INVESTIGATING THE FEASIBILITY OF LAND CONSOLIDATION IN THE CUSTOMARY AREAS OF NORTHERN AND UPPER WEST REGIONS of GHANA

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February, 2015

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ABSTRACT

Food security is an issue of global concern. The related issues of climate change creates more urgency especially in developing economies where crop production is largely rain fed and reliant on limited technology input. More fundamentally, land tenure and land use patterns greatly affect crop production. Specifically, land fragmentation is shown to undermine productivity in many countries. In the case of Ghana's customary lands, farmland sizes are relatively small. Additionally, household farmlands are highly fragmented. Current agricultural interventions, however, focus on input subsidisation that are ad hoc and the benefits of which are short lived. An alternative approach is considered to be the innovative and sustainable application of long term strategies such as land consolidation with which fragmented farmlands could be reorganised in order to improve yields, reduce the cost of production and improve the incomes of farmers. However, the successful implementation of land consolidation depends greatly on the suitability of local conditions with respect to land tenure and land use. In Ghana's customary lands, the alignment between the requirements for land consolidation and existing conditions remain unexplored. In response, this study investigated the feasibility of land consolidation within the customary tenure environment by juxtaposing the local conditions of the study areas hand in hand with the baseline conditions for land consolidation outlined in literature. Being exploratory in nature, the study relied on interviews and focus group discussions for primary data. Qualitative and categorical data collected from the field were processed using descriptive techniques and the Statistical Package for the Social Sciences (SPSS) respectively and spatial data was processed using ArcMap.

The results revealed certain traits of convergence and divergence with respect to the baseline conditions in the study areas. Conditions comprising the *existence of land fragmentation, suitable topography and soil distribution* were met. Three other conditions were partially met; there was evidence of the *existence of a land bank, technical expertise and infrastructure* and supportive *legal framework*. Other conditions were not fulfilled. The circumstances surrounding them are deeply rooted in local customs and traditions that change slowly over long periods of time. These include the *willingness to participate, available land information system* and *favourable land ownership structure*. It turns out that these conditions are fundamental for land consolidation and their absence negates its possibility. This leads to the conclusion that land consolidation under the current situation of the study areas, is not feasible.

Key words: Land consolidation, Tendanas, Chief, customary tenure, land fragmentation

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

FAO	Food and Agricultural Organisation
FASDEP	Food and Agriculture Sector Development Policy
GDP	Gross Domestic Product
GIS	Geographic Information System
GPRS	Growth and Poverty reduction strategy
GSS	Ghana Statistical Service
IFAD	International Fund for Agricultural development
IFPRI	International Food Policy Research Institute
MoFA	Ministry of Food and Agriculture
SRID	Statistics, Research and Information Directorate
USAID	United State Agency for International Development
WFP	World Food Programme

1 INTRODUCTION

1.1 Background

Agriculture is the main-stay of many developing economies (Gollin & Rogerson, 2014). It is the largest employer and contributor to gross domestic product (GDP). More particularly in Africa, bout 65% of the populace relies on agriculture as the main source of livelihood. Agriculture also contributes about 30-40% of Africa's total gross domestic product and about 60% of Africa's total export (IFPRI, 2009). Among the sectors of agriculture, crop production is widespread [about 95.1% of farmers in Ghana (GSS, 2010)] but has become more urgent in recent times following the shortage of food in many parts of the globe. Therefore to improve crop production, there is the need for cost efficiency and sustainable intensification so as to achieve food security whilst still conserving biodiversity and natural ecological systems (Verburg et al, 2013).

There are a number of factors that affect the level of output of crop production. These factors are general but may vary in extent based on climatic conditions, level of technological advancement, farming practices and government policy. These mostly include input materials, machinery, labour, soil fertility, fragmentation of farmlands and technical know-how. Focusing on fragmentation as one of major factors (Manjunatha et al, 2013), it generally creates disjointed and small farmlands. This increases travel time and operational costs thereby acting as a disincentive and a hindrance to the development of agriculture; the backbone of many developing economies. Contrary to this view, (Blarel et al., 1992) argued in favour of land fragmentation describing it as a way of reducing risk and easing seasonal bottlenecks. In Ghana, it is estimated that about 90% of farming households operate on less than 2 hectares (MoFA-SRID, 2011).

The problem of fragmentation is closely linked to tenure (Demetriou, Stillwell, & See, 2013) and cyclically evolves over time. In the case of Ghana, land is predominantly owned by customary institutions including Chiefdoms, Families and *Tendanas*. Chiefs, *Tendanas* and family heads manage customary lands on behalf of the larger group (Arko-adjei, 2011). The collective ownership of land gives every member the right to use a portion of the communal land. It is generally believed that an increase the number of owners creates land fragmentation (Farley et al., 2012). Asiama (2002) is of the view that customary tenure arrangements provide members with equal interests in land and this leads to fragmentation of farmlands as families try to allocate land for the use of every member. Fragmentation is also linked to inheritance (Demetriou, Stillwell, and See, 2013; Niroula and Thapa, 2005). As farmlands are transferred from parents to children they become common property and risk the tendency of fragmentation.

Specifically in the Upper West Region of Ghana, the customary institution was originally built around the Earth Priests (*Tendanas*) who were literally the owners of the land. They acted as custodians of the land and thus controlled the allocation and use of land until the colonial government introduced chieftaincy. Despite this institutional alteration, the two entities had distinct functions. The former had traditional rights over land matters and the latter, a spokesperson of the people to the government (Arko-Adjei, 2011). As the *Tendanas* delineate land to settler groups and families, the land eventually devolved along the lines of families, thus, reducing the *Tendanas* to one of the many owners of land and their control of land also reduced considerably. Consequently this reduced the broadness of the communal ownership to smaller ownership groups (families) whose members have the right to use their land to the exclusion of all strangers (non-

members). With increasing population, the size of families became bigger and the amount of land opened to the use of members also reduced accordingly. There however exist peculiarities with respect to different families and localities.

In the case of the Northern region, the customary institution is organised in chiefdoms headed by kings who manage the land on behalf of the people. Broadly, the region is divided into three main chiefdoms namely Dagbon headed by the Yaa Na, Gonja headed the Yagbon-Wura and Mamprusi headed by the Na Yiri. Authority over land devolves from the king through paramount chiefs to divisional chiefs and caretaker chiefs. Chiefs have the highest control over land and the level of control exercisable depends on a chief's position along the hierarchy.

Solving the problem of farmland fragmentation requires innovative approaches such as land consolidation (Thapa & Niroula, 2008). land consolidation is a re-allocation process of a rural area comprising fragmented land holdings (Vitikainen, 2004). It is also seen as a tool for enhancing agriculture and assisting rural development (Sklenicka, 2006). The concept of land consolidation has a history dating back to the middle ages in Europe. The current form of land consolidation practices has evolved in Europe towards the end of the 19th century to the beginning of the 20th century (Vitikainen, 2004). The concept developed with time and became multidimensional incorporating emerging issues like environmental management, development of rural areas (Zhang, Zhao, and Gu, 2014) and improvement of appropriate infrastructure (Vitikainen, 2004).

Lemmen et al. (2012) indicated that, the initial mono-functionality of land consolidation was to increase agricultural production through parcel enhancement, reduction of production cost and increase farm efficiency. Thus the consolidation of farm lands enhances the allocation and interactions between land and the other factors of production, namely labour and capital. Having farmlands together provides farmers the opportunity of reducing travel time, operational costs and also optimise the movement of machinery and labour.

Literature indicates that the concept of land consolidation has been widely implemented in many countries in Europe, America and some countries in Asia. Countries like the Netherlands, Germany, Finland, Sweden and Belgium have had success in the implementation of land consolidation in various aspects including; the improvement of agriculture, rural and country-side development, environmental management and improvement of infrastructure (Lier, 2000; Van Dijk, 2007). Niroula & Thapa (2005) found that the experience of land consolidation in East Asian countries like Japan and Korea has been successful because of the systematic increase in farm sizes due to reduction in the number of operational holdings from 4.66 to 3.45 and 2.16 to 1.77 million respectively between 1980 and 1990. They also attributed this success to the very low rate of population growth in these countries. In South Asia, countries have made policies and legislations to facilitate land consolidation; however, desirable results were yet to be achieved. This has been attributed to the fact that majority of the people are engaged in agriculture coupled with the increasing population growth rate which is about 2.4% regionally (Niroula & Thapa, 2005). In Africa, land consolidation has not received much attention; and Ghana in particular neither has it in policy nor implementation. Earlier research works dealt with the application of the concept in countries where private property rights and state ownership are dominant, nevertheless, the application of the concept in respect of communal/customary ownership is yet to be explored and this remains a gap a literature.

1.2 Justification

Current interventions in the Ghana agricultural sector including the FASDEP I & II (Food and Agriculture Sector Development Policy) and strategies like the GPRS I&II (Growth and Poverty reduction strategy) provide good objectives including the improvement of food security, enhancing farmers' income, application of science and technology, sustainable management of land and improvement of institutional coordination (MoFA-SRID, 2011). However, the implementation of these objectives focus on subsidies and credit access programmes which are mostly supported by international donor agencies and they subsist as long there is continues support; once the support ends the programmes come to a halt. Thus, they are ad hoc and the benefits of which are short lived. There is little or no attention on the sustainable application of long term strategies such as land consolidation. This approach is self-supporting and appears more sustainable because it takes place once for a given set of farmlands and does not require continues support from either government or donor agencies

Prominent among the beneficiaries of this research are the local farmers who are at the direct interface of the research and the Ministry of Food and Agriculture (MoFA) which can use the outcome of this study as input for policy decision making at the national level.

1.3 Problem Statement

Literature indicates that fragmentation of farmlands reduces crop production thereby inhibiting agriculture. In this study, land consolidation is proposed as a potential approach to addresses this problem. Experiences with land consolidation in European countries like the Netherlands, Germany and Denmark has demonstrated good results especially in the field of agriculture. In these countries private property rights and state ownership are dominant, however, till now; scientific research is lacking on the use of land consolidation within the customary tenure environment where there is communal ownership of land. Ghana as a country dominated by customary tenure has not tested land consolidation as an option for enhancing agricultural development. Therefore, having regard to the complexities of customary tenure such as oral allocation, indeterminate boundaries and emotional attachment to land, it is unclear if land consolidation will be feasible and that is what this study seeks to investigate.

1.4 Research Objective

Based on the problem description, the main objective of this study is to investigate the feasibility of land consolidation in the customary areas of Northern and Upper West regions of Ghana.

1.4.1 Sub objectives

1. To find out the baseline conditions required for land consolidation
2. To find out the existing tenure and land use situation in the case study areas
3. To analyse the baseline conditions in the context of the study areas

1.4.2 Research Questions

Sub objective 1: To find out the baseline conditions required for land consolidation

1.1. What are the main types of land consolidation

1.2. What are the necessary requirements needed for the use of each of them

Sub objective 2: To find out the existing tenure and land use situation in the case study areas

2.1 What are the categories of land ownership

2.2 How is land allocation done

2.3 How willing are farmers to exchange farmlands

2.4 What environmental[1] factors affect the choice of farmland
2.5 What are the causes of farmland fragmentation

Sub objective 3: To analyse the baseline conditions in the context of the study areas
3.1 How does the local situation meet these conditions
3.2 In what ways are these conditions not met

1.5 Conceptual Framework

This provides an insight of the fundamental concepts of this study and their interrelationships. Within the framework, there are four main concepts namely; customary tenure environment, land fragmentation, crop production and land consolidation associated with a number of relationships, some of which have been established in literature but there still exist an unknown relationship between the customary tenure environment and land consolidation. This is the link that this study seeks to uncover to ascertain the complementarity or otherwise of the two concepts. This is shown in Figure 1 below.

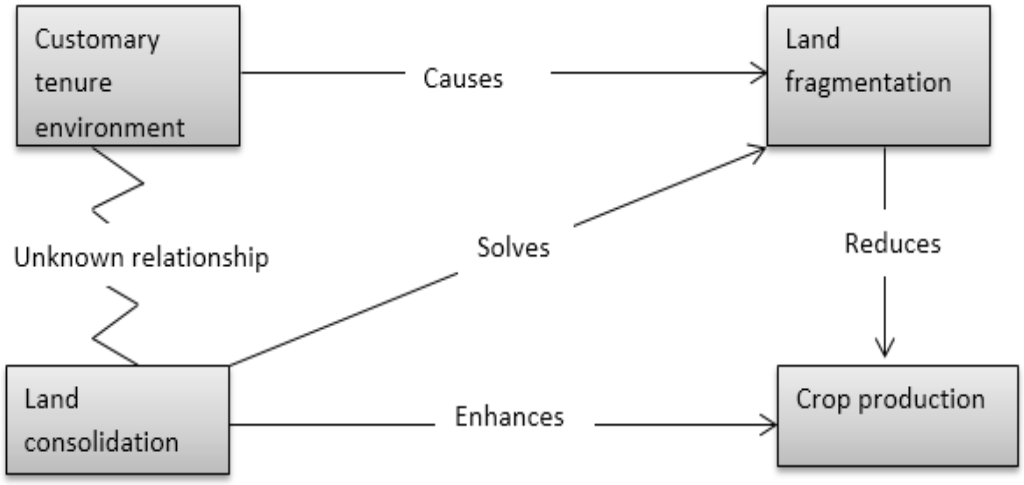

Figure 1.Conceptual framework

[1] *Environmental* - includes access to water, soil quality and relief

1.6 Thesis structure

This thesis comprises six chapters which are described as follows:

Chapter 1: *Introduction*

This chapter introduces the study and comprises the background of study, justification, statement of problem, conceptual framework, objectives and research questions of the research.

Chapter 2: *Literature Review*

This deals with the review of existing literature on the main concepts that underpin the study, namely; land consolidation, land fragmentation, customary tenure and food security.

Chapter 3: *Research Methodology*

This chapter contains the research design, thus, methodologies adopted for the research, sampling techniques, sources of data and techniques for data collection and analysis.

Chapter 4: *Results and Findings*

This presents the results and findings of the data collected from the field concerning the land tenure and land use situation of the study areas.

Chapter 5: *Discussion*

This chapter provides a synthesis of the findings hand in hand with literature with the aim of identifying elements of convergence and divergence between them in order to determine the level of suitability of the conditions for land consolidation within the local setting of the study areas.

Chapter 6: *Conclusion*

This chapter provides summary answers to the research questions and the overall objective as well.

2 LITERATURE REVIEW

2.1 Introduction

This chapter reviews existing literature on the key concepts which are covered in this study. Essentially this chapter addresses the issues of food security, customary tenure and its dynamics, land consolidation, types of land consolidation, required conditions for land consolidation, and land fragmentation. The chapter thus contains the views of researchers on the concepts covered in this study.

2.2 Food security in northern Ghana

According to the (FAO, 1996), food security exists when everyone has the ability to physically and economically access adequate, safe and healthy food that meets their dietary requirements and preferences for a healthy and active life. Food security is a global concern and has become very crucial bearing on the substantial change in climatic conditions as against the enormous increase in population especially in developing economies (Misra, 2014). There has been a global call for ensuring food security engendered by several international advocates including the Food and Agricultural organisation (FAO), the World Bank and International Fund for Agricultural development (IFAD).

At a national level, food security is an issue that draws considerable attention. As of 2009, about 1.2 million people representing 5% of Ghanaians were said to be food insecure. Thirty-four percent (34%) of these people are in the Upper West region and ten percent (10%) of them are in the Northern region. In addition, two (2) million people in the country are said to be vulnerable to food insecurity. It is therefore estimated that about 3.2 million people in total are unable to have access to adequate and affordable food (MoFA, 2009). At a household level, about 16% of households in the Upper West region and 10% of the households in the Northern region are food insecure (WFP, 2012).

