keep livestock and also farm or manage farms.

There are important relationships between off-farm livelihood strategies and land management and agricultural production. As discussed in Chapter Five, women use off farm income to gain access to the cash to buy resources critical for agricultural production .Women's earned income is thus invested in farming, but more importantly according to them, it is used to maintain a level of financial autonomy necessary for their well-being as Hausa women. They buy toiletries such as soap and washing powder for the household, clothes for themselves and their children, and accumulate a dowry for their daughters which is usually done over a number of years. Young brides usually come into their married homes with some capital and assets in the form

of *kayan daki* (room things) as mentioned in Chapter Four. These room things consist of assets that a young woman can sell to start a *sana'a*. Women save all their lives to provide adequate room things for their daughters, it is a source of pride and a measure of a woman's success as a mother that she is able to do this. They are usually tangible things such as table ware, furniture, crockery and dishes that can easily be sold when needed, but can include grain. Women therefore capitalize their own daughters early trades, and this acts as an added incentive for women to engage in farming among other occupations.

The multiple occupations carried out by both men and women are not a substitute or replacement for agricultural production but an addition to it. Farm and off farm occupations complement each other. Most women position themselves first and foremost as household traders (in food or craftwork or snacks) with farming as a secondary occupation and men as farmers first and another occupation second or third. Though household livelihoods are largely based on natural resources, off farm activities are more important to women as a source of livelihoods than agricultural based ones and thus they focus their energies, time, and labour on those occupations where their advantages lie and where there is no competition from men.

So women's diversification is actually from their off farm occupations into agriculture. This happens for a variety of reasons as has been explained throughout the thesis. For Bemun women, it is an example of the re-agrarianization of well to do women due to economic reforms mentioned in Chapter Four. For Yakai women, it is a necessary extension of their off farm activities and an opportunity to utilise their labour on field to their benefit. The contribution of women's proceeds from both farm and off farm activities will be discussed next.

7.6.1 Women Propping up Households - Taimako

In relation to division of household provisioning and budgets, Jane Guyer notes that

> "…the specialization is never complete; it oscillates according to each sex's ability to cope with its own sphere, and its ability to tap into the other or to shift the responsibilities" (Guyer 1988:171).

This shifting of responsibilities is now increasingly common in Hausaland (Imam 1993; Meagher 2000). Although this was not the primary reason for their involvement in agriculture, most women in both communities said they made a contribution to households but the type and extent of contribution they made differed somewhat between the communities. Both sets of women mentioned that they were responsible for provision of toiletries, clothes, seasonings etc. for household use, but traditionally, this has not always been the case. Men are by custom and religion obligated to provide food and everything else needed to run their households including their wives clothing and personal expenses. Meagher (2000) notes that economic constraints have led to a gradual change in the traditional ideological divisions of responsibility especially for poor women. The competing and increasing demands on women's income from husbands, which traditionally used to be in the form of short term loans (Watts 1983b; Hill 1977; Schildkrout 1983) has now given way to gifts and increasing contribution to household expenditure. The practice of 'pitching' in is now becoming increasingly common place in poor households (Meagher 2000). Wealthier households are less affected, and women less frequently need to 'help out'.

Seclusion especially, comes with the expectation of full maintenance. As mentioned in Chapter two seclusion is seen as a conjugal contract where a man provides everything a woman needs and she restricts her movement. But it is fluid and variable (Jackson 2012a). The rules of the conjugal contract are being tweaked to allow women take on more provisioning roles, although the bulk of food provision still rests on men and grain is still seen as a man's responsibility. As a result, men have a vested interest in their wives engaging in agriculture and gaining from it because it is viewed as one of the many trades that women can engage in that aids financial autonomy. For example Hauwa and Hajara who co-manage a farm in Kura 30 kilometres from Bemun travel there regularly to check on their rice farm, even though they are secluded and

their movement within their village is restricted, an illustration of creative conjugality (Jackson 2007).

