

UNIVERSITY OF CAPE COAST

GENDER DYNAMICS IN SMALL RUMINANT HUSBANDRY
TECHNOLOGY ADOPTION IN THE WA EAST DISTRICT OF THE UPPER
WEST REGION OF GHANA



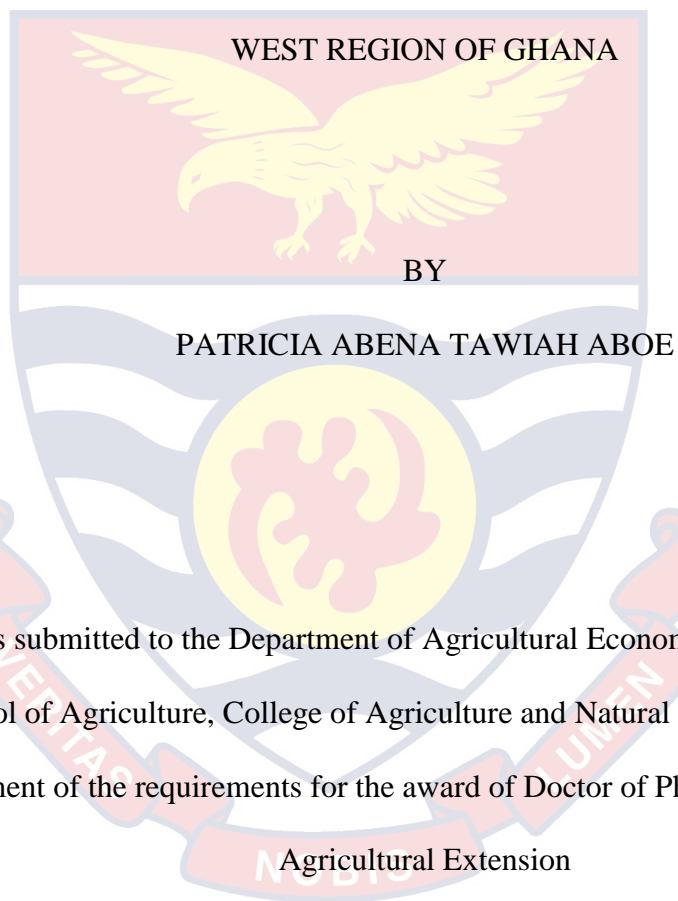
PATRICIA ABENA TAWIAH ABOE

2019



UNIVERSITY OF CAPE COAST

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TECHNOLOGY ADOPTION IN THE WA EAST DISTRICT OF THE UPPER



APRIL 2019

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature: Date.....

Name:

Supervisors' Declaration

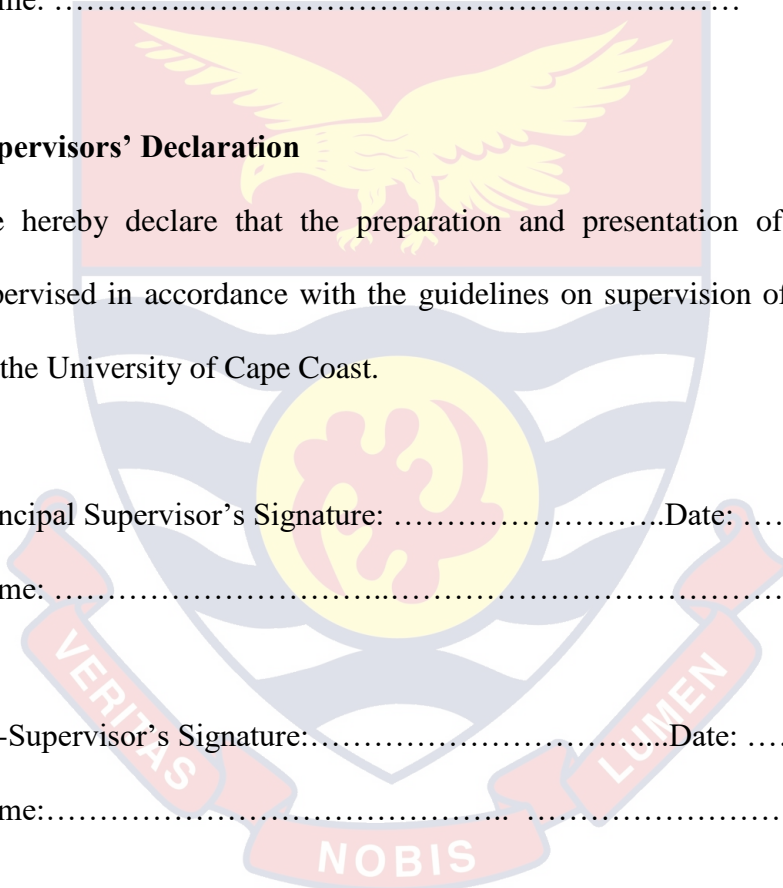
We hereby declare that the preparation and presentation of this thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature:Date:

Name:

Co-Supervisor's Signature:.....Date:

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ABSTRACT

The study investigated the gender dynamics in small ruminant husbandry technology adoption among farmers in the Wa East District of the Upper West Region. Gender sensitivity of the Tumu Deanery Rural Integrated Development Programme (TUDRIDEP) was examined; access and control of production resources were described and institutional rules and norms guiding small ruminant production and marketing examined. A single embedded case study design with a convergent parallel mixed methods approach was employed. Data was collected using structured interview schedule and interview guides. Quantitative data analysis generated descriptive and inferential statistics. Qualitative data was analysed along themes. Results showed that TUDRIDEP is gender aware, with a gendered staff structure that met a practical gender need. Although there were no significant gender differences in overall adoption levels and perception of technology attributes, gender division of labour explained significant gender differences in adoption of certain technology components. All respondents had access to production resources and benefits from animal sales. Men had oversight authority over household members and assets. Institutional rules and norms guiding small ruminant rearing changed with triggering effect in others. The study concludes that the gender sensitivity and ideology of the organisation influences the kind of gender policy intervention implemented and needs met. It recommends that gender analysis should be undertaken to guide gender targeting and choice of appropriate strategies before introducing small ruminant technologies.

KEY WORDS

Small ruminants

Sheep and goats

Gender relations

Technology Adoption

Gender Division of Labour

Rural women



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DEDICATION

To my late parents, my husband, children and Kayla



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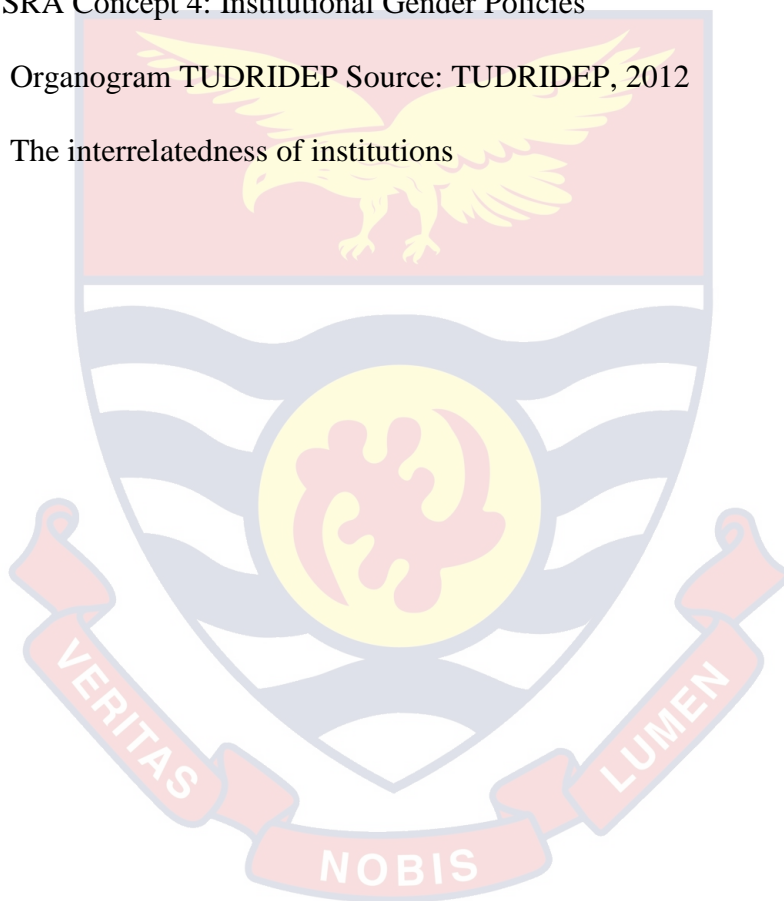
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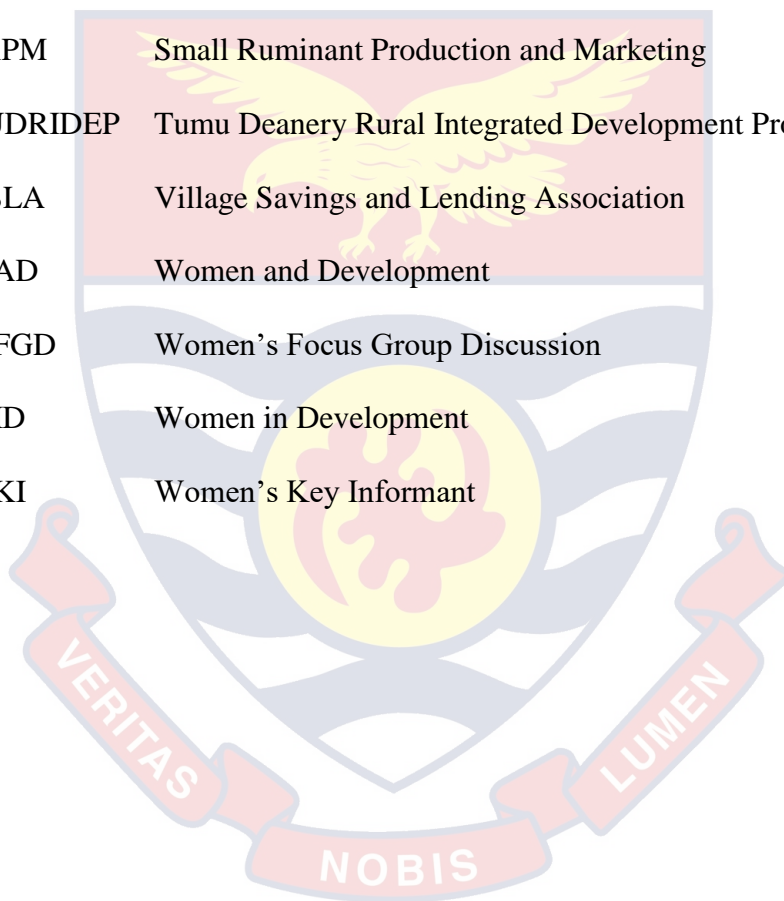
LIST OF ACRONYMS



ACDEP	Association of Church Based Development Projects
ADB	Agricultural Development Bank
ADRA	Adventist Development and Relief Agency
APD	Animal Production Directorate
CLW	Community Livestock Worker
CRS	Catholic Relief Services
CSIR	Council for Scientific and Industrial Research
DA	District Assembly
DAES	Directorate of Agricultural Extension Services
DAHO	District Animal Husbandry officer
DCE	District Chief Executive
DDC	Diocesan Development Council
DSR	Dimensions of Social Relations
DSR-SRPM	Dimension of Social Relations in Small Ruminant Production and Marketing
DVO	District Veterinary Officer
EPA	Environmental Protection Council
FBOs	Farmer Based Organizations
FSEF	Food Security and Environment Facility
GA	General Assembly
GAD	Gender and Development
GDOL	Gender Division of Labour

GES	Ghana Education Service
GHS	Ghana Health Service
GLDPS	Ghana Livestock Development Policy and Strategy
GPS	Ghana Police Service
GSS	Ghana Statistical Service
HHH	Household head
ICCO	Inter Church Development Cooperation, Netherland
JHS	Junior High School
KVIP	Kumasi Ventilated Improved Pit Latrine
LDP	Livestock Development Project
MFGD	Men's Focus Group Discussions
MKI	Men's Key Informant
MLGRD	Ministry of Local Government and Rural Development
MoFA	Ministry of Food and Agriculture
NGO	Non-Governmental Organization
NLSP	National Livestock Services Project
OIGA	Other Income Generating Activity
PPR	Peste des Petits Ruminants
PTA	Parent Teacher Association
SD	Standard Deviation
SFDC	Savannah Farmers Development Cooperation (ICCO)
SHS	Senior High School
SILDEP	Sissala Literacy Development Program

SILG	Savings and Internal Lending Group
SPSS	Statistical Package for Social Scientists
SR	Small Ruminants
SRA	Social Relations Approach
SRF	Social Relation Framework
SRIP	Small Ruminant Improvement Project
SRPM	Small Ruminant Production and Marketing
TUDRIDEP	Tumu Deanery Rural Integrated Development Programme
VSLA	Village Savings and Lending Association
WAD	Women and Development
WFGD	Women's Focus Group Discussion
WID	Women in Development
WKI	Women's Key Informant



CHAPTER ONE

INTRODUCTION

An estimated one billion people worldwide depend on livestock for food and income and the demand for livestock products is projected to increase by 70 percent to feed about 9.6 billion people by 2050 (Food and Agriculture Organisation, 2017). In many sub-Saharan countries including Ghana, subsistence agriculture is the primary source of employment with livestock playing a critical role. In Ghana, statistics showed that about 40.5 percent of the rural population manage some livestock, with about 6.02 million households partly depending on livestock for their livelihood (Ghana Statistical Service, 2012). The livestock sub-sector in Ghana contributed 8.8 percent of the total agricultural Gross Domestic Product in 2013 (Ministry of Food and Agriculture (MoFA), 2016).

Livestock, including small ruminants (sheep and goats) play important economic and socio-cultural roles for the wellbeing of rural households, such as food supply, source of income, asset saving, source of employment, soil fertility, livelihoods and agricultural diversification, transport, agricultural traction, and sustainable agricultural production (Bettencourt, Tilman, Naciso, Carvalho, Henriques, 2015). Livestock serve as a source of income and wealth accumulation and are considered a pathway out of poverty (Amankwah, Klerkx, Oosting, Sakyi-Dawson, van der Zijpp & Millar, 2012; International Livestock Research Institute, 2008; Njuki & Sanginga, 2013). Livestock including small ruminants (SR) are described as a 'bank on hooves', which can be converted into cash to meet owners' needs including purchase of other food items, farm inputs, pay school

and hospital bills (Dossa, Rischkowsky, Birner, & Wollny, 2008; Quaye, 2008). Small Ruminant production as compared to the production of large or non-ruminants is not only for food security but also for their role in reducing poverty and overall household wellbeing (Davendra, 2001; Davendra & Chantalakhana, 2002; Dossa et al., 2008 & Peacock, 2005).

Small Ruminants have been described as having advantages over large ruminants such as cattle because their small sizes make them more suitable for home consumption among poor households, for improvement of nutrition and animal protein requirement and food security (Adams & Ohene-Yankyera, 2014 a). They are also the source of increasing meat production and smallholder incomes since they require fewer resources, have shorter production cycles and faster rate of growth and greater environmental adaptability. The low capital investment, maintenance cost, short term returns to capital with low risk capital investment makes SR more attractive to farmers than large ruminants (Adams & Ohene-Yankyera, 2014a; Davendra, 1985). Socio-culturally SR are used during festivals and funerals; for payment of bride wealth, and are a sign of wealth (Adams & Boateng, 2012; MoFA, 2004). SR are a source of financial security during periods of crop failure, economic stress, disasters and calamities (Adams & Ohene-Yankyera, 2014 a; Amankwah et al., 2012; Rahman, 2007).

Small Ruminants are kept by smallholder subsistence farmers in mixed crop livestock production systems under the extensive system of farming, characterized by low input-output (Amankwah et al, 2012, Avornyo, Ayantundea, Shaibu, Konlan, & Karbo, 2015; Konlan, Ayantunde, Dei & Avornyo, 2014;

Opping-Anane, 2011). The traditional methods of farming used by these subsistence farmers seldom result in the development of commercially oriented level of production (Amankwah et al., 2012; Ntifo & Gbatey 1988; Turkson, 1992; Upton, 1985).

Akudugu, Guo and Dadzie (2012) suggest that the ability of the country to use its agricultural production potential depends on the innovativeness of the actors in the agricultural sector, particularly, farmers. By extension, this would apply to SR producers. Technical change in the form of adoption of improved agricultural production technologies has been reported to have positive impact on agricultural productivity and growth in the developing world (Akududgu et al.,). Various studies have shown that the success of the Green Revolution in Asia was due to the adoption of agricultural technology (Datt & Ravallion, 1998; David & Otsuka, 1994; DeJanvry & Sadoulet, 2002; Evenson & Gollin, 2003; Mwangi and Kariuki, 2015). Further, the adoption of improved agricultural technologies has been associated with higher earnings and lower poverty; improved nutritional status; increased employment opportunities, as well as earnings for landless labourers (Mwangi and Kariuki, 2015).

Agricultural extension aims at improving production and bettering the lives of farmers. As part of their mandate, the Extension Staff of the Directorate of Agricultural Extension Services (DAES) of the MoFA introduce farmers to improved technology to enhance the productivity of both crop and livestock farmers. For example, to increase the potential of livestock and SR production and reduce poverty, the government of Ghana has through the DAES and the Animal

Production Directorate (APD) of the MoFA and other non-governmental organizations (NGOs) initiated numerous programmes through research and technology (Adams & Ohene-Yankyera, 2014). Efforts include the National Livestock Services Project (NLSP) implemented between 1993 and 1999 and the Livestock Development Project (LDP) from 2003 to 2009. Technologies introduced included improved housing, supplementary feeding, record keeping, forage conservation and utilization, improved breeding, prophylactic treatment, castration and, general care and management. These efforts have been in line with Ghana's Livestock Policies. For instance, the Ghana Livestock Development Policy and Strategy (GLDPS) was put in place for the period 2004-2015 with the aim of increasing domestic supply of meat and dairy products from 30 percent to 80 percent. It also aimed at reducing the incidence of poverty among farmers who are also livestock keepers from 59 percent to 30 percent by 2015 (MoFA, 2007; MoFA, 2016).

Livestock production is undertaken by women and men across the globe. While large animals tend to be the preserve of the men, small species (poultry and SR) are the preserve of women in the rural setting (Kristjanson, Waters-Bayer, Johnson, Tipilda, Baltenweck, Grace & MacMillan, 2010). However, a recent study in northern Ghana (Upper East Region (UER), Upper West Region (UWR) and Northern region (NR)) found that household heads (HHs) were predominantly males and were the owners of SR (Adams and Ohene-Yankyera, 2014 a). The predominant male ownership of the SR was due to the custom and norms in Sub-Saharan African countries where men are in control of household

productive assets and the main decision makers (Apusigah, 2009, Oladeji & Oyesola, 2012; Turkson & Naandam, 2006). Women tend to be in subordinate positions (Apusigah, 2009, Bacho, 2004).

Gender inequalities in agriculture, including livestock are such that men have more access to productive resources including land, labour, capital (human and financial), information/extension services and market access (Diiro, Seymour, Muricho & Muriithi 2018; Kristjanson, et al., 2010; Manfre, Rubin, Allen, Summerfield, Colverson & Akeredolu, 2013 a). The extension activities and information meant for farm households target men, especially in male headed households (Budak, Darca, & Kantar, 2005; Galiè, Jiggins, Struik, Grando & Ceccarelli, 2017). This is because men are perceived as owners of resources and therefore are ‘the farmers’, while women are perceived as helpers on the farm (Aboe, 2001; Kristjanson et al; Sen 1990). However, studies showed that when the difference in access to production resources between female and male farmers is reduced the difference in adoption decisions is not statistically significant (Doss & Morris, 2001; FAO, 2011). This indicates that reducing the differential access to production resources between women and men could be beneficial to women’s output, income, livelihoods and the welfare of farmer households.

In line with Ghana Government’s efforts to increase agricultural production, including livestock production and the involvement of women, the Ministry of Local Government and Rural Development (MLGRD), with sponsorship from the Canadian Government, initiated the Food Security and Environment Facility (FSEF). The facility stressed the need to increase gender

equity by ensuring high female participation. The Tumu Deanery Rural Integrated Development Programme (TUDRIDEP), a Non-Governmental Organization (NGO) located in the UWR, responded to the call. TUDRIDEP aimed at increasing women's knowledge and skills in management and environmental practices for sustainable livestock rearing; increasing women's ownership of livestock as assets, and increasing their income for household provisioning. The TUDRIDEP project transferred SR husbandry technologies to female and male farmers (with females in the majority) on housing, health and feed packages and improved breeds. Some authors however posit that organisations that implement interventions are not always ideologically gender neutral (Hillenbrand, Lakzadeh, Sokhoin, Talukder, Green, & McLean, 2014; Kabeer, 1994; Miles, 2014) and their ideological position may affect the outcome of the intervention introduced.

Statement of the Problem

Despite the economic and socio-cultural contributions that livestock, including SR make towards rural livelihoods, their full potential and contribution to their keepers in Northern Ghana is often not realized because of a number of constraints (Adams & Boateng, 2012; Adams et al. 2014 a; Dossa et al., 2008; MoFA, 2004; Quaye, 2008). These include the continuous use of indigenous breeds, with low feed conversion efficiency, poor housing, chronic disease incidence and lack of nutritious supplementary feed during the dry season. Livestock production in Ghana for some time now does not meet the nation's domestic demand for meat consumption, causing the nation to rely on meat

imports to subsidise the shortfall (Adams & Ohene-Yankyera, 2014; Amankwa et al., 2012; FAO, 2012; MoFA, 2013).

Although both women and men are involved in SR rearing in Northern Ghana, household heads (mostly men) predominate in the ownership of the SR (Adams and Ohene-Yankyera, 2014). This is partly because culturally men have control of household assets and are the main decision-makers in the household (Apusigah, 2009; Oladeji and Oyesola, 2012; Turkson and Naadam, 2006). Further, men are the target of extension implementing organisations, leading to women having less access to extension services, among other productive resources.

The TUDRIDEP small ruminant husbandry project, a response to the FSEF call by the Ghana Government mentioned earlier, aimed at increasing women's knowledge and skills in management and environmental practices for sustainable livestock rearing. It also focused on increasing women's ownership of livestock as assets and increasing income for household provisioning. Although the TUDRIDEP project reported high adoption levels of the SR husbandry technologies introduced for women and men, the reports did not indicate the factors that influenced adoption. Identifying the factors that influenced adoption levels would help in strategizing for subsequent interventions of such nature.

Previous SR adoption studies including those in northern Ghana (UER, UWR and NR) have concentrated on investigating farmer and farm related characteristics that influence technology adoption (Adams & Boateng, 2012; Adams et al., 2014; Guo et al., 2013). However, considering the male dominance

in ownership, access and control mentioned earlier, this study focused on exploring how gender relations play out in SR husbandry technology adoption. Gender relations are explored not only in the household arena, but also in the community, state and market; and how these institutions work together to influence unequal relations among the farmers.

The main objective of the study was to investigate the gender dynamics among farmers who participated in the TUDRIDEP SR husbandry technology adoption in the Wa East District of the Upper West Region of Ghana. Specifically, the study sought to:

1. Examine the gender sensitivity of the TUDRIDEP project.
2. Examine the adoption of the SR husbandry technologies transferred among female and male farmers.
3. Describe ownership, access and control of production resources needed for SRs production and marketing and
4. Examine the institutional rules and norms that guide women and men in SR production and marketing.

Research Questions and Hypothesis

Research questions

1. How gender sensitive is the TUDRIDEP project?
2. To what extent is adoption of SR husbandry technologies transferred among farmers gendered?
3. What is the state of ownership, access and control of production resources needed for SR production and marketing

4. What are the institutional rules and norms that guide women and men in small ruminant production and marketing.

Hypothesis

Two research hypotheses were set for the study:

1. H₀: There is no significant difference between the adoption levels of female and male SR farmers of husbandry technologies.

H₁: There is a significant difference between the adoption levels of male and female SR farmers of husbandry technologies

2. H₀: There is no significant difference between the perception of female and male SR farmers of the attributes of the technologies transferred.

H₁: There is a significant difference between the perception of female and male SR farmers of the attributes of the technologies transferred.

