

Intrahousehold Relations and Environmental Entitlements of Land and Livestock for Women in Rural Kano, Northern Nigeria

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Abstract: Gender relations mediate access to the environment in a variety of ways, through formal institutions such as customary law or informal social norms operating at the household level. This is particularly so in rural areas of the global south that are highly dependent on natural resources for livelihoods. The environmental entitlements framework is useful in examining the influence of informal institutions on access to environmental resources among differentiated social actors. In this paper, we use the environmental entitlements framework to map entitlements to land and livestock, and explore the capabilities they provide for women in rural northern Nigeria. The aim of the study was to examine the influence of social norms governing marriage and inheritance on women's entitlements to land and livestock. The study methods were qualitative and used in-depth interviews and household case studies. We find that environmental entitlements of land and livestock for women are mediated by their relationships to men, through marriage or kinship, and through the different intra household arrangements within marriage, including seclusion, non-seclusion, and polygyny. Women are able to gain command of natural resources through negotiations within these relationships and within the wider social norms governing Hausa society. While these institutions can restrict the capabilities women derive from natural resources, women may delay or forgo entitlements as a means of enhancing their wellbeing.

Keywords: environmental entitlements; land; livestock; gender; households; northern Nigeria

1. Introduction

Social differentiation is important in understanding access to natural resources and their control and use, especially in societies that rely directly on natural resources for food, income, and livelihoods. These are often poor rural people in developing countries [1]. One important social differentiation is that of gender, defined as the 'sociocultural layer that sits atop biological sex' [2]. Gender is important in understanding environmental issues because of the long association between concepts of gender and nature, and the gendered interface of human labour with the environment [3], and because it mediates environmental attitudes and action [4]. It influences people's ability to utilise and benefit from ecosystem services, their vulnerability to climate change and adaptive capacity, and it often determines levels of poverty [5–7].

The gendered nature of access to and control of natural resources in many rural societies has been acknowledged for decades now [8–14]. Social differentiations such as gender and class influence agricultural production and forestry practices in the global South [4,15–19]. Female farmers often have more insecure land rights than do men, and are consequently less productive. [20]. The division of labour in livestock management and the multiple roles of livestock for women

in rural Africa & Asia have also been well documented. They are essential in nutrition & food security, traction and transport, soil fertility, and as assets and savings [14,21–23].

Our aim is to add to existing knowledge about gender-environment interactions, by examining the role of marriage and conjugality in environmental entitlements in the region. Intra-household dynamics and different arrangements within marriage including polygyny, and the seclusion status of women may influence the way they access and use environmental resources. An analysis of intra household dynamics within these different marriage arrangements and of associated social norms in the wider society governing women's environmental entitlements is important. This is because it is essential to consider local understandings of the notion of ownership of assets such as land, trees, and livestock [21,24] because of their implications for interventions and policy making, for example, in poverty alleviation and climate change adaptation. This paper uses the environmental entitlements framework to map entitlements to land and livestock, and to explore the capabilities they provide for 2 categories of married women—secluded and non-secluded—in rural Kano, northern Nigeria. Hausa society in Northern Nigeria is patriarchal, and the control of women's mobility through the practice of seclusion within marriage is seen as one of its more manifest forms. In this society, gender (both as biological sex and as a social construction of roles and responsibilities) is the main determinant of active participation in public space, especially in agriculture and natural resource management. There is a further differentiation between married and unmarried women through the practice of seclusion within marriage. Marriage can restrict a woman's freedom of mobility and her interaction with her natural environment because of the prevalence of seclusion.

This region is interesting for this research because of the strict segregation of gender roles in society, especially in agriculture and natural resource use and management. It is a rural agricultural society in which farming is largely a male activity in Hausa society and women farmers are very much a minority, and in this it differs from many parts of sub Saharan Africa [25]. In Hausa society, there is a strict separation of economic and conjugal interests. Married Hausa women are known to value their financial independence that they maintain by having a trade (*sana'a*) and keeping their finances separate from that of their husbands [26–29]. Researchers have noted how women buy food and ingredients to feed the family from their own stocks with money given by husbands [27,29] or loan money to husbands who pay back with interest [28]. As Mack [30] notes, “a Hausa woman of child bearing age without a trade is an anomaly”. For secluded women, this trade is carried out from inside their homes, or by using children. Nevertheless most women depend on agricultural produce for many of these *sana'a*.

The study focused on land and livestock, as these are two of the most important assets for agricultural production in the region. We explore the micro institutions governing the different patterns of access to land and livestock for women in different households in two communities and draw upon the concepts of conjugality and household bargaining. This study focuses not only on household units but identifies marriage, polygyny, and seclusion practices as micro institutions nested within individual households. We examine the mediating roles of marriage (and the social norms of seclusion and polygyny within it), inheritance, and social relations. We find that these institutions influence environmental entitlement outcomes for rural Kano women in a variety of ways. For most women, marriage is an important avenue for gaining environmental resources vital to their wellbeing, but can also be a means of restricting or delaying entitlements. Within marriage, seclusion status and polygyny—dictated by the presence of co wives—influence access to and control of land in particular, in specific ways, but wider social practices such as inheritance norms and strong male provisioning roles govern women's entitlements more generally.

The environmental entitlements (EE) framework brings together concepts of gender theory and the environment by highlighting social difference and the role of institutions in shaping power relations in natural resource use. Leach et al. [31] proposed it as a framework for understanding how diverse constituents of the environment are used and accessed by social actors who may be differentiated by class, gender, wealth, or even by locality. 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. It is an extension of Sen's entitlement framework that argued that there is often a difference between the existence of a resource and an individual's ability to take command of it [32]. The scale of Sen's analysis was limited to the household and individuals within the household, while EE includes communities, socially differentiated groups of individuals within these communities, and organisations. Accordingly, environmental entitlements are 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*' [33]. An important feature of the EE framework is that it focuses not only on resources, but on the human institutions that govern their management. The phrase 'legitimate effective command' recognises that both formal institutions such as legal rights and informal ones such as social norms can influence entitlement outcomes [1]. Institutions can constrain or promote an actor's access to environmental resources and in this way they highlight power relations, from the state down to the household. Access is governed by powers that are exercised through negotiations and social relations, and this is not static but can change over time [34].

The key components of the EE framework are *entitlements*, *endowments*, *capabilities*, and *institutions*. Endowments are rights and resources that social actors possess and include labour, land, and skills, while entitlements refer to the outcome of negotiations among actors to access these rights and resources. 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' [32] (p. 497). Endowments (such as livestock) become entitlements (such as manure) through the process of mapping i.e., separating the different components of a resource. Capabilities refer to the range of options that people can exercise with their entitlements. Age or gender may prevent certain social actors from mobilizing the endowments (such as capital or labour) needed to make effective use of other endowments (such as land).

The relationship between endowments, entitlements, and capabilities, and the strong mediating role of institutions, is illustrated Leach et al.'s EE framework diagram in Figure 1. The diagram illustrates the environment not as a single entity, but as a set of disaggregated but interconnected goods and services, affected at different levels by different stages of institutions.