While women's incomes may prop up households, there is little indication that they make a contribution to men's agricultural production such as in the form cash for labour and inputs. The contribution they make to household food provisioning overall seems to be minimal, and is more prevalent in the poorer households of Yakai. None of the women in Bemun mentioned contributing grain to the household without an expectation of payment, but 6 women out of 12 in Yakai did. In general the bulk of *taimako* is concentrated on non-food items. Some Bemun women did mention that they sold grain to their husbands if the household stock was depleted, and payment could be deferred to a time husbands were able to pay. This could certainly be the case as the Bemun households were relatively well off women and the households would be more food secure than the poorer Yakai ones. The women in Bemun would be expected to demand payment for their grain as their agricultural production was a business operation. However according to Imam (1993) it is difficult to ascertain exactly how much women contribute to household food because it is considered shameful to admit to it. But the women in the study shared this information voluntarily, and in fact so did some husbands. In the years since Imam's (1993) and Meagher's (1999) research, it may well be that 'helping out' is the new normal.

7.7 Social Networks

Conjugality is not the only social relationship that women farmers are invested in. They draw upon other social relationships such as with friends, kin and co-wives. A significant channel of access to resources is the relations between kin, which includes siblings who may reside in another village or another state. They can provide new seed varieties, and crops in times of scarcity. Women who have moved from their parental homes and still own inherited property in their home villages can call on obligations in times of need. They may also receive a share of agricultural proceeds from land they have rights to. Relatives also provide other advantages

that enable women to make more out of their farming. In Bemun where women have no granaries by custom, having a place to store grain and crop can have a significant impact on a woman's amount of income. Hansatu's case is an illustration of this. Hansatu has storage facilities available in her brother's house, she has been provided a room to store her bags of grain and cowpea, and she takes full advantage of this. She has this advantage because she is from Bemun herself, so has kin in the village. Many women marry into the community and have kin elsewhere so do not have this entitlement**.** This seemingly simple access to a room to store crops gives Hansatu an edge over many women in terms of the price she gets for her produce.

Hansatu explains:

> I keep the grain and cowpea to sell when the prices rise in the hungry season and I make a lot more profit then. I sell some to my husband first, if he needs it and then to others.

Women's networks mean they can obtain resources from a different community from that in which reside. Uwa Iya the old widow in Bemun obtains cotton seeds from her sister in Minna more than 400km from Kano. She says the seed variety she obtains from her yields better cotton than the local variety.

Labour networks also form an important part of women's social relationships. Women carry out the bulk of household food processing, and especially for grain it is a laborious process. Usually women organise work parties in the neighbourhood and take turns in each household pounding, threshing and winnowing grain, before moving on to the next. Even secluded women's restriction of movement does not prevent them from taking part. In wealthy households, men usually hire women to do it for their households, but the voluntary unpaid work parties are more common. In households co wives share childcare duties such as in the case of Aisha and her fostering of her co-wife's baby. Uwar Iya shares the care of her many grandchildren with her daughters in law. This pooling of labour frees up women and provides time for the many household tasks and trades that take place within the domestic sphere.

7.7.1 Bond Friendships (Biki)

As described in Chapter two bond friendship *(biki)* is an important element of the social capital of Hausa women. As noted earlier, births, weddings, and other festivities have an added importance to Hausa women, because they are usually the main occasions when women leave their houses to visit family and friends, sometimes in different communities. Biki is a form of bond-friendship undertaken by many Hausa women with friends. At occasions such as births or weddings, a friend gives a gift, usually of money to her celebrating bond friend, which the other returns with an increase when she hosts an occasion. The institution of biki is a vital part of women's network of cooperation and given the high divorce rates in society these friendships often outlast marriages (Jackson 1985). Gifts can also include grain and clothes.

Women are solely responsible for this expenditure, and have to ensure they can meet up to these obligations. Apart from bond friendships, women are also invested in other ceremonies of kin, daughters, and friends' children. Gambo in Yakai explains what happens in birth ceremonies.

> When people give birth such as daughters of friends or your own daughter or among your relatives; you have to take things to their houses. Once your daughter is pregnant you start saving so you are not shamed when the baby comes. Then you take grain, cloth and some money to your daughter and in-laws. But for daughters in the cities you only take rice or grain to them, not money or cloth. If you don't have the grain, you sell your livestock to get some. If we had more *jari* (capital) we would not have to sell our livestock when the time for ceremonies comes.

In part because of the rigid segregation of male and female lives, Hausa women's relationships with other women are very important as co wives, wives within the same compound, or as bond friends or neighbours. Thus as well as conferring some form of financial autonomy to the women, farming is seen as a means of attaining and maintaining these forms of social capital. In the research area agriculture sustains social relations and social capital. It is often said in studies that social networks sustain agriculture but in fact for the farming women in this study there is a two way relationship, where agricultural proceeds help in sustaining relations with kin and friends.