Being a country that depends largely on agriculture the issue of food security becomes more sensitive. Ghana's agricultural sector plays a major role in the economy employing about 55% of the workforce and contributing about 25% of the Gross Domestic Product (GDP). Despite the high dependency, about 90% of farmers operate on small-scale and are less than 2.0 hectors in size (MoFA-SRID, 2011). This has reduced cop production exposing people to insecurity.

2.3 The concept of customary land tenure and administration

Land tenure is defined by (FAO, 2002) as a relationship which exists either legally or customarily among people, in groups or individuals with respect to land. Land administration is also defined as the way of applying and making the rules of tenure operational (FAO, 2002). The concept of customary tenure is multi-dimensional and has been used in different contexts by various researchers; thus in some contexts, it is described with the terms, *'indigenous tenure', 'traditional tenure'* and *'communal tenure'* (Arko-adjei, 2011). USAID (2012) describes customary tenure as the embodiment of rules that govern the access, use and disposition of land and its resources within a community. Customary tenure reflects existing social conditions and is administered according to the customs of each community; unlike statutory tenure which is introduced and crafted by law. Ownership and use of customary land is on communal basis; comprising primary and secondary rights which subsist concurrently and exercised by different members of the community. Thus individual members have the right to use portions of the communal land into perpetuity but do not have the right to dispose of it (Nkambwe & Totolo, 2005). Under customary tenure, land is sometimes seen as a spiritual entity recognised as a divine heritage in which the spirits of the ancestors are

preserved (Asiama, 2002). Elias (1956) viewed land in the customary parlance as an age-long entity that connects the past, present and future members of a community. He thus observed that land belongs to a huge family with which many have died, a few alive and an incalculable multitude yet to be born. Therefore rights over land are supposed to be exercised in such a manner as to preserve the land for the living and the unborn.

Customary tenure is characterised by peculiarities that are community based and custom oriented. These characteristics according to (USAID, 2012) include;

- There is a differentiation between community members and strangers (non-members) in terms of ownership and use rights
- There is collective use of land and land resources at various degrees by different members
- With time, there is an evolution in response to institutional changes
- They mirror social norms and values of specific communities where they are practice
- Legitimacy is derived from the trust that a community puts in the institutions which govern them
- Right of occupation and use of land favours the first person who clears and occupies a virgin land

In the Ghanaian setting, customary ownership of land covers about 80% of the total land (Kasanga & Kotey, 2001). These lands are owned by families and communities in the form of stools and skins (headed by chiefs, family heads and *Tendanas*). Although there exist differences amongst various ethnicities, there is enough commonality to enable a categorisation of the Ghanaian customary tenure systems into two broad groups. The first category is land owned by communities that exist as chiefdoms. In this category there is a centralised political structure composed of a hierarchy of chiefs headed by a king. The hierarchy devolves from the king to paramount chiefs, divisional chiefs and caretaker chiefs (Arko-adjei, 2011). Under chiefdoms, each hierarchy of authority has an overriding power over all the smaller chiefs below it. As indicated in the hierarchy, the chiefdom is divided into paramount areas and each paramount area has divisional areas which consist of local communities. The second category is land owned by families where the *Tendanas* play an eminent role in the ownership of land and disposition. Family lands are controlled by family heads, usually the father in a nuclear family and the oldest elder in an extended family (Godwin & Kyeretwie, 2010). Customary tenure systems in Ghana vary among ethnic groups. According to (Mends, 2006), there exist many variations within the customary tenure and there exist as many variations as different ethnic groups within the same country, each group with its unique set of cultural practices and social norms.

Customary land ownership has a hierarchy, the highest of which is the *'allodial'* interests from which all other lesser interests are derived (Blocher, 2006). Article 19(1) of the Land Title Registration Law of Ghana (1986) categorised customary land ownership as follows;

- ***The Allodial interest***
  This is a permanent title to land which is held by a community as a whole. It is usually vested in a chief or family head who holds it on behalf of the community/family. Decisions regarding the use of land and land resources and alienation are taken by chiefs in consultation with the council of elders or the family head together with the principal family members, thus there is no unilateral disposition of land (Blocher, 2006).

- ***The usufructuary Interest or Customary freehold***
  Following the allodial interest is the usufructuary interest commonly called the customary freehold which is a right of ownership enjoyed by members of a chiefdom or family (Bullard, 2007). This kind of ownership is potentially perpetual and may subsist as a long as the occupant is a member. Hitherto the scarcity of land, members could farm on any portion of the communal land once they

are the first to occupy the land and known to other members. However, due to increasing scarcity and expansion of membership, land allocation is strictly done the chief/family head. Asiama (2002) in his work stated that communal ownership and use of land has almost become notional. He further stated that within the family ownership, claims of equal shares of lands may not truly exist as land is already appropriated among some members.

- ***Customary Tenancies***
  Tenancies are use rights that are given to strangers. Kasanga & Kotey (2001) describe a stranger as a non-subject in the case of stool/skin land and a non-member in the case of a family. Tenancies are acquired for specific uses over a given period of time. Tenants who are usually migrant/settler farmers pay rent for the use of the land in a manner agreed between them and their landlords. The sharecropping system practiced in the southern part of Ghana is an example of customary tenancies. Under this system the stranger (settler farmer) may contributes to the cost of farm input and do all the farm activities until the crops are ready for harvest in return for half of the produce or the proceeds. This is called *'abunu'* which literally means 'break in two'. Also, the tenant may do only the farm activities until harvest in which case he gets only a third of the produce or the proceeds. This is known as '*abusa'* meaning 'break into three'. Under this system the rent is the contribution made by the stranger (Blocher, 2006).

2.3.1 Evolution in customary tenure

Land in the customary parlance is held in common and is subject to the use of members as a natural right. There are historical developments that have influenced the transformation of customary tenure system. The effects of colonialism, economic development and population growth according to (Mends, 2006) have gradually transformed the rights that are associated with customary land. In addition, the development of land policies and land tenure formalisation by the state in view of modern land governance has enormously affected the very nature of customary tenure. The introduction of leasehold interests has taken away the right of free access and perpetual use of land through the use of legislations which restrict the length of leases to certain spans. Also, the disparity between the land rights under formal land administration and customary land administration has virtually changed the customary rights of free and perpetual use as allodial titleholders tend to give leases to both members and non-members alike depriving members of their natural rights (Yaro, 2012).

Customary lands have virtually become the property of royal families and right of usage have changed dramatically eliminating free access which hitherto was opened to members. Consequently land has become a scarce resource that is sold to both strangers and members alike (Asiama, 2002). Considerations for land which were symbolic have developed into monetary forms whereby chiefs and land owners no longer take cola nuts or drinks as token for land, instead, they demand for exorbitant sums of money akin to market values of land (Kasanga & Kotey, 2001). Transfer of customary lands in urban areas is mostly based on outright purchases and leases while the rural areas still have their customary characteristics. There is therefore an increasing transformational change with customary land ownership and disposition as one moves from rural areas through peri-urban areas to urban areas.

2.4 Land fragmentation, is it always negative?

In literature, land fragmentation is defined as the division of a single farmland into spatially distinct units (Binns, 1950; King & Burton, 1982; McPherson, 1982). King & Burten (1982) further described the manifestation of land fragmentation in two forms. First, the division of farmlands into units too small for profitable exploitation and secondly, the spatial separation of farmlands belonging to a single farmer/household. This is the definition that is used for the purpose of this study. Demetriou (2014)

describes land fragmentation as an essential spatial problem concerned with farmlands which are organised poorly in space with reference to their shape, size and distribution. Van Dijk (2004) categorised land fragmentation in terms of land ownership (where there exist multiple owners to a single parcel of land) and land use (where there exist spatially distinct units of a farm).

Land fragmentation may be caused by a number of factors which differ from place to place. These factors generally include inheritance, population increase, socio-cultural norms and land market (Binns, 1950; McPherson, 1982; Niroula & Thapa, 2005). These causative factors are dynamic and cyclically progressive. When heirs inherit land, they distribute it among themselves reducing it into smaller units. If this continue for successive generations, then the level of fragmentation becomes higher and land sizes become very small. Also, the growth of population inherently necessitate the need for land in spite the fact that land is fixed in supply with no population driven elasticity. Thus, the more the population, the lesser the size of land per head (King & Burten, 1982). The activities of the land market makes it even more significant as players of the land market transact base on the principle of value for money and this increases the mobility of land which breeds fragmentation. These factors do not play in isolation but are interrelated.

Researchers have differed in opinion as to whether land fragmentation is a problem or not and this has stirred a multi-disciplinary debate. Some researchers (Blarel et al., 1992) argued in their study in Ghana and Rwanda that fragmentation of farmland is not as inefficient as generally perceived. They supported this view by arguing in favour of fragmentation as a tool for the management of risk, seasonal bottlenecks and food insecurity. This argument is founded on the premise that farmers in most developing countries depend on rainfall and natural soil selection and are therefore greatly affected by seasonal climatic changes. Against this background they mostly distribute their crops on different lands with the aim of preventing total loss in case of any happening. They concluded their argument by describing farmland fragmentation as a means of matching food crops with appropriate soil types. This view is also shared by FAO (2012) in the voluntary guidelines for land consolidation where it is stated that fragmented farmlands should be maintained when they result in productive benefits such as reducing seasonal bottlenecks, diversification of crops and reduction of risk. Monchuk et al., (2010) in a study in India on whether land fragmentation reduces farm efficiency concluded that the adverse economic impacts of land fragmentation are somewhat small but provide room for adaptation for a variety of circumstances.

Other researchers (Niroula & Thapa, 2005) viewed land fragmentation as a mark of farm inefficiency which has ripple effects in the distance between individual farmlands and farmhouses, the size and shape of farmlands and access. Manjunatha et al. (2013) explains that land fragmentation deprives farmers of the benefits of economies of scale. In their view these problems result in increased travel time and cost of movement of both labour and machines thereby reducing productivity and profits of farmers. Demetriou et al., (2013) also argued that farmland fragmentation hinders agricultural development as it acts as a disincentive to mechanised large scale agriculture.

Land fragmentation therefore does not always denote generic inefficiency but depends more on the context and situation within which one sees it.

2.5 Land Consolidation

Land consolidation is a re-allocation procedure of a rural area consisting of fragmented agricultural or forest holdings or their parts (Vitikainen, 2004). It is a tool for improving land cultivation and assisting rural development (Sklenicka, 2006). The concept of land consolidation has a history dating back to the middle ages in Europe. According to FAO (2003), the first initiative of land consolidation in the 1750's in Denmark were part of social reforms meant to free people from the obligations of noble landlords through the creation of privately owned family farmlands. The current form of land consolidation practices has evolved in Europe towards the end of the 19th century to the beginning of the 20th century (Vitikainen, 2004). The concept developed with time and became multidimensional incorporating emerging issues like environmental management, development of rural areas (Zhang, Zhao, and Gu, 2014) and improvement of appropriate infrastructure (Vitikainen, 2004). For instance in Germany, the focus of land consolidation evolved from food security (in the 1950's), infrastructural development (between 1960's to 1970's), village renewal (in the 1980's) and environmental management (in the 1990's) (FAO, 2003).

The objectives for land consolidation differ from country to country. They include the promotion of efficient use of real property (Vitikainen, 2004), improvement of land cultivation and reduction of agricultural production cost (Sklenicka, 2006; Zhang et al., 2014) and environmental management (FAO, 2003). The common principle that underlie these objectives is usually the reconstruction of fragmented and disorganised landholdings (Thapa and Niroula, 2008). It is noted that consolidated landholdings improve the incentive for large scale investment which often promotes the development of agriculture.

The impact of land consolidation on rural development is at different levels. FAO (2008) categorised these levels into three; namely, the *micro-level*, *meso-level and macro-level*. *Micro-level* impacts deal with making changes to farmlands in terms of size, shape and also correcting inaccuracies that relate to documentation within the cadastral system. This enables farmers to get better incomes and also make them more competitive. Fragmentation of farmlands is tackled at this stage thereby reducing the number of farmlands into fewer larger ones for efficiency of production. At the *meso-level,* the aim of land consolidation is broader, thus, covering rural and community development through the provision of infrastructure (roads, drainage systems, flood management systems and irrigation systems). These rural renewal programmes include; managing of natural resources, environment and recreational facilities. *Meso-level* impact enables a fair distribution of activities for economic development. Finally, at the *macro-level*, land consolidation aims at bringing positives changes to a country by improving the sectors of economic power including the agricultural and environmental sectors and to facilitate the relationship between all stakeholders for an effective land market.

2.5.1 Types of land consolidation

There exists different types of land consolidation and according to FAO (2003), these include, comprehensive, simplified, voluntary and individual land consolidation;

- ***Comprehensive land consolidation***

  Generally, farmers have to deal with internal and external factors of production. Internal factors are those that can be controlled by the farmer. The external factors however fall outside the control of the farmer and these include; access routes, water channels and land size. These external factors therefore necessitate state intervention in the form of comprehensive land consolidation in order to enhance agricultural development (Herweijer, 1958). Basically it includes the reallocation of lands with adjoining activities like the construction of road network, irrigation and drainage systems and erosion control measures (Vitikainen, 2004). Comprehensive land consolidation require the services of several stakeholders and legislations that indicate the allocation of responsibilities. By

virtue of the extensive infrastructure, comprehensive land consolidation often require the backing of the central government as well as the services of several agencies, thus, cadastral agencies, planning departments, agricultural agencies and rural development authorities. It also involves farmer groups and civil society as to enhance good governance and transparency (FAO, 2003).

- ***Simplified land consolidation***
  This aims at optimising the conditions of the agricultural sector by reallocating or exchanging farmlands. It includes the provision of additional land from the land bank to increase the sizes of farmlands. It also includes provision of minor infrastructure unlike comprehensive land consolidation that includes extensive public works. Most often simplified land consolidation provides the foundation for comprehensive land consolidation (Demetriou, Stillwell, & See, 2012).

- ***Voluntary group land consolidation***
  This type of land consolidation has no element of coercion, instead mutual agreement is upheld throughout the entire consolidation process. Thus participants accept and join the project on their own volition. Based on this principle all participants have to fully agree to a project before it can be implemented (Sonnenberg, 2002). The use of voluntary land consolidation implies flexibility in the decision making process, thus it requires the engagement of participants in an interactive way that sustain stakeholders interest (Lemmen et al., 2012). Success rate for voluntary land consolidation reduces as the project grow bigger. It is therefore suitable for small projects with fewer participants of less than 10 (Sonnenberg, 2002). Its implementation failed in India and necessitated the introduction of compulsive elements in the Indian Land Consolidation Act of 1980 (Niroula & Thapa, 2005). Despite these challenges most land consolidation projects in Denmark are on voluntary basis (Hartvigsen, 2014). FAO (2012), observed that where land consolidation is meant to improve farm structures, it should be voluntary in countries where the people have little trust in the government.

- ***Individual land consolidation***
  This involves the implementation of land consolidation on sporadic and informal basis usually between fewer individuals who agree to exchange their lands. Participants and scope of this type of land consolidation is very small. It does not require direct state involvement, however, the state plays a regulatory role so as to encourage agricultural development(FAO, 2003). According to (Lerman & Cimpoieş, 2006), this type of land consolidation is market –driven and takes the forms of leasing, buying and selling for individual economic considerations.

2.5.2 Baseline conditions required for land consolidation

Before land consolidation can be implemented, certain conditions are required to be in place. Different researchers have dealt with the subject in different ways. There exist variations as to what these conditions are and their difference depend on the particular type of land consolidation, the objective of implementation and the geographical context within which it is implemented (Vitikainen, 2004). Conditional requirements that underpin land consolidation are generally similar but may be fine-tuned to enable tailor-made packages that meet the needs of society (Van Dijk, 2007). Contrary to earlier research works (Bullard, 2007; Vitikainen, 2004) which focused on only formal legal framework, (Lisec et al., 2014) argued that the conditions for the implementation of land consolidation should be reflective of both the formal institutional framework such as legislation and informal institutional framework such as tradition, cultural habits and emotional bonds to land.