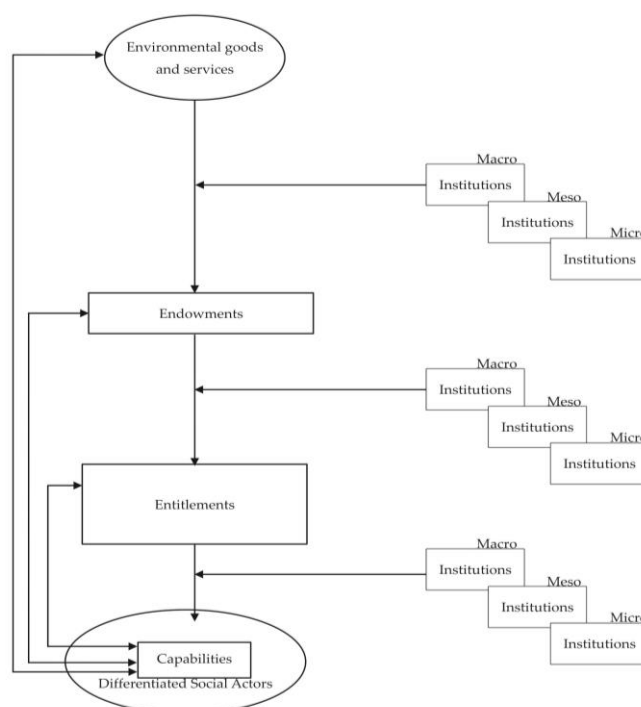


Figure 1. Environmental entitlements mapping: leach et al. [33] reproduced with permission.

Much of the EE framework's application in research has been in rural areas of developing countries, such as in studying environmental change in African drylands [35–37] or analysing the relationships between poverty and ecosystem goods and services [1]. It has been applied to identify the influence of institutions such as private and state sectors and NGOs on household entitlements in socio-ecological systems [38]. It is particularly useful in examining the often complex relationships between land access and ownership, for example in land rights and land reforms in post-apartheid South Africa [39], and forest entitlements in Vietnam [40]. With regards to gender, the EE framework has been used to highlight gendered social norms and socioeconomic differentiation in community-based forest management in Tanzania [41], and the gendered dimensions of fishery resources and the role of different institutions in mediating access in Uganda [42]. The EE framework's focus on institutions and social differentiation is especially important in situations in which people's relationship to the environment is mediated by informal institutions [38]. These studies examined different institutions from the state sector (macro) to household units (micro). Gender relations within households constitute these micro institutions operating at the local level. Household relations shape and are shaped by the informal institutions that Leach et al. [33] discuss.

There has been an increasing conceptualisation of gender not as a central category but as just one of many identities such as class, race, and ethnicity [43,44], i.e., an understanding that women are not a homogenous group even in the same locality. In analysis of households, there has also been a moving away from the static view of marriage as always being a site for gender insubordination to one that views it as a dynamic institution. This signifies a shift away from notion of the 'conjugal contract', which sees conjugality as designed to ensure the ownership of women's productive and reproductive roles [45], to one of creative conjugality, which recognises that men and women within households do not necessarily have separate and opposing interests [46–48]. The relationships between marriage and gender inequality are not fixed; marriage acts as a mediating institution and is just as susceptible to change as other social institutions.

2. Materials and Methods

2.1. Study Area in Context

The study area comprises 2 small farming communities in rural Kano State in northern Nigeria. They lie in what is called the Kano Close Settled Zone (KCSZ), a densely populated dryland region in northern Nigeria which forms part of the Sudan Sahelian region of West Africa known for its erratic rainfall and limited biological productivity [49]. In the KCSZ, almost all land is intensively cultivated, farm trees are nurtured, and crop residues used as livestock fodder [50]. Annually, it has two distinct seasons, a wet season in which nearly all cultivation takes place, and a slightly longer dry season. The landscape is a patchwork of food crops interspersed with large dryland trees in a form of agroforestry known as farmed parklands—a distinctive landscape where many tree species are planted or preserved on farms [51]. These large trees tower over tall stalks of millet and sorghum, as well as shorter bushes of cowpea and groundnut. In the dry season, the landscape is bare of crops, save for farm trees, many with green and leafy canopies. Rain-fed agriculture is the mainstay of rural livelihood in the region and provides food and income, though like most rural areas of sub-Saharan Africa, it is largely of the low input subsistence variety [52]. The mean annual rainfall is between 600 and 800 mm but is highly variable year by year, and can reach up to 30% [53]. Soils have low inherent fertility, and soil fertility is maintained with *taki*, a mixture of animal manure and compound refuse that is the bedrock of smallholder agriculture in the region. Livestock consist of mainly small ruminants—sheep and goats, poultry, and a few cattle. Most men and women own livestock which are valued for their multiple roles as savings and assets, and for providing soil nutrients [50,53]. Trees form an important part of farming practices and most grow naturally on farms, and farmers value and nurture them. The agricultural landscape is thus one in which land, trees, and livestock are interwoven in a mixed farming landscape of production.

The majority of the population is made up of the Hausa ethnic group, with a significant Fulani minority. In Hausaland, gender plays a central role in the organisation of society, not least because

of the strict separation of male and female space and the widespread practice of wife seclusion. This strict separation means that interaction with the environment and the use of natural resources is highly gendered. Agricultural production in the region is a largely male domain and women are not traditionally farmers. The practice of seclusion is largely responsible for the rarity of women's visible involvement in agriculture in the Kano region. Seclusion practices, known as '*kulle*', mean that many 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. They do not go to markets or work on farms. The practice usually applies only to married women of fertile age, and not unmarried girls, divorced women, widows, or women who are post menopause. By some accounts some of the most restrictive forms of it in the Islamic world are practiced here [26,54].

Islamic 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 [55]. All domestic chores and childcare are done by the women. Men are predominantly farmers, as is the case in most of rural northern Nigeria. Agriculture is small scale and mainly subsistence. The staple crops are millet, sorghum, and maize, with groundnut, cow pea, and other lesser crops also extensively grown. Farms are typically small and fragmented, and the average size of a farm in Kano is 0.3 ha [56]. Because the growing season takes up roughly half a year from planting to harvest, there is diversification of livelihoods, and almost all men have other occupations such as traders, butchers, barbers, civil servants, land agents, farm labourers, weavers, shop traders, quran teachers, and imams [57]. Women's main economic activities (known as *sana'a*) are largely dependent on agricultural produce. *Sana'a* refers to the wide range of off-farm occupations that many Hausa women do. It includes food processing, craftwork, sale of snacks and cooked food, and household trading.

Women are usually not responsible for fetching water, gathering firewood, or growing food. However, they are responsible for the bulk of food processing. They shell groundnuts, thresh, winnow and pound grain, and tend to livestock. Though agriculture is the mainstay of rural economies in the region, women farmers are a minority of the public workforce in agricultural production and the extent of their involvement diminishes with the rigidity of seclusion practices [54,58]. 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 [59]. For example, in remote villages where subsistence is meagre, all labour is needed to make a living and seclusion is a luxury many cannot afford; some people are therefore too poor to seclude [54]. Secluded women who engage in agriculture hire wage labourers to work on fields and provide all input and capital from the privacy of their homes.

The study sites are 2 communities in the KCSZ and share many of the typical characteristics of the area. Bemun is a small village in Dawakin Kudu local government of Kano and lies firmly within the inner KCSZ, about 20 km from Kano city. Most married women are secluded and some of them engage in agriculture as farm managers. Yakai is a village in Gabasawa local government, about 60 km north east of Kano city. It lies in the northern part of the KCSZ, and is more arid and remote than Bemun. Many married women in this village are unsecluded. The research focuses on the women who actively participate in agriculture in both communities: secluded women who manage farms by proxy in Bemun, and unsecluded women who work on fields in Yakai. The names of the communities have been changed to ensure complete anonymity.

2.2. Research Methods

This paper uses data from in depth interviews with a total of 20 men and 24 women, and case studies of 8 households that were conducted as part of a doctoral study that examined environmental change and land resource management in rural Kano. The main reason for this sample size 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 on intra household dynamics.