Significance of the Study

This study will contribute to the literature on SR husbandry adoption. Whilst previous studies have focused on the socio-economic factors that influence adoption such as farm and farmer related characteristics of famers, this work will contribute to the literature on gender relations in adoption of SR husbandry technology. It will also contribute to knowledge on how institutions such as the household, community, the state and markets, shape gender relations and influence adoption of SR husbandry technology.

The results of the study would enlighten project planners and implementers, extension workers, agricultural scientists, policy makers and other stakeholders on how gendered SR production and marketing (SRPM) activities

are. It would guide project planners and implementers on whom to target in the household for specific activities, for effective extension service delivery instead of focusing on household heads who are mostly men.

This work will contribute to the literature on the gender orientation and the extent of gender sensitivity of institutions. Although certain institutions work towards gender equality among female and male farmers, the institutions themselves may not be gender sensitive in certain areas. The study will also contribute to knowledge on the existing cultural norms and rules in the study area and how they influence (positive, negative or neutral) SRPM. The study will elaborate on norms and rules that exist in individual institutions such as households, community, market and the state, and their influence on SRPM. Further, the study will show how these institutions work together to perpetuate inequalities among female and male farmers and poverty among women in the rural households.

The study will generate information on the influence of the SR technology intervention by TUDRIDEP on the existing rules and norms and how the TUDRIDEP SR intervention affects the status of women that participated in the intervention. For instance, the impact of the supply of tangible resources (such as SRs) and intangible resources (extension information and training) on the status of women participants would emerge the kind of need that the intervention met, whether a Strategic Gender Need (SGN) or Practical Gender Need (PGN). Finally, the study also has implications for food security in the Wa East District in particular and northern Ghana as a whole.

Variables of the study

The key variables of the study were: “adoption of the SR technology package”, ‘farmer perception of technology attributes’, the ‘dimensions of social relations in SR production and marketing (DSR-SRPM)’ and the ‘kind of need met’. These variables are operationalised in the conceptual framework (Figure 1).

Delimitations

Collection of quantitative data for the descriptive survey was limited to the female and male SR farmers who participated in the project in the nine (9) communities (census) where the SR husbandry technology package was introduced. However, qualitative data was collected from other people in the communities, apart from the project participants. The qualitative data provided a better understanding of the results of the quantitative data, including the gender relations in the study area.

Limitations

As is the case with any academic endeavor this work had its limitations. Data was collected through interpreters, since the study was done in areas where the researcher was not familiar with the local languages (Sisale and Waale). The researcher however ensured that the limitations of language did not affect the validity and reliability of the findings, such as ensuring that the translations were correct. Although using qualitative approach allows for a good understanding of the phenomenon under study, it also has implications for generalizability. The results of this study would be peculiar to the project and its beneficiaries.

Definition of Terms

Access and control:

Access: In this study, access to refers to the ability to use an item or resource, without necessarily having control over it (or have a say over its use).

Control: refers to the power to decide on the use of a resource or benefits that accrue therefrom. Control would reflect in decision-making, i.e. ability to have an opinion or say, concerning what should or should not be done concerning production and marketing of resources and benefits and other household issues.

Access to extension delivery: Access to extension delivery in the study refers to the ability of the female or male farmer to obtain information on agricultural extension directly from an agricultural extension agent.

Adoption: Refers to the consistent use or practice of SR husbandry technology introduced to farmers

Adoption level: number of components of the technologies being used, out of the total being disseminated. This is similar to what Bonabana-Wabbi (2002) refers to as ‘the intensity of adoption’ - level of usage of a given technology in any time period.

Benefits: Refers to an increase in cash or in kind that accrues from livestock production and marketing activities.

Extension Contact: Refers to any meeting between the farmer and the Agricultural Extension Agent (AEA) which results in the exchange of ideas or transfer of agricultural information from AEA to the farmer.

Farmer: Refers to either female or male living in study area that keeps and is engaged in SR production and marketing.

Gender Dynamics: Includes the relationships and interactions between and among boys, girls, women, and men. Gender dynamics are informed by socio-cultural ideas about gender and the power relationships that define them. Depending upon how they are manifested, gender dynamics can reinforce or challenge existing norms.

Gender Relations: Refers to unequal ownership, access to and control of resources and benefits; and gender division of labour in households, the community, state and markets between women and men.

Household: Refers to a person or a group of persons who live together in the same house and have a common catering arrangement as one unit and in addition look up to one person as the household head (The Ghana Statistical Service, 2012).

Institutions: In this study, institutions would refer to the household, community, the state and market. Kabeer defines an institution as ‘a framework of rules and regulations for achieving certain social or economic goals. Institutions ensure the production, reinforcement and reproduction of social relations and thereby create and perpetuate social difference and social inequality’ (Kabeer, 1994).

Marketing: Any activity that is concerned with the sale or purchase of SRs.

Kind of need met: The kind of need met due to an intervention introduced may be a strategic gender need (SGN) or a practical gender need (PGN).

Practical Gender need: Refers to needs which when met would improve the lives of the target group without changing the existing gender division of labour or challenging the women's subordinate position in society (Kabeer, 1994; March et al., 1999).

Production: Entails all activities involved in the rearing of SRs other than sale and purchasing.

Resources: Any item regarded as an input of production that can be used to generate an output. A resource can be tangible (livestock) or intangible (Social networks, group affiliation and information).

Productive activities: This includes the production of goods and services for income or subsistence

Reproductive activities: This covers the care and maintenance of the household and its members. It includes cooking, washing, cleaning, bearing children and nursing them.

SR (SR): Refers to sheep or goats.

Status of Women: The position of women in relation to men as regards women's subordinate position.

Strategic Gender Needs: Refer to needs which when met do not only improve the life of the target group but also challenge the subordinate position of women in society. Meeting such needs tends to change gender relations in the household.

Technology: Refers to all kinds of improved techniques and practices which affect the growth of agricultural output. Effect may be positive or negative.

Organization of the Study

This thesis is organised into nine chapters. The first chapter gives a general introduction and states the problem to be addressed, the research objectives and questions, the variables, significance of the study, delimitations and limitations, definition of key terms and organisation of the study.

The second chapter discusses the theoretical and empirical basis of the work, as well as the conceptual framework that guided the study. It looks at theories and concepts that relate to the study. These include the diffusion of innovation theory, the concept of gender, Gender and Development and Gender Analysis frameworks. The empirical review looks at the agricultural and livestock industry in Ghana, gender and agricultural extension, agricultural extension approaches in Ghana, resources needed for SRPM, factors affecting adoption of technology, among others. The chapter ends with the conceptual framework.

Chapter Three provides the methodological basis for the study. The research design - a single embedded case study design, methods of data collection and analysis are outlined. Chapter Four provides a description of the case environment or context within which the intervention took place. A description of the study area, Wa East District, the study participants and the various aspects of the project implementing institution TUDRIDEP is given.

Chapter Five presents the first of the results' chapters. It covers objective one, which examined the gender sensitivity of the Tumu Deanery Rural Integrated Development Programme (TUDRIDEP), the intervention implementing organization. The first and second sections discuss the analysis of the TUDRIDEP

gender policy and the intervention itself. While the third section presents the analysis of the TUDRIDEP organogram.

Chapter Six presents the results of the second objective which sought to examine the adoption of the small ruminant husbandry technologies transferred by TURIDEP among female and male farmers. The presentation first describes the attributes of the husbandry technologies transferred. These are compatibility, relative advantage, observability and ease of use followed by a presentation of the results of the adoption levels of the components of the technology transferred.

Chapter Seven sought to describe ownership, access and control of production resources needed for small ruminants production and marketing. The presentation of findings follow the conceptual framework. Resources presented are tangible (sheep and goats, land, feed resources and water and credit) and intangible resources (agricultural extension information and group affiliation). Each resource is presented in the light ownership, access and control.

Chapter Eight presents findings on objective four, which sought to describe institutional rules and norms that guide small ruminant production and marketing. The presentation of findings are structured along the conceptual framework. The analysis determines whether the intervention introduced by TUDRIDEP to the case farmers caused a change in any of the institutions and whether these changes affected other the institutions. The first part of the presentation describes the norm or rules in the institution and the second part describes changes introduced and changes triggered in other institutions.

The final chapter, presents the main findings of the research together with the conclusions, recommendations, implications of the study and suggestions for further research. The next chapter presents a review of literature.



CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter provides a review of literature brings together existing theoretical and empirical studies to provide a background to the thesis and facilitates the discussion of the findings. The chapter starts with a review of theories and concepts relevant to the study, followed by the empirical review and then discusses the conceptual framework that guided the work.

Most agricultural activities in developing countries is undertaken by smallholder farmers and is characterized by the use of traditional methods of production and local varieties of crop and livestock species. It has been argued that the use of traditional methods have resulted in lower levels of productivity. Increasing agricultural productivity is critical to meet the rising demand for agricultural products (Mwangi & Kariuki, 2015). The introduction of improved technologies into agriculture has been associated with improved input-output relationships; rising outputs, reduction in average production cost and increased farm income for the farmers (Challa, 2013). It is also argued that it results in reducing poverty levels; improved nutritional status, lower staple food prices; increased employment opportunities and increased earning for landless labourers (Mwangi and Kariuki, 2015).

Agricultural Technology

Technology has been defined in different ways: Rogers (2003) defines it as “a design for instrumental action that reduces the uncertainty in the cause-

effect relationship involved in achieving a desired outcome. Rogers (2003) describes technology as composed of two parts, the hardware and software: the hardware is ‘the tool that embodies the technology in the form of a material or physical object’ while the software is the ‘information base for the tool’. Agricultural technology according to Jain, Arora and Raju, (2009) includes all kinds of improved techniques and practices which affect the growth of agricultural output. In fact, technology aims at improving a given status quo to a more desirable level (Udimal, Jincai, Mensah, & Caesar (2017). Bonabana – Wabbi (2002) states that technology assists the user to be more effective and efficient than he or she would have done in the absence of the technology. All the above definitions point to the fact that the use of technology changes the situation into a better, more desired and productive state. Agricultural technology therefore, has the tendency to change the state of agriculture to a more desirable and productive activity or venture. This study would adopt the definition given by Jain et al., (2009) that a technology ‘includes all kinds of improved techniques and practices which affect the growth of agricultural output’.

Innovation has also been defined by Rogers (2003) as an idea, practice or project that is perceived as new by an individual or other unit of adoption. Leeuwis and Van den Ban (2004) however, build on the definition of innovation given by Smits (2002), which states that innovations do not just consist of new technical devices, but also of new social and organisational arrangements, such as new rules, perceptions, agreements, identities and social relationships. These latter are no longer considered as external conditions that influence adoption, but

rather as integral parts of an innovation. This implies simultaneously, that there are often many different stakeholders (operating in different interdependent networks) involved in an innovation process, and hence it is not very useful to look at 'adoption' as something that happens only at an individual level. Thus, innovation is conceptualized as a successful combination of 'hardware' (i.e. new technical devices and practices), 'software' (i.e. new knowledge and modes of thinking) and 'orgware' (i.e. new social institutions and forms of organization).

In technology adoption however, prospective adopters follow processes or stages before making a decision. In adopting an innovation, the prospective adopter considers the extent to which the innovation can contribute to satisfying his /her needs. In the case of an agricultural innovation, it means evaluating the extent to which an innovation can better meet the needs of the primary producer, the manager of an agricultural enterprise (Kaine, cited in Botha and Atkins, 2005). Loevinsohn, Sumberge, Diagne and Whitfield (2012) define adoption as the means and methods of producing goods and services including methods of organization as well as physical technique. He continues that it is an integration of a new technology to existing practice and is preceded by a period of trying and some degree of adaptation the decision-making process that many potential adopters of a technology go through has been described using different theories. One of these theories the diffusion–innovation theory is discussed next.

Definition of Adoption

Different authors have defined adoption. Moshler (1986) defines adoption as a process by which a farmer is supposed to consider and reject or accept to

practice an innovation. Rogers (2003) defines it as a process that involves the decision to make full use of an innovation as the best course of action available. According to Rogers (1983) adoption is a process with a sequence of stages starting from knowledge, through persuasion to decision, implementation and confirmation. Thus, the individual first learns of the existence of the innovation and understands its function. Persuasion is the stage where the individual forms a favourable or unfavourable attitude towards an innovation in the process of adoption. This is followed by a period when the individual engages in activities that lead to decision on whether to partially or totally adopt. Implementation occurs when the individual has developed a favourable attitude towards the innovation and puts it to use. The next section gives a detailed account of the process and the theory.

The Diffusion of innovation theory

Rogers defines diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system. (Rogers, 1983, 1995, 2003). According to him, diffusion is a special type of communication in which the messages are about a new idea. Individuals and groups achieve the spread of the new idea (innovation) within the social system through its adoption. The diffusion of innovation theory by Rogers has been described as a Meta theory consisting of four sub- theories, which are the Innovation – Decision theory, the Individual Innovativeness theory, the Theory of Perceived attributes and the Rate of Adoption theory.

The Innovation–Decision Process Theory

The innovation decision process is described as “an information-seeking and information-processing activity, where an individual is motivated to reduce uncertainty about the advantages and disadvantages of an innovation” (Rogers, 2003). The individual seeks different kinds of information at this stage. This includes information about the availability of promising solutions, information clarifying the existence and of tensions and problems addressed by the innovation. Also, feedback information from one’s own practical experience or from other peoples’ and information reinforcing the adoption decision that has been made (Leeuwis and Van den Ban, 2004; Rogers 2003). Apart from that, different sources of information are used in connection with the different stages of the adoption. The innovation-decision process according to Rogers consists of five stages. The ‘knowledge stage’, where the individual farmer is aware of the existence of an innovation, the ‘persuasion’ stage is where the farmer develops an interest in the innovation and proceeds to evaluate it, the ‘decision’ stage, where the decision is made either to adopt or reject the innovation. This is followed by the implementation stage is where the innovation is tried or rejected and the final stage is the ‘confirmation’ stage (Fig.1). At the knowledge stage, the individual learns about the innovation and seeks information concerning the ‘what’, ‘how’ and ‘why’ of the innovation. According to Rogers, the questions form three types of knowledge. The Awareness Knowledge is where the existence of the innovation comes to the individual. From awareness knowledge one moves to the how-to-knowledge stage where the individual learns about how to use the

innovation in the correct way. The how-to-knowledge is critical, especially where the innovation is complex. The principles-knowledge follows the functioning principles and describes the 'how' and 'why' the innovation works. When innovations are adopted without the principles-knowledge, there may be misuse that may result in discontinuance. Sahin (2006) adds that to create new knowledge, technology education and practice should provide not only a how-to experience but also know-why experience.



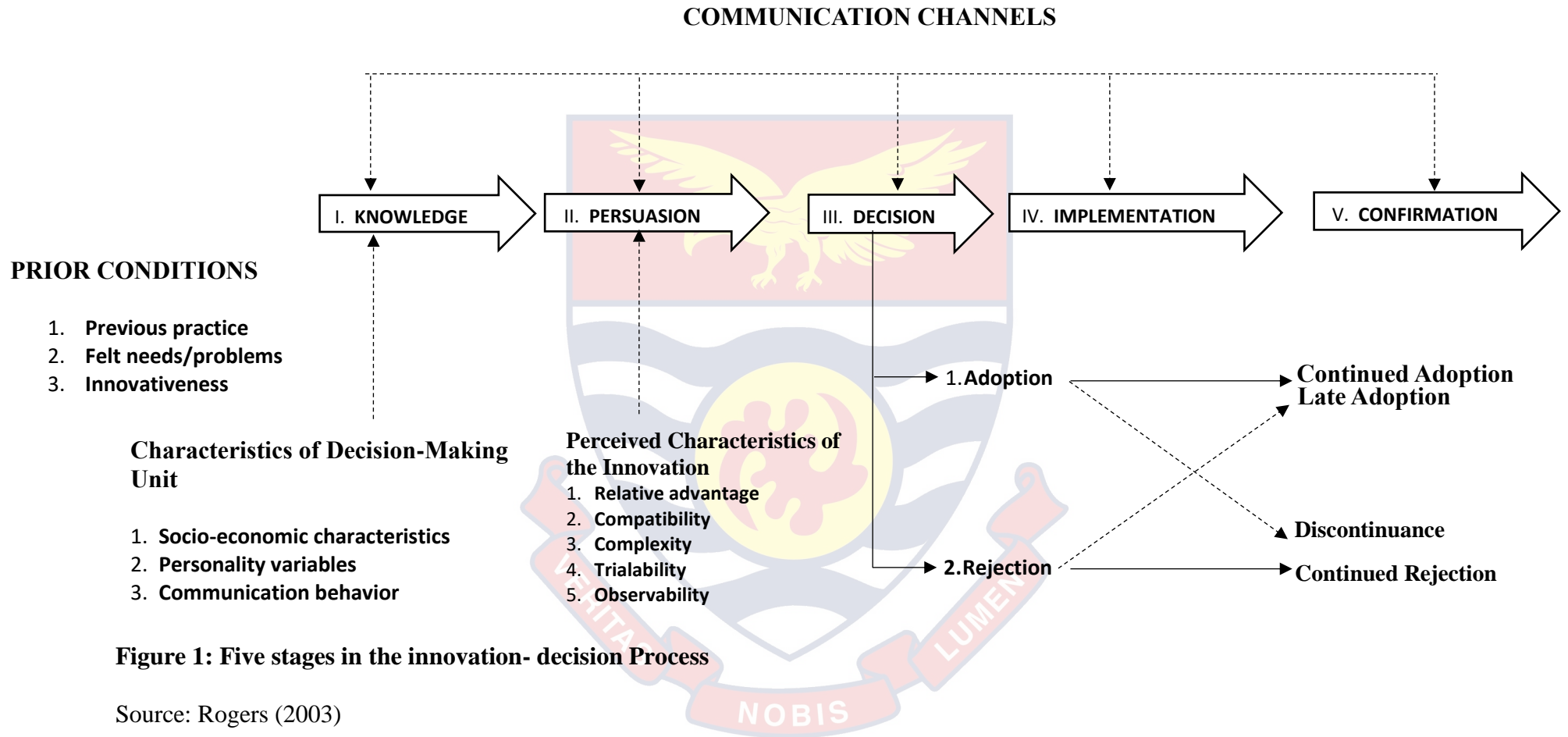


Figure 1: Five stages in the innovation- decision Process

Source: Rogers (2003)

The persuasion stage follows the knowledge stage and according to Rogers, this stage is more affective (or feeling) centred while the knowledge stage is cognitive (knowing) centred. During the persuasion stage, the individual forms an opinion of the innovation; it is a period of attitude formation and change on the part of the individual. As Sahin, (2006) put it; knowledge alone does not guarantee adoption, the individual's attitude counts. During this stage, prospective adopters consider the relative advantage, compatibility, complexity, trialability and observability of the innovation within the social system. The farmer seeks to reduce the degree of uncertainty about the innovation's functioning; and the social reinforcement from others (peers, colleagues) affect the individual's opinions and beliefs about the innovation. During the persuasion stage, interpersonal channels are more effective at persuading the individual to accept a new idea as compared with mass media methods such as radio, television and internet. Heffernan, Thompson and Nielson (2008) working on vaccine adoption among livestock farmers in Bolivia found that group membership improved uptake, which confirms the effect of interaction between colleagues.

The decision stage follows the persuasion stage. At this stage, the individual chooses whether to adopt or reject an innovation. When the innovation has the chance of being tried, referred to as "partial trial" the chances of the innovation being adopted are higher. Rogers however states that rejection is possible in every stage of the innovation-decision process. Rejection can be described as active or passive rejection. In an active rejection, an individual may try an innovation and think about adopting it, but later does not. Active rejection

could also be referred to as a discontinuance decision, where the innovation is first adopted and later rejected. In a passive rejection (or non-adoption) position, the individual does not think about adopting the innovation at all.

At the Implementation, the innovation is put into practice. However, there may sometimes be some degree of uncertainty about the innovation and therefore, the implementer may need technical assistance from the change agents and others in order to reduce the degree of uncertainty. At this stage 'reinvention' which is "the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation" may occur (Rogers, 2003, p. 180). According to Rogers the more reinvention takes place, the more an innovation is adopted and becomes institutionalized. The Confirmation Stage follows the implementation stage

Although the decision has been made at the confirmation stage, the individual looks for support for the decision. Rogers explains that the individual could reverse the decision if she/he is exposed to conflicting messages about the innovation. However, the tendency is for the individual to stay away from such messages and seek messages that are supportive that confirm the decision. Discontinuance may again occur during the confirmation stage in two ways. First, the individual may reject the innovation and replace it with a better one referred to as replacement discontinuance. The second type is the disenchantment discontinuance, where adopter rejects the innovation due to dissatisfaction with its performance. Another reason for discontinuance decision may be that the

innovation does not meet the needs of the individual. The Individual innovativeness theory is discussed next.

Individual Innovativeness Theory

The individual innovativeness theory explains how the adoption of an innovation is affected by the characteristics of the individuals in a system or society. Nutley, Davies and Walter, (2002) described this as who adopts the innovation and when. Adoption research has shown that innovations are not adopted at the same time by all members of a social system. For instance, when an innovation is introduced into a community some farmers adopt earlier than others do and this gives a pattern that indicates their level of innovativeness. Rogers, (2003) defines Innovativeness as 'the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a system' (Rogers, 2003). This definition is based on the normal distribution curve. The first group, 'innovators' consist of 2.5% of individuals who adopt a particular innovation. These are located at the extreme left end of the normal curve, two standard deviations from the mean. They are usually willing to take risk and are therefore the first to adopt innovations. The next group are the early adopters (13.5%) followed by the early majority (34%), the late majority (34%) and the last group, the laggards (16%). Innovators are usually willing to experience new ideas, and are prepared to cope with unprofitable and unsuccessful innovations and a certain level of uncertainty about the innovation. This category is described as cosmopolitan since they relate with people outside the social system. They may not be respected by others in the social system due to

their entireness and their close relationship with people outside the social system. Rogers also describes innovators as gatekeepers who bring the innovation from outside the system. The next section discusses the theory of perceived attributes.

The Theory of Perceived Attributes

The theory of perceived attributes is based on the notion that an individual will adopt an innovation if they perceive the innovation to have certain attributes or advantages over the existing or previous one (Nutley et al., 2002). The characteristics of the innovation determine the rate of its adoption. Prospective adopters consider five main attributes of the innovation under consideration: relative advantage, compatibility, complexity, trialability and observability. The relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes. Rogers (1995) refers to relative advantage as the profitability of the innovation and relative advantage is regarded as one of the best predictors of adoption of an innovation. It comprises of the degree of economic profitability, low initial cost, a decrease in discomfort, a savings in time and effort and the immediacy of the reward. The compatibility is the degree to which an innovation is perceived as being consistent with the existing values, past experiences and needs of potential adopters. The complexity of the innovation is the degree to which an innovation is perceived as difficult to understand and use; the trialability is the degree to which the innovation may be experimented with on a limited basis. The fifth attribute observability of the innovation is the degree to which the results of innovation are visible to others within the social system. The next section discusses the theory of the rate of adoption.

The Theory of Rate of Adoption

The rate of adoption of an innovation is the relative speed with which the innovation is adopted by members of the social system. According to Rogers, (2003) the rate of adoption is measured as the number of individuals who adopt a new idea in a specified period. It is the numerical indicant of the steepness of the adoption curve for an innovation (Rogers, 2003). When the number of individuals who adopt a new idea is plotted on a cumulative frequency basis with time, the resulting distribution is in an 's' shaped curve. Adoption grows slowly at first because only a few individuals adopt. However, as more individuals adopt, the curve begins to climb. There is a period of rapid growth that tapers off. It becomes stable and declines. There is however a difference in the slope of the curve depending on the individual innovation. Some innovations are adopted more rapidly than others, giving a steeper curve. The perceived attributes of an innovation have been proved through various studies on adoption to be an important variable that explains the rate of adoption. According to Rogers (1995), 49 to 87 percent in the rate of adoption is explained by the perceived attributes. Other factors that affect the rate of adoption are (1) the type of innovation-decision; (2) the nature of the communication channels diffusing the innovation at the various stages of the innovation –decision process; (3) the nature of the social system and (4) the extent of change agent's promotion efforts in diffusing the innovation (Rogers, 2003).