For there to be land consolidation, land fragmentation of some sort should have been established within the geographic area in question (FAO, 2012). Land consolidation as a form of mini land reform does not exist in isolation but it is used as a remedy to curtail the negative consequences of land fragmentation in a bid to improve agricultural development, better the income of farmers and protect the environment. Several researchers including (Bullard, 2007; Demetriou, 2014; Long, 2014; Van Dijk, 2007) have pointed to land fragmentation in a number of ways as a base factor that calls for land consolidation.

In the design of land consolidation for central and eastern European countries FAO, (2003) enumerated some of the conditions for land consolidation to include; enabling legislation, land information system, land bank, willingness of participants to consolidate and technical know-how. These conditions are however, influenced by land tenure and land use as well as market conditions and this affect the behaviour of stakeholders when it comes to the exchange of land and ownership rights (Bullard, 2007). Other researchers (Jansen, et al., 2010) categorised the requirements for land consolidation into two broad categories namely; legal and institutional requirement which includes the pieces of legislations that provide regulations and empowerment to state institutions for the implementation of land consolidation on the one hand and baseline data requirement on the other hand which includes the collection and use of data that pertains to ownership rights, land use inventory, cadastral maps, boundary information and land values.

Land consolidation in many countries is regulated by legislation(s)(Vitikainen, 2004). The need for the development of land consolidation regulations was occasioned in the past when it became apparent that fragmented lands could not be consolidation based on the operations of the free land market (Van der Molen & Lemmen, 2004). Legislations are not only meant to address land fragmentation but also to prevent the reoccurrence of fragmentation in the future (Bullard, 2007). Without preventive mechanisms land fragmentation becomes cyclical; hence, there is the need to regulate the laws on property inheritance, minimum lands size and taxation on fragmented lands (Thapa & Niroula, 2008). Most importantly, the interference into private property rights during land consolidation by state requires a legitimate legal backing so as to protect the rights of landowners and land users in a transparent manner. In view of this, land consolidation legislation amongst other things defines the limit and manner to which private property rights may be interfered, the category of right holders that are recognised and can participate in land consolidation (Jansen et al., 2010). Land consolidation legislation therefore acts as a reference along which projects are executed detailing out the responsibilities of stakeholders, the roles of collaborating agencies, general guidelines for implementation, thresholds for parcel size and redress in times of appeal. Land consolidation may also be indirectly regulated by other legislations that relate to the environment, buildings, and expropriation.

Bearing on the fact that land consolidation constitutes an interference into private property rights, the willingness of landowners and land users becomes eminent and cannot be discounted. Van Dijk (2007) observed that success in land consolidation depends on the willingness of landowners and users to participate in it. This is especially the case where there is no element of compulsion in participation (Louwsma, Beek, & Hoeve, 2014). Where participants are willing to exchange land, it makes the entire process of consolidation faster and easy, however, if there is disagreement, the process is impeded. In times of disagreements, recourse is paid to the provisions of the land consolidation legislation for redress. However, the absence of legislation creates a more difficult situation in which case other criteria may be used to settle disagreements such as mediation. The level of willingness therefore indicates the level of acceptability of private land owners and land users. FAO (2003) indicated that the willingness of land owners

sometimes depend on the proposed benefits and the terms of cost sharing between central government agencies, local government and land owners.

When stakeholders are willing to participate in land consolidation it then becomes necessary have to a reliable land information system (Demetriou et al., 2013) which provides an inventory of land ownership/use rights and also acts as a platform for verifying claims (Sonnenberg, 2002). The reallocation of lands which involves the exchange, distribution and portioning of land requires detail land information that provides ownership rights, property boundary information, digital topographic data as well as proposed developments in the project area (Jansen et al., 2010). As discussed earlier, land consolidation in recent times for most part of the developed world go beyond just land reallocation and incorporates adjoining public works such as construction of roads, drainage systems and irrigation facilities which makes it even more relevant to have a sufficient functional land information system. With the introduction of computer-aided design (CAD) within the GIS environment, modern land consolidation requires topologically consistent and accurate data to plan, partition and redistribute land (Demetriou et al., 2013).

Another condition for land consolidation is the existence of a land bank. Damen (2004) argued the role of land banking as the bedrock for the successful implementation of land consolidation. He described land banking as a means of acquiring and managing land in rural areas by state organisations for the purpose of redistribution/leasing with the aim of improving agriculture or reallocation for other purposes that suit the general interest of the public. Land bank provides an opportunity for expansion and shaping of farmlands, creation of adjoining infrastructure (Jansen et al., 2010). Where there exist a land bank there is increase mobility of land and this makes room for a flexible land consolidation design and also facilitates the reallocation process (Hartvigsen, 2014). Land banks are mostly run by state/parastatal agencies who are empowered by law to acquire lands, to hold and to reallocate such lands for active future use (Van den Berg, Revilla, Menken, & Verbeek, 2005). This acquisition is sometimes based on systematic reduction (a process of reducing a portion of each private land that has to be redistributed) or through the use of government owned land (Lemmen et al., 2012).

Being a surface activity, land consolidation is affected by geographical conditions such as topography, soil and water distribution. Differences in topography and quality of soil limit the possibility of land reallocation which is the core of land consolidation (Lemmen et al., 2012; Sonnenberg, 2002). As opposed to hilly and mountainous terrains, fairly flat terrains enhances land reallocation as it is easy to exchange farmlands with similar characteristics. In hilly and mountainous areas there are sharp variations in surface characteristics and creation of regular shapes for farmlands may be interrupted as land boundaries may natural follow the physical characteristics of the terrain like hill tops or cliff faces (Demetriou et al., 2012). This is further supported by (Sklenicka, 2006) who sees sharp topographic differences as one of the factors that hinders land consolidation. Likewise, substantial soil quality heterogeneity also inhibits reallocation of lands compared to a fairly homogenous distribution of soil quality. When there exist a wide range of variation in the characteristics of the land, valuation is used as a platform for comparison and exchange. Bullard (2007) observed that the value of lands for reallocation depends more on the agricultural productivity which is affected by factors such as topography, size, shape, soil quality and distance from home. Topography does not only affect reallocation but also affects the cost of infrastructure such as road network as it obstructs linear routing thereby increasing distances and cost (King & Burten, 1982).

The nature of private property rights, use and ownership of land affect land reallocation and may either facilitate or inhibit land consolidation. Modern land consolidation results in change of ownership rights and

registration of new titles in the land register (Lemmen et al., 2012). The ability of a private landowner to choose to participate in land reallocation without any ownership constraints is therefore important. Thus, dual and multiple ownership either at the family or community level restrict any of the co-owners the ability to unilaterally make a decision to exchange land during reallocation without the consent of the other(s) and this is therefore undesirable compared to the situation where land is owned by one person who can at his own volition decide to exchange or not(Demetriou et al., 2012).

Implementing land consolidation requires some technical capacity and infrastructure. It is difficult to wholly import and implement land consolidation based on the framework of other countries who have succeeded in its implementation. It is necessary for countries which have not yet implemented land consolidation to adopt and modify the existing examples to meet their local needs (Van Dijk, 2007). This can only be done based on expert technical knowledge. Thus, land use planners, land surveyors, valuation experts, land administrators, agricultural engineers and environmentalist are needed for the preparation and execution of the land consolidation. Based on the knowledge of local legal framework, land market conditions and land tenure experts are able to develop a land consolidation that satisfies local needs with the utmost efficiency.

From the literature above, certain conditions required for land consolidation can be derived. These include;

- ✓ Existence of land fragmentation
- ✓ Willingness to participate
- ✓ Available land information system
- ✓ The existence of a land bank
- ✓ Legal framework
- ✓ Suitable topography and soil distribution
- ✓ Favourable land ownership structure
- ✓ Technical expertise and infrastructure

Based on the characteristics of each type of land consolidation there exist differences in the extent to which these condition listed above may be required. Therefore there are no distinct set of conditions for each type of land consolidation, instead the conditions are broadly the same but only vary in extent.

2.6 Conclusion

Existing literature on key the concepts covered in this research have been reviewed in this chapter. To achieve the objective of this research, literature from researchers of varied disciplines was reviewed which provided multi-disciplinary perspectives on food security, customary tenure, categories of customary land ownership, the characteristics of customary tenure, the social environment that surround customary tenure and the evolution of customary. The chapter also dealt with concept of land fragmentation, its associated effects and the divergent views of researchers on it from various disciplines. It further looked into the concept of land consolidation as a measure to combat the effects of land fragmentation.

3 RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides insight to the detail approaches and techniques that were used to derive answers to the research questions outlined in chapter one. Methods of data collection, sources of data and how they were analysed. It also includes the operational plan which provides a sequential flow of activities from the research problem to the final conclusions. The chapter further provides a brief description of the study areas with respect to their geographic location, local economy and climate.

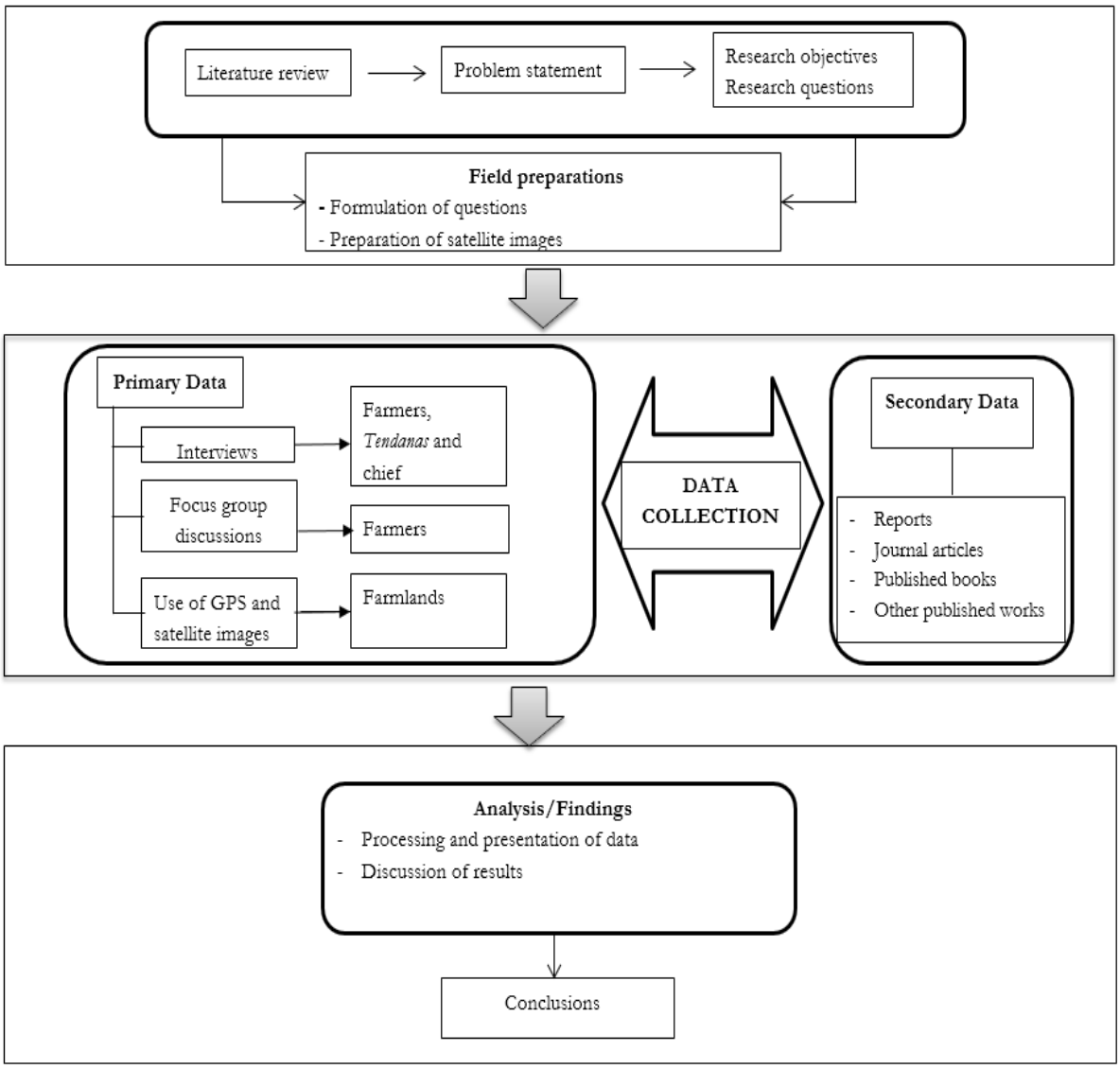

Figure 2. Operational plan

3.2 The study area selection

Although there exist differences amongst various ethnicities, there is enough commonality to enable a categorisation of the Ghanaian customary tenure systems into two broad groups. The first category is land owned by communities that exist as chiefdoms. In this category there is a centralised political structure composed of a hierarchy of chiefs headed by a king. The hierarchy devolves from the king to paramount chiefs, divisional chiefs and caretaker chiefs (Arko-adjei, 2011). The second category is land owned families where the *Tendanas* play an eminent role in the ownership of land and disposition. Family lands are controlled by family heads, usually the father in a nuclear family and the oldest elder in an extended family (Godwin & Kyeretwie, 2010).

Therefore to make the study representative of the customary tenure systems in Ghana, two farming communities were considered; Yaruu, in the Wa municipality of the Upper West region, where there exists family ownership and Tindan in the Savelugu-Nanton district of the Northern region which falls under the Dagbon chiefdom. These communities are typical farming communities which still have the traditional characteristics of customary tenure. Thus, there is no formalisation of land rights, no land commodification and land use is mainly agricultural. These characteristics form the basis of their selection for this study.

3.3 Sampling technique

The sample frame for this study comprised farmers with multiple farmlands and customary institutional heads (*Tendanas* and chief). A sample size of 32 was used, 16 for each study area and this included 15 farmers and one institutional head. Snowball sampling was used to access farmers as they were not personally known to the researcher. The institutional heads were purposively sampled. The sample size of 32 has been chosen so as to allow enough time to organise focus group discussions, conduct the interviews in-depth and also visit farmlands in the two separate study areas within the limited time of four weeks allocated for data collection. Much time was required for community entry and familiarization.

3.4 Sources and methods of data collection

In a bid to effectively address the objective of this study, there are specific data requirements which include both primary and secondary data. Primary data was collected through interviews, focus group discussions and direct observation. Secondary data on the other hand was collected from relevant scientific articles, published books, reports from international organisations, local research institutions and the Ghana Ministry of Food And Agriculture (MoFA).

3.4.1 Primary data

Much of the data required to answer the research questions for this study were collected from primary sources including interviews, focus group discussions, field visits and observations. These techniques were used to collect data on land ownership, land allocation, number of farmlands, environmental factors that affect the choice of land for farming, willingness to exchange farmlands, and reasons for farmland fragmentation.

3.4.1.1 Interviews

Semi-structured interviews were used to access information from both farmers. The use of semi-structured interviews enhanced the retrieval of more information from respondents since they were not limited to predetermined answers. Individual farmers were interviewed regarding the number of farmlands, reasons for the choice of farm locations, the reasons for having multiple spatially separated farmlands, the environmental factors that affect the choice of land for farming and willingness to exchange farmlands. The *Tendanas* and chief were interviewed using open ended questions to find the land ownership structure and also their role in land allocation and how they do it. Interviews were conducted with respondents at their homes and farms. To enhance independence of responses, respondents were interviewed individually.

Figure 3. Interview sessions with farmers

3.4.1.2 Focus group discussions

Two focus group discussions were held, one in each of the two study areas. The focus discussions comprised farmers, chief and *Tendanas*. Each group consisted of 10 to 12 participants who took part in the discussions and answered the questions raised. In addition to the participants there was a recorder who took notes of the discussion and a facilitator who moderated the discussion. For each question raised, each participant was given the opportunity to give their opinions until a saturation was reached through the repetition of opinions. Probing questions were asked in areas which were unclear and also some questions were reframed and posed in different ways to validate earlier answers. The focus discussions provided a wider understanding of complex issues and circumstances that could not be collected from individual interview sessions. They also provided an opportunity for participants to express their views and discuss multiple views with other participants which gave a clear understanding of the interwoven dynamics of land ownership and land allocation.