The research methods were primarily qualitative and combined conventional approaches such as interviews and focus group discussions with ethnographic methods such as participant observation and transect walks, a set of methods regarded as ‘the backbone of qualitative research in human geography’ [60] (p. 257).

The research was conducted in two phases between April 2010 and April 2011. The first phase focused on obtaining data from unconnected men and women as separate categories. One on one interviews were conducted by the lead author, a female native Hausa speaker, with a total of 44 participants in the 2 communities. In Bemun, 10 of the women were secluded and 2 unsecluded. In Yakai, the remoter and more arid village, all the women participants were unsecluded. The link to the communities was facilitated by the agricultural extension officers in the communities who assisted with introductions to village heads. The purpose of the research was explained and permission to conduct the studies sought and given. Participation by men and women was completely voluntary. Being female was an important advantage for the research, as it gave the lead author unimpeded access to secluded women within their houses. No reluctance to participate was encountered from both men and women, a likely reason being that education, whether religious or western, is held in high esteem in Hausa society, and the researcher’s status of a student conducting research from a university meant that she was accorded respect and hospitality.

The interviews lasted for several hours over the course of weeks and consisted of formal questioning and lengthy informal discussions. Informal discussions were unavoidable and formed part of participant observation; people usually sit in groups, whether it is men resting under trees after prayers or women doing household chores collectively or individually in the middle of compounds. As much information was acquired in the informal discussions that evolved naturally between different women who came to rest and chat under trees as from the more formal ones one on one interviews. Key informant interviews and sex segregated focus group discussions were also used to elicit information about social norms and customs.

Information from the first phase allowed the development of questions and more specific issues to be raised. Case studies were chosen to provide an in-depth study of some of the concepts that had come up in the first phase. Households were chosen from the initial pool of interviewees, and sampling was purposive to reflect age differences and to provide sufficient coverage of typologies. 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 with a particular focus on the women. Cases were chosen that 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. The research methods employed in the 8 case study households included;

- Separate in-depth interviews with female and male members of the household: participants were asked about demographic information, land, and tree ownership and use, cultivation practices, labour use, livestock numbers and types, household decision making, and sharing and allocation of resources
- Oral histories of the women
- Transect walks
- Timelines detailing roles and responsibilities of men and women in agricultural production

All the individual interviews and notes taken were recorded and transcribed. The interviews and case study material were transferred to NVivo qualitative analysis software. The data was both coded using apriori codes and iteratively. The starting point for gender analysis is the ‘arrangement between the sexes’ [61], and data was divided by gender at first and then other attributes. Coded data were then retrieved based on a characteristics or attributes shared by interviewees such as gender, seclusion status location, age, and wealth ranking. The patterns that emerged were then used to explain the results.

3. Results and Discussion

3.1. Environmental Entitlements: Land

In both communities, men are the heads of households, and there were very few female headed households. People live in compounds consisting of occasionally one, but more commonly several, conjugal units. Heads of the households living in the same compound are related to each other and are usually a man and his sons or brothers.

Land becomes an endowment when people get access or rights over it. 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. In general, the most common forms of land acquisition in both communities mirror that of the wider Kano region; inheritance (*gado*), borrowing/renting (*aro*), purchases (*saye*), or, less commonly, pledge (*jingina*) [59,62]. *Jingina* is when land is pledged as collateral for a loan. Thus, access to land could be temporary or permanent. As indicated by Table 1, whereas rights to land for men are often through inheritance, access for women is most common through marriage.

Table 1. Forms of land access recorded in interviews with 24 women and 20 men in the two case study communities of Bemun and Yakai.

Participants	Inheritance	Borrow/Rent	Purchase	Pledge
Men	20	5	3	1
Women				
Secluded	2	9	3	1
Unsecluded	2	12	1	0

Numbers exceed total number of participants because of multiple forms of land access for some individuals.

Fragmentation of the land is normal, largely because of inheritance practices and the free market in land [55]. All male research participants and 3 female participants cultivated more than one field. All men had inherited at least one field, and 4 women had inherited farms. Out of these, 2 were cultivating their inherited fields. Among them one had 5 fields, two of which were inherited, two purchased, and one pledged to her in return for a loan. 2 women who had inherited land could not have it, because it was being cultivated by male relatives; these same women worked on land borrowed from their husbands. Both had no direct access to land they owned. This is often common in Hausa society because 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 sustain their return and care from brothers in case of old age or divorce [59,62]. Delaying claims ensures brothers and uncles have a stake in the welfare of their female relatives.

Most of the men in both communities acquired land for cultivation through inheritance and sometimes purchase, but the most common access to land for women was through *aro*. For all but 4 of the 24 women, land access was only through *aro* from husbands or others. The Hausa word *aro* literally means to ‘borrow’, but is also used to indicate rent. It reinforces its temporary nature and gives full access to the land typically for one growing season. In an area of increasing land scarcity [63], economic conditions or illness might preclude many men from effectively farming all the land they have and women are able to borrow land. Secluded women managed fields that they borrow from their husbands or rented from others in the village using hired labour. Unsecluded women cultivated land themselves, using their labour for weeding and planting, and wage labourers for ploughing and ridging-tasks, which are exclusively male. When land is borrowed from other than husbands, a sum of money is usually exchanged before land is given depending on the size of the land. When money is not exchanged, cultivation takes the form of *kashe muraba* (literally divide and

we share), a type of share cropping in which the land owner is given a third of the yield at harvest. Land rents are negotiated by husbands or male relatives on behalf of secluded women.

Land purchase by women is rare, but a few well-off women in both villages purchased land: three women in Bemun and one in Yakai. Out of these, two were co-wives who pooled resources to buy a piece of land and managed it together. One of the secluded women explains:

I bought a farm 5 years ago from a man in the village who had put it on the market. My husband asked if I wanted to rent it out and share the yield, but I declined. I prefer to do it on my own. I don't farm myself, I pay others to do it, but the yield is all mine. (Ladi-Secluded)

Gifts of land to women are uncommon. Among the participants, only one old widow had been gifted land by her husband before his death. Interests in ownership are thus separate from interests in cultivation; a cultivator of land is not necessarily its owner. In this regard, access is different from ownership [34].

For men, but not women, land can also be allocated by village heads but as all arable land in the Kano zone is already cultivated [49,50], the importance of village heads in land allocation has decreased, though they still act as arbiters of land disputes. Land markets are another important institution, and land can be rented or purchased by both men and women from one another. Many more men than women have land to rent out or sell. Customary law is loosely based on Sharia law and is widely recognised. This kind of tenure depends on the village heads recognising an individual's right to land acquired through inheritance or purchase. These rights can be protected in lower courts. Higher state courts recognise only statutory tenure, but since these are expensive to acquire, most rural people have only customary rights to land. For the majority of the rural population, this is the case, so these rights are recognised by all local people. It is these customary rights to land that are inherited, bought, or borrowed through generations. Formal documentation is rare, and ownership is indicated as 'the right to sell or use as collateral security' [13].

The mapping of land entitlements is illustrated in Figure 2. It shows the different social actors including men, secluded women farm managers, unsecluded women farmers, and village heads. Men's positions vary as husbands, fathers, brothers, and uncles; women as sisters, daughters, and wives. Among the social actors, access to land for cultivation provides entitlements of food crops, which men use primarily to feed households, and less commonly, sell the surplus to pay for other needs. For women, they provide a variety of entitlements—food crops could be sold, or used raw as material for trade and craft, such as food and snack businesses, or in a few cases used to supplement household stock. They are also given as gift to friends and relatives on special occasions. Entitlements derived from land can depend on access to other endowments such as labour and livestock. For example, secluded women only cultivate crops if they have the money to hire the labour to do it on their behalf. Such money is acquired through the sale of other endowments such as livestock. They may have land rights or access, but without access to labour and the cash to buy inputs, they are unable to transform them to their benefit.