Although Rogers' theory of diffusion has been successfully used in many fields including communication, agriculture, public health, the theory has been

criticised. Criticisms include it being Pro-innovation biased, in that it assumes all members of the social system will adopt the innovation and that adoption should happen quickly (Botha & Atkins, 2005; Kole, 2000). Thus, rejection or discontinuance of an innovation is de-emphasised. According to Kole (2000), the theory ignores the fact that both diffusion and adoption may fail, especially if the innovation was a bad idea to begin with. Leeuwis and Van den Ban (2004) also state that some farmers may not adopt innovations because the innovation may not be relevant or suitable for them and yet such farmers are labelled 'laggards'. The Individual blame bias is another limitation of the theory. Individuals who do not adopt the innovation are blamed for their lack of response, while the change or development agent is not blamed for its lack of response to the needs of farmers. The theory is criticised as being biased in favour of larger and wealthier farmers. This is because development agencies tend to work with the more innovative, wealthy, educated, and information-seeking clients, who are usually more progressive and easier to convince. Such farmers either have the economic means to adopt and/or may easily obtain credit. Thus, produce from such large farms that adopt have a direct effect on total agricultural produce (Rogers, 2003; Stephenson, 2003), widening the social gap between the rich and the poor.

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Despite criticisms, the diffusion of innovations theory is still relevant in today's research and to this study in particular. The second objective of this study seeks to examine the adoption of small ruminant (SR) husbandry technologies transferred among female and male farmers. It is thus linked to the rate of adoption theory defined earlier. This study however focuses on determining the level of adoption of the SR husbandry technologies transferred, which is the level of usage of a given technology in any period (Bonabana-Wabbi, 2002). In addition, the study is interested in the perceived attributes of the SR husbandry

technology package transferred. Five variables determine the rate of adoption: the perceived attributes of the innovation, type of innovation–decision, communication channels, nature of social system, the extent of change agents’ promotion efforts and the perceived attributes of the innovation. The perceived attributes of the innovations have been reported by diffusion research to explain between 49 to 87 percent of the variance in the rate of adoption (Packrats, Hallfors and Cho, 2002; Rogers, 1995; & Rogers, 2003). This study thus focuses on the perceived attributes of the technologies transferred, adoption levels and adds a gender dimension to the study. Although Rogers’ diffusion of innovation theory considers the social system in which the innovation is diffused, not much is discussed about the gender dimension of the diffusion process. Since the study seeks to explore the gender dynamics of SR husbandry technology transfer and how adoption may or may not affect gender relations in the household and vice versa, it would be useful to discuss some gender concepts and approaches for an understanding of the role that gender relations play in the adoption of technologies. The next section thus discusses gender concepts, gender and development and gender analysis frameworks.

The Concept of Gender

Although the two terms sex and gender are used interchangeably, there is a distinct difference between the two. According to March et al., (1999) sex is the biological difference between women and men. Sex differences are concerned with women and men’s bodies. While men produce sperm, women bear and breastfeed children. “Gender is seen as the process by which individuals who are

born into biological categories of male or female become the social categories of women and men through the acquisition of locally-defined attributes of masculinity and femininity” (Kabeer, 1994:11). The experience of being female or male differs from culture to culture and gender is used by sociologists to describe all the socially given attributes, roles, activities and responsibilities connected to being a female or a male in a given society. Thus, gender identity determines how women and men are expected to think and act according to the way society is organized (March et al., 1999).

Women and men in a given society are expected to relate to each other or behave in certain ways towards one another that the society accepts as normal and this is referred to as gender relations. Gender Relations are hierarchical relations of power between women and men that tend to disadvantage women (Reeves and Baden, 2000). Gender relations are shown in power differentials, ownership and control of resources and distribution of benefits between women and men in the household. As Manfre et al., (2013) put it ‘gender relations embody and justify unequal power relations’ in many places. Gender relations are concerned with how power is distributed between sexes. They create and reproduce systematic differences in women and men’s positions in a given society. Gender relations is one type of social relations also referred to as the social relations of gender. The others are class race ethnicity and disability. According to Reeves and Baden (2000), social relations are evident in every culture and they are not static but change as does gender relations. Gender relations define the way in which responsibilities and claims are allocated and the way in which each is given a

value and vary according to other social relations such as class, race, ethnicity and disability (March et al., 1999).

Gender roles and gender division of labour

Responsibilities and tasks assigned to women and men by society are referred to as gender roles. These are the expected behaviours, attitudes, obligations, and privileges that a society assigns to the different sexes. Thorne cited in Fenteng (2009) asserts that the roles assigned to the sexes are evident when children play. For instance, boys engage in aggressive games while girls engage in more passive activities like playing with dolls and jumping rope.

Allocating some tasks solely or exclusively to women and others to men is known as the sexual division of labour (DOL), which forms the basis for determining gender roles; and these roles are reflected in the activities women and men undertake in the household and community. The roles are culture and context specific and may change with changes in external circumstance (March et al., 1999). For instance, the management of indigenous poultry may change from women to men when the enterprise becomes more profitable (Hill, 2003). Since gender power relations are skewed in favour of men, different values are ascribed to men tasks and women's tasks. This leads to the next topic, the triple role concept.

The Triple role

Moser (1993) postulated the triple role concept. She states that whereas women have three different sets of roles: the reproductive, the community and the productive roles that they play in a household, men have two, the productive and

sometimes the community roles. Community roles cover the ‘collective’ aspect of production (community organization and provision of items of collective consumption). Productive roles are those that generate income and reproductive roles are those that pertain to childcare /domestic labour. Kabeer (1992, 1994) comments on Moser’s triple roles framework by drawing attention to the multiplicity of demands on women’s time. Further, women’s community roles in addition to the reproductive tasks are considered natural and effortless and are therefore ignored by male community members and planners who enter to assess community needs. It is only productive work that is recognized as work.

Men’s work on the other hand is valued and they are labelled the ‘breadwinners’ in the household. They do not seem to have a defined reproductive role but may assist the women. Men’s involvement in community work revolves around leadership positions at the formal political level, while women are involved at the organizing level.

Kabeer (1994) posits that much as the triple role brings attention to the time use and multiple roles of women, it fails to ‘give serious attention to the multiplicity of social relations through which these roles are performed.’ Murthy (1993) has criticized Moser’s Tripple Roles Framework and the Harvard Analytical Framework. He argues that these have treated women as a homogenous and unproblematic category in that they have isolated gender from other sources of oppression and reduced the complexity of women’s oppression (Kabeer, 1994). Kabeer also emphasizes that Moser failed to integrate the ways in

which social differences between women might structure the performance of their triple roles and she describes this as a missed opportunity in Moser's framework.

Gender and Women's Interest

According to Molyneux (1985) the concept of women's interest is contentious because women are positioned within their societies through a variety of different means—among them, class, ethnicity and gender. The interests they have as a group are shaped in complex and sometimes conflicting ways. It is therefore difficult if not impossible to generalize about the interests of women (Molyneux, 1985). She stresses the need to specify how the various categories of women might be affected differently and act differently because of the peculiarities of their social positioning and their chosen identities (Molyneux, 1985). Gender interests are those that women or men may develop by virtue of their social positioning through gender attributes (Molyneux, 1985). Gender needs arise out of women's and men's interests. Gender interests are prioritized concerns that have been translated into the concept of gender needs (Moser, 1989) and can be satisfied in the planning process when gender needs are met. Although needs and interests are conceptually different, in practice they are related in the planning process (Molyneux, 1998). Gender needs may be practical or strategic.

Practical Gender Needs (PGNs) according to Moser (1989) are the immediate needs identified by women to assist their survival in their socially accepted roles, within existing power structures. Such needs are practical in nature and are concerned with inadequacies in living conditions including provision of water, health care and employment. Practical Gender Needs do not

challenge the prevailing forms of inequality although these needs may be a direct result of women's subordinate position in society (Moser, 1994). Practical Gender Needs may be addressed through policies and actions including those that reduce women's workload through location of standpipes and hand-pumps, providing grinding mills and developing fuel-efficient stoves. Also, in the provision of improved health care, access to safe water and sanitation and improved services (primary schools, housing and transport facilities). They ensure access to income-earning opportunities including skills training, credit initiatives and access to markets). When PGN of both men and women are met by projects there is no change in their relative positions in society and social conflict is not generated (Boateng, Brown & Tenkorang, 2013; Sayadi & Calatrava-Requena, 2008).

Strategic Gender Needs (SGNs) on the other hand, are needs that women identify because of their subordinate position in society. They vary according to particular contexts related to gender division of labour, power and control, and may include such issues as legal rights, absence of domestic violence, equal wages and women's control over their bodies (Kabeer, 1994; Molyneux as cited in Moser, 1994). According to Kabeer (1994) meeting strategic gender needs assists women to achieve greater equality and change existing roles, thereby challenging women's subordinate position and aiming towards their own empowerment. Strategic gender needs are often perceived as feminist in nature, because they seek to change women's status and position in society in relation to men. Meeting SGN does not only help women to achieve greater equality, it also changes existing roles and therefore challenges their subordinate positions.

Strategic Gender Needs vary according to the economic, political, social and cultural context (Moser, 1994). Meeting SGN are therefore more likely to be resisted than meeting PGNs. Coates (cited in Boateng et al., 2013) however posits that every practical intervention has an effect on strategic areas of life (power relations and control) whether it is intended or not (March, Smyth & Mukhopadhy,1999).

Sayadi and Calatrava-Requena (2008) working on the prioritisation of gender needs as a criterion for analysing gender asymmetry among rural women in Spain found educational attainment to be directly related to the prioritisation of strategic gender needs or with the questioning of gender roles. Other cultural variables including how often women read newspapers, books and magazines, their membership of women's associations, were positively related to prioritisation of SGN. Prioritisation of SGN also related to female labour force, since working women were more likely to prioritise strategic gender needs than women in other positions such as housewives and the unemployed were. The study showed that a greater perception of gender inequalities at home and work logically leads to a greater probability of prioritising strategic gender needs. Sayadi & Calatrava-Requena also posit that PGN are prioritised in communities where social development is low and prioritisation of SGN begin to take the place of PGN as development increases. They recommended that any plan of action to meet strategic gender needs should include increasing the level of education and training of women in rural regions, training in new technologies, languages and business planning and management. The action plan should include raising

awareness of gender inequalities in different areas at home, work and institutions, among others.

On the other hand, writers including Reeves and Baden (2000) posit that there is no obvious distinguishing feature between the two kinds of needs and that any policy or programme may meet both sets of needs. Through collective organizing around PGN, women may achieve more strategic and transformatory goals. It has been noted that NGOs and women's organisations use interventions that meet practical gender needs as an entry point into communities (Reeves and Baden, 2000). Women however, may not always recognise or prioritise their strategic gender needs, if it could threaten their immediate practical needs (*ibid*). The next section discusses the concept of power.

The Concept of Power

Rowlands (1997) categorizes power into four (4) dimensions: 'power over' 'power to' 'power with' and 'power within'. 'Power over' is the controlling power, which may be responded to with compliance, resistance (which weakens process of victimization) or manipulation. In the case of a gender analysis men wield power over other men and by men over women (Rowlands, 1995). With this kind of power 'power over' described as 'finite supply' (Rowlands, 1997) or 'zero sum' (Oxaal & Baden, 1997) the increase in power of one group or person results in the loss of power of the other. Thus, when women are empowered it means the loss of power for men; and any change in power relations as necessarily involving conflict. This according to Rowlands explains why women's empowerment seems a threat to men. 'Further men's fear of losing their

patriarchal control constitutes an obstacle to women's empowerment' (Rowlands 1997).

The second dimension of power by Rowlands (1997), describes 'power to' as generative or productive power (sometimes incorporating or manifesting as forms of resistance or manipulation) which creates new possibilities and actors without domination. Oxaal and Baden (1997) describe 'power to' as relating to having decision-making authority, power to solve problems and can be creative and enabling. While Kabeer (2001) states that 'power to' refers to people's capacity to define their own life –choices and to pursue their own goals. From the above all four Lukes, Rowlands, Oxaal and Baden and Kabeer agree to the element of decision making in 'power to.'

"Power with" is the type of power that is exercised with others, for instance in a social group. 'Collectively people feel empowered through being organized and united by a common purpose or common understanding' (Tasli, 2007). 'Power with' gives a sense of the 'whole' being greater than the sum of individuals, especially when a group collectively works on problems.

The fourth kind of power according to Rowland is 'Power from within' which Tasli (2007) describes as the mental and spiritual strength that stems from the inner deepness of an individual. Spiritual strength and uniqueness that resides in each of us and makes us human. Its basis is self-acceptance and self-respect which extend, in turn, to respect for and acceptance of others as equals (p. 26). Such power from within cannot be given; it has to be self-generated (Kabeer,

1994 p. 229). This power is manifested as an increase in self-esteem, awareness or consciousness raising and confidence building (Oxaal & Baden, 1997).

Power is relevant in the present study of ‘gender dynamics among farmers who participated in the SR husbandry technology transfer’. This is because in the communities under study men dominate while women are in subordinate positions, thus men are likely to exhibit ‘power over’ and ‘power to’, since the men are the main decision –makers. ‘Power to’ is an indication of the decision–making ability of the individual. Women in Development (WID) literature seeks to show that when women have access to income they exercise greater decision-making power in households. However, Kabeer states that only in few instances has women’s involvement in income generating projects caused a change in women’s position in the household (Kabeer,1994). Women’s increase in income and how it challenges men’s authority (power over), is discussed in the section under ‘Credit as a Resource’. The next section discusses Gender and Development.

Gender and Development

Agriculture in Ghana as in most developing countries is both a female and male activity. It is common knowledge that in both crop and animal agriculture women play an immense role by way of their labour use; that despite their immense contribution these women in both crop and livestock farming are disadvantaged when it comes to ownership, access and control of productive resources in agriculture; namely land, labour, financial resources, information among others. The International Food and Policy Research Institute (IFPRI) has

noted that the goal of development is that both male and female have a fair chance of having their needs met and each having equal access to opportunities for realizing their full potential as human beings, in this way sustainable development can be achieved (IFPRI, 2010). Since women make up more than fifty percent of the agricultural work force a bias in access and opportunities as mentioned earlier would skew development. The question is what is the source of this inequality and access to resources among other things?

Various schools of thought emerged seeking to explain the origins of women's subordination how it can be dealt with. The Women in Development (WID), Women and Development (WAD) are two approaches that preceded the Gender and Development (GAD) approach. According to critics, the WID approach had been successful to some extent in improving women's economic condition but had been less effective in improving women's social and economic power relative to men in development contexts. WID has its roots in the Modernization theory (Vijayamohanan, Asalatha & Ponnuswamy, 2009). It focuses on women's productive role and their integration into the economy as a means of improving their status, ignoring the question of women's subordination (Roberts cited in Rathgeber (1990) is of the view that WID intervention strategies tend to concentrate on income-generating activities not taking into account the time burden that such interventions impose on the women.

WAD followed WID. WAD as WID also pays immense attention to the productive roles of women to the neglect of their reproductive roles. Although WAD offers a more critical view of women's position than WID, it fails to

undertake a full-scale analysis of the relationship between patriarchy, differing modes of production and women's subordination and oppression (Rathgeber, 1990). The Women and Development (WAD) perspective, which has its roots in Neo-Marxist feminist and the Dependency theories focuses on 'women' whilst GAD focuses on 'gender'. The Women In Development (WID) and Women and Development (WAD) approaches which preceded GAD have not been able to convince some development theorists, who argue that neither WID nor WAD challenge the fundamental factors that structure and maintain gender inequalities (Connelly, Li, Tania, MacDonald, & Parpart, 2000; Vijayamohan et al., 2009). GAD on the other hand questions the underlying assumptions of social, economic and political structures. It is concerned with the root causes of gender inequalities that create many of the practical problems women experience in their lives (Connelly et al., 2000).

The Gender and Development (GAD) Approach takes its theoretical roots from Socialist feminism. It emerged in the 1980's because of criticism of the Women in Development (WID). The GAD approach is credited to the grass-roots organisational experiences and writings of Third World feminists and has been articulated by a group called Development Alternatives with Women for a New Era (DAWN). Elson (1999) indicates that the GAD approach also emerged because of the experiences and analysis of western socialist feminists interested in development issues. The Socialist feminists are of the view that the social construction of production and reproduction is the basis of women's oppression. They have therefore focused attention on the social relations of gender, and

question the validity of the roles of both women and men in different societies (Rathebege, 1990). GAD is concerned to find out 'why women have systematically been assigned to inferior and /or secondary roles'. To them the answer is found in the pervasiveness of patriarchy (the systemic societal structures that institutionalize male physical, social and economic power over women). Whitehead quoted in Tasli (2007) states that 'No study of women and development can start from the view point that the problem is women, but rather men and women and more specifically, the relations between them'.

GAD is of the view that women and men are found at different levels in the socio-economic structures because they play different roles and have different needs. GAD sees women and men as being active in development and that is the basis of their disagreement with WID. Arguments have been put forward by writers such as Kabeer (1994), Moser (1993) and Oakley (1972) on the need to shift from concentrating on women to women and men. Feminist writers including Oakley (1972) was worried about the general way of perceiving the problems of women in terms of their sex, their biological difference from men, rather than in terms of their gender, the social relationship between women and men, where women have been systematically subordinated. Others such as Kabeer (1994) argued that a gender analysis of social relations be considered, while Moser (1989, 1993) stressed on the need for the ultimate empowerment of women. There was therefore a shift to Gender Analysis in Development or Gender and Development. Thus, the focus was no longer on 'women but on

gender - women in relation to men, and the way in which relations between these categories are socially constructed (Moser 1993).

The GAD approach as opposed to the WID is not only concerned with women but looks at the social construction of gender (women and men) and how roles and responsibilities are assigned and what is expected of women and men. The GAD approach analyzes both the productive and reproductive roles of women in both the private (home) and public (community) sphere. By so doing, this approach analyses the work that women do in private-sphere (household and family work) which hitherto was undervalued. It also analyses the assumptions on which conjugal relationships are based. Thus, GAD is different from WID in three main ways: There is a shift in focus from 'women' to 'gender' and GAD identifies the unequal power relations between women and men. Second, it re-examines all social, political and economic structures and development policies from the perspective of gender differentials. Lastly, it recognizes that achieving gender equality and equity demands 'transformative change' in gender relations from household to global level. GAD thus proposes empowerment of women as one of its main strategies to transform gender relations. The empowerment according to GAD must be self-generated.

The limitations of GAD include the fact that the approach is not clear. As a result, it is interpreted and implemented differently (El-Bushra, 2000); GAD also has an individual focus as in the case of WID and stresses individual efforts and ability to overcome gender biases. It plays down collective approaches to achieving equality. The approach does not easily lend itself to integration into on-

going development strategies and programmes. This is because need for some commitment to structural changes and power shifts which are unlikely to be found either in national or international agencies (Moser, 1989; Rathgeber, 1990). GAD is also viewed as having oversimplified complex issues and expressing them as clichés, which has resulted in confusion (El Bushra, 2000; Razavi & Miller, 1995).

The Gender and Development (GAD) approach was chosen for this work despite its limitations. This is because it pays attention to both women and men and their relations to one another. It also questions the underlying causes of the inequalities that exist between them. It is not concerned only with the productive but also the reproductive roles of women and the effect of reproductive roles of women on their productivity as pertains in the study communities. The approach facilitated an analysis of both the GDOL and how women and men relate as they play their roles and as regards the ownership, access and control in SRPM households. The next section discusses gender analysis for a better understanding of the use of the gender analysis frameworks that follow.

Gender Analysis

Gender analysis is defined by Reeves and Baden (2000) as the systematic gathering and examination of information on gender differences and social relations in order to identify, understand and redress inequities based on gender. Clisby, (2005) also defines gender analysis as the commitment of integrating a gender perspective in all forms of development and political processes at all levels. Other definitions have the following in common: the differences in roles of

men and women, inequities between them as regards access and control of resources and benefits and decision-making, needs and conditions (UNESCO, 2005; CARE, 2005). CARE (2005) adds the need to ascertain the relationships and inequities between them; their experiences, capacities, constraints and rights issues; the reasons for the differences and the need, strategies and opportunities for change (CARE, 2005).

Gender mainstreaming follows gender analysis and involves processes used to ensure that women and men's concerns and experiences are integral to the design, implementation, monitoring and evaluation of all legislation, policies and programmes. Gender mainstreaming leads to equal benefits for women and men, and ends the perpetuation of existing inequality (UK's DFID, 2002). The next section discusses gender analysis frameworks.

Gender Analysis Frameworks

Various gender analysis frameworks have been developed to facilitate gender analysis. Each framework has a focus that reflects the values and assumptions of the designers; and these influence the type of development intervention that is selected. For instance, the Women In Development (WID) approach is focused on the efficient allocation of resources when planning programmes and this has been criticized as having the tendency to be gender-neutral or gender specific in their policies or interventions. Frameworks that have the focus on empowerment emphasize transformation of gender relations through women's self-empowerment. A combination of various aspects of three Gender Analysis frameworks were used for the gender Analysis in this study. These are

the Harvard Analytical framework, the Social Relations Framework and the Moser framework. Various aspects of these three frameworks are used since no single one of the frameworks answers all the questions. For example, the Harvard Framework (HAF) that is also called the Gender Roles Framework is good at bringing out the division of labour in the household and makes women's work stand out clearly. It gives us an idea of who does what in the household, when and with what, thus making women's work visible and helps to avoid underestimating women's workload. It gives a clear picture of the differences in men and women's workload and in differences in the access and control of resources and benefits (March, Smyth & Mukhopadhyay, 1999).

The Harvard analytical framework

The Harvard Analytical Framework (HAF) is also referred to as the Gender Roles Framework or Gender Analysis Framework. It is one of the first frameworks designed for gender analysis. Researchers at the Harvard Institute for International Development in the USA working in collaboration with the Women In Development (WID) office of USAID developed the framework. It aims to help planners design more efficient projects and improve overall productivity. It derives its source from the WID efficiency approach. It is used to collect information at the micro-level (household and community) level. It consists of four (4) tools, which include Tool One (1) the activity profile, tool two (2) the Access and control profile, tool three (3) Influencing factors tool, and tool four (4) Checklist for project cycle analysis. The tools one and two are essential for the study. The activity profile would enable us find out the activities that men and

women engage in on daily basis at home and also concerning sheep and goat production and marketing.

The tool two would enable us find out who has access and control of resources and benefits in the household. In short, the HAF sees the gender division of labour more in the sense of activities performed by the different sexes, time allocation, location of activities, access (ability to use) and control (ability to determine use). The framework is useful in helping projects decide who should or can be involved in the project, i. e whose labour is available, does one need to transfer some of their activities to others in order to participate in a particular project? It enables a labour audit in order to avoid failure in the project (Kabeer, 1994).

This framework however does not show how men and women relate to each other and therefore cannot answer the question about the how and why of unequal gender relations. Thus, the issue of women's subordination is not tackled. However, the profiles which emerge from the roles may serve as an entry point for examining these issues. Another shortcoming of the HAF is that it sees women and men as two homogeneous groups. The differences that exist within smaller groups such as mother-in-law and daughter-in-law, first and second wife are sometimes not investigated. As a result, power differentials are not observed and therefore the most vulnerable people are not singled out (March et. al., 1999). When it comes to decision making not everything can be captured using the Harvard Framework. The Harvard Framework ignores changes over time and therefore tends to give a static view of the situation. The framework was designed

not so much to create more balanced gender relations but to allocate new resources in such a way as to increase the efficiency of the project or programme. Thus, if it is the men for example who are already good or involved in a particular production activity, further allocating funds to such a group would result in increased income for the household but may not benefit the women and may also give more power to the men (March et al.,1999). Further, the framework is limited in the sense that it does not give any guidelines as to how the existing inequalities observed can be challenged.

Others have observed that the Harvard framework does not give any indication of how to draw out the power dynamics at play, or show the relationship between different people, how people bargains, negotiate interests and make decisions, among others. The Harvard framework has also been criticised for stressing on the separation of tasks when it comes to the division of labour and not on the relationship between the people performing the tasks. Thus, it ignores the social interconnectedness of the people performing the tasks. However, Whitehead cited in Kabeer, (1992) states that the gender division of labour is simultaneously a relationship of separation as well as connection. Kabeer (1992) continues that 'In assigning women and men to different responsibilities, activities or spheres it also makes it essential for them to engage in relationships of cooperation and exchange. She concludes that the gender division of labour implies both technical and social interdependence between women and men. As a result of the above deficiencies March et al., (1999) are of the view that using the Harvard Framework may result in gender neutral or gender specific interventions

(as described by Kabeer) rather than to interventions which transform gender relations.