Figure 4. Focus group discussion with farmers.

3.4.1.3 Field visits and observation

For each respondent we visited their farmlands and collected data on their locations and characteristics. The process was made more participatory and interactive through the use of geo-referenced satellite images. The satellite images were downloaded from Google Earth and were geo-referenced using Elshayal Smart GIS software. The output was printed on A1 paper size to enable easy identification of geographic features. Soft copies of the maps were loaded onto a mobile device equipped with a global positioning system (GPS) which was used to record the geographic positions of farmlands. Respondents were given explanation and guidance with respect to identifying their farmlands on the image. This was done by showing them known geographic features on the image. While on the field, cropping systems and farming practices were observed and pictures were taken.

Figure 5. Field visit with farmers

3.4.2 Secondary Data

Secondary data for this study was collected from relevant scientific articles, published books, reports from local research institutions and the Ghana Ministry of Food and Agriculture (MoFA). The review of documentation from these sources provided information on the concepts of land consolidation, customary tenure, land fragmentation and the baseline conditions required for land consolidation. The review of existing literature brought out diverse perspectives that relate to the subject matter from the works of other researchers.

3.5 Methods of data analysis

Data collected from the field was processed and analysed using descriptive methods. Discourse and narratives analysis were used to analyse the qualitative data. Categorical data was processed using the Statistical Package for the Social Science (SPSS) and the outcomes displayed using graphs and charts. The spatial data was processed using ArcGIS software and result presented in the form of maps.

3.6 Research Design Matrix

This gives an overview of the research including, the research objectives, questions, the methods used for data collection, processing of data and the expected output.

General objective: The main objective of the study is to investigate the feasibility of land consolidation in the customary areas of Northern and Upper West regions of Ghana.

Research Sub objectives	**Research question**	**Method of Data collection**	**Data processing method**	**Expected output**
To find out the baseline conditions required for land consolidation	What are the main types of land consolidation?	Literature review	Literature review	Main types of land consolidation
	What are the necessary requirements needed for the use of each of them?	Literature review	Literature review	Underpinning requirements for each type of land consolidation
To find out the existing tenure and land use situation in the case study areas	What are the categories of land ownership?	Focus group discussions	Discourse analysis	Categories of land ownership
	How is land allocation done?	Focus group discussions /Interviews	Discourse analysis	Steps and processes of land allocation
	How willing are farmers to exchange farmlands?	Interviews	Pie chart	Willingness to exchange farmlands
	What environmental factors affect the choice of farmland	Interviews/ Satellite maps	Bar graph/ Image processing	factors that affect the choice of farm location Distribution of farmlands in relation to the settlements and wetlands
	What are the causes of farmland fragmentation	Interviews/ Focus group discussions	Discourse analysis/ Frequency tables	Reasons for multiple separated farmlands
To analyse the baseline conditions in the context of the study areas	How does the local situation meet these conditions	Literature review/ Interviews/ Focus group discussion	Relational analysis	Identifying the conditions that fit study areas' situation.
	In what ways are these conditions not met	Literature review/ Interviews/ Focus group discussion	Relational analysis	Identifying the conditions that do not fit study areas' situation.

Table 1. Research design matrix

3.7 Description of the study areas

3.7.1 Location

Yaruu

This is located in the south eastern side of the Upper West region. It is located on latitude 10.110870° and longitude -2.346432°. It shares boundaries with a number of villages. To the west, it bounded by the Gudaayiri village, to the north-eastern side by Naahaa and to the south western side by Charingo. The community is located close the eastern border of the region. By virtue of the remoteness it is deprived of some basic social amenities and infrastructure.

Tindan

This is located at the extreme west of the Savelugu-Naton districts close to the Black Volta River. It shares boundaries with Kpalung to the west. It is located on latitude 9.667688° and longitude -0.917973°. The community is about 15 kilometres from the district capital Savelugu. There is a well-developed major road that links the community to the neighbouring communities as well as the district capital (Ghanadisticts, 2014).

3.7.2 Local Economy

The dominant economic activity in both study areas is agriculture which employs over 70% of the population. Majority of the farmers are into crop farming which serves as their main source of income. Crop production is done in small-scale mostly for subsistence. Tools for farm maintenance include simple farm implements like hoes and cutlasses. Majority of the farmers use tractor for ploughing the land; all other farm activities from sewing of seeds to harvesting are manually done. Food crops harvested are carried in bits through the use of head pans, bicycles, motorbikes and animal carts. Transport routes in the communities are mostly foot paths therefore accessibility to farmlands is limited to walking, cycling and use of motorbikes. Livestock rearing is another activity which provides supplementary income. Other minor economic activities include, trading, fishing, burning of charcoal and hunting.

3.7.3 Climate and Vegetation

Climatic conditions in the two study areas are similar by virtue of their close proximity. The year comprise of two seasons, namely; the dry season and the rainy season. The dry season which is characterised by cold winds starts from November up to March. The rainy season starts from the middle of April up to October. For Yaruu in the Upper West region, temperature is relatively high and range between 15°- 40° during the night and day of the dry season respectively. Annually rainfall ranges from 910 – 2000 mm with humidity averaging 95 mm. In Tindan, annual rainfall ranges between 750 -1050 mm with average humidity of 90 mm (Aduah & Aabeyir, 2012).

The vegetation is dominated by the guinea savannah characterised by sparse short vegetation consisting of grass, drought resistant trees and shrubs. Tree species commonly found in the areas include, Shea, Dawadawa, Baobab, Neem and Cashew. The vegetation exhibits great changes during different seasons. In the rainy season the vegetation looks green but in the dry season, the trees shed their leaves and the grass dries off.

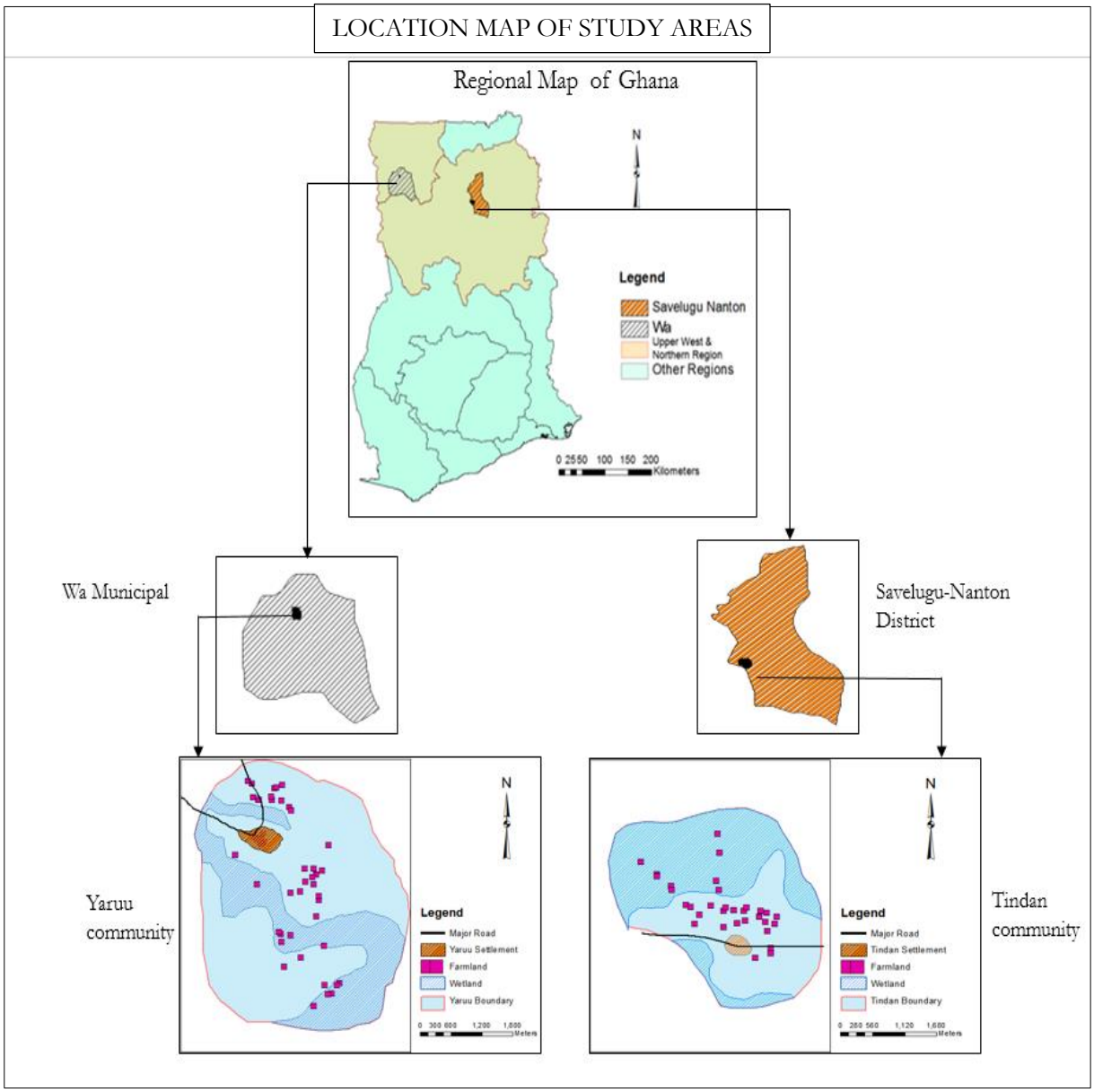

Figure 6. Regional map of Ghana and study areas

3.8 Conclusion

The methodology outlined in this chapter gives a summary of the techniques used in undertaking this research. The methods used for data collection and analysis were chosen with the research objectives and questions in mind. The use of interviews and focus group discussions brought out the required information needed to answer the research question as many of the questions were open ended and thus, afforded respondents the opportunity to fully give their views on the questions asked. The field visits and observation provided a first-hand evidence to researcher which served as a yardstick to cross check and validate certain responses. The collection of geographic information enabled the visualisation of some of the issues investigated.

4 RESULTS AND FINDINGS

4.1 Introduction

This chapter presents the results of the data collected from the interviews and discussions with farmers, Chief and *Tendanas*. The chapter looks at the results obtained on the various issues investigated in the interviews and discussions. The issues investigated included the categories of land ownership, land allocation, willingness of farmers to exchange farmlands, the environmental factors that affect the choice of farmland and the factors that cause fragmentation of farmlands.

As a caveat, the statistics shown in this chapter pertain to the study areas based on the responses obtained and it does not pertain to the whole of the Upper west/Northern regions or Ghana at large.

4.2 Land ownership and administration

Land administration is organised around the chiefs and the *Tendanas* in Tindan and Yaruu respectively. Interviews with the chief and *Tendanas* revealed that there are no established offices in charge of land administration per say, instead this is done at the residence of the *Tendanas* or the palace of the chief orally without recording of any sort. Thus, there is no documentation on land allocation, land use and ownership. Based on the local knowledge of their environment and the small size of the population, they are able to show the original owners of lands. However, subsequent allocations at the family level are most of the time not known to the chief and *Tendanas*.

During allocation, boundaries are demarcated using footpaths, trees, rocks, water bodies and other natural objects. These objects only provide general boundaries which are fuzzy in nature. They may also change with time leading to changes in boundary. For example when the reference tree dies or when the water body dries off or changes its course the boundaries may also change and may result in boundary disputes.

Participation of government in customary land administration was found to be absent in both study areas. In the Yaruu community, there was no involvement of the municipality nor the central government in community land administration. However, the community representative at the municipality (called Assemblyman) only plays the role of an arbitrator when there is a dispute resulting from the invasion of crop farms by domestic animals. In such a case the Assemblyman is the one who resolves the dispute through arbitration. In the case of Tindan community, the Assemblyman only plays the role of a witness when land is to be allocated to a non-community member. He witnesses allocations at the level of the chief and the family level. The roles performed by the Assemblymen in these communities are not official roles that are mandated by law, instead they are locally instituted arrangements.

4.3 Categories of land ownership

Variations exist in land ownership in the two study areas. Following the outcome of the focus group discussions held at each of the study areas, the following categories of land ownership were revealed. For the case of the Yaruu in the Upper West region, land ownership divided into two levels. In the first level, land is owned by the *Tendanas* who hold land and allocate it to community members and non-community members. This constitutes the major category of ownership and includes all un-allocated lands within the territory of the community. Also when non-community members vacate their lands and leave the community permanently without heirs, then their lands also revert to the *Tendanas*. The second level of land ownership is the family ownership. This is type of ownership is derived from the allocations that are made by the *Tendanas*. In this community when land is allocated to a person, it belongs to him and his family and are inheritable.

In the case of Tindan in the Northern region, there exist a hierarchy of land ownership knitted in centralised political structure that descends from the YaaNaa (the king of the Dagbon), through paramount and divisional chiefs to caretaker chiefs. Caretaker chiefs act as resident representatives within local communities and they are members of the localities. Therefore a caretaker chief holds ownership title over the entire community territory on behalf of the local. Like the case of Yaruu, lands that are occupied by natives belong to them and their families. However, in this community grantees hold land as usufructs, a potentially perpetual ownership right which follows the allodial ownership exercised by the chief. The chief thus has an overriding power that is exercisable over the land which is owned by usufructs.

In both study areas, there exist certain ownership constrains that are based on customs, for example it is no acceptable to sell land and also non-community members are not allowed to transfer land to other non-community members except to their own children or community members.

The study however revealed the existence of gender disparity in the ownership of land. In both study areas it was found that women did not own land. They do not also have the right to acquire land either directly from the chief or *Tendanas* or from the family. The reasons for this disparity are deeply rooted in the socio-cultural fabric of the communities. Traditionally, in these communities women are not considered as permanent members of the family based on the notion that they will leave the family when married unlike the male counterparts. It was found that most women therefore worked together with their husbands or their fathers on the farm especially during the times of planting and harvesting. As a result of this, most women resort to petty trading when the farming period is over. When it comes to inheritance, only the male children get shares of their fathers land. In case a husband dies without children the land goes back to his family members, not the surviving spouse since she is capable of marrying a to a different family.

4.3.1 Exercisable Land rights

Respondents generally indicated some rights that can be exercised by an owner of land. Discussions with respondents in the focus groups revealed that farming is the primary use right. Other land uses including the establishment of kraals sand winning and burning of charcoal were found. Grantees can also build houses on the lands allocated to them. The right of transfer also exist at different levels for natives and strangers. Both natives and strangers can transfer land free of charge to other natives but in the case of stranger transferees, only natives can transfer to them. A stranger cannot transfer land to another strangers unless with the permission of the transferor. Rights of disposition however do not include sale as it is not an acceptable custom in the two study areas.

4.4 Land Allocation

Land allocation in the two study areas had similarities and differences. In both areas it was revealed through the focus group discussions and the interviews that allocation is done at two levels. In Yaruu (the Upper West region), the first level of allocation is that of the *Tendanas* who allocate land to both natives and strangers. In the first step of allocation, grantees are asked to find a desirable vacant land, after which an inspection is done by the *Tendanas* to ascertain its vacancy. If it is truly vacant then the grantee gives a token of *cola* or a peppercorn amount as a consideration in respect of the land. The *Tendanas* perform some traditional rites on the land and the grantee is given the right of occupation. A similar process of allocation is followed in Tindan (in the Northern region). The only difference is that, instead of *Tendanas,* chiefs allocate land and no traditional rites are performed on land before it is occupied. After first allocation, a grantee is

eligible to extend the farmland if there is adjoining vacant land without the permission of the chief or *Tendana*s. Allocations in both areas are made upon the request of the grantee, thus, there is no systematic or specific times for allocation. The amount of land to be allocated for farming depends on both the availability of vacant land and the capacity of the grantee to farm.