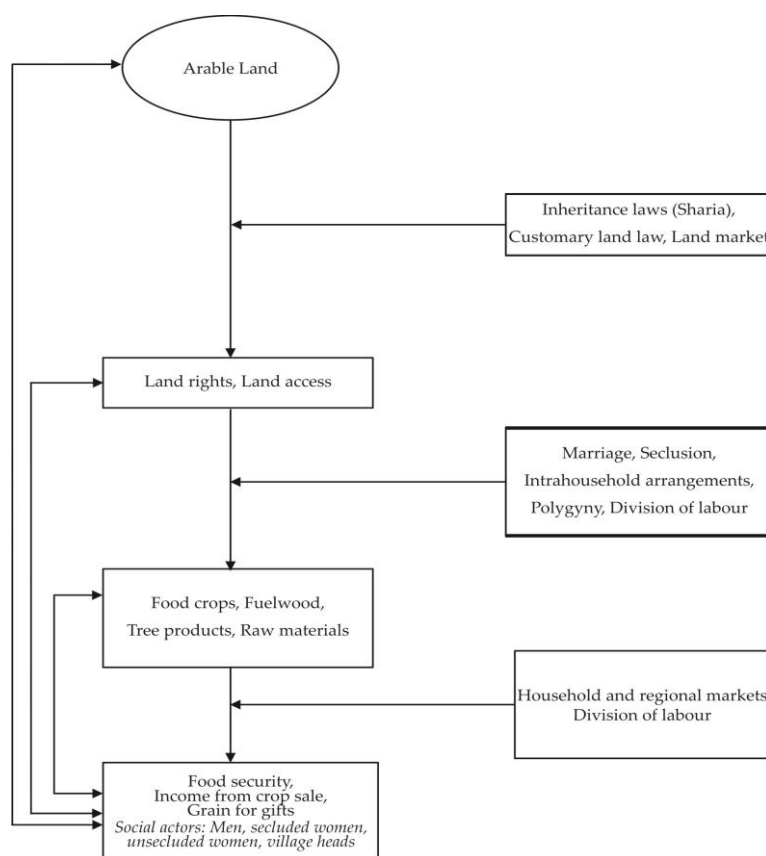


Figure 2. Environmental entitlements mapping: land (adapted from leach et al. [33]).

As illustrated in Figure 2, capabilities from land entitlements include cash from the sale of farm produce, and a means of sustaining social capital. These capabilities are what contribute to a sense of wellbeing for the different social actors. Cash from crop sales belongs to women to dispose of as they wish and is used to purchase 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 contribute their grain to household food stocks. In relation to grain and other crops from cultivation, a woman from Bemun sums it up:

‘Some we eat, some we sell, and some we give as gifts’ (Binta-Unsecluded)

For men and a few women where applicable, cash from sale or renting out land may be used to purchase inputs such as seeds and fertilizer.

Entitlements to trees are linked to land in complex ways [24]. As the landscape of the KCSZ is farmed parkland, arable land also includes trees. They have multiple uses: as food, fuelwood, fruits for sale, condiments, and leaves for soup and sale. Trees can be owned independently from the land on which grow; thus, they may not constitute an entitlement to owners or users of the land, and these are negotiated between owners and users using informal arrangements. When land is sold or inherited, a separate purchase may be made of the trees on the land. When land is rented, in most cases access to trees and tree products accrue to the landowner. 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 for women. Trees provide fuelwood, the main energy source in the KCSZ [64]. Men are traditionally responsible for providing fuelwood, and because most land is owned by men, so are trees. When women borrow land, trees and their produce—such as wood and fruits—still accrue to the land owner. The following statements by two women illustrate these points;

I have kuka, mangwaro and dorawa trees on my farm. The men chop off any large branches, dry them and bring home for us to use. I don’t sell my fruits but some people do. I make daddawa from the locust bean fruit and use the kuka leaves for soup. I use grain stalk and fuelwood for cooking. It’s my husband’s job to provide fuelwood, though I also contribute from my trees. (Hadiza-Secluded)

and

I do not own the trees on the land that I borrowed, they belong to my husband and he brings the wood home for our use. He cuts the tree branches and pay for them to be chopped, and then piles them in the house. I eat the fruits whenever I want and the trees provide me with shade. (Zulai-Unsecluded)

Marriage and inheritance laws are important in mapping entitlements to land, as illustrated in Figure 2. The conjugal contract in Hausa society is very strong and its terms are usually strictly adhered to [65]. Marriage is the fundamental building block of Hausa society [66], usually based on men as providers of basic needs, and wives as subordinates of their husbands. Secluded wives strike a bargain with their husbands to restrict their mobility in exchange for maintenance and care [67]. However, 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 are able to take risks with resources because the traditional role of men as providers of food and fuel holds firm [28].

Even though women are able to inherit land in northern Nigeria, the conjugal unit is the most important means of access to land for female farmers in the study, through negotiations between a man and his wife or wives. Marital relations are a crucial determinant of this access [18]. Across Africa, gender mediates access to land and as inheritance tends to favor men, both men and women work on fields that are mostly owned and controlled by male relatives [16]. While in many parts of Africa it is customary for men to allocate land to their wives to produce food, a crucial difference here is that in the research area there is no such obligation, since women are not responsible for growing food. Husbands give wives land to use as a means to generate income, and this only occurs when they have no resources to cultivate the land themselves. They make little or no other contributions to cultivation. There is no traditional obligation for women to contribute food crops for household use, or to use the cash from their sale for household provisions.

As a result, there is an important distinction between the reasons men and women farm. Men farm to feed households and sell surpluses if there are any, women farm or manage farms for economic independence, and to earn money to take care of their various needs—clothes, cosmetics, expenses for children's weddings, and gifts for friends and relatives. Among the research participants, only 2 women farmed as a principal means of sustenance for their families, an elderly woman whose husband was old and deaf, and who had no living children, and a young widow with a teenage son and four younger children who were not old enough to work on the land. Some women acknowledged that they sometimes did help their husbands out with crops if the household stocks ran low. The contribution women make to household food provisioning overall is minimal, and in fact some women loaned grain to their husbands, with the expectation of repayment. This indicates the separation of economic and material possessions in the domestic sphere that has been well documented in Hausa society [65,67,68]. Marriage is therefore an institution that transforms land from an environmental resource to an endowment that provides entitlements for many women. Crucially, and this is an important distinction from other parts of Africa [14,16,20], these entitlements could be for their personal well-being, separate from the households or their husbands.

For women, land rights acquired through inheritance may bring different entitlements from land access. A woman may own land but not have access to it, and have access and cultivate land that she does not own. Muslim Hausa women are able to inherit land; Islamic law divides land between male and female heirs, with a female getting half of a male's share. Virilocal marriages, however, mean that though women may own land, they often live elsewhere. In practice, they are usually given the cash value of the land by male relatives. Women who choose to keep inherited land but do not cultivate usually leave it with male kin, and this entitles them to maintenance when they are divorced or widowed, or provides share cropping entitlements—an 'implicit bargain' [59]. In Sub Saharan Africa, lineage ties are thought to be stronger than conjugal ties [69,70]. The high rates of divorce and remarriage in the region [65,66] mean women often return to natal homes to live under the care of brothers or uncles. Women therefore have a vested interest in letting male relatives cultivate their inherited land. In this way, having land rights provides them with *latent entitlements* [28], which they can lay claim to when the need arises.