The downturn in agricultural fortunes and economic hardships since the SAP era have affected the ability of women's kin to help them out in times of need. Bryceson (1997) suggests that economic conditions have had an impact on social relations of gift giving by kin because of a decrease in income and disposable cash. Economic conditions have affected the moral economy. Watts (1983b) blamed colonial policies for the breakdown of moral obligations to help both non kin and kin in the earlier part of the 20th century. Recently, however, dwindling agricultural fortunes and harsh economic conditions play a greater role in the continued decline of this moral economy. A woman farmer comments:

> 'If you don't get enough yield, you cut your costs, you don't buy livestock and you reduce your expenditure. Nobody will lend you money now, and gift giving has declined. It is not like before, everyone is for himself. Who will give you a loan? Things are difficult for almost everyone. (Hadiza)

Gift giving between friends in the organised way that bond friends do can therefore be seen as a social investment and can be a form of insurance against risk (Mortimore 2002) because of the principle of reciprocity involved.

7.8 Chapter Summary

The chapter has used the environmental entitlements framework to explore the different social actors in land and livestock management, and has examined the gendered nature of women's access to and control of these resources and the importance of informal institutions in mapping women's access to resources. Formal institutions such as markets and customary law can determine how both men and women benefit from these resources. Cultural norms that guide the institution of marriage such as seclusion and male provisioning that influence gender roles and responsibilities and maintain power relations are not rigid and static, but in practice, show flexibility and diversity across a range of individuals and households (Verma 2001). This diversity has an effect on their resource use, can determine whether they are farmers themselves or farm managers, and the types of investment they can make on the land of labour and money. Women's subject positions as wives and daughters can provide them access to resources, but it is also the case that in this region with a thriving rental market, as members of the society

they can gain access within a network of friends, family and local connections. The chapter has also shown how women's off farm economic activity is an important contributor to household expenditure and the importance of social relationships other than conjugality to women. In contrast to Sen's (1987) assertion, shared well-being does exist in many households, especially among women. It would be extremely difficult and contrary to individual women's own interests not to cooperate in those aspects of livelihoods such as household trade, childcare and livestock management, given that the household is their space and they have little or no participation in the public sphere and in formal markets.

Institutions can constrain or promote access to resources and in so doing highlight power relations between men and women. Informal institutions such as marriage and seclusion are slow to change, but formal ones such as legislation can change rapidly (Leach et al. 1997), for example the ban on female farm inheritance in Kano and its subsequent repeal by emirs mentioned in section 5.12. Even though the institutions involved in promoting or restricting access to land can be identified, it is not always appropriate to attempt to change the nature of these institutions through interventions or policies (Leach et al. 1997; Nunan 2006). In the research areas, change can come from a surprising institution, sharia law. The Islamic laws governing inheritance if enforced can increase women's ownership of land. This land may be small and fragmented and women may not have the resources or even the inclination to cultivate, but ownership itself is an important endowment that brings many benefits regardless of what women choose to do with it - cultivate, rent , share cropping or just leaving it in the hands of kin for leverage. A change in the share of the land they have a right to though (i.e. half of a man's) is nigh impossible, and there is no indication that change is sought by the people given their strict adherence to Islam, as the inheritance rules are laid out in the Quran.

In the concluding chapter, the main points of the research will be brought together and suggestions for further research will be made.

Chapter Eight: Conclusion

8.1 Research Contributions

The research has used the important elements of a gendered analysis of environmental change (Jackson 1995, 1998), divisions of labour and responsibility, ecological considerations and access to resources and has integrated context (Resurrection & Elmhirst 2008) to examine land management practices and perceptions of environmental change among men and different types of women. It has contributed to the body of literature on gendered access to and control of natural resources in the developing world, and on gendered agricultural strategies (Carr 2008). By applying a feminist political ecological lens to land management, it has exposed how complex and varied women's relationship with land and agricultural practices are, even among a subset of rural Hausa women. The research has concentrated on women, specifically an often overlooked category of Hausa woman who is actively involved in the male dominated field of agriculture.

The study sought to answer questions about: the conception of land degradation in official circles in Nigeria and how it compares with the local perceptions of environmental change and affects intervention and policy; the gendered dimensions of land management among farmers; and the effect of seclusion practices and socio economic differentiation on land access and management. In attempting to answer these questions, the key contributions the research makes are considered in the following sections.