The HAF identifies productive and reproductive roles but not community role of females and males. The tool one of the Moser Framework (Gender roles /triple role) would complement the HAF tool one (Activity Profile) in identifying the community roles of women and men. Thus, the HAF is good at analysing activities the household level but fails to analyse the social milieu or the macro-level. As earlier stated, this concept of the triple role of women is to raise awareness in the planning process that women have to balance all these roles. It also draws attention to the implications for their ability to participate in planned interventions.

The triple role concept brings attention to the time use of women however the term 'roles' according to Kabeer (1992) is interpreted differently in that it sometimes refers prescribed 'norms' (what people ought to be doing) and other times to the observed (what they actually do). Murthy cited in Kabeer (1994) has criticized Moser's Triple Roles Framework. He argues that these have treated women as a homogenous and non-problematic category. They have isolated gender from other sources of oppression and reduced the complexity of women's oppression (Kabear 1994). The above discussion on the HAF and TRF brings to the fore some shortcomings of the frameworks that render them not adequate for studying the gender relations in small ruminant keeping households. The limitations would be catered for by adding the Social relations framework (discussed next) in undertaking a gender analysis.

The social relations framework

The Social Relations Framework (SRF) would be used to undertake analysis at the community or macro-level by analysing institutions and what men and women do at the community level. Naila Kabeer at the Institute of Development Studies, Sussex University, UK developed the Social Relations Approach (SRA) in collaboration with policy-makers, academics and activists from the south. The framework has its roots in the Gender and Development Approach, which follows the socialist feminist perspective. The socialist feminists like the Marxists believe that class relations are important in understanding women's oppression. They however do not believe like the Marxists that women's oppression would go away when capitalism falls.

The framework exposes the gender power relations that perpetuate inequity and therefore provides understanding of social relations as regards roles, claims, rights, access and control, which the Harvard identifies but does not go further to challenge. According to Kabeer (1994), the HAF analyses roles but does not examine how power is structured and negotiated. The Social relations approach (SRA) seeks to analyse the existing gender inequalities in the distribution of resources, responsibilities and power, the relationships between people, their relationship to resources and activities, and how they are reworked through institutions. It is also used for designing policies and programmes that enable women to be agents of their own development (Hillenbrand et al., 2014; March et al., 1999; Miles, 2014).

The SRA uses concepts rather than tools to analyse the existing gender inequalities. There are five (5) main concepts that constitute the Social Relations Approach and these include the goal of development of human well-being (concept one), the concept of social relations (concept two), Institutional analysis (concept three), Institutional policy analysis (concept four) and the immediate, underlining and structural causes (concept five).

Concept one of the SRA deals with Kabeer's view of development. She sees development as 'increasing human well-being', where well-being concerns survival, security and autonomy. Autonomy refer to the ability to participate in those decisions that shape one's choices and one's life chances, at both the personal and the collective level. With this concept, production is not for the market only but includes reproductive activities that ensure the well-being of humans such as caring, nurturing caring for sick people; activities carried out by the poor to survive; as well as activities concerned with environmental sustainability and consequently survival.

The second concept (2) has to do with social relations. It describes the structural relationships that create and reproduce systemic differences in the positioning of different groups of people. Such relationships establish who we are, what our roles and responsibilities are, the kind of claims we are entitled to make, our rights, the control that we have over our lives and those of others. Social relations produce crosscutting inequalities, which tend to establish the position of people in the structure and hierarchy of their society. There are different types of social relations. Gender relations, also referred to as the social relations of gender

is one type (Amoah, 2014, Kabeer, 1994 & March et al., 1999). Others include class, race relations and ethnicity. Reeves and Baden (2000) add that social relations are evident in every culture. Social relations are not static but dynamic. A change at the macro-level can bring about changes in the social relations of a group (March et al., 1999). The concept would expose the researcher to an understanding of why men and women play certain roles and hold certain responsibilities and claims in small ruminant production and marketing. Also, about ownership, access and control, which would be evident in the rights and control they have over production resources and benefits that accrue in small ruminant rearing and marketing. Concept 2 would complement the use of tools one and two of the HAF discussed earlier.

The third (3) concept is that of Institutional analysis. Kabeer (1994) defines an institution as ‘a framework of rules and regulations for achieving certain social or economic goals. She posits that institutions ensure the production, reinforcement and reproduction of social relations and thereby create and perpetuate social difference and social inequality. She defines organizations as the specific structural forms that institutions take’ (March et., al. 1999). Kabeer maintains that the underlying cause of gender inequality are not confined to the kinship / family but are reproduced across a range of institutions including the community, state and the market place (March et., al. 1999; Miles, 2014). Concept three (3) would be used to analyse how institutions in the study area create and reproduce inequalities among men and women, if any. These institutions are embodied in organisations including the household (small

ruminant farmer families), the community (traditional authorities, elders, networks, associations, TUDRIDEP and Community Livestock Workers), the state (Local government, Ministry of Food and Agriculture and its Agricultural Extension Agents (AEA) and markets (small ruminant traders).

The concept of institutional analysis challenges two myths about institutions: the first myth holds that institutions are ideologically neutral and the second that institutions are separate entities, such that changes in one does not affect the other. Challenging the first myth, Kabeer (1994) argues that few institutions admit to ideologies of gender or any other forms of inequality. Each institution has an 'official' ideology that guides their policy and planning based on the assumptions that: the state pursues both the national interest and welfare; that the market pursues profit maximization; that the community, including NGOs is about service provision; that family/ kinship is about altruism and is a co-operative and a non-conflictual institution (March et al., 1999). She argues that in order to understand how social differences and inequalities (in roles, responsibilities, claims and power) are produced, reinforced and reproduced through institutions, we must move beyond the official ideology of bureaucratic neutrality and scrutinize the actual rules and practices of institutions to uncover their core values and assumptions (*ibid*).

Challenging the second myth about the independence of institutions or separateness of institutions, Kabeer (1994) argues that a change in one institution affects another; that there is constant interaction between institutions; that institutions are capable of change and 'indeed, they adapt constantly, in order to

respond to change in the external context' (March, 1994). For instance, in the present study, the myth would hold that the introduction and adoption of husbandry technologies by small ruminant farmers would not affect income, access and control; and decision-making in the household; and hence social relations within the household. 'Institutional change according to Kabeer is brought about through the practices of different institutional actors and through processes of bargaining and negotiations' (Kabeer, 1994; Miles, 2014).

Although social institutions vary across cultures, the SRA approach states that there are five dimensions of social relationships common to all institutions (Table 1). These five dimensions are distinct and yet interrelated and definite to the analysis of social inequality in general, and gender inequality in particular. These comprise of rules (how things are done), activities (what is done), resources (what is used and produced) people (who is in or out, who does what) and power (who decides and whose interests are served). When these five dimensions of social relationships are applied in examining institutions, it helps to unearth and understand the gender dynamics at play, referred to as institutional analysis (Kabeer, 1994; Hillenbrand et al., 2014; Miles, 2014).

Rules are accepted principles that state the way things are to be done in an institution and may be official and written down or may be unofficial and expressed through norms, values, laws, traditions and customs (Table 1). Rules have the ability to allow or regulate what is to be done, how it is to be done, who does it and who will benefit. The advantage of rules is that it allows everyday decisions to be made with minimum effort but the disadvantage is that they

entrench ways of doing things to the extent that they seem natural or unchangeable.

Activities undertaken by people in the institution are governed by rules and are of different types: activities may be productive, distributive, or regulative, who gets what? Who can claim what? The rules of institutions ensure that tasks are allocated according to rules. As such, certain tasks are assigned and routinely carried out by certain groups of people. It turns out that that group becomes associated with those tasks, such as women carrying out care work in the household, market and state institutions. It thus seems to be their natural work. Although rewards are attached to tasks, some tasks get more rewards than others do. For example, household chores receive less recognition than ploughing a family land. The difference in recognition tends to reinforce the inequalities between women and men or between age groups. In the final analysis, institutional practice must be changed, if unequal relations are to be transformed (March et al., 1999).

The mobilization and distribution of resources are the third common aspect of institutions. Resources may be human (labour, education and skills), material (food, assets, land or money) or intangible (information, contacts, networks). The rules of an institution govern the distribution of resources (Kabeer, 1994; Miles, 2014).

People are important in every institution. Institutions however, tend to be selective about who is included and excluded, who is assigned various resources, tasks and responsibilities and their position within the hierarchy.

Table 1: Dimensions of Social Relationships

Rules: How things get done	<p>Rules allow or constrain:</p> <ul style="list-style-type: none"> What is done How it is done By whom it will be done Who will benefit
Activities: what is done?	<p>Who does what?</p> <p>Who gets what?</p> <p>Who can claim what?</p>
Resources: what is used, what is produced?	<p>Human resources (labour, education, skills)</p> <p>Material resources (assets, land, money)</p> <p>Intangible resources (information, contacts, network, goodwill)</p>
People: who is in, who is out, and who does what?	<p>Institutions deal with people and are selective about:</p> <ul style="list-style-type: none"> Who they allow in and exclude, Who is assigned various resources, tasks and responsibilities Who is positioned well within the hierarchy
Power: who decides and whose interests are served	<p>Unequal distribution of resources and responsibilities</p> <p>Official and unofficial rules that promote unequal distribution</p> <p>Authority and control to promote practices which entrench privileged positions</p>

Source: Adapted from Amoah (2014); Kabeer (1994); Miles (2014)

Power, another aspect of institutions is concerned with who decides and whose interests are served. ‘The unequal distribution of resources and responsibilities, together with the official and unofficial rules which promote and legitimize this distribution, ensures that some institutional actors have authority

and control over others' (March et al., 1999; Miles, 2014). Such privileged individuals tend to promote practices that end up entrenching their position; and may resist change. When institutions are examined based on their rules, practices, people, distribution of resources and their authority and control structures it helps to bring an understanding to who does what, who gains, who loses (which men and which women). This is institutional analysis.

Concept 4 of the social relations approach is Institutional Gender policies. Kabeer classifies policies first as gender blind and gender aware depending on the degree to which they recognize and address gender issues. Gender-blind policies are those that do not acknowledge that differences exist between the sexes. The policies therefore perpetuate the already existing gender biases and this often tends to exclude women (March et. al., 1999; Miles, 2014). Gender aware policies however 'recognise that women as well as men are development actors and that they are constrained in different, often unequal ways as potential participants and beneficiaries in the development process (ibid). With gender aware policies women and men may have needs, interests and priorities that are different and sometimes conflicting. Gender-aware policies may be gender neutral, gender specific or gender redistributive. Gender-neutral policies according to March et al., (1999) use the knowledge of gender differences in a given society to overcome biases in development interventions. They ensure that the intended interventions target and benefit both sexes effectively thus meeting the practical gender needs of both sexes. Such gender-neutral policies work within the existing gender division of resources and responsibilities (March et al.).

Gender specific policies also use the knowledge of gender differences in a given context to respond to the practical gender needs. However, these policies target either sex (either women or men) or also work within the existing gender division of resources and responsibilities. Gender-redistributive policies on the other hand, are interventions that are intended to transform existing distributions to create a more balanced relationship between women and men. Gender redistributive policies may target both men and women or one group and are concerned with meeting the strategic gender interests or needs. When they work on the practical need of women, they do so in ways that have transformatory potential, whereby conditions are created for women to empower themselves.

The fifth concept of the Social Relations approach has to do with exploring the immediate, intermediate and structural factors that cause the problem under study, and the effects on the various actors involved. The Social Relations Approach however encourages support to women to foster relationship of solidarity, and challenge and transform relationships that reproduce and maintain inequality. The strengths of the framework include the fact that it does not just give a snapshot of static view of gender roles, but can also be used to discuss processes, which have led to the situation. It also emphasizes the connectedness of women and men through their social relationships, as well as the ways in which these affect them as separate groups. The social relations approach offers a way of understanding how various institutions relate to each other and how a change in one can trigger a change in another. It is thus able to give an insight into the roots of powerlessness, poverty, and women's subordination.

The SRA is a method for analysing existing gender inequalities in the distribution of resources, responsibilities and power and for designing policies and programmes that enable women to be agents of their own development. It however has some methodological challenges for practitioners, in that the complexity and multiple levels of analysis, and the focus on gendered structures and institutions, are holistic and theoretically satisfactory, but challenging to apply in a participatory manner (March et al., 1991).

This theoretical review has focused on diffusion leading to adoption, the concepts of gender, division of labour and power; women in development, women and development; gender and development approaches and gender analysis frameworks. The discussion has shown how various gender analysis frameworks can be combined to undertake a gender analysis of the communities under study and how the inclusion of the SRF explains how institutions such as markets, households, communities and the state can contribute to explain gender relations within the small ruminant production and marketing arena in the study area. The next section deals with the empirical review.

Empirical Review

The section starts with an overview of agricultural sector in Ghana, small ruminant production and marketing in Ghana, including the necessary production resources: small ruminants as assets, land, labour, credit extension services. Ownership patterns of small ruminants in the household, access to and control of resources and benefits of production and marketing in small ruminant households; and decision-making powers of female and males over ruminant production and

marketing are discussed. Agricultural extension approaches and factors that may influence technology adoption, including gender division of labour, perception of attributes among others, also follow. First, the Agricultural sector is discussed.

The Agricultural sector

The agricultural sector is recognized as the backbone of the Ghanaian economy. It is key to the overall economic growth and development agenda of the country. According to UNEP (2013), the sector was the second largest in 2010, but slipped to the third position in 2011. Further, provisional estimates provided by the World Bank for 2012 confirmed this trend (27.6% of GDP for the industrial sector compared to 23.1% for the agriculture sector). Nonetheless, the agricultural sector remains the largest employer in the economy even though its share of employment has been declining over the years. The sector contributed 30.2 per cent of the GDP compared to about 18.6 per cent for industry and 51.1 per cent for the service sector (UNEP, 2013). Definite improvements in the productivity of the agricultural sector which includes the livestock sub-sector are required to raise the average real incomes of Ghanaians and impact on the attainment of at least three of the Sustainable Development Goals: end poverty (goal one), end hunger (goal two) and attain gender equality (goal three). The next section discusses the importance of small ruminants and its systems in Ghana.

The importance of small ruminants

The livestock species play important economic and socio-cultural roles for the wellbeing of rural households, such as food supply, source of income, asset

saving, source of employment, soil fertility, livelihoods, transport, agricultural traction, agricultural diversification and sustainable agricultural production (Bettencourt, Tilman, Naciso, Carvalho & Henriques, 2015). Small ruminants, sheep (*Ovis aries*) and goats (*Capra hircus*) which are a part of livestock are kept for similar reasons. They are important economically and socio-culturally. They make definite contributions to rural livelihoods and are a source of employment and wealth creation towards poverty reduction (Adam, Atengdem & Al-Hassan, 2010). Small ruminants are a source of capital generation, savings, investment and insurance for their keepers. They constitute a key aspect of livestock and are good sources of first-class protein, used as a source of draught power, manure production and income generation (SRID, 2010; MoFA, 2016; Oppong-Anane et al., 2008). They serve as a source of income in times of hardship (Amankwah, 2012; Adams & Ohene- Yankyera, 2014 b; Oluwatayo & Oluwatayo, 2012; Quaye, 2008; Asafu-Adjei & Dantankwa, 2001). Vulnerable households especially rural women, depend on livestock including small ruminants for economic sustenance (Duku, Price, Tobi & Zijpp (2011).

Three critical periods have been identified in the life of SR keepers in northern Ghana when small ruminants are of great importance (Amankwah et al., 2012). The first is in times of food shortages during the extended drought periods from November to May, when small ruminants serve as an insurance. They are sold to purchase food (Amankwah, 2012; Asafu-Adjei & Dantankwa, 2001; Quaye, 2008). Secondly, SR are sold to pay for cost of labour and other inputs at the beginning of the farming season (Amankwa et al., 2012). The third critical

period is unforeseen circumstances such as drought, crop failure, disaster or funerals (Amankwah, 2012; Asafu-Adjei & Dantankwa, 2001; Okunlola, 2002; Rahman, 2007). Small ruminants are therefore a potential source of ‘liquid cash’ in times of financial need for the farm households (Adams & Ohene-Yankyera, 2014 b). Small ruminants are also referred to as ‘quick cash’ especially goats (Aboe et al., 2013 a & b); in addition to other livestock, they are perceived as a ‘walking bank’ of capital (Terril, 1985 b).

Socio-culturally small ruminants are used for various purposes (Apori, Osei, & Oppong-Anane, 2010; Fakoya & Oloruntoba, 2009; Turner, 2007; Oluwatayo & Oluwatayo, 2012) including meeting obligations such as dowries, festivals, funerals, payment of social dues and for religious ceremonies. One very important use proceeds of small ruminants is the payment of medical and school fees among rural women (Aboe et al., 2013 a & b; Devendra, 1985).

In a recent study across the three northern regions (Upper East, Upper West and Northern regions) farmers itemized similar reasons for keeping small ruminants. These included for ‘use of manure for fertilizer’, ‘non-cash saving needs’, ‘urgent need for cash’, ‘food risk management’ and ‘gifts’. They however differed by region on other reasons. For farmers in the Northern Region the most important reason was ‘sale or market’, as reported by authors including Baah, Tuah, Addah, & Tait (2012). For Upper East Region, it was for ‘non-faith based cultural functions’; while for the Upper West Region the reason was “to sell when they were in ‘urgent need of cash’”. The section that follows describes farmers’ preference for small ruminants.

Preference for Small Ruminants

Small ruminants are preferred over large ruminants like cattle because they are less capital intensive, require less land, have low initial investment and low operational cost (Birthal and Ali, 2005; Devendra, 1985; Fakoya & Oloruntoba, 2009 & Upton, 1985). Compared to cattle, small ruminants have a short gestation period, high prolificacy, rapid growth rate, high feed use-efficiency from coarse roughage and high tolerance to tannins and disease, as well as marketability within one season (Lebbie, 2004, Peacock, 2005, Terril, 1985 a). Further, sheep and goat are more efficient in converting non-grain feed into quality meat compared to cattle and poultry (Terril, 1985 b).

Sheep and goat are smaller and therefore easier and quicker to sell than larger animals like cattle. The importance of small ruminant production is emphasized as compared to other ruminants and non-ruminants such as cattle, pigs and poultry, because they ensure food security in rural areas and help in reducing poverty and fostering overall household well-being (Dossa, Gauly, & Wollny, 2007; Davendra & Chantalakhana, 2002; Peacock, 2005). The smaller size of small ruminants makes them suitable for home consumption as compared to cattle and SR provide protein for nutritional purposes (Oluwatayo & Oluwatayo, 2012). Furthermore, small ruminants are biologically adaptable and are better able to cope with the long spells of drought in northern Ghana (Lebbie, 2004 & Peacock, 2005). The short gestation periods enable them better recover from drought or disease outbreak. Thus, sheep and goat can generate a continuous

income for their owners before, during and after periods of drought (Adams & Ohene-Yankyera, 2014 b).

There is evidence of a growing market demand for sheep and goat meat than other livestock in urban areas across West Africa (Itty, Ankers, Zinsstag, Tarawally, & Pfister 1997; Lebbie, 2004 & Peacock, 2005). This ‘presents opportunity to increase income and sustain livelihoods of rural households’ (Adams & OheneYankyera, 2014b). Besides one of the main attractions is their low input requirements. Amankwa et al., (2012) reported that farmers preferred to raise small ruminants to other livestock because ‘small ruminants do not require much investment but are prolific and can be relied on in times of need’.

Within the small ruminant species, there are preferences (Dossa, Rischkowsky, Birner, & Wollny 2008). For instance, in Ghana where goat meat (chevon) is preferred to mutton, more chevon is produced than mutton (MoFA, 2010 & Oppong- Anane, 2011). Goats are preferred to sheep because they are hardier, more prolific, mature faster and therefore sell faster (Aboe et al., 2013a). Production of manure for fertilizing farmlands is another issue of comparison. Some like to keep sheep because they are confined more often than goats and so generate more manure. Others prefer goats because they claim goats produce more manure due to their prolific nature (*ibid*). Further, goats are more popular than sheep because they are perceived as a lower risk investment than sheep (Fakoya & Oloruntoba, 2009; Oluwatayo & Oluwatayo, 2012). Goats are more tolerant of arid and drought conditions (Lebbie, 2004 and Peacock, 2005). The next section describes the sheep and goat production systems in Ghana.

Sheep and goat production systems in Ghana

In Ghana, three systems of production are practiced, the extensive, semi-intensive and intensive systems. The extensive system, also known as traditional system of small ruminant production of sheep and goats, is the most common system of production. The system is fraught with constraints that prevent the full potential and contribution of small ruminants in northern Ghana from being realized. These include the continuous use of indigenous breeds, with low feed conversion efficiency, poor housing, chronic disease incidence and lack of nutritious supplementary feed during the dry season (Adams & Boateng, 2012; Adams & Ohene-Yankyera, 2014; Avornyo, Ayantundea, Shaibu, Konlan, & Karbo, 2015; Dossa et al., 2008). Diseases, mostly helminthiasis and *peste des petites ruminants* (PPR) are the main causes of poor productivity and high mortality among the animals (Oppong-Anane, 2010; MoFA, 2016). The feed situation is compounded by the presence of transhumant herders, whose cattle grazing activities erode vegetation cover (Avornyo et al., 2015). Consequently, livestock production in Ghana for some time now does not meet the nation's domestic demand for meat consumption. The nation therefore relies on meat imports to subsidize the shortfall (Adams & Ohene-Yankyera, 2014; FAO, 2012; Amankwa et al., 2012 & MoFA, 2016).

In Ghana, most small ruminants are produced under the extensive system. This results in slow growth of the animals (Adzitey, 2013, Avornyo, Ayantundea, Shaibu, Konlan, & Karbo, 2015). Shortage of quality feed, limited watering points characterize the extensive system of production. Amankwah et al., (2012) report

that water shortages during the dry season, high mortality and theft of livestock are among the constraints facing small ruminant production in northern Ghana. Elsewhere constraints found by Fakoya & Oloruntoba, 2009 to affect the production of small ruminants included in order of priority lack of capital / credit (93.3%), lack of access to land (90.83%), diseases and pests (86.7%), animal feed shortage (81.7%) and theft (80%).

This system of production in Northern Ghana (Upper East, Upper West and Northern Regions) which is described as the hub of livestock production including sheep and goats (Dei, Konadu, Otchere, & Djang-Fordjour, 2007) is extensive. However, it is changing towards the semi-intensive system (Oppong-Anane, 2010). This is due to the many sheep and goat interventions that the hub has experienced.

With the semi-intensive system, simple pens for small ruminants are constructed within the compound or the pens are attached to the owner's house. The pens are constructed from locally available materials such as timber off cuts, bamboo, tree branches and mud, and roofed with leaves, split bamboo or metal sheets (Avorny, Ayantundea, Shaibu, Konlan, & Karbo, 2015; Oppong-Anane, 2010). The small ruminants are fed with "cut and carry" forages from the pasture, field and household wastes, including cassava and plantain peels, crop residues and crop by-products. The animals graze within and at the outskirts of the villages and towns (Oppong-Anane, 2010).

The third system, the intensive sheep and goat production system is similar to that of the semi-intensive except that feed is provided in the pen. This

system is practiced in the peri-urban areas, and in particular, the ‘Zongo’ communities. The system supplies fattened rams and bucks for the urban market, during religious festivities. Crossbreeding of the Djallonke sheep and goats with the long-legged and larger Sahelian sires is common to this system. There are no large-scale commercial sheep and goat farms in the country (*ibid*, 2010). The next section discusses efforts that the government has made to improve the productivity and production of small ruminants and in Ghana and northern Ghana in particular.

Overview of National Livestock Projects on Small Ruminant in Ghana

Projects on livestock development in Ghana have been carried out since 1901 through the 1950’s to date. These were done to address or remove problems and constraints that beset the livestock sub-sector as well as create the enabling environment for its development (Oppong, 1998). These projects were also to essentially give guidelines as well as provide direction for the behavior (including competition) of stakeholders in the production, importation, marketing and other activities carried out in the livestock sub-sector (MoFA, 2004).

In the recent past, some of the programmes aimed at improving the livestock sector have been undertaken. These efforts do not follow any chronological order. The Agricultural Services Sector Improvement Programme (AgSSIP), undertaken between 2004 and 2009 involved the transfer of technology aimed at reducing poverty among rural farmers. Other initiatives like the Livestock Development Project (LDP), which started in 2002 and ended in 2008 addressed challenges including low genetic material of livestock species, poor

management practices, inadequate quality feed, lack of Good Agricultural Practices (GAP) and production, handling and transportation of livestock and livestock products and poor quality of data, among others.