A secluded woman 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 trees on my farms. Even the trees on the farms that my uncles use belong to me, and I use the fruits as I wish. (Hansatu-Secluded)

Increasingly, however, with the rise in the value of land, women are staking and enforcing their claims on land itself [59]. Access through inheritance has increased [62], because wealthy women have the resources and connections to pursue claims.

The household is the usual unit of analysis of production and consumption in studies of rural communities. However, households do not always pool incomes or even risks [71,72]. Studies have shown that conflicts do not always define households; rather, cooperation, bargaining, and intra household relationships govern access to resources of production, and household bargaining can get women access to resources from husbands [73,74]. In agricultural production especially, cooperation and mutual interdependencies are vital for both women and men [74].

The presence of co wives sometimes creates conflict in the allocation of resources [28,74]. Polygyny can have mixed effects on the efficiency of agricultural production in household depending on cultural contexts. 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 [75]. This is certainly the case for the women in the research area who live with each other all day in their households. Where wives have the wherewithal and a man has the land to give, sharing is an option. For example, Hauwa and Hajara are secluded co-wives. Hauwa is the second wife but had previously been married in a town called Kura. She manages two farms with her co wife, one in Kura, and another in the study community. In the village though, they had other arrangements. She 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. (Hauwa-Secluded)

The cooperation between the two women is evident in the statement and allows them to access resources that would otherwise be beyond their capabilities. However, another woman, Hadiza, rented land from her co-wife for which she paid a 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. 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. However, access to land does not guarantee access to other means of production [46].

3.2. Environmental Entitlements: Livestock

In terms of land management and soil fertility, land and livestock endowments are linked. The production of livestock is the most essential link in the farming system of the KCSZ, because of the use and importance of *taki* [53]. 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 owning livestock. Throughout the region, they are an important resource, as well as a means of accumulating wealth, and in both communities all participants—men and women—had some livestock. There is a more equitable division of livestock resources between men and women than with land, for example [76]. Most of the livestock were sheep, goats, and poultry. Only 3 men and 1 woman owned cows. 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 [23]. 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.

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 this. While in the 1990s income from livestock sale was a negligible part of women's total income [68], at present it contributes a substantial part of women's income and savings. Poultry in particular are easily and readily traded for cash, and they are popular with women. In some households, women own the majority of livestock—for example in Yakai, a woman had as many livestock as her husband and three sons combined.

In livestock management there is a general notion of the division of labour, with men being involved in political aspects of livestock production and women being involved in reproduction [21]. In both communities, women are the main caretakers of livestock that 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 negotiated at the household level. The main entitlements derived from livestock are 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*. Poultry are eaten on special occasions, but only sick animals are slaughtered for meat; people buy their meat from butchers. The mapping of livestock entitlements is illustrated in Figure 3.

The main capabilities that livestock entitlements provided were income from sale, and the conservation of soil fertility, and a valuable form of savings. Income from their sale funds the purchase of inputs into agriculture for both farming men and women. In fact, secluded women cite income from livestock sale as contributing the most to their agricultural funding. It finances the vital endowment of labour women require to manage farms. For unsecluded women who work in fields, it pays for labour in those tasks that are exclusively male such as ploughing and ridging. The possession of livestock enables women to discharge their social obligations [21]. Access to some entitlements of livestock is mediated by social norms and customs.

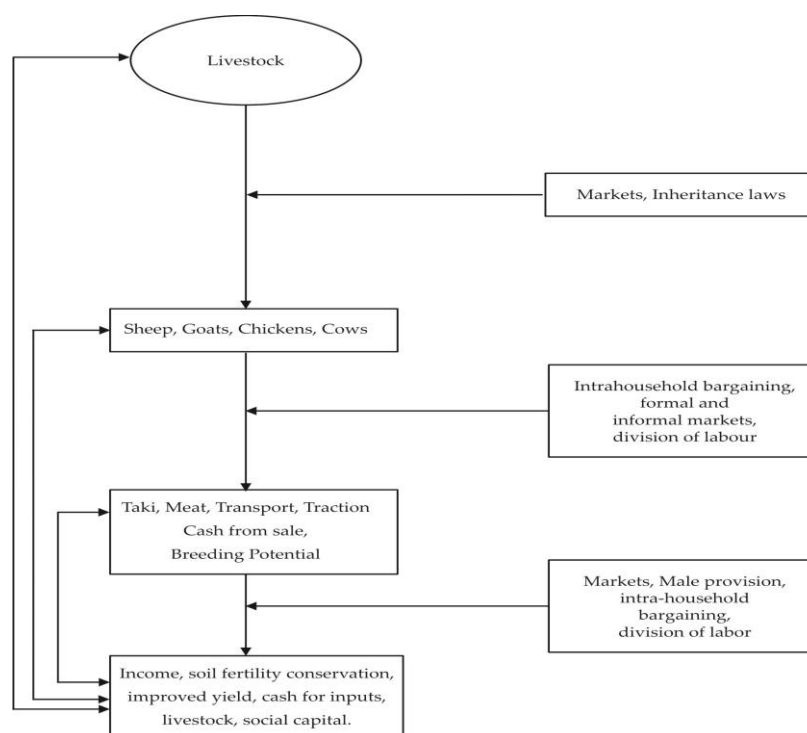


Figure 3. Environmental entitlement mapping: livestock (adapted from leach et al. [33]).

Certainly, one of livestock's most important entitlements is of *taki*. Its importance in rural agricultural livelihoods cannot be overemphasized. In general, in both villages *taki* is understood as male entitlement. *Taki* goes to husbands even though women farm and require it themselves. 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 that 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. (Gambo-Unsecluded)

However, social norms and local customs prevent 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 the main source of *harawa* (grain stalks) and grasses used to feed livestock. This division of responsibilities and entitlements is seen as part of the cooperation needed to ensure household food security [46]. Men and women have shared vested interests in maintaining livelihoods [77], and marriage can be a site of cooperation with regard to access to scarce resources in a way that enhances wellbeing under often uncertain climatic conditions. Aisha, a secluded woman, repeatedly asserts her husband's entitlement to household *taki*.

The taki is for the man of the house... 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-Secluded)

Social norms act as the informal institution that mediates access to manure from their own animals, and for the majority of women *taki* is not an entitlement their livestock provide. However, there are some exceptions. Power relations within the conjugal unit, as well as a woman's subject position, play a role in entitlement mapping. Duwa is a woman who gets *taki* from her household to apply on her farms. She is only woman in the village to own cows and has no co-wives—her bargaining power within the household is substantial. Collective household models [73] assume that household members have breakdown positions that influence their bargaining power [78]. Secure land rights, for example, can strengthen women's relative bargaining power within households [79]. In this case, having the most valued livestock (cows) means she can appropriate a share of the household *taki*. Two other women were also in exceptional situations: Binta, who is de facto head of the household due to her husband's incapacity and has no living children, and Jummallo, who is a widow who farms with her teenage son. For all the other women participants in that community, *taki* was not an entitlement they could benefit from, the number of livestock they owned notwithstanding.

Women in both communities insisted that decision making about livestock sale and occasionally slaughter depends entirely on them, and they are at liberty to dispose of the income from such sale. 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. This is discussed in the next section.