8.1.1 Gendered access and control of natural resources

This study has illustrated the complexity and diversity of women's relationship with land and agricultural practices. It has shown that unsurprisingly women's gender governs their interaction with natural resources and with agricultural production, it governs the kind of agricultural practices they can engage in and crucially, limits their access to natural resources such as land

and labour vital for agricultural production. The study finds that though gender is an important differentiation, both men's and women's views and perceptions of their natural resource base are influenced by their socio economic positions, and by wider economic forces.

The land management practices of women are mediated by their relationships with men and with other women. Relationships with men are vital to women's participation in agriculture and their access to the means of agricultural production. Land access for most women, unlike most men, does not come from ownership of land. The study has shown that though women are able to inherit land, the most common form of land access is through borrowing land from their husbands. Marriage is not the only way to access natural resources, but it is an important conduit. Ownership of land however, bolsters breakdown positions of women and guarantees being 'wooed' by male relatives and ensures maintenance in divorce, widowhood or old age.

In the study area, unlike in some areas of Asia (Agarwal 1994) or even Africa (Goldstein & Udry 2008), land is not the main constraint to women's agricultural participation. For women who do not own land, only land scarcity precludes them from cultivating land if they so desire, their gender is no barrier to borrowing or purchasing land, only in inheriting it. Similar to other studies in Hausaland (Meagher 1999), land is not the most important constraint to women's participation in agriculture. Their main constraints are capital, labour and inputs and the stigma associated with on farm work. Land management by hiring labour to farm on their behalf is desirable, but this requires considerable inputs and investment. Women prefer to concentrate on trade, craftwork and small crop processing businesses.

Regarding labour, unsecluded women have a degree of freedom when it comes to deployment of their labour in agricultural production, and all women control and utilise daughters' labour in their trades, but they do not have control over the male household labour that is the main input into agriculture. Seclusion does not totally preclude women from participation in agriculture, but the restriction on mobility does preclude them from utilising their own labour on

field. For secluded women husbands and male relatives mediate their relationship with hired labour.

The importance of livestock to every single household cannot be overestimated, they are desired and kept by all the people and households involved in the research. They are a vital endowment, are the key to maintaining soil fertility and act as insurance for emergencies. Livestock act in lieu of rural banks and have been described as the major determinant of a household's resilience (Mortimore 2005). In Chapter seven environmental entitlement mapping has shown how livestock provides entitlements and capabilities. Their sale supports agriculture through cash for money for labour, seeds and other inputs, and provides vital *taki*. Certainly livestock disease and mortality have a great impact on a household's livelihood, and even on individual resource endowments. A policy focus on veterinary care and livestock extension services is needed, but this is lacking, an omission that has important repercussions.

Age and class differentiation also matter. Gender relations are not static and change according to a woman's life cycle. Young married women are seldom involved in agriculture. Old women are free from the restrictions of seclusion. However the free movement of menopausal women within society does not translate as well to their agricultural activities. Their access to extension services and fertiliser does not change, their age brings respect and gives them freedom of movement, but interaction with the environment still requires the mediation of men.

The study did not find evidence of much conflict in allocation of resources between men and women within the household. This is as a result of the strict separation of male and female spheres. Agricultural production is a male domain and female participation in it does not carry the expectation or the right of access to inputs and extension services that men have. The conflicts reported by a minority of women involved disputes over land inheritance.

Inequalities in allocation of resources may be part of a bigger picture approach of allocating resources where they make the most impact e.g. household *taki* to men, as part of a wider strategy of ensuring household food security (Whitehead & Kabeer 2001; O Laughlin 2007).

8.1.2 Land Degradation: Perception & Effect

Experiences of environmental change and perceptions of change to soil fertility and vegetation are similar to those found elsewhere in African drylands (Dahlberg 2000; Warren 2002; Osbahr and Allan 2003). Farmers understand that soil fertility, inputs and yield are connected to social and economic factors. What is apparent from this study is that farmers are more interested in the inputs they can make into the soil than its inherent properties. As a result, decline in crop yields is attributed by both men and women in both villages to a lack of inputs, due to costs and availability. One important aspect in this research, and is perhaps not acknowledged enough in previous research, is the importance of inorganic fertilisers to farmers. Men lack access because of factors such as price, official policies and incompetence, while women lack of access to fertiliser for the same reasons, but also precisely because they are women. The use of inorganic fertilisers is not considered sustainable by some researchers who are enamoured of *taki* use (Mortimore & Adams 2001; Mortimore & Harris 2005; Maconachie 2007) because of erratic supply and cost, but in the study both men and women note that despite the vital role of *taki* in farming systems, without an improvement in fertiliser access and distribution, agricultural production will remain stagnant. The importance of inorganic fertiliser, despite its shortage can therefore not be dismissed and must be an area of policy focus.