The Ghana Livestock Development Policy and Strategy (GLDPS) was put in place for the period 2004-2015. It aimed at increasing the supply of meat, animal and dairy products from domestic production of 30 percent to 80 percent by the year 2015 as well as reduce poverty from 59 percent to 30 percent for the same period. However, this goal was not fully achieved due to ineffective implementation, as well as monitoring and evaluation problems (MoFA, 2016). Some national policy directions have strategically targeted certain vulnerable and deprived parts of the country to raise the living standard and improve farmer livelihoods. Between 1988 and 1996, the Smallholder Rehabilitation and Development Programme (SRDP) was undertaken in the Northern Region of Ghana. This programme initially did not have any livestock component but at the request of the Ministry of Food and Agriculture (MoFA), a livestock component was instituted in a project dubbed Small Ruminant Project (SRP). Other government initiatives include the Land Conservation and Smallholder Rehabilitation Project (LACOSREP I) in the Upper East Region. The first phase of this project ran between 1992 and 1998 while the second phase (LACOSREP II), ran from 1999 to 2003. The Upper West Regional Development Project (UWADEP) was also initiated in 1997 and ended in 2003. These projects were promoted to improve the subsistent small ruminant production and poverty alleviation in northern Ghana (Adams & Ohene-Yankyera, 2014). In 2010-2011.

The community-driven initiatives for food security (CIFS) i.e. livestock food security initiatives in the eastern corridor of the northern region of Ghana was undertaken by CSIR-Animal Research Institute. The main objective of this project was to re-stock three focal communities in the East Gonja district with small ruminants. The impact of these efforts on the livelihoods of the farmers have been described as negligible (Amankwa, 2011; MoFA, 2009; Adams & Ohene-Yankyera, 2014b). Some studies have indicated that such programs have had minimum impact because most of the initiatives have not been consistent with the livelihood needs of the farmers (Bossman, cited in Ohene-Yankyera, 2014b).

It has been suggested that information on the socio-cultural, socio-economic and farm characteristics of farm household is critical in designing effective and appropriate livestock programs that would benefit local subsistent farmers (Adam & Ohene-Yankyera, 2014; Amankwah, 2012; Ayalew, Duguma, & Tolemariam, 2013). The next section first discusses livestock ownership in general and then ownership patterns of sheep and goats as part of the socio-cultural aspect of sheep and goat production and marketing.

Livestock Ownership

Ownership of livestock is perceived as a sign of wealth of a household. Livestock are assets that are used for production or exchanged for cash. In livestock ownership, men own the big animals while women, the small species (Jin and Iannotti, 2014). This is corroborated by a study in Zimbabwe on the socio-economic status of smallholder livestock production where women owned more chickens, while men owned more cattle (Chawatama, Mutisi, and

Mupawaenda, 2005). The FAO (2011) reported that in Ghana men own three times as much cattle as women.

A study of sheep and goat farmers across northern Ghana found that ownership of small ruminants was more towards men than women. There were more men in the sample of farmers interviewed (66 %) and they were male household heads, 19 percent were female spouses, 8.4 percent children and others were 6.6 percent. Out of the sample, 14 percent described their marital status as widows. This showed that only few women in households across northern Ghana own small ruminants and that household heads who were usually men were the owners of small ruminants (Adams & Ohene-Yankyera (2014 a). Another baseline study of small ruminant farmers across the three northern regions also reported that men were more involved in livestock especially small ruminants and cattle than women were because when the women got married, they handed over all their animals to the husbands (Aboe et al., 2013). The culture of men owning women and their property prevails in the three northern regions (Apusigah, 2009 and Bacho, 2004). Further, women culturally do not claim ownership of animals publicly (Aboe et al., 2013a). Unmarried women usually give their animals to brothers to take care of (*ibid*).

The potential of small ruminants for poverty alleviation has been documented (Aboe & Ameleke, 2008; Duku et al, 2011; Adam & Boateng, 2012). Livestock rearing has been shown to be a pathway out of poverty (Ehui et al 2005; Randolph et al., 2007). Thus, rearing small livestock are considered a good way to improve the livelihoods of rural women (Ampaire and Rothschild, 2011).

Women's ownership of livestock is beneficial to household welfare. Among others, children's nutrition is improved (Valdivia, 2001; Kariuki, Njuki, Mburu, and Waithanji, n.d) and there is improvement in family welfare (Jin and Iannotti, 2014).

Although an increase in women's income results in improved family welfare, studies show that the contribution of livestock to food security is dependent on intra-household dynamics. This is because as women's income increases and they begin to increase their contribution towards household provision, men may tend to reduce spending on the home and that shifts the financial burden of the home to the women (Cheston and Kuhn 2002, Mayoux, 2002). Such situations sometimes result in the further subjugation of women, since they remain poor and vulnerable (Kariuki, Njuki, Mburu, and Waithanji, n.d; Mayoux, 2002; Silberschmidt, 2005).

In many societies including Ghana, norms and rules concerning ownership, access and control are institutionalized such that male household heads have the control over production resources, while women tend to be in subordinate positions (Bacho, 2004; Apusigah, 2009). In addition, in most areas, men tend to own more sheep than women do because traditionally sheep are used to pay dowry so the older men endeavour to keep some sheep. Besides, sheep are more expensive to acquire than goats and the men are richer than the women are. The next section discusses the division of labour and small ruminant husbandry practices.

Division of Labour and small ruminant husbandry

Small ruminant husbandry is undertaken by family members with very little hired labour (Duku et al., 2011; Amankwah et al., 2012). Men are in charge of three activities: building of pens, healthcare and marketing of small ruminants (Aboe et al., 2013 a; Adams & Ohene Yankyera, 2014 a; Bacho, 2004). Traditionally men are responsible for purchasing and sale of animals. When a woman wants to sell an animal, she seeks the permission of the husband and he does the bargaining and selling (Aboe et al., 2013 a; Bacho, 2004).

When women want to house their sheep and goats, they request for land from the men, who give the women land to avoid marital conflict, in situations where the man has more than one wife. However, it is the man who builds the pen (Aboe et al., 2013 a; Amankwa et al., 2012). Housing of small ruminants is not common in the traditional system of small ruminant rearing as stated earlier. The animals sleep in the compound at night. Where there is an attempt to house the animals, sheep are housed, because they are perceived as more delicate and less hardy than goats (Aboe et al., 2013a). The houses are made of mud and thatch roofs or corrugated iron sheets but sometimes unroofed. Lack of pens is a recipe for theft and animal loss from car accidents (Aboe et al., 2013a; Aboe et al., 2013 b; Amankwa et al., 2012).

Cleaning of waste generated by small ruminants is another husbandry practice undertaken by the family members although; reports are not consistent. While Aboe et al., (2013 a) reported that in some districts in the Upper west region of Ghana, men sweep, they reported that in other districts women do the

sweeping. In the few instances where housing was provided, men and children, cleaned pens while women carted dung to the family farms. However, where the sheep and goats slept on the compounds and kitchen areas, the women swept (Aboe et al., 2013a). On the contrary a study by Adams & Yankyera, (2014 a) in the three northern regions found that women were responsible for cleaning of small ruminant pens and this was corroborated by Javed, Sadaf, & Luquman (2006).

Provision of water and feeding seems not to be clear-cut. According to Adams and Ohene Yankyera (2014 a), provision of water is the responsibility of the youth (31.7%), men (30.5%) and women (29.3%). Feeding of small ruminants is the task of male spouses 39.6%, followed by adult children (30.2%) and then female spouses (24.8%), in areas where supplementary feed is provided during the dry season. However, where flocks are more than 80 sheep, older men above 60 years herd the small ruminants during the rainy season, while children attend school; and the younger men engage in crop farming. Where numbers were small sheep and goat are tethered on uncropped and marginal lands near homesteads for grazing in the rainy seasons (Amankwa et al., 2012; Aboe et al., 2013 a).

Keeping of written records is not a common practice among small ruminant farmers across the three northern regions. In a qualitative baseline study by Aboe et al., (2013a) mentioned earlier some communities across study Upper West (Lawra and Wa East) Upper East (Talensi and Kasena Nankani) and Northern Region (Tolon and Gushegu) most farmers keep oral records. The few

who keep written records do so for birth, death, and sales. The next session discusses the market orientation of small ruminant farmers in northern Ghana.

Market orientation

Sheep and goat are sold on demand as well as during times of distress. Distress sales are however, more popular. In a sheep and goat study in the Lawra and Nadowli Districts of the Upper West Region of Ghana, Amankwa et al., (2012) reported that twice as many communities made distress sales as compared with those that sold on demand. Such sales occurred between June and August, after cropping and before the harvest. Farmers flock to sell their animals to buy food, resulting in low prices. However, demand driven sales were observed to be high in two communities. In one, Dakyiae most farmers had been involved in an input credit scheme for one acre of maize provided by Adventist Development and Relief Agency (ADRA) an NGO, enabling them produce enough food for the lean period. In another community, Tankyara, the co-operative society in the community bought from farmers during the harvest time and resold with a small margin, therefore there was no need to engage in distress sales. Demand driven sales occur during festivities such as Christmas, Easter and Ramadan.

Small ruminant farmers in northern Ghana seem not to be business oriented. Amankwah et al, (2012) report that amidst the prevailing high-risk environment with numerous constraints, “smallest holders seek to achieve a livelihood from multiple sources and by means of low input sufficient volume small ruminant production in order to meet their needs whenever the occasion demands”. The report continued that only a few farmers in their study had

developed successful strategies for improved small ruminant husbandry that enabled them to take advantage of periods of high market demand. The study indicated that most smallholders do not perceive higher input, market –oriented production as a viable option. The farmers see themselves more of crop than as animal farmers. They therefore, tend to invest more capital and labour resources into crop production, although crop farming is dependent on income from small ruminants. This is similar to an earlier observation by the Animal Research Institute (1999) of the Council for Scientific and Industrial Research (CSIR) that smallholder farmers in the Lawra District are guided by the principle of minimum investment in livestock but optimum investment in crop production. The minimum investment principle is also corroborated by other studies which indicated that the production decisions of farmers in the semi-arid Sub Saharan Africa are based on risk avoidance rather than maximization of returns (Kristjanson, Reid, Dickson, Clark, Rommey, Puskur, Macmillan, & Grace, 2009; Rooyen, & Homman-Kee, 2009).

Farmers explained that crop farming is seasonal and they always need to take advantage of the rains. With livestock, they explained that the sheep and goats are perceived as being able to fend for themselves all year round, with little help from the owners. Farmers perceived livestock as an enterprise that needed little attention (Aboe et al., 2013b). The high value placed on crops compared to livestock is exemplified in the reaction of farmers in the Upper West Region to a project that introduced the establishment of *Cajanus cajan* fodder banks for small ruminant feeding by the CSIR-Animal Research Institute between 2003 and 2009.

Most of the farmers did not plant the seeds supplied and of those that planted, very few harvested for feeding the animals. On the other hand, Wala farmers who traced their origins to Mali, embraced a similar project by MoFA and established the pasture (Ojinga, as cited by Amankwa et al., 2012).

The introduction of interventions has however, had lasting effects in some communities. In two communities (Orbili and Tankyara) in Lawra District in the Upper West Region, where dry season supplementary feeding practices were introduced in a CIDA/CSIR/ARI/MoFA project, sheep and goat numbers had doubled after three years. Flock sizes of up to 44 and 22 in Orbili and Tankyara respectively were observed compared to other communities (9.1 and 12.5) where there had been no such interventions (Ojinga as cited by Amankwa et al., 2012). The next section discusses feed resources for sheep and goats.

Feed resources for Sheep and Goats

Farmers cut leaves of *Ficus gnaphalocarpa*, used as shade or windbreak and fed to animals. They also dried and stored fruits of *Faiherbia albida* known locally as *Goozie*, dried groundnut vines under shade on wooden planks under shade trees for dry season feeding (Amankwah et al., 2012). Feeds given to the animals include crop residues –groundnut vines, corn chaff (Dusa), rice and bean chaff, brans rice and salt lick (Aboe et al., 2013). Other feed resources available for feeding included agro-industrial by-products such as corn mill waste flour, brewers' spent grain of sorghum, (Konlan, Ayantunde, Dei, & Avorny, 2014). The crop residue is more available and accessible to ruminants after crop harvest and animals graze freely (Annor, Djan-Fordjour, & Gyamfi (2007).

In the rainy season, it has been observed that feedstuffs are inaccessible to animals in some communities due to restricted movement (from tethering) to prevent damage to crops (Awuma, 2012; Oppong-Anane, 2013). Thus, feedstuffs are about 80% available to ruminants after crop harvest while feed shortage is pronounced in the late dry season from February to April (Konlan et al., 2014). A few of the smallholder farmers provide water for their animals during the dry season to enable the animals to come home to drink. This helps to avoid animal losses from theft and stray dogs (Amankwah, et al., 2012) and pigs (Aboe et al., 2013) preying on them when they go the river or dam sites to drink water. The next section discusses land as a resource.

Land as a resource

Access to or ownership of land has been one of the main challenges to women's access to agricultural extension services (Meinzen-Dick et al 2010). Women's ownership of land always lags behind that of men. In Sub-Saharan Africa about only 15% of women own land, but huge differences exist by country: in Mali, less than 5 percent of agricultural land holders are women; in Botswana, Cape Verde and Malawi, they make up over 30 percent (FAO, 2011:23). In contrast to Latin America, the share of women agricultural landholders is about 20 percent; in southern Asia and southeastern Asia the proportion is about 10 percent (FAO, 2011:25). Gender inequalities in land ownership reduce women's access to extension services where land serves as a key criterion for establishing who extension clients are (Manfre et al., 2013). Further, land owned by women is smaller than men and of low fertility; which requires extension advice to improve

the agronomic potential of the land. Thus, strengthening land rights for women has a number of positive outcomes (Manfre et al., 2013 p. 9).

Land ownership often makes men and women eligible to access other productive resources, including credit. It also enables them belong to producer associations, from which they receive information to enhance their work. It has been reported that access to, use and ownership of land by men and women are defined by social relations and norms in the household and society. This is because gender relations and power define the rights within the household and community. Within the household and beyond there are legal and customary laws that govern access. In Ghana for instance, both women and men have rights to land through their membership in a lineage, marriage, or from contractual arrangements Kotey and Tsikata (as cited in Britwum, Tsikata, Akorsu, & Aberese Ako, 2014). However, the principle is not followed due to gendered practices, one of which is the sexual division of labour (DOL) in crop cultivation (Britwum et al., 2014). Under customary law in Ghana, gaining usufructory rights to land is primarily by land clearing. This activity has however, been assigned to men under the gender division of labour. This excludes women from gaining usufructory right through their lineage. Also, in northern Ghana, the belief in the sacred nature of land requires that rituals be performed before land is assigned for use. Since performance of rituals is the preserve of men, women's access to land is hampered (Apusigah, 2009). Women thus gain access to land from the lineage through men, who may be father, brother or uncle.

In a study by Anaglo, Boateng and Boateng (2014) in the Upper West region both male and female indicated that access to land was significantly ($P=0.0446$) higher for men (71.5%) than women (68%). In the Wa East District, the same trend was reported where males (88%) have more access to land than females (78%). Anaglo et al., (2014) also cite Quisumbing and Pandolfelli who confirm that men are given preference over women in accessing land in such patrilineal systems. Accordingly, women more often than not have to contend with smaller plots and less fertile land (Manuh et al., 1997; Whitehead, 1984). Apart from the smaller size of women's land holdings, there is a high level of insecurity associated with land tenure, thus they prefer to farm the land continuously from season to season rather than risk following the land for fear of losing it (Goldstein and Udry as cited in Manfre et al., 2013). Further, while men are into cash crops that are perennial and need no annual renegotiation of land, women are into food crop production and have to negotiate annually for the use of the plots for crop production and this does not provide long term security for them (Apusigah, 20091). Women's plots as has been stated earlier are smaller than that of men. However, women have challenges with time available to farm those plots. This is because they are obliged traditionally to assist their husbands on their farms in addition to working on their own separate plots.

This tends to increase their workload and limit the amount of time that they are able to spend on their own farming activities (Duncan, 1997; Aboe, 2001 Apusigah, 2009; Britwum & Akorsu, 2016). The plots are beneficial to the women because traditionally they have both control and access over the proceeds

(Duncan, 1997; Aboe, 2001; Apusigah, 2009 & Britwum, 2016). In Malawi, women's own plots are advantageous for two main reasons. A woman may want to have access to personal income that she could control. It is also a form of social security, i.e. protection against husbands spending all the family money and leaving their wives with nothing to fall back on (Mudege, Kapalasa, Chevo, Nyekanyeka, & Demo, 2015).

In respect of land for grazing, animals graze wherever there are no farms, since the system of production is extensive. In most communities animals are tethered in the cropping season to avoid crops being destroyed. In the dry season they graze wherever they find pasture (Amankwah et al., 2012). The next section discusses labour.

Labour as a resource

The agricultural labour force is defined to cover those engaged in agriculture, in livestock production and in agricultural services but does not include those engaged in Forestry, in logging, in hunting and in fishing (Rourke, as cited in Dankwa, 2001). Access to labour for women in women headed households is more acute than in male headed households (Dillon and Quinones, 2010; FAO, 2011). Women use unpaid labour within the household (Quisumbing and Pandolfelli, as cited by Anaglo, et al 2014). They are unable to access hired labour for their own plots thus, they rely on their own and husbands' labour, as most of the farms are owned by men (Anaglo, Boateng & Boateng, 2014). In the Wa East District, Upper West Region, a study by Anaglo, Boateng and Boateng (2014) on small holder farmers showed a significant relationship ($P=0.000$)

between gender and smallholder farmers' access to labour with men having more access than women.

Ghanaian women are obliged to assist their husbands on their farms in addition to working on their own separate plots. This tends to increase their workload and limit the amount of time that they are able to spend on their own farming activities (Duncan, 1997; Apusigah, 2009). A study on time poverty of women in Mozambique showed that women are required to fulfil the needs of the household through a variety of care work and assist the husbands in farming and other cash generating activities. Household chores and care work are women's responsibility, which they perform with minimal assistance from men (Arora, 2015).

Labour for small ruminant production in the three northern regions is from family members as stated in the section under division of labour earlier. The next section discusses credit as a resource

Credit as a Resource

Credit is one of the basic resources that smallholder farmers need for meaningful agricultural production (Anaglo, Boateng and Boateng, 2014). Access to credit is important to farm enterprises to enable farmers acquire inputs for their activities and enhance smooth running of their operations.

The relationship between gender and access to credit is not clear-cut. Results obtained by Anaglo et al., (2014) in their study of small holder farmers on gender and access to credit, showed that there was no significant difference between women and men's access to credit by smallholder farmers ($P=0.249$)

although women (19.5%) had more access to credit than men (11.5%). FAO, (2011) has supported this assertion and stated that credit markets are not gender neutral. While Mehra and Rojas (2008) have observed that women have more access to credit than men, FAO (2012) asserts that although there is little difference between women and men 's access to credit, women farmers who are market oriented have better access to NGO and co-operative credit sources. Some other studies have reported that credit institutions give women smaller loans compared to men, even when they are involved in similar activities (Fletschner cited by Anaglo et al., 2014). Anaglo et al. (2014) in their study reported that farmers mentioned two problems with credit acquisition. These were untimeliness and cumbersome processing procedures. Although differences were not significant ($p=0.483$) more women (49.5%) than men (46%) indicated that untimeliness of credit access was a problem.

When women are targeted for credit programmes it is often assumed that high borrowing and repayment levels mean a positive impact on women and further investigation is not done (Kay, 2002; Mayoux, 2002). It is also assumed that once women's income increases the welfare of the family is improved since women have been found to spend more of their income on the household (Kay, 2002; Mayoux, 2002; Kay, 2002, Chester & Kuhn, 2002). Sometimes when females borrow, they have only a partial control over the loans. They either may relinquish all control to the male family members or invest in a family enterprise (Oberhausen & Hanson, 2004; Goetz & Gupta, 1996, MacIsaac, 1997). Interest rate from formal sources are higher than from informal sources such as friends,

relatives and business contacts (Mayoux, 2002; Offei-Aboagye, 2004) and this deters some women from borrowing. The credit that women receive may sometimes not be enough to set up or significantly expand economic activities, thus the money is diverted and used for other purposes, such as paying school fees, debt repayment or other social contributions (Wrigley–Asante, 2012). Female entrepreneurs have difficulty in securing bank loans due to lack of collateral in the form of landed property (Wrigley- Asante, 2012).

A study by Wrigley-Asante (2012) reported that women who participated in a credit scheme had improved their socio-economic status through access to financial and non-financial resources. However, she argues that most studies focus on the economic benefit to the women without looking at the impact on gender relations at the household level and its implications for women. Effects may be positive or negative. Women’s increase in income often times has positive impact on the household. As women’s income increases, their socio-economic positions improve and they contribute to the family budget (Ardayfio-Schandorf, 1995). Contributing to the household budget results in men revaluing women’s contribution to the survival of the household and their recognition as income earners enhances their position. This results in an improvement in the relationship between spouses (Hashemi, Schuler & Riley 1996, Kabeer, 1998; Wrigley-Asante, 2012). The attitude of male spouse changes as they recognize women’s productive role (MacIsaac, 1997, Mayoux, 2002, Wrigley-Asante, 2012). Women’s contribution in the household also increases their self-esteem and their ability to exercise their voice in decision-making process (Moser, 1988 and

Kabeer, 1998). Even after their economic contribution to the household increases, some women still make the effort to continue to recognize the men as the head of the household to maintain peaceful relationships. For instance, some women still consult their husbands before making purchases on things that are personal to them.

There are however negative consequences to women's improved socio-economic situation. In some situations, women's improved economic status has plunged spouses into confrontations creating power conflicts. Men tended to interpret women's increased ability to contribute to the home and increased autonomy as a sign of the women challenging men's authority in the home. This is because men fear to lose authority over the women. (Wrigley Asante, 2012). Sometimes violence erupts in the home when empowered women challenge gender norms (Schuler, Hashemi and Badal, 1998; Mayoux 1997; Silberschmidt 2005). Thus, improvement in women's economic status sometimes generates domestic violence and men withdrawing their support to the home. Household debt and subsistence is thus shifted to the women, (Cheston and Kuhn 2002, Mayoux, 2002) increasing their vulnerability (Mayoux, 2002; Silberschmidt, 2005).

Wrigley-Asante (2012) argues that at the household level, socio-cultural norms and practices underpinned by patriarchal structures appear to be a constraint for women in expressing their full capabilities; and it continues to act as cages for women (Wrigley-Asante, 2012). To that end, Stacki & Monkman, (2003) asserted that cultural and social practices that affect gender equity do not

change quickly. The next section discusses agricultural extension as a production resource.

Agricultural Extension as a Resource

Basel missionaries introduced agricultural extension into Ghana's agriculture as far back as the late nineteenth century (pre-colonial era). The missionaries experimented with crops and employed women and men in their gardens to teach them a way of farming (La-Anyane, 1963:27). The Department of Agriculture was established in 1890. During that time, emphasis was placed on the production of cash crops such as cocoa, rubber and oil palm to feed their factories abroad (Axinn, 1988:58). To achieve the latter objective cash crop seedlings produced at the Aburi Botanical Gardens were distributed to farmers for cultivation.

Agricultural Extension Approaches in Ghana

Agricultural Extension has come a long way from the colonial days when the farmers concentrated on cash crop production to meet the colonial masters' industry needs. In the post-colonial era concentration on cash crops continued until the Ministry of Agriculture established the Extension Services Department. Many approaches have been used in agricultural extension. These include Focus and Concentrate (Atsu, 1974) and Commodity Specialized Approach, which focused on individual commodities. This approach was used by the Cocoa Board and the Cotton Development Board (Axinn, 1988; Kilmer, 1986). The integrated Agricultural Development Approach operated under the assumption that the existing technology of production is adequate and that limiting factors are lack of

co-ordination, or of inputs. The Sasakawa Global 2000 project was an example of this approach (MOA, 1990). The General Agricultural Extension Approach aimed at increasing food production through technology transfer from government to rural people (Axinn, 1988). This gave way to the Training and Visit (T&V) Approach, which was an attempt to reform and improve the effectiveness of the conventional or general agricultural extension approach (Swanson and Claar, 1984). This approach operated on the assumption that staff are poorly trained, tend not to visit farmers, that the two-way information flow between farmers and extension staff are poor and staff supervision is poor. This approach could not be sustained after the World Bank pulled out because it was logistic intensive. The Unified System followed the T&V.