The second level of allocation is family level. At this level a family head can allocate whole/part of the land that was originally allocated to him to his children, relatives or even non-community members either by way of inheritance or word of mouth. The ownership obtained from this level of allocation is equal to that which is given by the chiefs/*Tendanas* unless it is given with constrains that preclude full ownership (for example, land give for temporary use). In doing this the original grantee does not need the approval of the chiefs/*Tendanas.*

Interviews with the *Tendanas* and chief revealed that, sometimes, there can be a reallocation of lands under certain circumstances. First, when a stranger vacates the village leaving no family behind his land reverts to the *Tendanas* or the chief and such lands can be reallocated to others. Secondly, if a beneficial community development project requires the land of either a native or a stranger for its success, then the land is reallocated for that purpose upon notice of the occupant and the occupant is given a fresh allocation. For the second situation, in Yaruu, if all the community members decide in favour of the development, the occupant of the affected land(s) has no option but to accept an alternative allocation. Here, the *Tendanas* alone have no coercive power to remove the occupant. In the case of Tindan, the chief has an overriding power with which he can unilaterally relocate such affected occupants through alternative allocations

4.4.1 Modes of land acquisition

According to most of the respondents in Yaruu, they inherited the farmlands and this represents 46.7% of the responses. A considerable number of them representing 26.7% indicated that, their farmlands have been allocated to them by their fathers. When a farmer desires extra land for cultivation they acquired them from the *Tendanas* and this category of respondents represents 6.7% of the respondents. 20% of the respondents acquired their lands directly from the *Tendanas*.

In the case of Tindan also, inherited farmlands was higher representing 40% of the respondents. There were some respondents who had a combination of lands from the chief and also through inheritance. This category of respondents (which accounts for 33.3% of the responses) requested for more land to grow new crops which do not thrive well on the original farmlands on the basis of soil quality and water needs. This is shown in the figure 7.

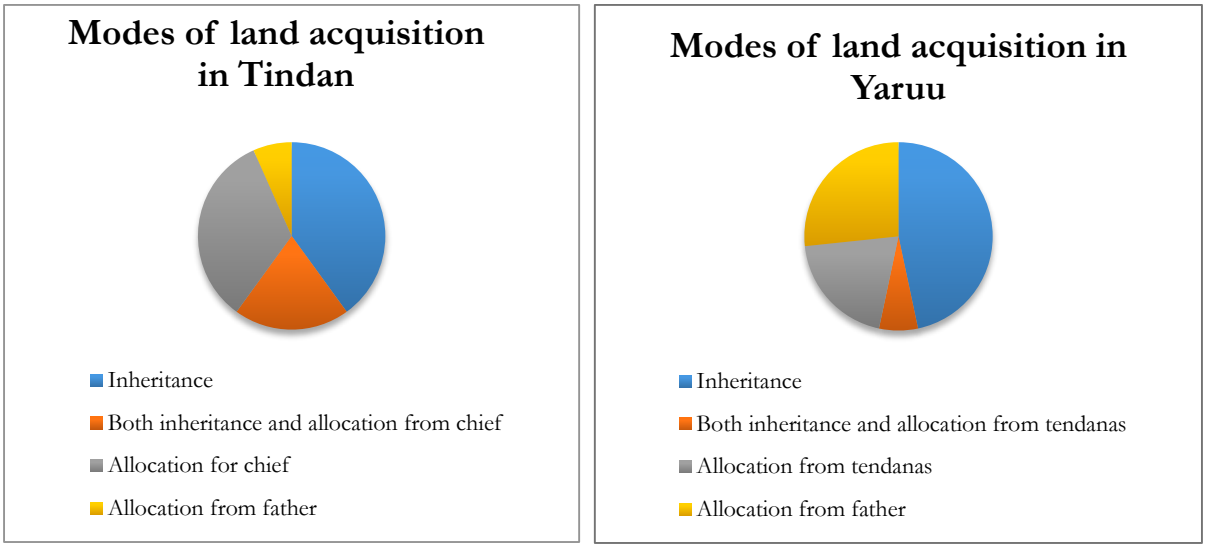

Figure 7. Modes of land acquisition in Tindan and Yaruu

Observing the results of the interviews on this issue, it is clear that inheritance is the biggest mode of land acquisition compared to direct acquisitions from the chiefs and *Tendanas*. It is an indication that most of the families have already acquired land and now pass it from generation to generation. A few number of people have acquired their lands directly from the chief and *Tendanas* and this is as a result of the fact that many people resort to them as a second source of getting more land. Projecting this situation into the future it appears almost all the lands will devolve along family lines and the chiefs and the *Tendanas* may have no more land to allocate.

4.4.2 The processes of land acquisition

The different modes of land acquisition revealed different processes of acquisition. For allocation from parents or inheritance, no process was followed. Children took over simply by word of mouth or upon the death of the father. For such transfers, permission from either the chief or the *Tendanas* is not a requirement. This category of respondent accounts for 63.3% of the responses. For those who had allocations from the chief or *Tendanas*, they followed a similar process. The process is initiated by first identifying a vacant land within the community territory. The chief or the *Tendanas* is then informed for a site visit. Upon the visit to the land if the land was verified to be vacant the allocation was approved and *cola* nut or a symbolic amount was given as a token in respect of the allocation. In the case of the *Tendanas* a further step is taken by performing some traditional rites on the land before occupation. 23.3% and 13.3% of respondents followed these processes of acquisition through the chief and *Tendanas* respectively. These outcomes are graphically represented in figure 8.

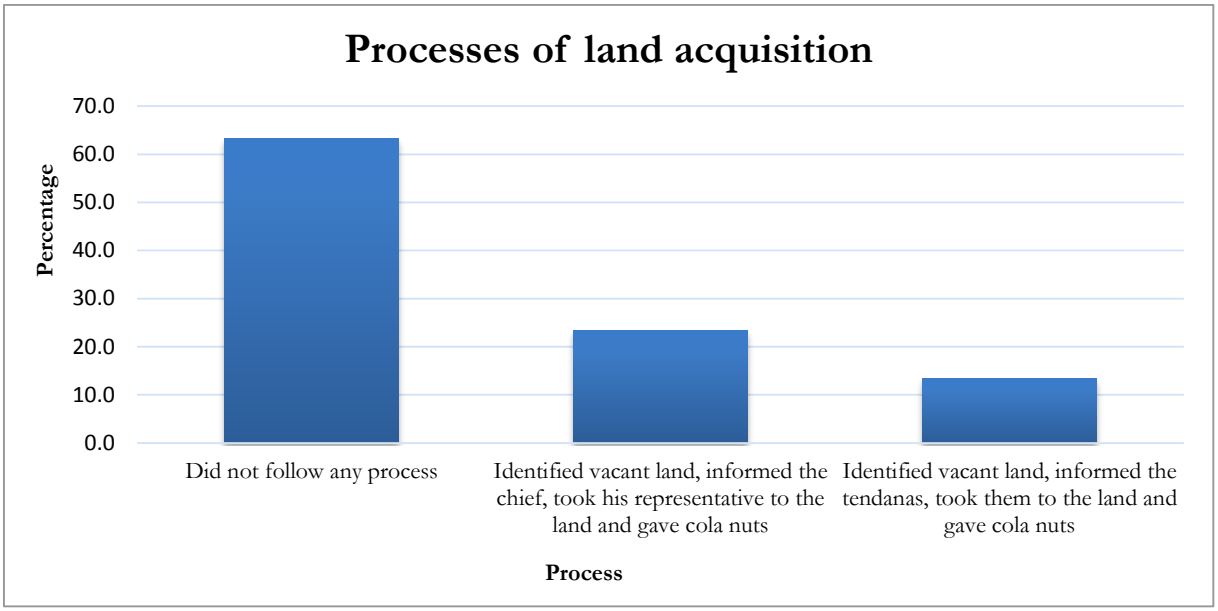

Figure 8. Process of land acquisition in Yaruu and Tindan

4.4.3 Qualification for land allocation

The focus group discussions revealed that every member is qualified to be allocated land and there are no fixed qualification requirements put in place. However, there are two general considerations that mostly necessitate land allocation, first, when a member is strong enough to work on his own farmland and secondly, when a male child marries. In either instances the father can allocate part of his land to him or the child identifies a vacant land and acquire it by himself from the chief or *Tendanas* as discussed earlier.

4.5 Willingness of farmers to exchange farmlands

On the issue of exchanging farmlands for others, majority of the farmers (60%) were not willing to participate in an exchange. Some consider their farmlands as family heritage that cannot be given out while others consider exchange to be something alien to their custom. Some respondents entertained the fear of causing family problems when they pass them onto latter generations and the last group said they like their farmlands as they were.

However, 40% of the respondents were willing to exchange their farmlands if they found the exchange to be beneficial. The reason given for this was that the exchange could enable them to grow different crops. For those farmers who were willing to exchange their farmlands, 10 out of 13 were only interested in a short term exchange and 3 out of 13 were willing to permanently exchange their farmlands.

The outcome of the interviews further revealed different periods of occupation ranging from one (1) to fifty (50) years per the life an occupant farmer. Collectively, 87% of the farmers have occupied their farmlands between 1-30 years while 13% occupied their farmlands between 31-50 years. Many of the farmers have fallen within the range of 11-20 years of occupation and they constitute 36.7% of the respondents. Those who fell within the period of 1-10 years of occupation accounts for 30% of the respondents. When respondents were asked about how long they will want to keep their farmlands, they all indicated they want to keep them forever. The graphical representation of the results are shown in the figures 9 and 10.

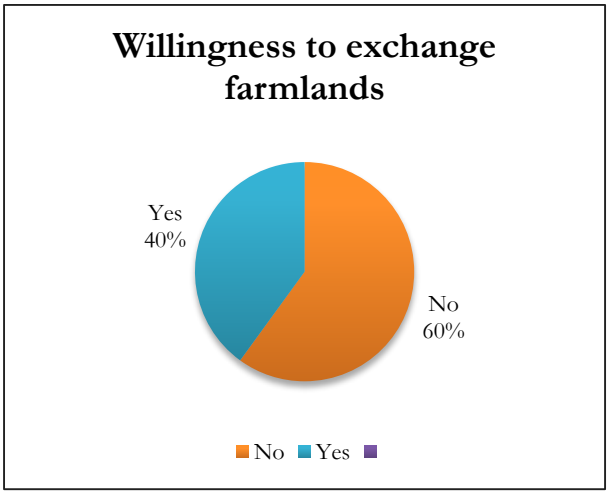

Figure 9. Farmers desire to exchange farmlands

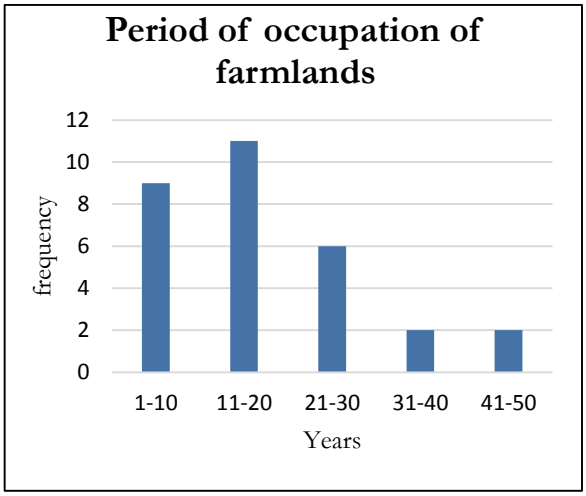

Figure 10. The period for which a farmer has been in occupation of their farmlands

Looking at the fact that majority of the farmers do not want to exchange their farmlands but will want to keep them forever for social reasons coupled with the fact that they have farmed on the farmlands for a long time (10-30 years on average), it can be interpreted that there is higher sense of emotional attachment between the people and their land.

4.5.1 Desire to have farmlands together

Both the focus group discussions and the interviews revealed a high desire of farmers to have their farmlands together. They acknowledged the benefits of having their farmlands together as against having them separate. When respondents were asked whether they wanted to have their farmlands separate or together, 93% said they wanted to have them together and only 7% said they wanted to have them separate. For those who wanted to have their farmlands together, they had reasons which included; reduction of travel time, facilitation of farm work and protection of farms from animals and wildfire. On the other hand those wanted to have their farmlands separate, said their reason was to offset seasonal risks.

Consolidating farmlands requires some form of land exchange. Despite this necessity, only 40% of the respondents are willing to participate in farmland exchange and 60% does not. Analyses of these outcomes reveals an inverse relationship between the desire to have farmlands together and the desire to exchange farmlands. The reason for this kind of relationship is the fact that farmers farm according to the nature of the land and are not able to improve it to fit the crops they want to grow. By virtue of this, they choose locations for farms based on the natural attributes of the land. Therefore exchanging farmlands may be advantageous but may also limit the number of crops they can grow which is essential for their livelihood. Figure 5 illustrates these responses.

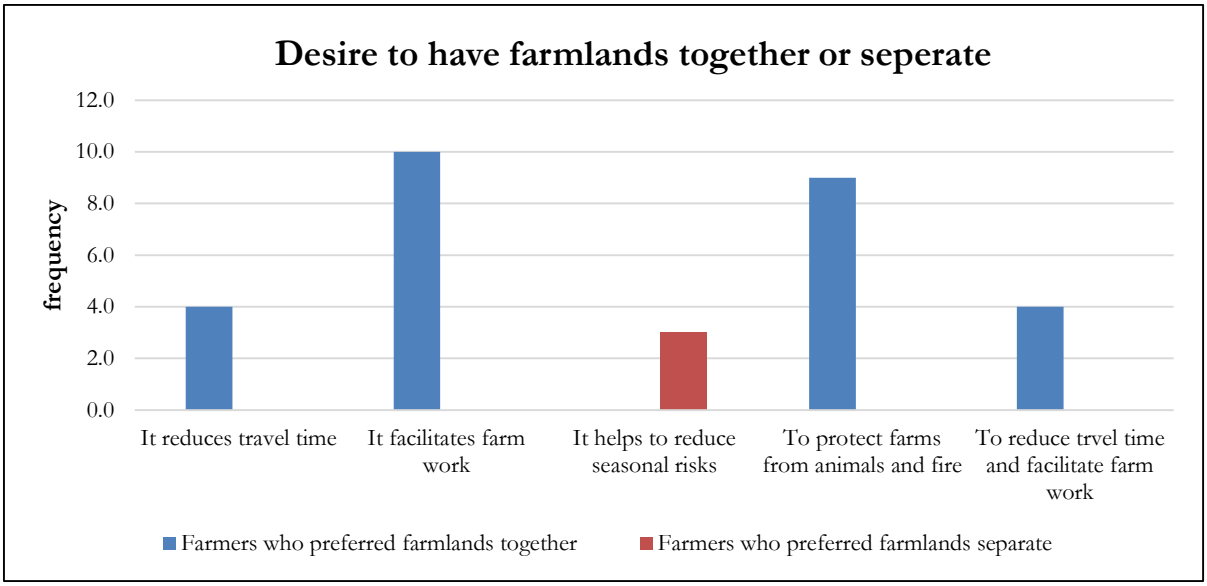

Figure 11. Farmers' desire to have farmlands separate or together

4.6 Fragmentation of farmlands

4.6.1 Number of farmlands per household

It was revealed through the interviews that households have multiple farmlands. On the average a household has three (3) farmlands. 13 out 30 respondents representing 43.3% of the respondents had 3 farmlands. Those who have 2 or 4 farmlands represented 26.7% and 23.3% respectively. The least being those who have up to 5 farmlands representing 6.7 % of total responses as shown in figure 12. Despite having multiple farmlands, sizes are generally small. 15 out of 30 households had 6-10 acres as their aggregate size of farmlands, 10 out of 30 had between 1-5 acres, 4 out of 30 had 11-15 acres and only one household had between 16-20 acres. Comparing the aggregate sizes to the average number of farmlands per household, it turns out that the average size of a single farmland is approximately 1 acre on the lower limit (i.e. 1-5 acres) and 6 acres on the upper limit (i.e. 16-20 acres) and this give a clear indication of a high level of fragmentation. Farmlands are usually distributed around the settlements or at distant locations and may be located within the same or different areas. A household's farmlands may be closed together or wider apart as shown in Figure 13. Some respondents said that, having more farmlands enables them to grow a variety of crops to cover the basic food requirement of their family.