In chapter four, women's ignorance of intervention programs reflected existing gender relations within both communities. Men were also ambivalent, an indication of the different niches the discourses of land degradation occupy among government and local people. The chapter showed how the desertification paradigm is still relevant in official circles in Nigeria. One of the limitations of political ecological research as discussed in chapter two is that recent research

findings and the shift from neo Malthusian rhetoric has not been able to make inroads into official policies and policy making. In this regard, Stringer and Dougill (2013:14) call for researchers to overcome their reluctance toward media engagement and actively pursue policy opportunities. They also stress the need to identify knowledge gaps of key policy makers and include these policy makers into research designs. Without doing this alternative conceptualisations of land degradation that eschew simplifications will continue to be ignored by relevant officials. The current focus of the Nigerian government in the drylands land management is the Great Green Wall (GGW) mentioned in Chapter 4 and in 2014, it officially launched this project. It is promising that the rhetoric on the Green Wall has now shifted from building a wall of trees to stop desertification to include an integrated programme of land conservation and management, in theory at least. According to Nigeria's environment ministry, the goal of the Great Green wall has evolved from the initial idea of a wall of trees to include a development programme aimed at improving food security as well as developing water and social infrastructure (FME 2014). This is a welcome recent development if put into practice.

8.1.3 Gender & Environmental Change

The reason most often touted about women being at the forefront of environmental degradation is that as food growers and fuel gatherers, they would be adversely affected by environmental change such as land degradation and climate change (Dankelman 2010). But this research has demonstrated that in the research areas women largely farm for their own selves and are less dependent on agriculture to make a living than men. The fact that they are not responsible for food and fuel production and control their income and labour means that they would be affected differently. The most important impact of any environmental change on these women is on their ability to maintain their autonomy and maintain their social and kinship ties. Women's autonomy is related to their ability to carry out a trade and earn a living. For the women of the two communities, distances to fetch water and struggles to feed the family are not the standard

effects of land degradation. It is in the way it threatens their ability to provide for their personal needs and affects their social relationships with other women, aspects of their lives that gives them great satisfaction and contributes to their bargaining power within households.

As discussed in Chapters Two and Five, gender is only one variable, clearly the class of women is equally important. While all women share similarities as social minors with little or no public participation, the poorer unsecluded women will be more negatively affected than the better off women, even though the latter are confined to the domestic sphere.

In the gender related division of labour, based on tasks and responsibilities carried out, land degradation will have a lesser effect on women than on the men, primarily because of the conjugal contract and household bargaining. It may lead to a reduction in the workload and obligations of unpaid work in their conjugal contracts, as the bulk of food processing for household consumption is done by women and this is typically not remunerated.

How do declining crop yield and soil fertility affect men and women? The burden of a decline in crop yield are felt directly by men first, and then by women and the effect is mediated by men, specifically husbands. The make-up of the society means that dependence on a man is inevitable and by definition, desirable. As Jackson (2012a) notes for many women a husband personifies food security. Marriage and kinship, she argues, are not always a mechanism of subordination, but one of insurance as well and a legitimate entitlement. Marriage therefore is of profound value to women and ease of divorce and remarriage confers on women a strong bargaining position in households (ibid). Men act as a cushion to certain effects of environmental change such as food insecurity, but other important aspects of women's lives such as their social networks and their economic independence are vulnerable.

The absence of a male provider such as the case of Binta in Chapter Seven, whose husband was old and deaf, and who had no children, and Jummalo the widow with several children has

a profound impact on women's lives because they are unable to fully participate in male tasks themselves. They also lack the cushioning effect of a male provider.