This chronology shows that agricultural extension approaches have changed from one form to the other. Recent approaches such as the decentralization of the extension service took place in Ghana in 1997 (Okorley, 2007). Other recent approaches include pluralism, cost sharing with stakeholder participation being an important aspect. The farmer is one of the main stakeholders. The top-down approach of the previous extension approaches gave way to the bottom up approach where extension agents are encouraged to involve the farmer in the entire project cycle. From the planning stage through design and implementation, evaluation and monitoring, the farmer is to be involved to enable them own the process after it has ended. This ensured project sustainability (Okorley, Gray and Reid, 2009).

The frequency of contact of farmers with development agents is beneficial to farmers in that farmers were able to learn and internalize the information or education they receive. It is argued that farmers' frequency of contact with the development agents has a direct relationship with effectiveness of extension, i.e. the more the frequency of contact of farmers and the development agents the better the effectiveness of the extension service (Aphunu & Otoikhian, 2008; Lahai, Goldey & Jones, 1999; Sarker & Itohara, 2009). Contrary to the popular view Oladosu (2006), reported an inverse relationship between the frequency of contact and effectiveness of extension. Extension visits to clients had an effect on output of farmers. Betz (2009) in a study in Uganda found that there was a positive relationship between the agricultural extension visits and value of output for small (< 2 acres) and large farms (>13 acres) but there was no definite relationship between extension and value of output for farms between 2-13 acres using Cobb-Douglas agricultural production function (Betz, 2009). Extension agents use different methods to interact with farmers. One of such methods is the group extension method.

Group Extension methods

Group extension methods are advantageous because they enhance group learning, joint decision-making and are cost effective as many people are reached at the same time. Bringing people together in groups enhances the establishment of self-reliant groups that can articulate their needs, problems and priorities. Previous studies have reported some advantages of belonging to a social group. These include exchange of information and ideas, and learning from each other

(Mignouna et al., 2011a; Uaiene, Arndt & Masters, 2009). It also includes the benefits and use of new technology (Mwangi & Kariuki, 2015). While studying the effect of community-based organization in adoption of corm-paired banana technology in Uganda, Katungi and Akankwasa (2010) also found that farmer participation in community-based organizations increased social learning on new technology, hence raising the likelihood of adoption. It also resulted in increase in income for farmers and their involvement in decision-making (AREP, cited in BahadurGhartiMagar, 2011).

A study in Uganda showed that farmers on an agro-forestry project preferred the group method of extension to individual extension ($P < 0.05\%$). They perceived the group methods as an opportunity for sharing knowledge and experiences by discussing practices. It was easier for farmer groups to get support opportunities from NGOs and Government. In groups, the members encourage, assist and motivate each other to implement technologies. Farmers taught using group methods had higher adoption levels than those who benefitted from individual methods.

Many NGOs used the group extension methods and it worked in passing on technologies (Tengnas, 1994). The tools used to conduct the meetings are also important in enhancing the effectiveness of the meetings. Focus Group Discussions for example are preferred by the less literate or semi-literate farmers. This is because it induces confidence and exchange of ideas (Buyinza and Mukasa, 2007). FGD is less expensive in terms of staff time and effort to cover a given number of farmers.

Farmers were of the view that group methods had more opportunities than individual methods. This is because farmers had the opportunity for the group to travel and see other places like research stations, exchange of ideas among the group members, discussions between members and AEA all enhance high adoption levels. Group methods enable farmers to be involved in monitoring and evaluating of the progress of farms and so facilitate achievement of goals and sustainability after project ends (Buyinza, Bukenya, Bbale, & Ndemere n.d).

However, some disadvantages to group methods is that the wealth status and culture of groups affects the success of the group methods. If the farmers see themselves as well off where they have enough to eat and safe drinking water, they are often reluctant to learn with fellow farmers or groups. There is seldom cooperation in such 'wealthy' villages (Buyinza et al., n.d). Few farmers patronized training meetings because of the length of meetings and women's time. In the Vi-project, more farmers preferred the group extension method than those who liked the individual method.

Gender and Agricultural Extension

Women play important roles in both crop production and livestock rearing in many developing nations of the world. The FAO (2011) states that women comprise an average of 43% of the agricultural labour force in developing countries, ranging from 20 percent in Latin America and to 50 percent in Eastern Asia and sub-Saharan Africa. In sub-Saharan Africa (SSA) women are the main producers (WB, FAO & IFAD, 2008) and also play important roles in livestock production. In the Indo-Gangetic plains the main source of rice and wheat

production in South Asia, women provided more than 60 percent of the labour for crop production and more than 70 percent of the labour for livestock production (Ladha., et al. 2000). In 2006, the Food and Agricultural Organization (FAO) stated that more than 200 million small holder farmers in Asia, Africa and Latin America rely on livestock as the main source of income. Most of these livestock keepers were however poor and are women (Kristjanson et al., 2010). This is because of gender inequalities that prevail in access to productive resource such as land, labour, capital (human and financial), information/ extension services and access to markets; also a neglect of women's needs.

Women have less access to extension programmes than men (Kristjanson et al., 2010, Aboe, 2001) since most extension activities and information meant for farm households are targeted at men (Budak et al., 2005), especially in male headed households. Men are perceived not only to be the household heads but also the owners of household assets; whilst women are regarded as helpers in farming households (Sen, 1990: Aboe, 2001), whether in crop or livestock farming (Kristjanson et al., 2010). This gives rise to the trickle –across effect where it is assumed that information flows freely between men and women and therefore when men are targeted the information would be relayed to the women even when it is the women that were responsible for a particular activity (Fong and Bushan, 1996). The limited number of female extension workers and other socio-cultural issues were cited as the reason for skewed extension services (Ministry of Gender, Children and Social Protection, 2015).

Galie, Jiggins and Struik (2013) writing on women's identity as farmers in Syria stated that men are the target of research and extension services leaving the women as the invisible side although their contribution to agronomic activities is huge. Due to women's invisibility their access to agricultural extension services and information and their control of production processes and resources are affected. This had a negative effect on women's performance as farmers and food providers and on decision making in relation to agriculture.

Studies have shown that in most households, the household head whether male or female is defined as the primary farmer and is perceived as the appropriate person to receive agricultural extension information. Twyman, Muriel and Alejandra Garcia, (2015) working in Latin America on rice reported that men were perceived as the main farmers, producers, landholders, or household heads and therefore are more often recognized as the appropriate respondents, especially in male-dominated cultures. Women on the other hand, are not considered farmers or producers but are rather perceived as being unknowledgeable about production activities. Extension staff thus tend to concentrate on men as respondents (Twyman et al., 2015; Kristjanson et al., 2010).

Another observation made by Twyman et al., (2015) is that the lack of recognition of women's knowledge and contribution to production is often 'reinforced by the social norms of the multiple actors involved in agricultural work, research, and development including household members, community leaders, extension agents, ministry of agriculture employees, and researchers (ibid). The notion or belief that women are helpers of their husbands in farming

activities is also sometimes reinforced by the women themselves (Colverson, 1995; Payson-Roopschand, 2006). In a study in Honduras, Colverson (1995), reported that women regarded themselves as helping husbands, while in Trinidad backyard gardening was described by women as supplementary activities (Payson-Roopschand, 2006).

Earlier studies that focused on gender differences in agricultural productivity found that female headed households and women's plots are less productive than men's (mainly crops) because women have less access to resources, however such differences have been found to disappear once inputs are accounted for (Doss and Morris, 2001; FAO, 2011; Tiruneh, Tesfaye, Mwnangi and Verkuijl, 2001; Twyman et al., 2015). Such studies use the household headship/ plot manager/landowner to distinguish between men and women's productivity. When the output of women and men headed households were compared there were definite differences but when the women and men landholders were compared they found no differences. Doss and Morris (2001) argue that each conceptualization of gender yields different results. Therefore, it is important to note how gender is conceptualized in studies. Some authors argue against using headship for conceptualizing gender, as it excludes women in male-headed household and often underestimates women's assets and participation in farm-household decisions making. They also argue that headship analysis tends to provide information about household type rather than directly about gender relations within and across households (Deere, Alvarado & Twyman, 2012).

Women's apparent lack of resources has resulted in extension workers focusing on men who are the ones that own land and who are willing and able to obtain credit and invest in inputs and technological innovations. Men are usually the target leaving the women invisible although they contribute substantially to agronomic activities. Due to the invisibility of women, their access to agricultural extension services and information and their control of production resources are affected. This has been shown to have a negative impact on women's performance as farmers and food providers and on their decision-making in relation to agriculture. Agricultural extension is therefore, biased towards men (Sen, 1990). Women thus have less access to agricultural extension services and training and less access to irrigation and modern inputs. The difference in access to delivery of livestock and veterinary services does a great disservice to women and men livestock producers and processors. It also stifles the potential for more sustainable and effective actions along the value chain. With the privatization of the services women face a disproportionate challenge as compared to men (Hill, 2003).

There are many advantages for the household when women and men have equal access to extension services. This is because it enhances the flow of quality goods. When women have low wages and are sometimes unpaid they do not have the incentive to invest their time and energy into improving their production and processing activities, especially in crop production. Sometimes they withdraw and that affects the constant supply of quality products to the value chain (Manfre al.,2013). The contribution of women to household food production including

their work with small ruminants has been found to help increase the essential micronutrient for cognitive development of children. When new varieties and breeds and technologies are adopted through interaction with extension services there is an improvement in productivity that results in increased income. Household nutrition also improves when women have access to extension services. Authors including Quisumbing (2003) have established a strong relationship between the women's control over earnings and greater investments in children's health and education. Thus, when women farmers are also reached all household members are reached with technologies resulting in benefit to the whole household. It is also important to identify discriminatory beliefs and practices that tend to restrict the full participation of women and men in agriculture, since these also affect the terms and conditions under which they operate.

The division of labour in the household determines what women and men know. However, it is often assumed that men are the ones that know about diseases of livestock and the extension staff also assume that it is the men who raise the livestock. This is because it is the men who are better endowed with physical capital like transport to travel to veterinary offices or animal health posts for information or training. Men also have access and are able to pay for services and information (World Bank, 2008). The FAO (2011) argues that reducing gender inequalities in access to productive resources and services could produce an increase in yields on women's farms of between 20 and 30 percent that could raise agricultural output in developing countries by 2.5 to 4 percent. It therefore

follows that giving the same opportunities to male and female farmers would go a long way to improving agricultural productivity and hence development, with a resultant reduction in poverty and improvement in livelihoods. The next section discusses reforms in the veterinary services.

Reforms in veterinary services

In the early 1980s major reforms took place in the agricultural services as a result of Structural Adjustment Policies (SAP) promoted by the International Monetary Fund (IMF) and the World Bank. The SAP was put in place because of inefficient delivery of goods and services in the agricultural sectors of developing countries. The aim of SAP was to reduce the role of public sector in the provision of goods and services and enhance the role of the private sector (Woodford, 2004). Services were either decentralized and or privatized and the reforms affected agricultural research, input supply, rural financial services, agricultural extension, veterinary services and water resources management (Smith, 2001). In developing countries the reforms resulted in privatization of selected tasks, decentralization of veterinary organisations and a move towards confining the State veterinary services to delivery of public goods and services (Cheneau, Idrissi, & Ward, 2004). The SAP resulted in a reduction of veterinary staff in relation to the livestock populations (Turkson and Brownie, 1999; Amankwa et al., 2012).

In Ghana, the government encouraged private practice and promoted the use of the Community Animal Health Workers (CAHWs) Scheme. These were people selected by communities, trained in basic animal health care and provided

with starter kits by the Veterinary Services Department (VSD). One thousand and seven (1007) CAHWs were trained nationwide (VSD as cited in Amankwa et al., 2012). The licences of the CAHWs were renewed every year. The CAHWs charged farmers nominal fees for rendering basic health care and were supervised by Technical officers and Districts Veterinary Officers in the district.

According to a study by Amankwa, (2012) in the Lawra district, out of four communities that had been using the services only one of them had an active CAHW at the time of the study, the CAHW indicated that only a few farmers still consulted him because most of them had learnt to treat their animals by themselves. According to Amankwah et al, (2012) the reforms seem to have benefited lower skilled veterinary services providers such as para-veterinarians, technical assistants and community health workers. Less qualified personnel adapted better in-service delivery than veterinarians in subsistence and extensive production systems Woodford (2004). This was because such para veterinary staff, who acquired their skills through practice, are often members of the same ethnic groups as their clients and reside in the communities where the livestock were found. They had lower income aspirations and could handle 80-90% of the veterinary interventions in extensive production systems.

The CAHW scheme had collapsed because some of the CAHWs went beyond providing the basic health care to giving injections and even performing surgeries. This resulted in the VSD officers perceiving the CAHW as being in competition with them. They therefore withdrew their support for the scheme and stopped cooperating with the CAHWs. Thus, the deregulation and deployment of

the para veterinarians induced by the reforms were perceived as a threat by the veterinarians (Amankwa et al., 2012; Turkson and Brownie, 1999). This resulted in problems with supervision of the CAHWs (Ahuja, 2004). The privatization of the veterinary services also resulted in a high concentration of the private veterinary practice in the urban centre while the rural areas had no coverage (Woodford, 2004). In Sub-Saharan countries including Ghana, the SAP-induced reforms resulted in a reduction in the quantity and or quality of veterinary services to poor communities (Woodford, 2004; Turkson and Brownie, 1999).

A study in Kenya however reported of successful activities of the CAHWs introduced in the 1990s. The productivity of cattle and goat herds used the services of Community Based Animal Health Workers (CBAHWs) on the one hand and professional veterinarians on the other, were compared. The annual live births per mature female (birth ratio) and the proportion of young stock to mature females (breeding index) was computed over a period of 3 years in cattle and goat herds under care of CBAHWs and professional veterinarians. The birth ratios in cattle and goats under CBAHWs were not significantly different from those under the care of professional veterinarians ($P>0.05$). Furthermore, the breeding index of cattle and goats under the two categories was not statistically different. CBAHWs also served as a source of participatory learning for neighbouring livestock keepers, who later dispensed with their services (Mungunieri, Irungu & Omitii, 2004). The next section discusses women's control over productive assets and income.

Women's Control over Productive Assets and Income

When women have access, control and management of resources such as small ruminants, grazing areas and feed resources it results in a positive impact on household welfare. Women are more constrained in the access to production resources such as extension services, marketing opportunities and financial services and in exercising decision-making powers and these often prevent women from reaching their full potential within the agricultural sector, including livestock (Patel, Patel, Patel, Patel, & Gelani, 2016).

Women's limited control over productive assets, income and management remains a potential risk to their ability to boost household food security (Kariuki et al., n.d). Hill (2003) reports that in Iringa pastoral systems in Tanzania women could not sell or exchange their poultry without seeking permission from their husbands. In Kilimanjaro, milk which was once under the control of women later came under the control of men as it became the key source of household income. When women own livestock this increases the probability that they will make decision on allocation of livestock, livestock products or income derived from these on household consumption. This also increases the likelihood that the household would consume more animal protein (Kariuki et al.)

A study in India by Sharma et al., (2013) which investigated the extent of women's involvement in decision making related to household farm, livestock and income-generating activities, indicated that women play important roles in farm activities and do more work as compared to male workers however, their participation in decision making that relates to farm and income generating

activities is low. Increasing the control of women over assets has positive effects on food security, child nutrition and education and women's well-being (ibid).

Some studies show that there is an aversion by men when women earn and control more income than men do. Bertrand et al., (2015) reported that in the United States of America, there is an increase in the number of women who earn more money than men. In such instances, women tend to show a compensatory behaviour in the home such as taking on more domestic chores to placate the men. They also reported that in such situations where women earn more marriages are threatened and likely to end up in divorce, among others. Mudege, Kapalasa, Chevo, Nyekanyeka & Demo (2015) reported a similar situation among Malawi potato farmers where the women gave their husbands money from sale of crops and the men were also often allowed some leeway even with women owned crops. Women participate in potato sales but do not operate from a position of power but as "stress sellers" in the sense that they sell to buy food and meet other household needs while men sold because they had excess seed that they could not store safely or utilize (Mudege et al., 2015). Decision-making is discussed in the next section.

Decision Making

Decision-making is a good farm management practice that tends to increase food production since it ensures that the right thing is done at the right time. According to Miller (2001) women benefited more when they have authority to make decision about the animals they manage, even if they are not the legal owners. However, men continue to dominate decision making on the farm

despite women's contribution to production, processing and marketing (Barasa 2006; Enete, 1999). Studies confirm that men lead in decision-making (Dissu, 1998a and Sharma et al., 2013). They belong to the inner caucuses of traditional institutions while women are prevented from belonging. Men are involved in the formulation of policy with the traditional institutions resulting in women's issues being seen through men's eyes (Dissu, 1998 a). In Nigeria and most of the developing world, the father is the key actor when it comes to decision-making and the mother influences, approves or at least agrees with these choices before they are pursued, with the cooperation of other family members (Jibowo, 2000). Thus, women are excluded from playing roles in family matters and developmental issues whether intentionally or unintentionally (Dissu, 1999).

A study among cocoa farming households in Ikwuano, Nigeria by Arigbo and Ifenkwe (2013) reported that decision-making was positively affected by the frequency of extension contact, cooperative membership and farming experience, while age, education, marital status and farm size have negative effect on decision-making. They explained that with married women it was the men that took most of the decisions. Women with high educational level are less interested in farming; and hence participate less in decision-making on farm activities, preferring to look for white-collar jobs. Also, the older the women the less interest they have in taking decisions on farm activities.

Contrary to the finding by Arigbo and Ifenkwe (2013), Solomon and Adekoya (2006) reported that age had a positive relation to decision-making by women. They explained that women's participation in decision-making increased

with age; if they did not participate as young women, they did so as they grew older. Solomon and Adekoya also reported that participation in decision-making was inversely related to size of household. Also, that women with formal education and small size holdings participated in decision-making together with their spouses. Those women who had urban contact and high social participation participated more in decision-making than others (Omokhudu, 1999).

Women's full participation in family decision-making is advantageous because the family members are healthier and better fed; family income, savings and re-investment also increase (Kariuki et al., n.d; Kofi, 2003). Due to the enormous contribution of women to production, it is expected that they would be in the forefront in taking decisions about various farm activities. Overlooking women's contribution tends to reinforce the inequality of women's access to productive resources including land, labour, inputs, technology and support services such as credit, extension services and research (FAO, 1995). The next section discusses various factors that may affect adoption of technology by small ruminant farmers.

Factors Affecting Adoption of Technology

Adoption research has found several other factors that affect the adoption of innovations. Earlier factors investigated by Ryan & Gross during their study of the adoption of hybrid-seed corn included personal factors such as age, education, farm size, travel habits, readership of farm magazines, among others. Several other factors have been added to this list. Researchers working from an economic viewpoint identified factors such as personal characteristics and endowments,

imperfect information, risk, uncertainty, institutional constraints, input availability and infrastructure (Feder et al., 1985; Rogers, 2003 & Uaiene, Arndt & Masters, 2009). Akudugu et al., (2012) who studied adoption of modern agricultural production technologies by farm households in Ghana classified the factors into economic, social and institutional factors. Some authors have suggested that the factors be grouped according to the research in question (Mwangi & Kariuki, 2015 and Bonabana-Wabbi, cited in Mwangi & Kariuki, 2015). This write up looked at specific factors including perception of technology attributes, extension services, group affiliation, gender and technology and division of labour. The discussion starts with extension services.

Extension services and technology adoption

Access to extension services has been found to be a key aspect of technology adoption (Mwangi & Kariuki, 2015). It informs farmers about the new technology. The extension services serve as a link between the innovators (researchers) and the users (farmers). Many studies have shown a positive influence of the extension services on adoption of technology (Akudugu et al., 2012; Mignouna et al., 2011 & Uaiene et al., 2009).

Access to extension services is critical in promoting adoption of modern agricultural production technologies because it can counter balance the negative effect of lack of years of formal education in the overall decision to adopt some technologies (Yaron, Dinar, Voet et al, 1992). Access to extensions services therefore creates the platform for acquisition of the relevant information that promotes technology adoption. Access to information through extension services

reduces the uncertainty about a technology's performance hence may change individual's assessment from subjective to objective over time thereby facilitating adoption. Access to extension services was positively related to the adoption of modern agricultural production technologies and was significant at 10 percent alpha level. This means that farm households would adopt modern agricultural production technologies if they had access to extension services. The next section discussion on credit and technology adoption.

Credit and technology adoption

Access to credit has been reported to stimulate the adoption of technology (Mohamed & Temu, 2008) as well as promote the adoption of risky technologies (Simtowe & Zeller, 2006). This is because the option of borrowing enables households to do away with risk reducing but inefficient income diversification strategies to enable them concentrate on risky but inefficient investments (Simtowe & Zeller, 2006). Access to credit has however been found to be gender-biased such that female-headed household were discriminated against leading to low adoption rates (Muzari et al., 2013). Access to credit was found to have a positive relationship with the probability of adoption and was found to be significant at the 1 percent level (Table 2). This meant that credit was an important facilitating factor of agricultural production technology adoption. This is consistent with the view that high poverty levels among farmers and lack of access to credit make it almost impossible for them to afford technologies (Ministry of Food and Agriculture, 2010). This is so, given that most modern technologies are expensive. This makes it difficult for many farmers, especially

those in rural areas where poverty is endemic to be able to acquire and use the technologies without assistance. The assistance was in the form of supply of affordable credit and other financial services (Benin cited in Akudugu et al., 2012). The next section discusses gender and technology adoption.

Gender and technology adoption

There are different views on the relationship between gender and adoption of technology. The head of household factor may influence adoption of technology. This is because the head of the household is the primary decision maker, and men have more access and control to vital production resources than women due to socio-cultural values and norms (Mignouna et al., 2011; Omonona, Oni & Uwagboe, 2006). It is therefore, expected that male-headed households would adopt certain technologies more than women (Lavison, 2013; Obiesan 2014). Akudugu et al., (2012), also found gender to be related to the adoption of modern agricultural production technologies by farm households and was significant at 1 percent alpha level. This means that male farmers would adopt modern agricultural production technologies than their female counterparts. This is because it is men who make production decisions in the study area (Upper East Region) and control productive resources such as land, labour and capital which are important for the adoption of new technologies. This finding contradicts reports from two studies: Doss and Morris (2001) on factors influencing improved maize technology adoption in Ghana; and Overfield and Fleming (2001) on coffee production in Papua New Guinea. Both studies showed insignificant effects of gender on adoption.

Doss and Morris (2001) did not find any definite relationship between gender and adoption of improved maize in Ghana. They concluded that technology adoption decisions depended primarily on access to resources, rather than on gender. Also, that if adoption of improved maize depended on access to land, labour or other resources, and if in a particular context, men tended to have better access to these resources than women, then in that context the technologies would not benefit men and women equally.

Inequality in access to productive resources often affects and shows in the adoption of technology between males and female farmers. A report by Bourdillon, Hebinck, Hoddinott, Kinsey, Marondo and Mudege (2007) working in Zimbabwe stated that men would adopt high yielding maize varieties than women, while women preferred to adopt open –pollinated varieties, which did not require them to obtain loans for fertilizer and seeds. This was because men had greater access to financial assets and formal marketing institutions. In situations where there has been the need for large initial investments or asset ownership, mechanisms could be put in place for pooling of resources or complementary assets can also be disseminated. For example, in an evaluation in Bangladesh poor women were organized into groups for leasing of fish ponds and they adopted a poly-culture fish technology. In another initiative in Bangladesh women were able to adopt improved vegetable varieties for homestead production because they were organized into groups and these were women in households with small portions of land. The venture was attractive to them because it involved low investment and did not require land.

Differences exist not only between women and men, but also among women. Few studies have looked at differences among women when analyzing factors that influence agricultural production and technology adoption. Examples of such differences include age, marital status, education and size of land holding (Quisumbing and Pandofelli, 2010). For example, Potash cited in Quisumbing and Pandofelli, (2010) reported that when young Luo women in Kenya start farming under the tutorship of their mothers-in-law, they do not obtain rights to farm independently until they have had children. The next section discusses the division of labour and technology adoption.