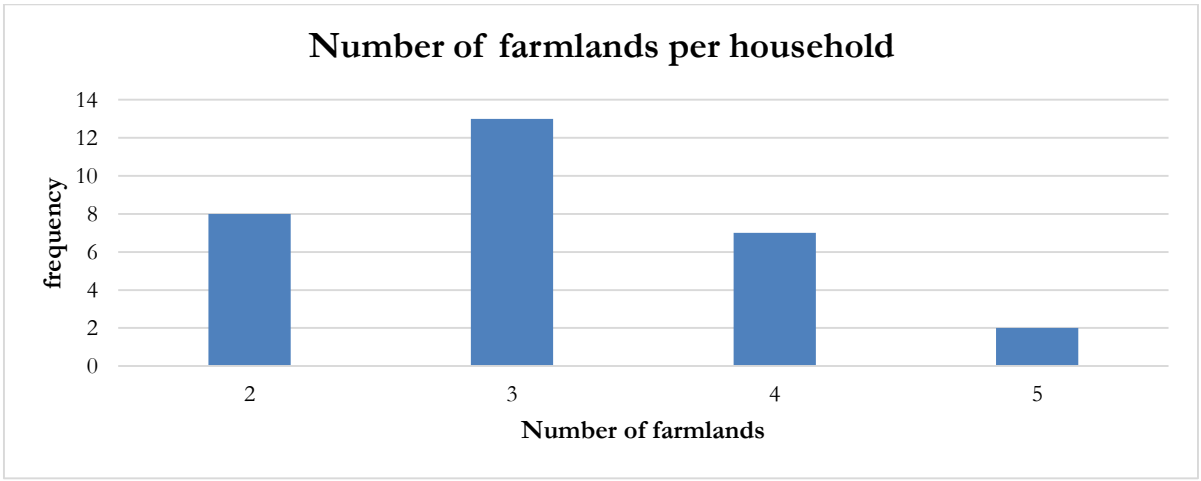

Figure 12. The number of farmlands owned per household

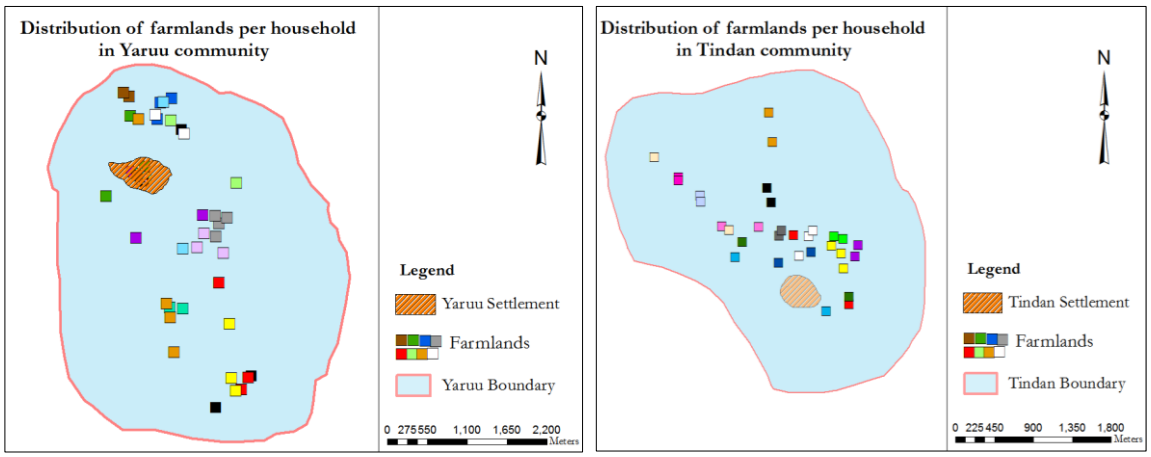

Figure 13. Distribution of farmland per household in Yaruu and Tindan

Figure 13 shows the distribution of farmlands per household. The symbols shown in the maps are not the actual shapes and sizes of the farmlands. This is because farmland sizes are generally small and at the scale of 1:40,000 their actual sizes are too small to portray any meaningful visualisation. Each colour of squares on the maps depicts the number of farmlands owned by one household. Most famers have a combination of clustered and distant farmlands. The shortest distance between two farmlands of the same owner is approximately 30m and the farthest is approximately 3200m in the case of Yaruu and approximately 35m to 1200m in the case of Tindan. This gives an indication of how far a farmer travels if he visits all his farmlands at a given time.

4.6.2 Reasons for having multiple farmlands

On the reasons for having separate farmlands, 17 out of 30 respondents said they acquired separate farmlands so that they could grow different crops. Different crops require different soil conditions so for a farmer to grow all his crops, it is necessary to look for areas with favourable soil condition that can support such crops. Farmers generally said they grow as many crops as can support them throughout the year so that they buy less food from the market. 9 out of 30 respondents said that they could not readily access adjoining vacant lands when they wanted to extend their farmlands so they had to go elsewhere to establish new ones. As continues cultivation reduces soil fertility farmers try to extend their boundaries if there is vacant land so as to allow the old ones to regain their fertility. 3 out of 30 respondents indicated that they acquired separate farmlands in order to reduce seasonal risks. One respondent said the appearance of rocks on his original farmland caused him to look for a new land elsewhere.

4.6.3 Causes of farmland fragmentation

The causes of fragmentation were found in both study areas to be the manner of allocation and the desire to grow different crops. From the point of allocation, grantees have to look for vacant lands before they can request for land from the chief or the *Tendanas* and this results in fragmentation when they identify vacant lands at locations different from their original farmlands. Also, inheritance and allocation at the family level creates fragmentation as the family membership increases. As land is transferred from father to children and children to grandchildren, the size of land per person reduces as the family size increases and this leads to both fragmentation of ownership and use. Finally, the desire of farmers to grow many crops instigate the establishment of different farmlands for each crop depending on the soil requirements of the crops and this leads to the establishment of multiple spatially disjointed farmlands.

4.7 Environmental factors that affect the choice of farmlands

Farmers considered a number of reasons for choosing farmlands. These considerations were; soil quality, distance from home, access to water and the intended type of crop. 11 out of 30 respondents considered the quality of soil as first priority, 9 out of 30 considered the type of crop as first priority, 6 out of 30 considered access to water and 4 out of 30 considered distance from home. Respondents were also given the option to indicate other priorities after their first priorities. Some of them chose a combination of these factors up to three and ranked them accordingly. Others chose only one factor as their primary consideration (see Figure 14). From these outcomes certain interpretations can be made. First, because of differences in soil quality farmers looked for lands that are fertile but do not care if they are together or not, secondly, the type of crop dictates where the farmer goes. Some farmers had as many farmlands as the number crops grown, a separate location for each crop depending on the crop requirements for example yam and rice thrive well in water log areas whilst maize and groundnut thrive on dry land.

Figure 15 gives a visual impression of the distribution of farmlands around the settlements and wetlands. It was observed that many farmers just farmed on the land as it was without applying fertiliser or physically reorganising the farmlands into a more productive form. There is no agricultural infrastructure for distributing water to the farm lands. Therefore the nature of the environment greatly influences choice of farmland.

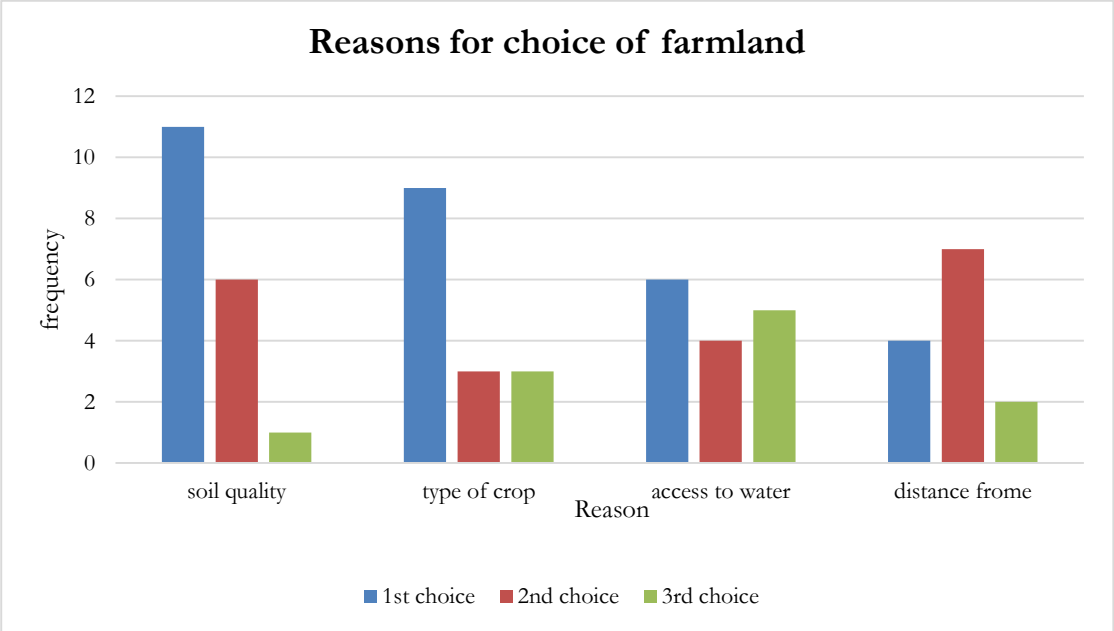

Figure 14. Considerations for choosing farmlands

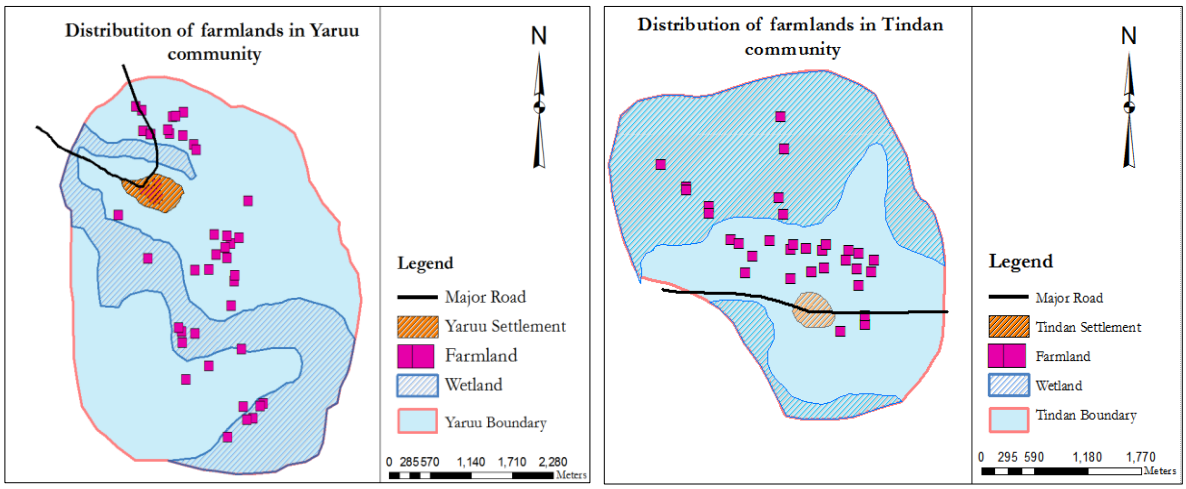

Figure 15. Distribution of farmlands in Tindan and Yaruu

Looking at these maps it can be seen that most farmlands in the Tindan community are spread around the immediate environs of the Tindan settlement. That part of the land is not wet and is suitable for most of the crops farmers grow in the community. These crops include, maize, millet, groundnut, soya beans and vegetables. A few farmlands are located farther away from the settlement into the wetlands and these are used for growing rice and yam. However, in the Yaruu community, the farmlands have a wider dispersion. Similarly, in this community, farms that are within the wetlands are used for growing tuber crops and rice. Outside the wetlands are the farms for growing maize, groundnut, soybeans, cotton and vegetables.

4.7.1 Topography and soil characteristics of the study areas

The topography of both study areas are fairly flat with a height distribution of 100-150 and 300-350 meters above sea level in the Yaruu and Tindan areas respectively. Within each area there exist slight variations in elevation that afford a gentle terrain as shown in figures 16 and 17 which illustrate the elevation profiles of Tindan and Yaruu respectively. Watercourses record the lowest elevation values. The nature of the topography affords farmers a certain amount of ease in cultivation since it is easier farming on a flat land than a hilly surface. Information collected from the Savannah Agricultural Research Institute (SARI) revealed that the soil is fairly homogenous and compose of vertisols and planosols in the Yaruu and Tindan areas respectively. These types of soil support mainly savannah sparse vegetation with scattered shrubs and trees.

Figures 16 and 17 portray the pictorial view of the topographic cross section of the study areas depicted as elevation profiles 1 and 2 respectively. Each of the blue and black arrow lines on the maps represents a straight path along which the profiles were recorded. The length and width of the Yaruu community are approximately 3.35 and 3.2km while that of Tindan community are 3.35 and 3.38km and the average elevation difference is approximately 19m above sea level. It can therefore be said that the topography of both areas are gentle.