8.1.4 The Importance of off-farm livelihoods

Diversification is the key to coping with the variability of dryland ecosystems (Batterbury 2001; Mortimore 1999). As discussed in Chapter Seven, in the research areas men and women farmers have many other occupations which they engage in, agriculture provides only a part of livelihoods. For most women, these occupations are more important than farming, and farming is a means to augment what is acquired from them. Behind a well off woman is a well off man and this is usually the case with the poor as well. At the beginning, women's businesses are usually capitalised by their husbands, or by dowries provided by mothers. But husbands and other relatives are increasingly unable to provide this capital as evidenced by their own increasing reliance on wives to shoulder some household responsibilities. In this regard microcredit will be a godsend. *Jari*, the Hausa word for capital came up time and again in relation to both sets of women in the communities. The expansion of small businesses involving agricultural processing such as grain threshing will do dual good, it will reduce their dependence on children especially girl children for the advancement of their trade, showcase their entrepreneurship and increase their autonomy and agency, regardless of seclusion status. They have an advantage over many women in the developing world, they are not obligated to provide food, fuel and labour for agricultural production. Traditionally they have utilised this freedom to their economic advantage but are constrained by the lack of capital. Free from back breaking labour intensive agricultural work, women have the potential to be economically transformative, even within the confines of their own homes.

Apart from the minority women farm managers, it is hard to see how agriculture in its present form can be profitable for most women. Gladwin & McMillan (1989) allude to this when they argue that in areas of increasing intensification where production cannot be extended to new

land (such as in the research areas) the future of female farming does not look promising unless there are technological advances. A wide range of other livelihood options such as in markets and trade and other forms of natural resource management may in some cases provide more to a woman's welfare than an emphasis on cultivation.

Micro credit schemes would be a policy success for both men and women. They may have the effect of taking poor women out of agricultural production and the associated fieldwork, but would concentrate them in their self-declared areas of strength – trade and small businesses. Access to credit has been demonstrated to strengthen women's bargaining positions by expanding their independence especially when they are able to invest their new capital in autonomous activities (Ngo & Wahhaj 2012). Hausa women have traditionally demonstrated this economic autonomy (Coles & Mack 1991).

8.1.5 The significance of faith

Islam governs all aspects of society including gender relations and access to resources (such as land inheritance) and is the primary justification for seclusion practices and strong male provisioning and female caregiving roles. In the study, among men its influence seems stronger than among women but conformity to its interpretation is universal. Environmental change, rainfall and soil fertility are attributed to Allah's will and so are the responses. An underlying aspect of the research was that all participants without exception qualified their responses with references to divine will and faith. Faith gives hope that things will get better and the forbearance to act and people will pull through somehow. People rely on faith in Allah to cope with stress and shocks, even environmental ones, especially regarding the main variable affecting drylands – rainfall.

Religious doctrine governs inheritance laws. Where religion and culture indicate that a woman's basic necessities of food, accommodation and clothing are the responsibilities of the closest male relatives - husband, father, son or brother depending on her subject position, then

inheritance laws such as for land where women get half of a man's share makes equitable sense, because a woman's basic needs must be met from a man's share. A woman's share is hers and hers alone, and Islam gives her absolute control over her property and a right and share in her husbands or fathers or brothers. If subjectivity is seen as the psychological and social metal interior (Jackson 2003) then religion plays a pivotal role in shaping women's subjectivities.

8.2 Farming Women's Subjectivities

The degree of autonomy that women possess depends on their positioning within their households, both natal and marital. Economic autonomy however does not always translate to agency (Cornwall 2007). Women abide by and are bound by the patriarchal norms within the society and appear not to question them, which is unsurprising as they accept that they are backed by religion. Religion allows them to assert their rights over their property and to demand those rights, but the interpretation of religious doctrine coupled with local custom also reinforces their status as social minors. They assert their agency only within the particular cultural representation of these religious norms, as well as their desire to get out of the laborious and demanding part of agricultural production. Seclusion is a variable institution that some women can use to their own advantage Secluded women comply with their restrictions and support the social stigma associated with on field work because it is a reflection of their status and contributes to their well-being and to their subjectivities as women who are cared for and provided for, who have in fact married well. But for poor secluded women, this restriction in mobility limits their possibilities.