Division of labour and technology adoption

The gender division of labour influences adoption of technology. A study by Britwum and Akorsu, (2016) in the three northern regions found that women adopted crops which traditionally fit into their GDOL in the household. For example, they adopted improved varieties of legumes, cowpeas and groundnuts, which were crops that they were farming and also they needed for meal preparation. Women's marital status also affected their adoption decision. Married women would not adopt crops or a practice which the husband had rejected, since women need their husbands' approval to change the farming practices and methods. Widows however, sometimes had problems following their new husband's methods (*ibid*). The next section discusses social group affiliation and technology adoption.

Social Group affiliation and technology adoption

Belonging to a social group has been reported to enhance social capital allowing trust, ideas and information exchange (Mignouna, Manyong, Mutabazi & Senkondo, (2011). Farmers within a social group tend to learn about the use and benefits of a new technology from one another and this helped in decision making (Uaiene et al., 2009; Mwangi & Kariuki, 2015). Participation in community-based organizations encouraged social learning about the technology and increased the likelihood of adoption (Katungi and Akankwasa, 2010).

Information and technology adoption

Acquiring information about a new technology is another institutional factor that determines adoption. The farmer learns about the existence of the technology, how to use it effectively and this tends to facilitate its adoption, since uncertainties are reduced and farmer's assessment may change from a subjective to an objective one (Bonabana-Wabbi, cited in Mwangi et al., 2015). However, there is a caution about the negative effects of information. In the sense that where experience about the technology is limited more information rather induces a negative attitude towards its adoption, probably as more information exposes an even bigger information vacuum and hence increases the risk associated with it. It is therefore, important for information reaching farmers on a technology to be reliable, consistent and accurate. The next section discusses the perception of attributes and technology adoption.

Perception of attributes and technology adoption

The attribute of an innovation or technology is not as important as the potential adopter's perception of the technology in question (Rogers, 2003). Thus, it is the potential adopter's perception of the relative advantage, compatibility, trainability, complexity /ease of use and the observability of the technology that affects its rate of adoption. Previous authors have found that the perception of an innovation may enhance or limit adoption and diffusion of a technology (Mignouna, Manyong, Mutabazi, & Senkondo, 2011). The way targeted adopters perceive the attributes of an innovation is critical and these perceptions account for 49-87 percent of the variance in whether or not the target group adopts (Rogers cited in Pankratz, Hallfors and Cho, 2002). In a study in Kenya on using IRM for *Striga* control, the perception of the farmers towards the technology was one of the important factors that influenced the farmers' willingness to adopt (Mignouna et al., 2011). Assessing the perceived attribute of an innovation can be used to help close the gap between what is known and what is done in practice (Pankratz et al., 2002). Profitability (relative advantage) is the main motivation that stimulates the use of a new technology (Adrian, Norwood, Mask, 2005; Aubert, Schroeder & Grimaudo, 2012; Folorunso & Ogunseye, 2008 & Rezaei-Moghaddam & Salehi, 2010). The next section presents the conceptual framework that guided the study.

This section presents the conceptual framework based on existing theories, concepts and empirical studies that have been presented in this literature review. According to Ogah (2013), theories and models may be worked into a conceptual

framework that captures the relationships among the variables, indicating where gaps exist.

Conceptual Framework

The conceptual framework for this study was based on the theoretical and empirical information from the literature reviewed. The theoretical framework was guided by the diffusion of innovation theory posited by Rogers (2003) and the Social Relations Approach posited by Kabeer (1994). Rogers defines diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 1983, 1995, 2003). According to him, diffusion is a special type of communication in which the messages are about a new idea. Individuals and groups achieve the spread of the new idea (innovation) within the social system through its adoption.

The diffusion of innovation theory has been described as a meta-theory comprising four individual theories: The Innovation-Decision Process theory; the Individual Innovativeness theory; the Theory of Perceived Attributes and the Rate of adoption theory. The rate of adoption of an innovation is defined as the relative speed with which an innovation is adopted by members of a social system (Rogers, 2003). This study is however interested in the level of adoption of the husbandry technology transferred to female and male farmers and not the rate of adoption. Thus, it focuses on the level of usage of a given technology in any time period (Bonabana-Wabbi, 2002). This study also focuses on the perceived attributes of the technology package transferred. As stated earlier, out of the five variables that determine the rate of adoption, the perceived attributes of the

innovation is reported by diffusion researchers to explain between 49 to 87 percent of the variance in the rate of adoption (Packrats, Hallfors and Cho, 2002; Rogers, 1995; & Rogers, 2003). This study thus focuses only on the perceived attributes of the technologies transferred; adoption levels of SR husbandry technologies transferred and adds a gender dimension. The existence of inequalities in access to production resources between women and men necessitated the inclusion of the Social relations Framework (SRF) to facilitate an understanding 'gender dynamics in small ruminant production and marketing'.

The SRA emanates from the GAD approach that is rooted in the Socialist Feminist theory (see earlier section on GAD and SRA). The SRA exposes the gender power relations that perpetuate inequity and therefore provides understanding of social relations as regards roles, claims, rights, access and control. Guided by the Social Relations Approach (SRA), the SRF seeks to analyse the existing gender inequalities in the distribution of resources, responsibilities and power, the relationships between people, their relationship to resources and activities, and how they are reworked through institutions: household, community, market and state (Amoah, 2014; Kabeer, 1994; Miles, 2014). As earlier explained in the section under Gender Analysis, the Social Relations Framework (SRF) uses five main concepts to analyse the existing gender inequalities in the institutions as they ensure the production, reinforcement and reproduction of social relations and thereby creating and perpetuating social difference and social inequality. This study however focused on three of the five

concepts: the concept of social relations, institutional analysis and institutional policy analysis.

These institutions are interrelated such that a change in one triggers a change in the others (SRA concept three). The four institutions have five dimensions in common: resources, rules, power, activities and people referred to as the dimensions of social relations (DSR) which determine what people do, the rules that pertain, how resources are distributed, the power structures, and how these work to perpetrate inequality. For the purposes of this study, the DSR stated earlier, has been adapted from Amoah (2014), Kabeer (1994) and Miles (2104) as one of the components / variables of this study Table 1 (page 59).

The intervention under study involved the introduction of a small ruminant husbandry technology package introduced to 118 (female and male) farmers over a three-year period by TUDRIDEP. The main aim of the intervention package was to increase the production and productivity of small ruminants as a way of diversifying rural incomes towards poverty reduction in the Wa East District. The project aimed at improving animal housing structures, the quality and availability of animal feed; facilitating the linkage of livestock farmers to veterinary services; providing improved breeds to farmers, facilitating linkage of livestock farmers to marketers; and organizing livestock farmers into groups and associations. The intervention package had twelve components namely:

- 1) Routine cleaning of pens
- 2) providing drinking water
- 3) planting tree seedlings supplied (*Leucaena leucocephala/Albezia lebbek*)

- 4) planting forage seeds i.e. *Cajanus cajan*
- 5) feeding of ficus seed cakes to sheep and goats
- 6) feeding dried forage leaves (*Cajanus sp*) to sheep and goats
- 7) feeding *Leucaena sp* and *Lebbek sp* tree leaves to sheep and goats. The rest included:
 - 8) annual vaccination against Peste des Petits Ruminants (PPR)
 - 9) using the services of Community livestock workers for:
 - Treatment of sores; deworming; de-teaking and dystocia (birthing);
 - 10) using the services of the veterinary officer for injection of sheep and goat;
 - 11) practicing record keeping;
 - 12) attending group meetings.

According to the conceptual framework the DSR in Small Ruminant Production and Marketing (DSR-SRPM) was expected to guide the study to explore the existing gender inequalities in the institutions (the state, community, household and market). Starting from, resources (Figure 1) the DSR-SRPM was expected to guide the study to identify the different resources needed for SR production and the rules that govern the allocation of production resources and benefits sharing. The resources were expected to be in two categories: the tangible (land, labour, capital, SR) and intangible (extension information, group affiliation). The rules, norms and traditions that govern activities undertaken by different people in households and the community would be identified. Policies used in formal institutions, as TUDRIDEP and MoFA would also be revealed. Power relations between women and men for instance would be expressed in the

form of who had authority over whom ('power over') and which resources and benefits; access and control of resources and benefits, and level of decision-making in the institutions would be identified. The different types of activities that female and male farmers engaged in would be identified (productive, reproductive and community). The category of people allowed to engage in, or excluded from various activities in the four institutions would also be identified, alongside the rules and norms that held. Other components / variables of the conceptual framework included the attributes of the technology package transferred, the adoption of SR technology package and the kind of need met by the intervention.

It was assumed that the four components were all either directly or indirectly related to each other. The DSR-SRPM was expected to directly influence farmer perception of the attributes of the SR technology package transferred and farmer adoption decision. This is because the gender division of labour (GDOL) which is part of the DSR-SRPM component was expected to have a direct relationship with farmers' perception of the attributes of the SR husbandry package. For instance, the role that a farmer played in SRPM before the intervention was expected to influence the farmer's adoption decision. The prospective adopter would consider whether the new technology was similar to what they were practicing before the intervention (compatibility). Farmers would consider how much more money the new technology would generate (relative advantage) before deciding to adopt.

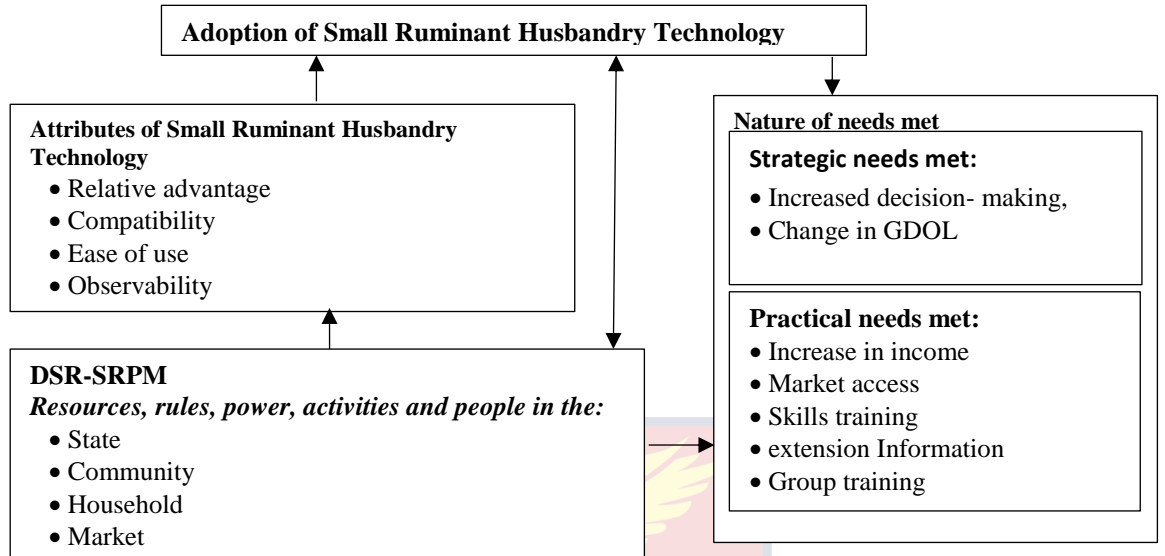


Figure 2: Conceptual Framework for Gender Dynamics in Small Ruminant Husbandry Technology Adoption

Source: Adapted from Rogers (2003); Amoah (2014); Kabeer (1994); Miles (2014)

Farmers would also consider how easily or difficult the practice of the new technology would be as compared to what they were practicing before. Thus, farmer perception of the attributes of the technology was expected to directly influence farmers’ decision to adopt. It was also expected to influence the extent (level) of adoption. Hence, the DSR-SRPM was expected to influence the ‘attributes of technology.’ through the GDOL. The GDOL was also expected to influence adoption directly.

In the reverse, adoption was expected to influence the DSR-SRPM. This is because the introduction of the small ruminant husbandry technology was external to the usual SR husbandry practices in the institutions (household and community). Since these institutions already had their norms, rules and

regulations, the introduction of new practices, rules and regulations through the intervention by TUDRIDEP was expected to cause a change in one institution (the household) and trigger changes in the other institutions as regards increase in animal numbers, household income and decision making, among others.

The ownership access and control of resources is embodied in the DSR-SRPM component. The SRA concept two (social relations), would enable the study explore the root causes of unequal ownership access and control of resources among female and male farmers in the household and communities on the project. The institutional analysis (concept 3) would also enable the study examine the effect the intervention (through the institutional rules and policies of the FSEF and TUDRIDEP) would have on ownership access and control of both tangible and intangible resources. This would expose the power relations between women and men after the intervention. The intervention was expected to influence the dynamics of ownership, access and control of resources and hence the arrow from the adoption of intervention box to the DSR-SRPM.

The DSR-SRPM component was expected to influence the kind of need met by the intervention. This is because the gender ideology of the organisation (TUDRIDEP) was expected to influence the gender policy the organisation pursues. The Institutional Gender Policy Analysis (concept four) of the Social Relations Approach (SRA) embodied in the DSR-SRPM component was expected to guide the study to ascertain the kind of gender policy the intervention pursued. Whether the intervention itself was gender blind or gender aware; and if gender aware, whether it was gender neutral, specific or redistributive. This in

turn would determine the kind of need the intervention met: whether it was a PGN or a SGN.

The adoption of the small ruminant husbandry technology package was expected to influence the kind of need met. This is because the adoption of the intervention package was expected to start a process of change in the households, which were expected to contribute to the kind of need met whether a practical or a strategic gender need. For instance, if the increase in small ruminant numbers after adoption, translated into increased income earnings without a change in the GDOL in the household responsibilities and in SRPM, in the level of control (decision-making) of the adopter, the need met would be labelled a practical gender need.

This conceptual framework was expected to give an idea of the gender inequalities that pertained in the case communities; how farmers perceived the technology package introduced and how the perceived attributes of the technology package influenced adoption of SR husbandry technologies introduced. In addition, the kind of gender policy TUDRIDEP pursued, the kind of needs met by the intervention, leading to how the adoption of the intervention package affected gender relations in the institutions (the household, communities, market and state). It guided the preparation of instruments: the structured interview schedule and the interview guide for gathering quantitative and qualitative data respectively, the analysis of data and finally the write up of the thesis.

Chapter Summary

The chapter discussed the theories on adoption, concepts of gender, power, approaches to women's development and gender analysis frameworks. The empirical information covered SRPM, including resources required for SRPM, and factors that may influence the uptake of technology. The chapter concludes with a conceptual framework to guide the work.

The conceptual framework had four variables: the adoption of SR technology package, the attributes of the technology package, dimensions of social relations in small ruminants' production and marketing (DSR-SRPM) and finally, the kind of need met. The variables and how they were expected to relate to each other was shown. For instance, the variable 'attributes of the technology transferred' guided the study to determine farmers' perceptions of the technology attributes, and how the technology attributes influenced adoption.

The component DSR-SRPM guided the exploration of existing gender inequalities in the four institutions, the state, community, household and market, using the five distinct but inter-related dimensions of social relationships: rules, resources, power, activities and people. The DSR-SRPM variable also guided an Institutional Gender policy analysis of the gender policy that TUDRIDEP pursued; the extent of gender awareness of the intervention itself, and to determine the kind of need the intervention met. An institutional analysis guided the study to determine the gender ideology of TUDRIDEP and the interrelatedness of the four institutions. The activities performed, who performed them before the intervention were explored guided by the DSR-SRPM variable.

This was to enable a comprehension of how the GDOL could influence farmers' perception of the attributes of the SR husbandry intervention package and adoption levels. The next section discusses the research methods.



CHAPTER THREE

RESEARCH METHODS

Introduction

This chapter focuses on methodological issues, covering where and how the study was undertaken. It presents the research design, sampling, data collection instruments, procedure and data analysis used. The appropriateness of the methods used, the reliability and validity of the results are discussed. The next section describes the research design that guided the work.

Research Design

The case study design was adopted for this study because it fits into the description of case study given by authors, including Hartley (2004); Ridder, (2017) and Yin, (2003). Yin (2003), defines a case study as an ‘an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when boundaries between phenomenon and context are not clearly evident (Hartley, 2004 & Yin, as cited in Soni, 2014). The definition by Ridder (2017) that a case study research is one that ‘scientifically investigates into real-life phenomenon in-depth and within its environmental context is close to that of Yin (as cited in Soni, 2014). The present study sought to investigate a contemporary phenomenon: ‘gender dynamics in the adoption of small ruminant husbandry technology adoption among small ruminant farmers’ that participated in a particular project, TUDRIDEP. The study required the collection of data to describe the environment in which the project took place. Verschuren (2003) also made a strong case for the use of case study strategy to study phenomenon

situated in a socio-cultural context. In this study data collected on the socio-cultural environment described the patriarchal nature of the study area, the norms and rules that guided small ruminant production and marketing and gave room for inequalities in access and control of resources, and the perpetuation of the inequalities. Further, the suggestions given by Yin (as cited by Soni, 2014) on choosing strategies to conduct research made the case study more appropriate for this study. He suggested that the type of research question posed; the extent of control the researcher has over behaviour of research subjects or situation, and whether the focus of the study was a contemporary phenomenon in some real-life context. In this study, the questions of how and why inequalities were generated and perpetuated among small ruminant farmers were answered, without controlling the behaviour of the subjects of the research. The phenomenon under study 'gender dynamics in small ruminant technology adoption' was a contemporary rather than a historical event. The case study was considered most appropriate. Studies using case study have been reported by some authors as having a low generalisability due to its use of selective sampling (Babbie, 2011 & Bliss and Martin, 1989). However, Yin (1994) argues that case study research is not about being able to generalize, but about relating the findings to theory.

A case study can be single or multiple design. Although the multiple design is more robust, the single design was chosen because it has the advantage of giving in-depth understanding to the chosen phenomenon Yin (as cited in Soni, 2014). A single case study design could be holistic or embedded depending on the number of units to be analysed. Holistic cases deal with a major or primary unit

of analysis, while the embedded deals with a major unit and other sub units for analysis. The study adopted a single embedded design. The TUDRIDEP project was the major unit of analysis with sub-units/components, including the organisation, its gender policy and the intervention introduced. Other units of analysis were the beneficiary households and the community. The single-embedded case design allowed for in-depth understanding of the phenomenon in question, which is ‘gender dynamics in SR husbandry technology adoption in the Wa East District of the Upper West Region’.

This case study adopted a mixed methods approach. Both Hartley (2004) and Yin (as cited in Soni, 2014) stated that case studies may use qualitative, quantitative methods or both. In this study the convergent parallel mixed methods approach was used. The approach merges quantitative and qualitative data in order to provide a comprehensive analysis of the research problem (Creswell, 2014). Thus, qualitative and quantitative data were collected at the same time on the field and the information was integrated in the interpretation of the overall results.

The quantitative approach is based on the positivist paradigm while the qualitative approach is based on the interpretivist paradigm. The positivist paradigm or research philosophy posits that science is the only way to learn about the truth. It is objective and the researcher is detached from the phenomenon being studied.

The interpretive paradigm however tries to understand the world from the subjective experiences of the individuals under study. In this study, it was

required that information be collected that would give an understanding of the phenomenon of gender dynamics in small ruminant production and marketing: the sources and perpetration of inequality in the distribution, access and control of production resources; the gender sensitivity of the implementing organisation; norms and rules that guide the production and marketing. Interview techniques including in-depth interviews, focus group discussions and observation, which are qualitative in nature, were therefore employed in answering three out of the four objectives of the study. The study thus leaned more towards the interpretivist] paradigm.

Although the positivist paradigm contrasts the interpretivist paradigm in ontology and epistemology, the two paradigms complement each other in this study. The positivist paradigm guided the measuring of farmers' perception of technologies introduced, adoption levels of farmers (objective four) and hypothesis testing, while the interpretive paradigm enabled the researcher to know the why and how gender inequalities are generated and perpetrated, as stated earlier. Within the quantitative approach, the study used the descriptive survey design. The next section describes the selection of the case.

Case selection

In the selection of a case, care was taken to choose one that would generate enough data for meaningful and reliable conclusions to be drawn (Miles and Huberman (1994). Other authors, Marshall and Rossman (2011) and Yin (2003) stressed the need for proximity and accessibility to enable the researcher to have close and frequent contact with interviewees.

The case for study was selected using purposive sampling since the researcher was interested in a specific phenomenon, ‘gender dynamics in the adoption of small ruminant husbandry technology adoption’. Northern Ghana was chosen because it is the hub of livestock production (Dei et al., 2007). Two 3-year projects were identified which had responded to the the Food Security and Environment Facility (FSEF) call (described earlier in the introduction of chapter one). One project was located in the Northern Region and the other in the Upper West Region. Both projects had similar objectives including promoting equality between women and men farmers by reducing the resource ownership gap and had both transferred SR husbandry technologies. Both projects aimed at increasing women’s knowledge and skills in management and environmental practices for sustainable livestock rearing. Another reason for choosing northern Ghana is because, Adams and Ohene–Yankyera (2014a) in a study of SR famers reported that whereas SR farmers in the Northern Region were market oriented and kept SR for sales, farmers in Upper West sold SR only when they needed to meet a need. Since high adoption levels reported for both projects was likely to result in increased SR numbers, the researcher decided to focus on the Upper West Region project to explore further the dynamics of ownership, access and control of SR in the Upper West region. Further, documents obtained from the Upper West Region gave a better undersanding of the project background that would enable this study achieve its objectives.

The TUDRIDEP project in the Wa East District involved the introduction of small ruminant husbandry technologies to female and male farmers in ten

communities in the Wa East District which are: Funsì, Halimboi, Yaala 1, Yaala 2, Boffiama, Jumo, Chaggu, Tiisah, Tuasa, Dupari. The first five communities are located in the Funsì zone, whilst the last four in the Bulenga zone. The Funsì community was used as the pretest leaving the other nine communities for the actual study. A zone as demarcated by MoFA, comprises of operational areas. Each operational area is made up of communities. One agricultural extension agent (AEA) oversees an operational area and is responsible for agricultural extension activities of farmers in the zone.

Other reasons why the TUDRIDEP project was a suitable case to study included:

- i. Enough information would be obtained for analysis. It was a single embedded case and therefore, there were various sub-units (previous section) from which information could be obtained for the study. In addition, various TUDRIDEP documents were available for analysis, including the project proposal, annual and quarterly reports, monitoring and evaluation reports, the organisation's staff structure, gender policy and operational guidelines.
- ii. The female and male farmers who participated in the project intervention were available to share their experiences; elderly female and male key informants, who had rich knowledge about the case culture and small ruminant production and marketing were available and accessible for interview;

- iii. In addition, the reports made available before the study begun showed high female and male adoption levels of SR technologies introduced.
- iv. The communities were patriarchal, where males dominated in access, ownership and control of production resources. The cultural environment would provide a rich background context for an understanding of the phenomenon under study ‘gender dynamics in small ruminant husbandry adoption’;
- v. The interventions had taken place in ten communities (one was used for the pretest and nine were used for the actual study) and this would give the researcher enough information and credible data for analysis;
- vi. The data collected would show the dynamics of gender relations in the adoption of small ruminant husbandry intervention which had hitherto not been the focus of previous adoption studies (Adam, Atengdem, & Al-Hassan, 2010; Adams & Boateng, 2012; Adams and Ohene-Yankyera, 2014 a & b). A detailed description of the case and its context is given in chapter 4. The next section describes the population of the study.

Population of the Study

The target population for the case study was farmers that had been exposed to the small ruminant husbandry technologies introduced by TUDRIDEP in the ten communities mentioned earlier in the Wa East District. The total was one hundred and sixty-one (161) farmers including females (113) and male (48) according to a list obtained from the TUDRIDEP project.

Sampling Procedure

Quantitative data was collected by a census facilitated by the structured interview schedule. This is because farmer numbers were small. Funsu, one of the ten communities that had been exposed to the small ruminant husbandry intervention that TUDRIDEP undertook, was used for the pre-test. Funsu was used because it was the only other community that had been exposed to the intervention, out of all the districts that TUDRIDEP works in. It had similar characteristics as the final sample.

Participants for the qualitative data collection were selected using non – probability sampling. In qualitative research, the sample size is not predetermined (Merriam & Tisdell, 2016), but based on the researcher’s judgment and the purpose of the research (Babbie, 2011; Creswell, 2014). In this study, participants for separate women and men’s FGDs were selected using purposive sampling. In this study, purposive sampling was used to select participants for separate women-- and men’s FGDs. The selection criteria included age, ownership of SR and involvement in SR keeping. Age enabled collection of data across generations. Ownership and involvement in SR keeping before and after the intervention provided information on farmers’ varied experiences. In the same vein, the researcher used snowball sampling to identify elderly women and men (key informants) with knowledge about the rules and norms of the communities, and with experience in SRPM. Thus, the previous participant recommended the next. Other key informants such as the Assembly Persons were selected using purposive sampling. The different categories of respondents that were interviewed

in the study are stated (Table 2).