3.3. Markets

Cash from sale of livestock and crops is important, as it provides women with capabilities to meet their material needs and to maintain social ties. Formal markets are institutions in which gender plays a central role. 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 Hausaland is gendered, governed by social norms and regulations about what is acceptable and about women's roles in public space. A woman farm manager 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-Secluded)

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 many parts of Africa, 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 [80]. In the study area, participation in formal weekly markets is exclusively a male domain. Women sell grain from their households or delegate men to sell for them in formal markets. Women's access to markets is mediated by men, and markets and prices for crops influence their income from crop sale. Informal household trade is a female domain though, but is usually on a small scale compared to men's market trading. Polly Hill [29] 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. Livestock trade in markets is exclusive to men, but women do not have any difficulty in selling. 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. Separate income streams and complete ownership of their agricultural produce mean that women are able to make many vital decisions regarding natural resources independently, but they are dependent on men for the execution of many of these decisions.

There is a complex relationship with regards to land and its entitlements, and a simpler one when it comes to livestock. Entitlements can be latent; they can be deferred and called upon in times of need. Both sets of entitlements are governed by the social institutions that determine a woman's position—within her conjugal household and in relation to her kin. Declared social norms can differ from actual practice, as evidenced by unsecluded female farmers in a region where seclusion is affirmed as the norm. Women make the crucial decisions about cultivation and when to buy and sell their livestock based on what would best fit their needs. Entitlements from land and livestock sustain economic activities, social relations, and social capital.

Women's forfeiture of some of their environmental entitlements to men, such as *taki* to husbands or land to male kin, are decisions that conversely maintain their wellbeing, the former by enhancing household food security, and the latter by ensuring later support [59,70]. However, these are not necessarily independent decisions that individual women make, but part of the informal institutions that govern them and which they adhere to as members of the community. Irregular behaviour [33] exists as seen in the case of a few women's access to *taki* mentioned earlier, but these are exceptions to the social norms that occur as a result of a particular woman's subject position and her place within the household.

Because land and livestock are linked in many ways, their environmental entitlements, including the capabilities they provide and their contribution to women's wellbeing, are also interconnected. Women sell livestock to buy agricultural resources and sell crops to buy more livestock. Among the main indicators of wellbeing among Hausa women are relationships with friends and an independent income [55,67]. Hausa women's relationships with other women are very important, as co wives, wives within the same compound, or as friends or neighbours. Thus, as well as conferring some form of financial autonomy to the women and providing them with an income, environmental entitlements from these resources enable them to attain and maintain these forms of social capital. In this way, women use natural capital to sustain social capital. Women thus transform their land and livestock endowments into entitlements that are vital to their wellbeing through a variety of negotiations, and through informal and formal arrangements.

4. Conclusions

This paper has utilised the environmental entitlements framework to analyse the different social actors in land and livestock management in rural Kano. By mapping these endowments, this study has examined the nature of women's access to and control of these resources and the importance of informal institutions in providing women with access to resources. The findings demonstrate that institutions such as markets and customary inheritance law determine how both men and women benefit from these resources, and these findings reflect those found in the wider gender and environment literature [13,14,16], which analyses the heterogeneity of women's

positions and the disparity in women's and men's control of resources. The EE framework has been useful in illustrating how social norms influence the use to which women put their environmental resources and the linkages between the micro institutions of marriage and seclusion, and meso institutions like markets. The framework's multi-layered approach to the examination of institutions and their mediating role has been particularly helpful in highlighting the complex and dynamic intra-household relationships that characterise rural Hausa society.

The research has shown the importance of the different arrangements within the conjugal unit as sites where negotiations for resource access take place, especially regarding land and *taki*. Women's access to land is subject to their relationship to men, as wives or daughters [74], and cultural practices dictate who inherits, owns, and manages land. Within marriage, polygyny and seclusion practices present their own complexity, especially as the strictness of seclusion practices varies according to individual circumstances: age, wealth, status, ecology and environment.

The diversity of arrangements within marriage itself (polygyny, seclusion, non-seclusion, relationships with husbands and co-wives) influence the environmental entitlements of women, particularly in access to land and its use, and in livestock entitlements. Despite this diversity, individual women's entitlements are still governed by the wider social norms that women adhere to, such as inheritance laws and customs, and strong male provisioning roles. This is because there are limits to bargaining within a household; it always takes place within the norms of broader society. Household dynamics do not exist in isolation but within outside institutions like the market [71]. Seclusion can mean that 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 agricultural production practices or participation in markets.

Husbands are the main providers of access to land for women farmers, but conjugality is not the only social relationship that women farmers are invested in. They draw upon other social relationships such as with kin, co-wives, and friends. A central component of the EE framework is the relationship between entitlements and wellbeing. Women use their environmental entitlements to sustain these social norms in ways that enhance their well-being. In Hausa society, marriage and the comfort, cushion, and status it provides are important to many women [65,67]. Because women's agricultural production is chiefly to bolster their economic autonomy, and traditional norms support this separation of finances, they forgo entitlements such as *taki* for the benefit of the wider household, and in so doing maintain their own well-being.

Women's association with natural resources is rooted in particular cultures and histories, and the findings show that traditional latent environmental entitlements contribute to wellbeing. The EE framework highlights how women's subject positions as wives and daughters can provide them differentiated access to environmental resources. Marriage and lineage ties may not be dedicated to the management of natural resources, but they are important mediating factors [42]. Although these are institutions that have often restricted women's livelihood choices and their positions in agrarian societies [18], the findings show that they can be an attractive form of cooperation for women [77], with significant advantages especially for farming women's access to land.

Though the sample of women farmers in the study is not very large, a common shared ethnicity and religion indicates that their experience and positioning reflects wider Hausa society as it relates to women and agricultural production. The study focused on women farmers in northern Nigeria, who are a minority of the region's women, albeit an important one, and a more general study of women's environmental entitlements will be useful to see if the same patterns emerge. A focus on livestock entitlements will be particularly useful for further research, as there has not been much research on livestock and women in the region, despite their importance in women's livelihoods [22] and in household resilience [49,50].

A recognition of social difference even among women in the same locality, and the importance of their own voices in articulating what environmental resources are of most value to their capabilities and wellbeing, can lead to a better understanding of what measures will be most helpful in strengthening women's (and men's) resilience and improving livelihoods at the household level. This can lead to more strategic policy making for environmental resources in the region.