In truth, none of the women aspired to be on-field farmers, without exception they preferred to be farm managers, even at the cost of withholding their labour, or especially because of it. This is of course tied to the social stigma of toil, women who toil on the land are women whose husbands cannot afford to keep them secluded. For poor unsecluded women, their toil on fields, while necessary, is in effect a source of shame and a reaffirmation of their status in society. For

secluded women their seclusion limits them to farm management, but as seclusion is a strong indication of social standing, the ideal participation for women in agriculture is as farm managers. For secluded women farm managers, their agricultural production was a source of pride, an indication that they were wealthy enough to pay for hired labour, and were successful enough in their own trades to have the cash to pay for inputs or had a wealthy husband behind them. It is thus no coincidence that secluded women farmers' perception of yields was the most positive out of the four subsets of men and women in both villages. They were participating in a male domain by choice, and to an extent on their own terms. So an increase in income may encourage seclusion as seclusion means social standing for both men and women, similar to Kabeer's (2001) findings in Bangladesh.

Regarding agency, all the women however stated they participated in agriculture only with their husbands' permission. In reality a husband has nothing to lose and much to gain from his wife being a farm manager - social status and affirmation of their standing in society, and more capacity for wives to help out at home. The majority of the female population in both villages fall somewhere in between, they are not wealthy or entrepreneurial enough to be farm managers, and are not so poor that they have to work on their own fields or in wage laboring.

The ease and acceptance of divorce and remarriage and the fact that women can and do initiate divorce with no social stigma attached (Adamu 1994; Jackson 2007) means that despite their social subordination in public, they exercise some sort of power within the home, which is effectively their space. In this regard the balance of power within the domestic sphere and household is not as one sided as it seems. The domestic sphere is a site of power for women where they exhibit subtle but effective forms of resistance (Robson 2006). A central component of Sen's cooperative conflict as discussed in Chapter Two is perceived wellbeing and self-interest. While he emphasizes objective measures, there are subjective ones such as marriage and childbearing and the comfort, cushion and status they provide that are equally important to

many women (Jackson 2007). It is possible for women to simultaneously be aware of their oppression and to resist it, and to be conscious of injustice and still exercise agency (Ahmed 2014).

8.3 Study Limitations & Further Research

This research was carried out in two different communities. A different approach would be the study of a single community where there are secluded and unsecluded groups of women farmers. A focus on a single community and socially differentiated women within that community would eliminate factors of remoteness and ecology and the subtle differences in cultural practices between the communities in this study, and would provide useful insights into different women's management of resources within a single community including their gendered dimensions.

This research has focused on two sets of Hausa women who are actively involved in agriculture, either as farmers themselves or as farm managers. However a large majority of rural Hausa women are not farmers or farm managers, but still rely on the natural resource base for their livelihoods, directly through the use of trees, tree products, livestock and crops for their various trades or by being members of household that do. They also face vulnerabilities as a result of environmental change. A study that focuses on this larger group of women and their relationship with the resource base would also give useful insight and perhaps a different perspective on gendered natural resource management. In this regard a study of gender and livestock management will be useful. Livestock make important contributions to women's and men's livelihoods and can provide a pathway out of poverty (FAO 2013) and the importance rural people attach to it attests to this. Women in the study areas play a prominent role in livestock management, and an important area of research would be understanding the function of livestock for men and women and the various gender roles in livestock production and management.

Rainfall features prominently in discourses of the environment and climate change is a concern even when it is attributed to the will of God. The recent IPCC report (IPCC 2014) predicts an increase in number and intensity of drought incidents for the drylands in sub Saharan Africa, with important implications for agriculture, crop yields and food security. Further research on the implications of these for food security in relation to gender and gender relations will be beneficial.

An important component of FPE is that the economic, ecological and gendered dimensions of natural resource use and environmental change are interconnected. Women are on the periphery of state and local power and define and redefine their situations despite the constraints they face (Rocheleau et al. 1996) and larger economic and political systems transform women's lives at the local level. The state plays an important role in natural resource management. Therefore perceptions and knowledge of local people, both men and women and their different roles in natural resource management, which complement rather than conflict each other, must be taken into consideration at the macro level on issues such as agricultural policy and economic development of rural communities. Degradation in the drylands can be and is being contained by the people of the drylands, both men and women, using the resources and capabilities available to them (Mortimore & Adams 2001). State investment in rural infrastructure, agricultural extension and inputs, micro credit services, and in education and social services that provides equal opportunities for women are the best ways of ensuring that local people are able to continue to do so (Below et al. 2012).

Another fundamental principle of FPE is that women cannot simply be grouped together with regards to their land and labour use and access, and their agricultural production, because they occupy various socioeconomic positions and have contextual differences. Even at the local level, there are important subdivisions among women. This study of farming women in Bemun and Yakai and their men suggest that gender categories should only be a starting point, albeit

an important one, in subdividing or indeed uniting women and men into categories that can drive interventions and development.