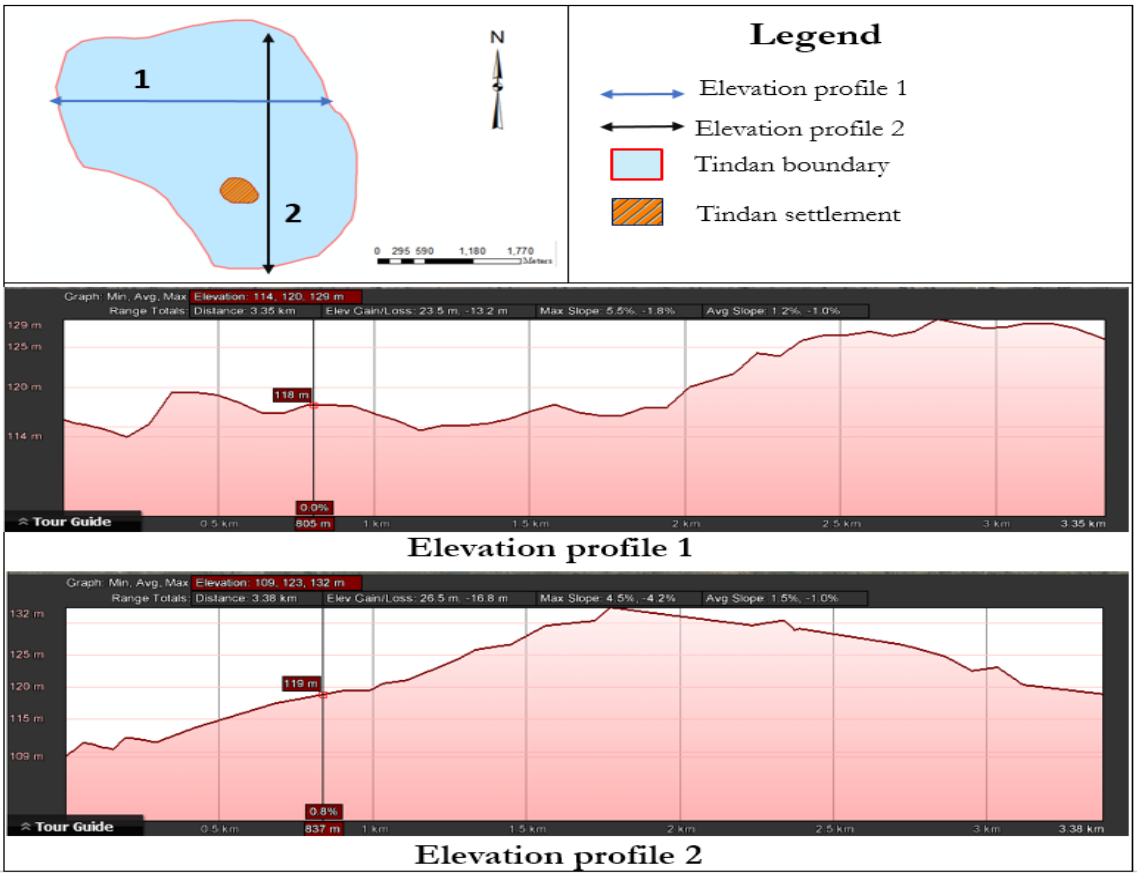

Figure 16. Elevation profiles of Tindan

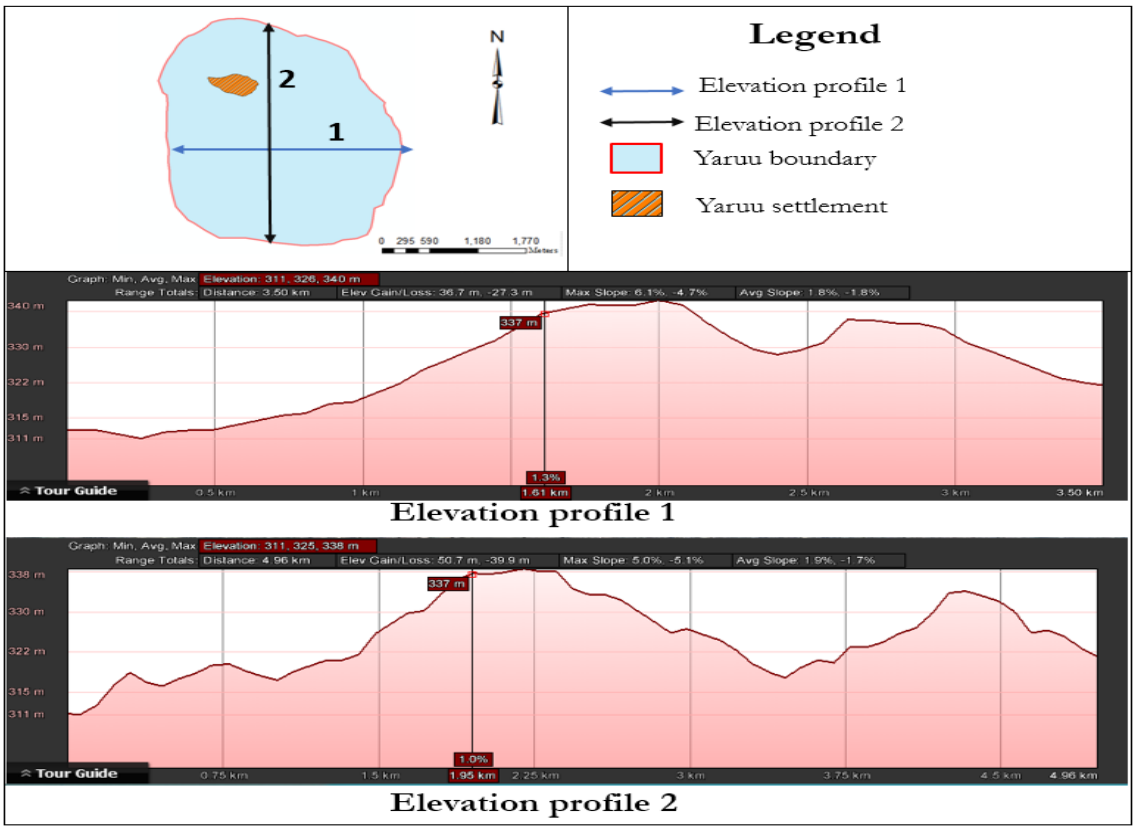

Figure 17. Elevation profiles of Yaruu

4.8 Conclusion

This chapter presented the results of the responses gathered from respondents with respect to the research objective which sought to find out the existing tenure and land use situation in the case study areas. The results provided answers to the research questions that make up this research objective. The key areas investigated include categories of land ownership, land allocation, willingness of farmers to exchange farmlands, the factors affecting the choice of farmland and the causes of farmland fragmentation. The results provided insights into local land administration, its nature and the socio-cultural connotations that are associated therewith. From the results certain inferences have been drawn.

i. There exist a devolution of land ownership from one level to the other, thus, from the *Tendanas* or chiefs to families.
ii. That customary ownership will eventually give way to individualisation as population increase and the need for land increases.
iii. That certain socio-cultural constraints reduce ownership rights such as the prohibition of land sales based on generally accepted customs.
iv. There is a high level of emotional attachment to land which makes people want to keep their lands.
v. The use of land is highly influenced by the climate, topography, soil characteristics and water distribution.

5 DISCUSSION OF RESULTS

5.1 Introduction

This chapter discusses the findings presented in the previous chapter. It juxtaposes the existing ownership and land use situation of the study areas against the position of literature on the conditions required for land consolidation and seeks to identify the elements of fit and misfit so as to enable an assessment as to whether land consolidation is feasible in the customary areas of Northern region and Upper west region of Ghana. It explores the subject in respect of the types of land consolidation discussed earlier in chapter two with specific reference to the baseline conditions that are required for implementation. These conditions are analysed in the context of the study areas to ascertain the extent to which they are met.

5.2 Analysing the baseline conditions from literature in the context of the study areas

5.2.1 The existence of land fragmentation

The review of literature in chapter two points to land fragmentation as the basis for land consolidation. This is especially the case when it reduces agricultural productivity (FAO, 2003). The results obtained confirms the existence of land fragmentation in terms of land ownership and use in both study areas. This deduction has been drawn through the juxtaposition of the findings on household size, farmland size as well as the number of farmlands per household. On the average, a household owns three (3) separate farmlands in both study areas. Meanwhile, the total size of land operated per household ranges from 1- 20 acres resulting in a size of approximately 1- 6 acres per farmland which is an indication of fragmentation in terms of size. Also considering the spatial distribution of discrete farmlands, the average distance between farmlands of the same owner is approximately 1600m in the case of Yaruu and approximately 600m in the case of Tindan. Comparing this level of dispersion to the small size of farmlands gives an idea that farmlands are somewhat scattered.

Similar to the findings of (Thapa & Niroula, 2008) in the mountains of Nepal on the continual reduction of inherited farmlands, the study areas exhibited the tendencies of further fragmentation through the inheritance of farmlands. Considering the household sizes which ranges from 3 to 36 persons, it can be reasoned that fragmentation of ownership is very high since all male household members have the right of succession and this is further strengthened by the fact that most farmers rely on inherence as the main source of land acquisition. This therefore suggests that, in spite of the high household size, members are likely to further share their current farmlands in the future and this will make the level of fragmentation higher.

Viewed from the positive angle (Blarel et al., 1992) noted farmland fragmentation as a tool for managing seasonal bottlenecks and food insecurity which is confirmed in the study as 67% of the respondents engaged in this practice because of crop variety and risk management. On the contrary however, 93% of the respondents acknowledged the problems faced with the operation of fragmented farmlands to include; the inability to supervise all farms at the same time, increased travel time and cost and this goes in line with the argument of (Bentley, 1987; Niroula & Thapa, 2005) who are of the opinion that farmland dispersion increases travel time and cost of moving labour and machinery between farmlands. From the foregoing discussion it can therefore be established that there exist farmland fragmentation and if this is projected into the future the level of fragmentation is likely to increase significantly.

5.2.2 Willingness to participate

The success of land consolidation relies on land reallocation which involves the exchange, portioning and redistribution of farmlands (Van Dijk, 2007). This interferes into private property rights and therefore requires the willingness of landowners and land users to a certain degree for its implementation. In some countries, legislation provides compulsion in terms of participation since it is difficult to gain full unanimity voluntarily. This is sometimes done by voting in order to determine the level of willingness when implementing land consolidation as in the case of Denmark where a 2/3 majority vote of landowners is required for the execution of land consolidation while 1/3 of landowners are compelled to participate. In other countries like Norway, the decision to consolidate is made by a land consolidation court (Sky, 2002). However, in the study areas, a different criteria is used in gaining unanimity in community development activities. Consensus is reached through majority community acceptance through meetings in which case the few opposing members are compelled to follow suit. On the other hand, sometimes, the chief uses his overriding power to compel unwilling members. These criteria are based on tradition and not a codified set of laws. This is usually done with alternative options in case it affects livelihood.

Whereas (Lerman & Cimpoies, 2006) noted the success of land consolidation to be dependent on the willingness of landowners to exchange farmlands, the study revealed a reverse situation. Only 40% of the respondents are willing to exchange farmlands while majority of them (60%) are not willing. Within those who are willing to participate in exchange, only 3 out of a total of 13 are interested in permanent exchange, the rest are only interested in a short term exchange. The question then is, will a short term exchange fit the purpose of land consolidation? Invariably, this undermines the purpose of land consolidation as indicated in the work of (Jie-yong, Yu-fu, & Yan-sui, 2012) who said active willingness is key for the success of land consolidation. Having indicated this, it can thus be said that the level of true willingness which can actually support land consolidation is 10% which represents the 3 people who are interested in permanent exchange. The rest of the 90% comprising those who are not interested at all and those who are interested in short term exchange cannot properly support land consolidation. Contrary to this pattern of response, 93% of the respondents wished to have their farmlands together for economic reasons. Reconciling these contrasting responses leaves a gap to be filled, thus, on the one hand farmers are holding out because of social reasons and on the other hand they are giving in for economic reasons. Can there ever be a compromise between these extremes? From the economic point of view, this situation can be changed if certain agricultural infrastructure is provided, making improvement to the land and affording farmers the ability to use a single farmland for multiple crops. However, from the social point of view, there is a strong emotional attachment to land which takes a long time to change. As noted by (Arko-adjei, 2011), the bond between people and land under customary tenure breaks down when commercialisation and commodification set in as a result of urbanisation. Therefore, under the current social climate, emotional attachment cannot easily be discounted, however, in the long term the bond will break down as the communities develop and only the economic aspect will be left which can be systematically addressed.

Willingness of landowners and land users is essential for the implementation of all the types of land consolidation and this low level of willingness is not supportive. Short-term exchange of farmlands is inconsistent with modern land consolidation as it results in permanent change of ownership rights in the land register (Lemmen et al., 2012).

5.2.3 Available land information system

To successfully undertake land consolidation, there is the need to have a detail inventory of ownership rights, land use and boundary information. This provides the basis for verifying ownership claims, reallocation and settling boundary disagreements. From both study areas, such land information was found to be non-existent. Land allocation is done orally and transmitted from generation to generation through oral tradition. There is no record on land ownership, land use and land boundaries. Boundaries are mostly

demarcated using natural objects, so, it is difficult to establish precise boundaries in order to determine the exact size of land per owner for the purpose of reallocation. Moreover, there is no complete knowledge of landowners as the chief and *Tendanas* do not have knowledge of allocations at the family level.

In view of the types of land consolidation, this form of land administration cannot support any of them. It may somewhat support individual land consolidation in which case participants may resort their own agreed terms and criteria of exchange. However, comprehensive, simplified and voluntary land consolidation cannot do without sufficient land information which is not available in the study areas.

Despite the absence of existing land information, experience from European countries like Finland and Sweden (Vitikainen, 2004) has shown that land information can be collected as part of a consolidation project either to authenticate existing datasets or to create a new ones altogether in a form that meets specific project needs. This is usually done through adjudication in which an inventory of land ownership rights, land values and boundaries is created (FAO, 2003). Sonnenberg (2002) observed that, in the absence of land information, special inventory procedures should be announced for verifying rights so as to enable the creation of a new inventory. Viewing this in the context of the study areas, a survey can be organised using a team of experts in conjunction with the chiefs and *Tendanas* as well as family heads for verifying claims and settling disputes on ownership and boundaries. However, the creation of a project based land information is difficult and time consuming yet it correctness may not be guaranteed (Sonnenberg, 2002).

5.2.4 Existence of a land bank

Land banking is the means of acquiring and managing land in rural areas for the purpose of redistribution with the aim of improving agriculture or other purposes that suit the general interest of the public (Damen, 2004). A land bank is a way of activating inactive land use and thus increases land mobility creating the opportunity for expansion of farmlands and also the creation of adjoining agricultural infrastructure.

Viewing land banking from the point of the study areas reveal certain traits. Kotey (1995) indicated that, allodial title of ownership in communities that exist as chiefdoms resides in the chief while the subjects have usufructuary interest and this happens to be the case of the Tindan community which is under the Dagbon chiefdom. The land belongs to all community members and the chief is only holding the allodial title on behalf of them. In such a case, all unallocated land within the community belongs to all the people and can serve as a land bank that can be used for farmland expansion and creation of infrastructure. Conversely, in the case of the Yaruu community, all unallocated land is the property of the *Tendanas* and not the community as a whole which confirms the view of (Godwin & Kyeretwie, 2010). Hence, unallocated land in this situation cannot be used as a land bank since it is a private property and entry into it will constitute an interference. Essentially, the *Tendanas* are regarded as one of the many owners of land though their ownership is the biggest. Neither the *Tendanas* nor individual families have overriding powers over one another. It is observed by (Kotey, 1995) that, the sale of land is not acceptable in most customary areas and this precludes the possibility of establishing a land bank through land purchase.

As put forth by (Damen, 2004), the extent to which a land bank is needed depends among other things, the number of participants and volume of adjoining infrastructure. If these factors reduce, the extent of a land bank also reduces. Thus, the need for a land bank is higher in comprehensive land consolidation than simplified, voluntary and individual land consolidation. Having discussed the possibility of land banking in the study areas, it appears the circumstances of the Tindan community favour the creation of a land bank for all the type of land consolidation while that of the Yaruu community may favour only individual land consolidation because of its limitation in the number of participants, coverage and the absence of adjoining infrastructure.

5.2.5 Legal framework

Legislation provides legal basis for the implementation of land consolidation. It gives empowerment to the central government or certain agencies to undertake land consolidation and also outlines the procedures and roles of stakeholders. Most importantly, it provides regulations on the manner in which private property rights can be interfered and provides avenues for settling disagreements. Legislation as a condition for land consolidation in the context of the study areas is viewed from the national level since there are no written laws at the community level, except customary laws which are unwritten and based on the norms and customs of the community. There are no laws on Land consolidation in Ghana and it has never been implemented also. However, there exist pieces of legislations that can be pieced together to provide basis for its implementation. These legislations include the State Lands Act, Act 125, 1962, which provides regulations for the expropriation of private property by government; the Administration of Lands Act, Act 123, 1962, which deals with the management and disposition of customary land and its revenues; the Ghana Highway Act, Act 540, 1997, which provides regulations for private property interferences in respect of road construction and the Wayleaves Act, Act 186, 1963 which provides regulations for private property interferences in respect of public installations and utility works. These laws take their root from the 1992 Constitution of the republic of Ghana. Article 18 (1&2) of the constitution gives citizens the right to own property and article 20 provides the protection of private property rights during interference of any kind. It spells out in sections 1-6, the general conditions that are to be fulfilled before an interference of private property can be done. The summary of these conditions include;

- Acquisition should be done for a public purpose/interest
- The payment of prompt, adequate and fair compensation
- The right to redress at the High court in times of disagreements
- The right of pre-emption upon the original owners in case the property is used for the public purpose earlier intended

These pieces of legislation may serve as the legal basis for the implementation of land consolidation in the interim, but the extent to which these can adequately support land consolidation is questionable. Bearing in mind that they are not tailor-made for land consolidation, there is a likelihood of redundancy and inefficiency which can occur as a result of overlapping and conflicting institutional roles. These inefficiencies can impede the realisation of land consolidation. Contrary, to having a multiplicity of legislation, a tailor-made legislation synchronises all the aspects of land consolidation (i.e. the roles of institutions and stakeholders) in and efficient manner. From this point of view, it can reasoned that these separate legislations may not provide a solid base for the implementation of land consolidation.