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References

1. Fisher, J.A.; Patenaude, G.; Meir, P.; Nightingale, A.J.; Rounsevell, M.D.; Williams, M.; Woodhouse, I.H. Strengthening conceptual foundations: Analysing frameworks for ecosystem services and poverty alleviation research. *Glob. Environ. Chang.* **2013**, *23*, 1098–1111.
2. MacGregor, S. Gender and environment; an introduction. In *Routledge Handbook of Gender and Environment*; MacGregor, S., Ed.; Routledge: Abingdon, UK, 2017.
3. Rocheleau, D.; Thomas-Slayter, B.; Wangari, E. Gender and environment: A feminist political ecology perspective. In *Feminist Political Ecology: Global Issues and Local Experience*; Rocheleau, D., Thomas-Slayter, B., Wangari, E., Eds.; Gender Routledge: New York, NY, USA, 1996; pp. 3–23.
4. Rocheleau, D.; Edmunds, D. Women, men and trees: Gender, power and property in forest and agrarian landscapes. *World Dev.* **1997**, *25*, 1351–1371.
5. Dankelman, I.; Jansen, W. Gender, environment, and climate change: Understanding the linkages. In *Gender and Climate Change: An Introduction*; Dankelman, I., Ed.; Earthscan: London, UK, 2010; pp. 21–54.
6. Carr, E.R.; Thompson, M.C. Gender and climate change adaptation in agrarian settings: Current thinking, new directions, and research frontiers. *Geogr. Compass* **2014**, *8*, 182–197.
7. Nunan, F. *Understanding Poverty and the Environment: Analytical Frameworks and Approaches*; Routledge: Abingdon, UK; New York, NY, USA, 2015.
8. Rocheleau, D.; Gender, ecology, and the science of survival: Stories and lessons from Kenya. *Agric. Hum. Values* **1991**, *8*, 156–165, doi:10.1007/BF01579669.
9. Agarwal, B. The Gender and Environment Debate-Lessons from India. *Fem. Stud.* **1992**, *18*, 119–158.
10. Jackson, C. Gender Analysis of Land: Beyond Land Rights for Women? *J. Agrar. Chang.* **2003**, *3*, 453–480.
11. Pearson, R.; Jackson, C. Introduction: Interrogating development. Feminism, gender and policy. In *Feminist Visions of Development: Gender Analysis and Policy*; Jackson, C., Pearson, R., Eds.; Routledge: London, UK, 1998; pp. 1–16.
12. Nightingale, A. The nature of gender: Work, gender, and environment. *Environ. Plan D* **2006**, *24*, 165–185.
13. Doss, C.; Kovarik, C.; Peterman, A.; Quisumbing, A.; Mara Bold, M. Gender inequalities in ownership and control of land in Africa: Myth and reality. *Agric. Econ.* **2015**, *46*, 403–434.
14. Meinzen-Dick, R.; Nancy Johnson, N.; Quisumbing, A.; Njuki, J.; Behrman, D.; Amber Peterman, A.; Waithanji, A. The gender asset gap and its implications for agricultural and rural development. In *Gender in Agriculture*; Springer: Dordrecht, The Netherlands, 2014; pp. 91–115.
15. Jackson, C. Men's Work, Masculinities and Gender Divisions of Labour. *J. Dev. Stud.* **1999**, *36*, 89.
16. Kevane, M. Gendered production and consumption in rural Africa. *Proc. Natl. Acad. Sci. USA* **2012**, *109*, 12350–12355.
17. Leach, M. Gender and the environment: Traps and opportunities. *Dev. Pract.* **1992**, *2*, 12–22.
18. Tsikata, D. Gender, Land Tenure and Agrarian Production Systems in Sub-Saharan Africa. *Agrar. South J. Political Econ.* **2016**, *5*, 1–19.
19. Carr, E.R. Men's crops and women's crops: The importance of gender to the understanding of agricultural and development outcomes in Ghana's central region. *World Dev.* **2008**, *36*, 900–915.
20. Goldstein, M.; Udry, C. The Profits of Power: Land Rights and Agricultural Investment in Ghana. *J. Political Econ.* **2008**, *116*, 981–1022.
21. Chanamoto, N.J.; Hall, S.J. Gender equality, resilience to climate change, and the design of livestock projects for rural livelihoods. *Gen. Dev.* **2015**, *23*, 515–530.
22. Kristjanson, P.; Waters-Bayer, A.; Johnson, N.; Tipilda, A.; Baltenweck, I.; Grace, D.; MacMillan, S. Livestock and Women's Livelihoods. In *Gender in Agriculture*; Quisumbing, A., Meinzen-Dick, R., Raney, T., Croppenstedt, A., Behrman, J., Peterman, A., Eds.; Springer: Dordrecht, The Netherlands, 2014; pp. 209–233.

23. Herrero, M.; Grace, D.; Njuki, J.; Johnson, N.; Enahoro, D.; Silvestri, S.; Rufino, M.C. The roles of livestock in developing countries. *Animal* **2013**, *7*, 3–18.
24. Poole, N.; Audia, C.; Kaboret, B.; Kent, R. Tree products, food security and livelihoods: A household study of Burkina Faso. *Environ. Conserv.* **2016**, *43*, 359–367.
25. Boserup, E. *Women's Role in Economic Development*; George Allen & Unwin: London, UK, 1970.
26. Callaway, B.J. Ambiguous Consequences of the Socialisation and Seclusion of Hausa Women. *J. Mod. Afr. Stud.* **1984**, *22*, 429–450.
27. Schildkrout, E. Dependence & Autonomy: The Economic Activities of Secluded Hausa Women in Nigeria. In *Female & Male in West Africa*; Oppong, C., Ed.; George Allen & Unwin: London, UK, 1983; pp. 107–126.
28. Jackson, C. Resolving risk? Marriage and creative conjugality. *Dev. Chang.* **2007**, *38*, 107–129.
29. Hill, P. Hidden Trade in Hausaland. In *Man*; JSTOR: New York, NY, USA, 1969; pp. 392–409.
30. Mack, B. "Royal Wives in Kano". In *Hausa Women in the Twentieth Century*; Coles, C., Mack, B., Eds.; University of Wisconsin Press: Madison, WI, USA, 1991.
31. Environmental Entitlements: A Framework for Understanding the Institutional Dynamics of Environmental Change. Accessible online: http://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/3716/Leach-et-al-environment_entitlements_a_framework_for_understanding_the_institutional_dynamics_of_environmental_change.pdf?sequence=1 (accessed on 1 January 1997).
32. Sen, A. "Rights and capabilities". In *Resources, Values and Development*; Sen, A., Ed.; Basil Blackwell: Oxford, UK, 1984; pp. 307–324.
33. Leach, M.; Mearns, R.; Scoones, I. Environmental Entitlements: Dynamics and Institutions in Community-Based Natural Resource Management. *World. Dev.* **1999**, *27*, 225–247.
34. Ribot, J.C.; Peluso, N.L. A theory of access. *Rural Soc.* **2003**, *68*, 153–181.
35. Stringer, L.C. Testing the orthodoxies of land degradation policy in Swaziland. *Land Use Policy* **2009**, *26*, 157–168.
36. Baba, S.U. Mediated by Men: Environmental Change, Land Resources Management & Gender in Rural Kano, Northern Nigeria. Ph.D. Thesis, University of Birmingham, Birmingham, UK, July 2015.
37. Maconachie, R. *Urban Growth and Land Degradation in Developing Cities: Change and Challenges in Kano, Nigeria*; Aldershot: Ashgate, UK, 2007.
38. Orchard, S.E.; Stringer, L.C.; Quinn, C.H. Environmental Entitlements: Institutional influence on mangrove social-ecological systems in Northern Vietnam. *Resources* **2015**, *4*, 903–938.
39. Ntshona, Z.; Kraai, M.; Kepe, T.; Saliwa, P. From land rights to environmental entitlements: Community discontent in the 'successful' Dwesa-Cwebe land claim in South Africa. *Dev. South. Afr.* **2010**, *27*, 353–361.
40. Sikor, T.; Nguyen, T.Q. Why may forest devolution not benefit the rural poor? Forest entitlements in Vietnam's central highlands. *World. Dev.* **2007**, *35*, 2010–2025.
41. Makalle, A.M.P. Gender relations in environmental entitlements: Case of coastal natural resources in Tanzania. *Environ. Nat. Resour. Res.* **2012**, *2*, 128–142.
42. Nunan, F. Empowerment and institutions: Managing fisheries in Uganda. *World Dev.* **2006**, *34*, 1316–1332.
43. Nightingale, A. Bounding difference: Intersectionality and the material production of gender, caste, class and environment in Nepal. *Geoforum* **2011**, *42*, 153–162.
44. Elmhirst, R. Introducing new feminist political ecologies. *Geoforum* **2011**, *42*, 129–132.
45. Whitehead, A. I'm hungry mum: The politics of domestic budgeting. In *Of Marriage and the Market: Women's Subordination in International Perspective*; Young, K., Wolkowitz, C., McCullagh, R., Eds.; CSE Books: London, UK, 1981.
46. Living with Uncertainty: Gender, Livelihoods and Pro-Poor Growth in Rural Sub-Saharan Africa. Accessible online: <http://www.ids.ac.uk/publication/living-with-uncertainty-gender-livelihoods-and-pro-poor-growth-in-rural-sub-saharan-africa> (accessed on 1 January 2001).
47. Jackson, C. Introduction: Marriage, Gender Relations and Social Change. *J. Dev. Stud.* **2012**, *48*, 1–9.
48. Johnson, S. 'We don't have this is mine and this is his': Managing money and the character of conjugality in Kenya. *J. Dev. Stud.* **2017**, *53*, 755–768.
49. Mortimore, M.; Harris, F. Do small farmers' achievements contradict the nutrient depletion scenarios for Africa? *Land Use Policy* **2005**, *22*, 43–56.
50. Harris, F.M.A. Farm-level assessment of the nutrient balance in northern Nigeria. *Agric. Ecosyst. Environ.* **1998**, *71*, 201–214.