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Appendix 1

Consent Form

Study Title: Land Degradation & Gender in Kano, Northern Nigeria

Researcher: Saadatu Umaru Baba, University of Birmingham.

The purpose of this PhD research is to examine the official and local perceptions of land degradation and environmental change in northern Nigeria, and its gendered dimensions. The research is important because of the importance of agriculture in rural livelihoods and the conception of land degradation as the foremost environmental problem in northern Nigeria. It is hoped it will provide useful insight into gendered land management and conservation in northern Nigeria and ultimately inform policy.

The study methods will involve interviews, and the ultimate results will be presented in a written thesis for the award of a PhD degree at the University of Birmingham. All information given will be treated confidentially and participants will remain anonymous.

The interview will be audio taped with your permission. The tapes and transcribed text will only be accessible to the researcher and her academic supervisors. Your personal data will be processed for the purpose of this research only, in accordance with the UK Data Protection Act 1998.

You have the right to withdraw from the study at any time. If you choose to withdraw from the study all information you provide will be destroyed and omitted from the final write up. Direct quotes from you may be used in the paper, but your name and other identifying information will be kept anonymous.

I have read and understand the above information. I voluntarily give my consent to participate in the study.

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Name of Participant	**Signature of Participant**	**Date**
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Name of Interviewer	**Signature of Interviewer**	**Date**

Appendix 2

Individual Interview Guide

Personal Information Name, Sex, Age, Number of children, Size of household (how many, their ages), Seclusion status of women, Education

Land Use

1. How did you acquire the land you cultivate?
2. What crops did you plant this year? Reasons for choice?
3. What labour do you use for cultivation?
4. Do you have any problems regarding land use?
5. How do you address these problems?
6. Any other occupation and sources of income?

Soil Knowledge & Fertility

1. What are the types of soil in the community? On your farm?
2. What soil conservation methods do you practice?
3. Has there been any change in your soil properties over the last ten years? Reasons for change? What are the indicators of this change?
4. What is the effect on crop yields? On livelihoods?
5. Explain your fertiliser use and access (inorganic and organic). How often, how much?
6. Rainfall? How much, how often? Any Change in rainfall patterns over 10 years?
7. Have you made any changes made to your farming practices/livelihood as a result of these changes?

Trees

1. What trees and & vegetation in the community? On farms?
2. Uses of trees? Which are the important trees and why.
3. Have you noticed any decrease or increase in tree cover in the last ten years? Reasons?
4. How do you acquire firewood?

5. Has there been a change in its availability?
6. Do you use any other sources of energy for cooking, heating etc.?

Livestock

1. How many animals do you have? What kind? Use and importance?
2. What is the division of labour in livestock care?
3. How is taki from animals allocated?

Household Decision Making

Who decides on:

1. Crops Planted / Use of crops
2. Income use and distribution
3. Food distribution
4. Livestock care & sale
5. Labour use and hire
6. Any other aspects of household decision making?

Government Policies

1. Has there been any government intervention in your agricultural production?
2. How have you been involved?
3. Have you received any seedlings/trees or had any contact with government officials regarding tree planting. Have you planted such trees?
4. What do you think about the intervention project in community? (Mention specific intervention program)
5. What have been the impacts of interventions if any?
6. What do you think the government should prioritise in terms of agriculture?

Appendix 3

Interview Guide: Government & NGO Officials

Land Degradation/ Desertification

- What do you understand by land degradation?
- What are the causes? What are your views on human vs natural causes?
- What are the manifestations of land degradation/desertification?
- What are the effect/impact does it have on natural resources (Soil/Vegetation/Water)?
- What do you think are its most important impacts on the lives of dryland populations?
- How do you determine if land degradation is taking place?

Policy & Interventions

- How are they determined/ managed?
- How is your department/ organisation involved?
- What are the intervention programmes by the Government/ your organisation .Any particular projects and how are they implemented?
- Which of them have been successful, and why? Which have failed, and why?
- What role do local communities play in projects? What is the extent of their participation?
- On what basis is priority assigned in selecting the locations where program are cited?

Funding

- How are the intervention programs funded?
- Is national funding for programmes adequate, or is more international aid required?
- How is your organisation funded (NGOs)?