5.2.6 Suitable topography and soil distribution

Land consolidation is affected by the distribution and nature of surface characteristics of land namely; topography and soil quality. Sharp changes in topography and high level of soil heterogeneity limits the land reallocation process during land consolidation (Lemmen et al., 2012; Sonnenberg, 2002). The findings indicate that there exist favourable geographic characteristics. Topography of both study areas are fairly flat with a height distribution of 100 - 150 and 300 - 350 meters above sea level in the Yaruu and Tindan communities respectively. Height differences in both areas are relatively gently and is about 50 meters. Soil on the hand is fairly homogenous and mainly compose of *vertisols* and *planosols* in the Yaruu and Tindan areas respectively.

However, where there exist differences in the natural attributes of lands, valuation is used as a platform for comparison and possible exchange (Sonnenberg, 2002). FAO (2003) stated that a valuation may be based on market values in areas with developed agricultural land markets and natural yield potential in areas without or with weak agricultural land markets. Van Dijk (2003), on the other hand argued in favour of yield potential indicating the use of market value as inappropriate and (Demetriou, 2014) counter argued that the use of only yield potential will limit the premises of valuation to only agricultural land use which is not

always the case. Synthesising these arguments in the perspective of the study areas, it stands out that the use of yield potential is most suitable bearing on the premises that, there is no land market in these areas and that agriculture is the dominant land use.

5.2.7 Favourable land ownership structure

How land ownership is organised affects the execution of land consolidation. Multiple ownership of land inhibits land consolidation compared to single ownership (Demetriou et al., 2012). Effectiveness in land reallocation greatly depends on the ability of landowners to decide to exchange lands which often lacks in customary tenure. Customary tenure is characterised by communal ownership (i.e. at the household, family or community level). Within a household, members sometimes work on different portions of their land, thus, it is difficult to attain unanimity among them when it comes to making a decision to participate in land exchange. All things equal, it takes a longer time for multiple owners to make a decision and reach consensus compared to a single landowner. As it common in most customary areas, chiefs, *Tendanas* and family heads have considerable control on land. However, decisions regarding the development, use and disposition of such lands are based on tradition which cannot be changed abruptly like formal legislations, instead, they evolve according to the changing trends of society (USAID, 2012). Thus, traditional institutional heads are not able to make changes to these traditions on their own. Other customary constraints like the prohibition on sale of land in both study areas precludes the formation of a land bank based on the operation of the land market. The ease of sales increases land mobility and facilitates land reallocation. This form of land ownership can hardly support land consolidation.

5.2.8 Technical expertise and infrastructure

A combination of technical expertise and infrastructure is required to successfully commence and implement land consolidation. Right from the conception of the decision to consolidate, expert knowledge in the fields of planning, land surveying, land administration, financing, engineering and project management is required for preparatory works and actual execution (Van Dijk, 2007). The level of technical expertise may vary between countries with long term land consolidation programmes and countries with pilot programmes. Whereas they are well established in countries with long term consolidation programmes, those with pilot programmes use it as platform to identify them in preparation for future programmes (FAO, 2003). Findings from both study areas revealed that local technical expertise at the community level was lacking, however, it is only available and could be accessed from state institutions which are in charge of land management, planning and agricultural development. These institutions include the Land Commission, Town and Country Planning and the Ministry of agriculture. Therefore experts from these institutions could be used in the execution of land consolidation in these customary areas. A question then arises as to whether the capacity of these institutions is good enough to undertake land consolidation. The knowledge of geographic information systems (GIS) and spatial algorithms which are needed to properly implement land consolidation is woefully inadequate in these institutions.

Also, the existence of good infrastructure (roads, drainage systems and irrigation facilities) reduces the need of having to acquire huge size of land for public works, thus, systematic reduction and capital expenditure to create new infrastructure are reduced thereby reducing the overall cost of implementation. Aside cost implications, existing infrastructure serves as boundaries in the creation of reallocation blocks that contain individual farmlands (Demetriou, See, et al., 2013). However, in the study areas, infrastructure in terms of road network and drainage systems are lacking as many of the transportation routes are foot paths. Each study area has only one major road that links it to the neighbouring communities with no existing drainage and irrigation facilities. The absences of these facilities creates the need for their creation which will have a reducing effect on the size of existing farmlands which are already relatively small. Offsetting this effect requires a land bank which is only handy in the Tindan community as explained earlier.

5.3 Priority of conditions

Following the discussion of the baseline conditions with respect to the study areas, some conditions appear to take priority over others. These conditions include, the existence of land fragmentation, willingness to participate, available land information system and favourable ownership structure. Therefore to implement land consolidation, these conditions take precedence over the other conditions; without them land consolidation may not be possible.

5.4 Elements of fit and misfit

From the forgoing discussion, a summary table (Table 2) has been developed to indicate for each of the study areas whether the conditions are met. It also shows which type of land consolidation can be supported under the circumstance of the study areas for each condition.

Condition	**Tindan**				**Is the condition met?**		**Yaruu**			
	CLC	*SLC*	*VLC*	*ILC*	*Tindan*	*Yaruu*	*CLC*	*SLC*	*VLC*	*ILC*
Existence of land fragmentation	✓	✓	✓	✓	Met	Met	✓	✓	✓	✓
Willingness to participate	×	×	×	×	Not met	Not met	×	×	×	×
Available land information system	×	×	×	✓	Not met	Not met	×	×	×	✓
Existence of a land bank	✓	✓	✓	✓	Partially met	Not met	×	×	×	✓
Legal framework	×	×	✓	✓	Partially met	Partially met	×	×	✓	✓
Suitable topography and soil distribution	✓	✓	✓	✓	met	met	✓	✓	✓	✓
Favourable land ownership structure	×	×	×	✓	Not met	Not met	×	×	×	✓
Technical expertise and infrastructure	×	×	✓	✓	Partially met	Partially met	×	×	✓	✓

×= does not support ✓= supports

Table 2. Elements of fit and misfit

As shown on the table, a condition may be met, partially met or not met within the study areas. If a condition is 'met' it means it has been fulfilled in a manner that can properly support land consolidation. If a condition is 'partially met', it means it is fulfilled in a way that is partly supportive to land consolidation. Also, if a condition is 'not met', it means it does not exists or it exists in a way that cannot support land consolidation.

Based on the extent to which the condition is met, the sign '✓' is used to indicate which type of land consolidation that can be supported and the sign '✗' is used to indicate those that are not supported.

6 CONCLUSIONS

6.1 Introduction

This provides summary answers to the research questions which feed into the specific objectives and the main objective of the study. The main objective of this study is to investigate the feasibility of land consolidation in the customary areas of Upper West and Northern regions of Ghana. This was achieved through the specific objective which include; (1) To find out the baseline conditions required for land consolidation; (2) To find out the existing tenure and land use situation in the case study areas; (3) To analyse the baseline conditions in the context of the study areas.

6.1.1 Sub Objective 1: To find out the baseline conditions required for land consolidation

a) *What are the main types of land consolidation*

The main types of land consolidation identified from literature are comprehensive, simplified, voluntary and individual land consolidation. There however exist peculiarities in different countries regarding the naming and procedures based on situational needs.

b) *What are the necessary requirements needed for the use of each of them*

The review of literature points to certain conditions which are required for the implementation of land consolidation. The conditions include;

- ✓ Existence of land fragmentation
- ✓ Willingness to participate
- ✓ Available land information system
- ✓ The existence of a land bank
- ✓ Legal framework
- ✓ Suitable topography and soil distribution
- ✓ Favourable land ownership structure
- ✓ Technical expertise and infrastructure

These conditions apply to all the types of land consolidation, however, there exist differences in the extent to which they are required as conditions for each type of land consolidation. Therefore, there are no separate set of conditions for each of them.

6.1.2 Sub Objective 2: To find out the existing tenure and land use situation in the case study areas

a) *What are the categories of land ownership*

Land ownership in both study areas consist of two categories. For the case of the Tindan community, there is ownership by the chief on behalf of the community and family ownership. For the Yaruu community, there is ownership by the *Tendanas* and family ownership. The family ownership is derived from the chief and the *Tendanas*.

b) *How is land allocation done*

Land allocation is done at both the level of the chief/ *Tendanas* and that of the family. At the level of the chief/*Tendanas*, grantees have to first find vacant land and then inform the chief/*Tendanas* for ascertainment. Subsequently, an allocation is made with and the grantee pays a token of *cola* or peppercorn amount in respect of the allocation. However, in the Yaruu community, the *Tendanas* perform traditional rites on the land before the grantee occupies the land. At the family level, fathers can allocate part of the family land to their children, grandchildren, relatives and even strangers. Family allocations are done through inheritance or by word of mouth; thus, there is no designed process.

c) *How willing are farmers to exchange farmlands*
There is a low level of willingness in both study areas regarding the exchange of farmlands. It was found that most farmers are not willing to exchange their farmlands, only a few of them were found to be willing to exchange their farmlands but only for a short term. Merely a handful of them were willing to participate in a permanent exchange.

d) *What are the environmental factors that affect the choice of farm location*
Based on the premise that farming in these communities is rain fed and depends largely on the natural attributes of the land, farmers make choices of farmlands with respect to certain key factors which include; the quality of soil, the type of crop to be grown, access to water and distance from their home. These factors vary in importance and their priority is as they have written.

e) *What are the causes of farmland fragmentation*
The causes of fragmentation were found in both study areas to be the manner of allocation and the desire to grow different crops. From the point of allocation, grantees have to look for vacant lands before they can request for land from the chief or the *Tendanas* and this results in fragmentation when they identify vacant lands at a location different from their original farmlands. Also, inheritance and allocation at the family level creates fragmentation as the family membership increases. Finally, the desire of farmers to grow many crops instigate the establishment of different farmlands for each crop depending on the soil requirements of the crops and this leads to the establishment of multiple spatially disjointed farmlands.

6.1.3 Sub Objective 3: To analyse the baseline conditions in the context of the study areas

a) *How does the local situation meet these conditions*
From the analyses and discussion of the results it became clear that some of the conditions for land consolidation were met while others are partially met. Two conditions, namely, *the existence of land fragmentation* and *suitable topography and soil distribution* are met in a way that can support land consolidation. Three other conditions are partially met and these include *existence of a land bank, technical expertise and infrastructure* and *legal framework*.

b) *In what ways are these conditions not met*
It was found that some of the conditions including; the *willingness to participate, available land information system* and *favourable land ownership structure* were not met.

6.2 General conclusion on the main research objective

This study was based on investigating the feasibility of land consolidation in the customary areas of the Upper West and Northern regions of Ghana. In doing this the study looked at the conditions required for land consolidation and analysed them in the context of the study areas. Through the analyses, the study was able to find out how each of these conditions relate to the study areas. In all, it turned out that some of the conditions were met in a manner that can support land consolidation while other were not. Unfortunately, those conditions which were not met happened to be fundamental for land consolidation without which it is not possible. The low level of willingness, absence of a land information system and unfavourable ownership structure make bleak any opportunity of implementing land consolidation. Against this background and given the current circumstances of the study areas, land consolidation in its theoretical sense is not feasible. However, individual and voluntary land consolidation may somewhat be supported in a very limited sense by virtue of their limitation on the number of participants and absence of adjoining infrastructure. Even for these ones to succeed well, there is the need for a land market through which participants can transact and exchange land for economic considerations, but unfortunately, there exist no land markets in the study areas as land cannot be sold. It therefore follows that other criteria such as the

natural attributes of land may be used other than economic value but this presents another problem as land is not perfectly uniform.

Comparing the suitability of the two categories of customary tenure systems for land consolidation, it can be said that chiefdoms are more suitable than communities with *Tendanas*. The reasons being that; (1) there is an overriding control of land vested in the chief which he can exercise to address disagreements (2) there is a likelihood of using unallocated community land as a land bank.

Despite the current situation, future projections may exhibit more favourable local conditions for land consolidation but then the idea of customary tenure will only be notional. Looking at the trends of development and transformation of customary tenure under the influence of urbanisation in Ghana, it is reasonable foreseeable that these communities will lose their customary characteristics with time. As it is in many urban areas, there is increased individualisation of customary land, thus instigating commercialisation and formalisation. Typically the case of Ghana, it is only when people ascribe economic value to land that they see the need to formally document their ownership. By this time, the dynamics of the land market will set in and land will be held for its economic benefits with no or little emotional attachment to it. Subject to these stipulated future developments, there may be new opportunities for land consolidation.

To this end, land consolidation may not be the appropriate intervention to enhance food security in the customary areas of Northern and Upper West region of Ghana at this moment.

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APPENDICES

Appendix A: Individual Farmers

This data is being collected for the preparation my thesis for a postgraduate degree at the University of Twente. It seeks to find out the feasibility of land consolidation in the customary areas of Upper West and Northern regions of Ghana. Your views are very important for this survey. All information will be treated confidentially.

Name of respondent:
Age of respondent:
Sex: Male ☐ Female ☐
Locality……..
Family/community member ☐ Non- Family/non-community member ☐
Literacy: Yes ☐ No ☐

---

1. How many farms do you have? .....
2. Where are they located?
   ……
   ……
3. Why have you chosen these farm locations?
   ……
   ……
   ……
   ……
   ……
4. Why do you have separate farmlands?
   ……
   ……
   ……
   ……
5. How did you acquire them?
   (a) Purchase (b) Inheritance (c) Allocation from the chief/family head
   (d) Other……
6. From whom did you acquire the farmlands?
   ……
   ……
7. What processes did you follow in acquiring them?
   ……
   ……
   ……
8. How long have you been farming on your farm lands?
   ……
9. How long will you want to keep it? ……..

10. Would you like to exchange any of your farmlands for a different one
    Yes ☐ No ☐
    Why
    .....
    .....
    .....
11. How do you move to your farm lands?
    (a) Walking (b) bicycle (c) motorbike (d) other……
12. Do you prefer to have your farmlands separate or together?
    Why
    ……
    ……
    …….
13. How would you rank the following considerations when choosing a farm land?
    (a) Access to water
    (b) Soil quality
    (c) Distance from my home
    (d) Nearness to road
    (e) Distance to other parcels
    (f) Size of the parcel
    (g) Type of crop
    (h) Other……
14. Do you have a farm house? Yes ☐ No ☐
15. Would you want to live on your farmland? Yes ☐ No ☐
    Why
    ……
    ……
    ……
    ……
16. What other sources of income do you have aside farming?
    ……
    ……
    ……..
17. What is the size of your household?
……
18. How do you plough and harvest your farm?
    (a) Tractor ploughing (b) use of hoe (c) use of animals

Thank you for your time

Appendix B: Focus Group discussions for farmers

1. Who are the owners of the land?
2. What are the categories of land ownership?
3. Who controls the use of land?
4. What rights are exercisable on land?
5. How do you acquire land for farming?
6. Who is allowed to transfer land to another?
7. Who is not allowed to transfer land to another?
8. Who is in charge of allocating land?
9. What makes one qualify to be given land for farming?
10. Is a non-family/community allowed to farm on a part of your family/community land?

Appendix C: Interviews for Chief and *Tendanas*

1. Do you have an office in charge allocating land?
2. How do you record allocations?
3. Do you have any inventory of land owners?
4. Do you have inventory of land uses?
5. At what frequency do you allocate land for farming purposes?
6. How many farmlands can be allocated to a single farmer?
7. What makes a farmer qualified to be given more land?
8. Are you able reallocate existing allocated farmlands?
9. Is the local authority involved in activities of land use and allocation?
10. What makes one qualify to be given a farmland?
11. Can a farmer opt for alternative farm land when an allocation is made to him?