51. Cline-Cole, R. Knowledge claims and landscape: Alternative views of the fuelwood-degradation nexus in northern Nigeria. *Environ. Plan. D* **1998**, *16*, 311–346.
52. Solomon, D.; Lehmann, J.; Fraser, J.A.; Leach, M.; Amanor, K.; Frausin, V.; Kristiansen, S.M.; Millimouno, D.; Fairhead, J. Indigenous African soil enrichment as a climate-smart sustainable agriculture alternative. *Front. Ecol. Environ.* **2016**, *14*, 71–76.
53. Mortimore, M. Managing soil fertility on small family farms in African drylands. In *Biological Approaches to Sustainable Soil Systems*; Uphoff, N., Ball, A.S., Fernandes, E., Herren, H., Husson, O., Laing, M., Palm, C., Pretty, J., Sanchez, P., Sanginga, N., Eds.; CRC Press, Taylor & Francis Group: Boca Raton, FL, USA, 2006; pp. 373–390.
54. Robson, E. Wife Seclusion and the Spatial Praxis of Gender Ideology in Nigerian Hausaland. *Gend. Place Cult.* **2000**, *7*, 179–199.
55. Robson, E. The Kitchen as Women's Space in Rural Hausaland, Northern Nigeria. *Gend. Place Cult.* **2006**, *13*, 669–676.
56. Essiet, E.U. Agricultural sustainability under small-holder farming in Kano, northern Nigeria. *J. Arid Environ.* **2001**, *48*, 1–7.
57. Mortimore, M. Overcoming Variability and Productivity Constraints in Sahelian Agriculture. In *Politics, Property and Production in the West African Sahel: Understanding Natural Resources Management*; Benjaminsen, T.A., Lund, C., Eds.; Nordic African Institute: Uppsala, Norway, 2001; pp. 233–254.
58. Mortimore, M.J.; Adams, W.M. Farmer adaptation, change and 'crisis' in the Sahel. *Glob. Environ. Chang.* **2001**, *11*, 49–57.
59. Pierce, S. Farmers and "Prostitutes": Twentieth-Century Problems of Female Inheritance in Kano Emirate, Nigeria. *J. Afr. Hist.* **2003**, *44*, 463–486.
60. Davies, G.; Dwyer, C. Qualitative Methods: Are You Enchanted or Are You Alienated? *Prog. Hum. Geogr.* **2007**, *31*, 257–266.
61. Buscatto, M. Using ethnography to study gender. In *Qualitative Research*; Silverman, D., Ed.; SAGE Publications Ltd.: London, UK, 2011; pp. 35–51.
62. Ross, P.J. Land as a right to membership: Land tenure dynamics in a peripheral area of the Kano close-settled zone. In *State, Oil, and Agriculture in Nigeria*; Watts, M., Ed.; Institute of International Studies, University of California: Berkeley, CA, USA, 1987.
63. Maconachie, R. Reconciling the mismatch: Evaluating competing knowledge claims over soil fertility in Kano, Nigeria. *J. Clean. Prod.* **2012**, *31*, 62–72.
64. Maconachie, R.; Tanko, A.; Zakariya, M. Descending the energy ladder? Oil price shocks and domestic fuel choices in Kano, Nigeria. *Land Use Policy* **2009**, *26*, 1090–1099.
65. Adamu, F.L. My wife's tongue delivers more punishing blows than Muhammed Ali's fists. Bargaining power in Nigerian Hausa Society. In *Gender in Flux*; Murphy, B., Ed.; Boran: Chester, UK, 2004.
66. Solivetti, L.M. Family, Marriage and Divorce in a Hausa Community: A Sociological Model. *Afr. J. Int. Afr. Inst.* **1994**, *64*, 252–271.
67. Imam, A. If You Won't Do These Things for Me, I Won't Do Seclusion for You': Local and Regional Constructions of Seclusion Ideologies and Practices in Kano, Northern Nigeria. Ph.D. Thesis, University of Sussex, Brighton, UK, 1993.
68. Meagher, K. Veiled conflicts: Peasant differentiation, gender and structural adjustment in Nigerian Hausaland. In *Disappearing Peasantries? Rural Labor in Africa, Asia and Latin America*; Bryceson, D.F., Kay, C., Mooij, J., Eds.; IT Publications: London, UK, 2000; pp. 81–89.
69. Kabeer, N. Resources, agency, achievements: Reflections on the measurement of women's empowerment. *Dev. Chang.* **1999**, *30*, 435–464.
70. O'Laughlin, B. A Bigger Piece of a Very Small Pie: Intrahousehold Resource Allocation and Poverty Reduction in Africa. *Dev. Chang.* **2007**, *38*, 21–44.
71. Agarwal, B. Conceptualising environmental collective action: Why gender matters. *Camb. J. Econ.* **2000**, *24*, 283–310.
72. Doss, C. Intrahousehold bargaining and resource allocation in developing countries. *World Bank Res. Obs.* **2013**, *28*, 52–78.
73. Haddad, L.; Hoddinott, J.; Alderman, H. *Intrahousehold Resource Allocation in Developing Countries*; Johns Hopkins University Press: Baltimore, MD, USA, 1997.

74. Kevane, M.; Gray, L.C. A Woman's Field Is Made at Night: Gendered Land Rights and Norms in Burkina Faso. *Fem. Econ.* **1999**, *5*, 1–26.
75. Akresh, R.; Chen, K.; Moore, C. Productive efficiency and the scope for cooperation in polygynous households. *Am. J. Agric. Econ.* **2012**, *94*, 395–401.
76. Quisumbing, A.R.; Rubin, D.; Manfre, C.; Waithanji, E.; van den Bold, M.; Olney, D.; Meinzen-Dick, R. Gender, assets, and market-oriented agriculture: Learning from high-value crop and livestock projects in Africa and Asia. *Agric. Hum. Values* **2015**, *32*, 705–725.
77. Jackson, C. Conjugalities as Social Change: A Zimbabwean Case. *J. Dev. Stud.* **2012**, *48*, 41–54.
78. Sen, A. Gender and Cooperative Conflicts. In *Persistent Inequalities: Women and World Development*; Tinker, I., Ed.; Oxford University Press: Oxford, UK, 1990.
79. Quisumbing, A.; Maluccio, J. Resources at marriage and intrahousehold allocation: Evidence from Bangladesh, Ethiopia, Indonesia, and South Africa. *Oxf. Bull. Econ. Stat.* **2003**, *65*, 283–327.
80. Njuki, J.; Kaaria, S.; Chamunorwa, A.; Chiuri, A. Linking smallholder farmers to markets, gender and intra-household dynamics: Does the choice of commodity matter? *Eur. J. Dev. Res.* **2011**, *23*, 426–443.



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