Table 2: Distribution of respondents interviewed

Category of respondents	Number
Male farmers	39
Female farmers	79
Elderly males	6
Elderly females	5
Assemblypersons	2
Sheep and Goat Traders	2
Community Livestock Workers (CLW)	6
TUDRIDEP staff	3
Total	142

Source: Fieldwork (2017)

Various respondents represented the four institutions. The female and male farmers represented the household; the elderly females and males, and the three staff members of TUDRIDEP (the station Manager at Funsì, the accountant and the field staff) represented the community. The Assembly persons and MoFA staff represented the state whilst the two small ruminant traders represented the market. The data collection producers are described in the following section.

Data Collection Methods

As stated earlier under research design, the mixed methods approach was used for data collection. Case studies allow the use of different techniques and sources in data-gathering (Hartley, 2004 & Soni, 2014). The sources include documents, archival records, interviews, direct observation, participant observation and physical artifacts (Yin, 2003). Collecting data using different

methods and sources tends to make results more accurate and convincing (Creswell, 2014; Soni, 2014). The dependability and trustworthiness of the data and interpretation are also increased (Bowen, 2009; Zohrabi, 2013).

In this study, the qualitative methods used were in-depth interviews, Focus Group Discussions (FGD), direct observation and documents analysis. Document analysis is used in combination with other qualitative research methods as a means of triangulation (Bowen, 2009). Document analysis entails examining data and interpreting the data to elicit, gain understanding and develop empirical knowledge (Bowen, 2009; Corbin and Strauss, 2008). The documents examined included TUDRIDEP's project proposal and organisation's profile, its gender policy and operational guidelines, quarterly and annual project reports. These documents provided information on the history of TUDRIDEP, its goals and activities undertaken; the objectives TUDRIDEP's Gender Policy and operational guidelines, the staff organogram and criteria for farmer selection details of the technology package introduced.

These documents helped to ascertain the gender policy guiding the TUDRIDEP intervention and TUDRIDEP's gender orientation. Document analysis is advantageous in that information from documents can be assessed at times convenient to the researcher and at minimal cost. The process is unobstrutive and non-reactive, in that such data is not affected by the research process (Bowen, 2009; Creswell, 2014; Merriam and Tisdell, 2016). Documents have a wide coverage in terms of time span, events and setting and provide exact names, references and details (Yin, 1994). However, limitations include not

having sufficient detail to answer the research question since they were written for purposes other than research. Further, documents may not always be retrievable as access may be blocked. However, the advantages of document analysis outweigh their disadvantages (Bowen, 2009).

The use of FGD and in-depth interviews enabled in-depth knowledge of the phenomenon – the gender dynamics in the adoption of small ruminant husbandry technologies by female and male farmers. The lived experiences of the people involved with the issue were described (Holloway, 1997, Kvale, 1996, Maypole and Davis, 2001) the thoughts and feelings of participants were expressed, enabling the interviewer to perceive the meaning that people ascribed to their experiences. Existing knowledge was expressed in the form of answers that were interpreted (Zohrabi, 2013).

The use of the FGD and in-depth interview methods in the present study, generated more knowledge of how the household, community, state and market, work through rules and norms to shape the social relations of gender, perpetrating inequalities as regards gender division of labour (objective 3); and access to and control of production resources and benefits in small ruminant keeping households (objective 2). Guided by the interview guided the FGD and in-depth interviews allowed for openness and flexibility. Holding the FGD separately for female and male in small groups (6-10), gave each participant a chance to express themselves. The female and male groups had a good representation of young and old participants to obtain views across generations. Collecting data using FGD method enables a large amount information to be gathered within a short time.

However, the large volume of information that FGDs generate makes some researchers reluctant to use qualitative methods (Rosenthal, 2016; Zohrabi, 2013).

Another data collection method, the non-participant observation provided first-hand account of the phenomenon of interest as they unfolded in the natural setting (Marshall & Rossman, 2011). For instance, sheep and goats were observed as they were let out of their pens in the morning and led back in, in the evening. Animals were observed as they were given supplementary feed outside the pen in the morning. At such times, the owners, especially the women, were able to observe the animals for any abnormalities. Small ruminants were also observed drinking around boreholes. Women's activities at the bore holes were also observed. These observations were documented as they occurred, or soon afterwards (Merriam & Tisdell, 2016). Non-participant observation supplemented data obtained from the FGD and in-depth interviews and documents. In addition to these methods, pictures were taken. Using different methods in combination provided a way of data triangulation (Bowen, 2009; Marshall & Rossman, 2011).

The qualitative methods were used for objectives one, three and four. However, the second objective: examining the adoption of small ruminant technologies, necessitated the collection of solely quantitative data, therefore the descriptive survey design was used. This enabled the adoption levels of female and male farmers to be quantified. It also allowed hypothesis testing to find out whether adoption levels were gendered.

Collecting data using quantitative methods is preferred because questions are objective, quick to collect data and cost effective (Chun-Fu, 2009; Dossler,

2008; Zohrabi, 2013). However, the method has limitations, including inhibiting the discovery of information about topics of which little is known. This is because there are predetermined questions with a range of corresponding answers. This method also forestalls the opportunity for respondents to express their own views (Cohen, Manion & Morrison, 2007; King, 2004 & Zohrabi, 2013). In this study, it would have been difficult to obtain a good knowledge of farmers' views on the rules and norms that guide small ruminant production and marketing using structured questions. Besides, if new information emerged and there was the need to obtain more complete answers to certain questions, the survey instrument could not have been changed. It would have been maintained to facilitate statistically sound analysis (Cohen et al., 2007). The two methods, the qualitative and quantitative used in this case study, therefore, complemented each other. The following section describes the population for the study and the data sampling techniques.

Data Collection Instruments

Two types of instruments were prepared. A structured interview schedule was prepared to elicit quantitative data whilst eight (8) different interview guides were prepared to collect qualitative data from various categories of respondents including: female and male farmers; elders and assembly persons; MoFA District Animal Husbandry Officer and District Veterinary Officer; sheep and goat traders; community livestock workers; TUDRIDEP manager and TUDRIDEP field officer. The structured interview schedule is discussed first and the interview guides follow.

The Structured Interview Schedule

The structured interview covered objective four, which examined adoption of husbandry technologies transferred and part of objective two, which describes the ownership access and control of production resources needed for small ruminant technology adoption. The socio-demographic characteristics of the farmers were also covered by the structured interview schedule. The structured interview schedule (Appendix A) was used to collect the survey data from the all female and male farmers that participated in the project. The interview schedule was divided into six main sections. Section A, captured background information, section B, the bio data of respondents; section C covered respondent occupation and farm related activities; section D covered farmers' adoption of husbandry technology. It also included a six-point Likert type scale (ranging from not at all to very high extent) question developed to measure farmers' perception of the attributes /characteristics of technologies they had been exposed to: compatibility, relative advantage, observability and complexity/ease of use (APPENDIX J). Trialability was omitted from the list of attributes because it was assumed that since some of the farmers had been keeping SR before the intervention, the new practices would not be strange and would not need to be tried on a small scale before adoption. Farmers' responses to the Likert scale were confirmed or not by participants' views from the female and male FGDs. FGD data for adoption levels was obtained by asking farmers to first indicate whether or not they used the technologies transferred to them, secondly the frequency of use for all the twelve items in the technology package.

Section E covered agricultural extension services, group affiliation and sources and access to credit. The structured interview schedule consisted of both closed and open-ended questions. The closed ended questions were pre-coded and participants chose from a number of limited responses. The open-ended questions enabled respondents to provide answers in their own words and express themselves fully. This provided greater depth and gave in-depth understanding to views of respondents. As mentioned earlier the strengths of the structured interview schedule includes among others, enabling the researcher to quantify population parameters. In this study, responses from the survey were used to test hypotheses and to determine the level of adoption of the technologies transferred. The structured schedule instrument was developed using information gleaned from the literature reviewed, the TUDRIDEP project documents and project staff, from the manager and the veterinary technician who was also the TUDRIDEP field staff on the project.

Validity of Structured Interview Schedule

Face, Content and Construct validity of the structured interview instrument were assured. The face validity was assured by establishing that the questions asked were a good reflection of the variables under investigation. Content validity of an instrument ensures that the items or questions asked adequately cover the variables being investigated. To ascertain content validity lecturers at the Department of Agricultural Economics and Extension University of Cape Coast and staff of the (TUDRIDEP), the case organisation examined the instrument to ensure that it extensively covered the variables being investigated

(Cohen et al., 2007). Construct validity involves establishing the correct operational measures or definitions of the concepts under study. Hence construct validity establishes whether the researcher's understanding of the construct is similar to that which is generally accepted to be the construct. In consultation with literature, supervisors and other lecturers of the Department of Agricultural Economics and Extension University of Cape Coast, unclear and obscure questions were detected and corrected. Suggestions were made for rewording questions that sounded complex. Redundant questions were removed. The next section describes the pretesting of the structured interview schedule.

Pretesting of Structured Interview Schedule

To establish the reliability of the instrument, it was pretested. The reliability refers to how dependable, consistent and how the questions asked could be replicated. Pretesting of the interview schedule enabled the detection of some errors and deficiencies and the instrument was further revised. This clarified and enhanced perception of the questions and ensured internal consistency among the items. As suggested by Kumar (1996), the pretesting was undertaken with a population similar to the one from which the sample was drawn by interviewing farmers in Funsu, one of the ten communities that had participated in the project in the district. This left nine communities for the actual study.

Twenty farmers were interviewed, since twenty (20) is considered an optimal size for reliability analysis. Reliability test was done to obtain the cronbach alpha coefficient for the Likert type scale questions on the characteristics of the technologies transferred with the aid of the Statistical

Package for the Social Sciences (SPSS). The Chronbach alpha provides a coefficient of inter-item correlations, meaning the correlation of each item with the sum of all the other relevant items (Cohen et al., 2007). The test was run and a coefficient of reliability of 0.81 was obtained. The figure is acceptable since an alpha of more than 0.70 implies consistency (Pallant, 2013). Reliability of the scale items measured was thus assured. The researcher then proceeded to administer the instrument. The next section describes the interview guide.

Interview Guide

This section describes the different interview guides developed to facilitate the collection of qualitative data, and the objectives that the questions addressed. These interview guides facilitated the use of methods like in-depth interviews for key respondents; focus group discussions (FGD) for the female and male farmers and observation record sheets for the non-participant observation of certain activities. There were eight different interview guides (Appendices B, C, D, E, F, G, H and I). These interview guides were developed with information from various sources: literature, key informants, including elderly women and men in the study area, the staff of Ministry of Food and Agriculture, staff of the implementing organization, TUDRIDEP, especially the station manager and the veterinary technician, who was also the project field staff.

The interview guide for women and men's Focus Group Discussions (Appendix B), covered objectives three and four. Objective three (3) sought to describe the asset ownership, access and control of production resources needed for SR production. The Harvard Analysis Framework (HAF) tool two, a

Participatory Rural Appraisal (PRA) tool, referred to as the Access and Control Profile (Chapter 2) was used to explore objective three. Questions centred on ownership, access and control of tangible and intangible resources needed for sheep and goat production; as well as the benefits therefrom. Tangible resources included land, sheep and goats, water and feed resources, and credit, while intangible resources included agricultural extension support services and information, as well as group affiliation. The interview guide for women and men's Focus Group Discussions (Appendix B) also covered the importance of sheep and goats as a resource and this was established through a ranking exercise. After listing the various reasons for keeping sheep and goats, respondents undertook a ranking exercise to show which category was more important to them: the social or the economic uses of sheep and goats. In each community, the exercise was undertaken by two groups; sheep only and goats only, owners. Each group was asked to indicate the importance of these animals to the owners.

The interview guide for women and men's Focus Group Discussions (Appendix B) covered the gender division of labour in the household and in small ruminants production and marketing, as well. This was to provide a background on farmers' practices before the husbandry technologies were introduced to the small ruminant farmers. The questions on the division of labour, were guided by three Participatory Rural Appraisal (PRA) tools, Harvard Analytical Framework (HAF) Tool one, also known as the Activity Profile; tool one of the Moser Framework, also known as the triple roles framework; and a third framework, the Social Relations framework. The interview guide for women and men's Focus

Group Discussions (Appendix B), also covered Objective four (4) which examined the institutional rules, norms influencing SR production and marketing in the study area in terms of the institutions, including the household, community, state and market. The questions covered the five aspects common to all institutions- rules, activities, resources, people and power, with particular emphasis on the rules both official and unofficial. The unofficial rules were norms, customs and traditional beliefs that pertain in the study area as regards SR production and marketing.

The interview guide for elderly women, men and assemblypersons (Appendix C), covered questions on the general rules and regulations governing SR production and marketing. It also covered questions on their views about the importance of sheep and goats, roles of women and men in SR production and marketing. Questions also covered their views on ownership, access and control of resources for SR production and benefits.

The interview guide for MoFA veterinary and animal husbandry staff (Appendix D), covered the role they each played in training farmers and CLWs in general production and health as well as in the acquisition and distribution of SR supplied to the farmers. The interview guide for Sheep and Goat Traders (Appendix E) facilitated the interview of SR Traders. It covered questions on purchasing and sales, information on norms and rules for sales and purchasing of SR, the involvement and role of livestock traders in TUDRIDEP activities; their mode of operation and how their services were patronized by participants and non-participants of the project. Questions also included who contacted the traders

for their services - female or male participants; their perceived benefits of services to participants; sustainability of services after the project period and challenges faced.

The interview guide for Community Livestock Workers (CLW), Appendix F covered handling of health issues of sheep and goats. It also covered questions on the involvement of the CLWs in TUDRIDEP activities. Their mode of operation, acquisition of medications and charges for services rendered to participants and non-participants. Questions also covered the frequency of patronage of CLW services by female, male participants and non-participants. The perceived benefit of services to participants; how to sustain the services after the project period, and challenges faced were also covered.

The interview guide for the TUDRIDEP station manager, (Appendix G) covered the background and motivation for the project under study; problems identified by TUDRIDEP before the project; gender issues identified in the communities and proposed solutions; beneficiaries and non-beneficiaries and other stakeholders that TUDRIDEP works with. Other services provided by TUDRIDEP to its communities and staff male / female ratios. These questions assisted in answering objective one which involved examining the gender sensitivity of the TUDRIDEP. In addition to that, secondary data consisting of documents from TUDRIDEP including the organisation's profile, gender policy documents, the project proposal, annual and quarterly reports of the organization and the current project were consulted in answering objective one.

The interview guide for the TUDRIDEP field staff (Appendix H) covered the role the field staff played during the implementation period and after. It also covered the perceived views of the technology uptake, perceptions of the operations of the CLWs and small ruminant traders during and after project. The views of the field staff on the effect of the TUDRIDEP intervention on gender relations of participating households were also sought. This interview guide contributed to answering objectives four (technology adoption), and three (rules and norms guiding SR production and marketing).

The final instrument the Observation Record Guide (Appendix I), facilitated the non-participant observation process. Various activities were observed first-hand, without asking any questions. The non-participant observation method served as a form of triangulation, since it complemented the information obtained the other interview methods; and forestalled misinterpretation of information from other sources. Scenarios such as opening of pens in the morning, letting animals back into the pens in the evening were observed to find out whether animals were given any supplementary feed and water at such times. Other scenarios included fetching of water and use of the bore-hole by women and animals, meetings of credit associations and farmer group meetings.

From the foregoing, it is clear that no one guide answered completely any one of the objectives. Rather portions of the various interview guides contributed to answering the objectives. Having discussed the data collection instruments, it is

also important to describe how quality of the instruments and the data collection process were assured.

Assuring Quality of the Interview Guide

Unlike quantitative research, there are no statistical tests for checking on the reliability and validity in qualitative research. The reliability, construct validity and external validity of the data were tested at different stages of the study and described.

The construct validity involves the need to establish the correct operational measures or definitions of concepts under study. To improve construct validity in this study, data was collected from multiple sources including in-depth interviews with key informants, focus group discussions with farmers, non-participant observations and documents. This resulted in data triangulation (Ridder, 2017; Stake, 2005). After data collection, portions of the report were sent to some key informants including the TUDRIDEP manager via email for review. In other instances, telephone calls were made to clarify certain portions of the write up and gaps were filled. An independent person who spoke both Waale and Sissale languages listened to the audio recordings and checked the transcriptions done by the study team on the field. Some omissions were identified and gaps were filled. Such methods proved convenient since the researcher resided far from the study area.

Reliability of the data refers to whether the data collection procedures can be repeated with the same results. To ensure reliability of the data in this study, a data collection protocol (details in the next section) was prepared (Yin, 2003).

The data analysis has also been described in detail such that interested researchers can follow and replicate. In addition, the data collected has been preserved in the form of audio recordings. Copies of the original transcripts are also in both soft and hard copies. Triangulation using different techniques including FGD, in-depth interviews and non-participant observation, increased the reliability of the data and results.

External validity has to do with how one can generalize the findings of the case study beyond the immediate case. Since it is difficult to generalize from one case study to another in qualitative research, the research team provided a detailed description of the context and case. Thus, the primary unit of analysis, TUDRIDEP, the other sub-units of the organisation, the intervention and the farmers, were described in detail to give a good knowledge of the phenomenon under study. The next section describes how data collected was managed.

Data Collection Procedures

A data collection protocol was prepared to guide data collection. Protocol preparation is an important step, since it enhances reliability, and enables other researchers to repeat the process (Soni, 2014). The protocol involved identifying the data to be collected by objective, data collection methods, and how the data would be analysed. Data collection methods for objectives one, two and three were qualitative. Thus, interview guides were designed to guide the collection of qualitative data using methods as FGD, In-depth Interviews and non-participant observation. A structured interview schedule was designed to collect quantitative

data for objective four. After data collection, the data was stored as both hard and soft copies. The recordings from the interviews were stored as hard copy transcripts and as files on the world wide web (www). The pictures taken during observation were also stored on the www.

Two assistants trained by the researcher administered the structured interview schedule face to face to respondents in the local languages, Sissale and Waale. Nine communities were covered in all. In the Finsi area (Halimboi, Yaala 1 and Yaala 2, Jumo and Bofiama) the assistants asked the questions in Sissale and spoke Wale in the Bulenga area (Dapari, Tuasa, Tisaa and Chaggu).

One research assistant wrote field notes to complement the audio-taped interviews and the writings of the other research assistant. The notebook served as a reminder of certain situations that helped in the interpretation of data collected. It was used to comment on impressions, environmental contexts, behaviours, and capture non-verbal cues that could not be captured by the audio-recording (Austin and Sutton, 2015). One challenge that the researcher encountered during the FGD was that, some participants sometimes attempted to dominate the discussion, preventing less vocal participants from expressing themselves. On such occasions, one of the assistants quickly and quietly intervened to get such participants to calm down.

The data collection started on 15th March, 2017 and ended on 12th May, 2017. The interviews took place between 8 am in the morning and 6 pm in the evening, while the observation started at 6 am in the morning.

Data Management

Data collected from the in-depth interviews and FGDs were audio recorded and transcribed verbatim into English language every evening, before the next session to avoid high workload as the work progressed. Data analysis begun when all the transcriptions were complete (Austin and Sutton, 2015). The audio recordings and transcripts (both hard and soft copies) have been preserved. Discussion on data processing and analysis follows.

Data Processing and Analysis

Data processing was done in two parts: data collected from the survey using the structured interview schedule was managed differently from data collected using the interview guide. The analysis of the survey data is discussed first.

Analysis of survey data

After data collection using the structured interview schedule, data cleaning followed. The completed schedules were examined to identify and minimize errors by carefully reading the scripts to check responses for incompleteness and misclassification and gaps were filled. In some instances, call backs were made by telephone to fill the gaps. Data was then coded, entered and analysed using Statistical Package for Social Scientists (SPSS) software package Version 21. Appropriate results in the form of descriptive statistics such as frequencies, means, standard deviation and percentages were generated. Independent sample t-test was used to compare differences by gender.

The sections described under the structured interview schedule, which captured background information were analysed to generate descriptive statistics including frequencies and means. These included the bio data of respondents, respondent occupation and farm related activities, technology adoption, agricultural extension services, group affiliation and credit. Where there was the need to test hypothesis and compare responses by gender, analysis was done using the independent sample t-test. In section D a six point Likert type scale (ranging from not at all to very high extent) was developed to measure farmers' perception of the attributes of the husbandry technologies transferred (Appendix J). The attributes measured were compatibility, relative advantage, observability and complexity / ease of use. The frequencies of the various Likert scale type responses given by farmers were calculated and the independent sample t-test gave the various means and standard deviations. The composite mean for each attribute was then calculated by sex. This was followed by the overall composite mean to give the extent of the level of appreciation of the attributes of the technologies by gender.

The Friedman's test was applied to find how the means were ranked from the highest to the lowest. The Wilcoxon's test was done as there were significant differences between the four rankings of the four characteristics. The Wilcoxon test was used to identify where the differences lay. The test does permutations to compare the differences in rankings. The Wilcoxon test is also called the Mann-Whitey-Wilcoxon / Wilcoxon rank –sum test.

The level of adoption of the small ruminant husbandry technology was calculated as the level of usage of a given technology in any time period (Bonabana-Wabbi, 2002). In this study, the level of adoption is the number of components of the technology that each respondent adopted. The first thing was to assign '1' to those technology components which had been adopted and '0' to those which had not been adopted. A technology was deemed to have been adopted if the frequency of practice was close to the expected or was at the expected frequency. For example provision of water is supposed to be ad libitum (water should be available all the time) however most respondents gave water twice a day, in the morning, when they opened the pens to feed the animals before they left home and in the evening when the animals returned home. Others gave water three times a day because the animals came home in the afternoon. Therefore, when water was given between once and three times or even four times a day the respondent was reckoned as having given the water daily. However, with feeding where the respondents had to prepare ficus seed cake for example, those who indicated that they fed occasionally or once a while were deemed not to have fed. The adoption levels were then computed for each respondent to arrive at the adoption frequencies. Female and male adoption levels were compared for each component of the technologies using chi-square to find whether there was significance difference between adoption levels. After that, the Independent sample t-test was used to test mean female and male adoption levels at 0.05 level of significance to determine whether the null hypothesis that there was no

difference between adoption levels of female and male farmers should be upheld. The next section describes the analysis of the qualitative data.

Analysis of qualitative data

According to Merriam and Tisdell (2016), the analysis of qualitative data involves making sense of data collected from participants during FGDs, in-depth interviews and observations. Documents obtained from TUDRIDEP in the form of project proposal, the organisation's profile, its gender policy and operational guidelines, quarterly and annual project reports were also analysed. The analysis started in the field during note taking. The notes taken helped during analysis off the field. Audio-recorded interviews were transcribed and typed in English from the Waale and Sisale local languages daily to avoid missing important explanations. Daily transcriptions guided the decision about which questions to focus on in subsequent interviews and to determine when saturation was reached.

When transcribing ended, detailed data analysis began. Analysis was undertaken manually. The documentary data were analysed together with data from FGD, indepth interviews, participant observation. Documents and transcripts were read thoroughly and coding begun. Coding entailed assigning short expressions to various aspects of the data to enable easy retrieval of specific pieces of data or data bits. This process was guided by the research questions and the conceptual framework. For instance, in discussing the importance of sheep and goats to the keeper, codes assigned to responses were 'for funerals', 'to buy food', 'pay hospital bills', 'pay school fees'. These expressions were written on the right-hand margins of the transcripts in pen. Highlighters and markers were

used where necessary. This first exercise was referred to as open coding (Merriam and Tisdell, 2016) where all data bits that were of interest or related to the purpose of the study were identified. The next stage was axial coding, where codes were put under a bigger cover called categories or themes, where they were deemed to fit best and the categories were named. Some categories were merged with others to hold more codes; other categories were further divided into sub-categories and in some instances, new categories were formed.

The final categories named met criteria suggested by Merriam and Tisdell, (2016): The categories were mutually exclusive, such that each code fitted in only one category, ii) categories were responsive to the purpose of the research, in the sense that the categories created were more or less the answers to the research questions. The categories were exhaustive such that all codes identified fitted into a category and no code was without a category; iv) in addition, the category was as sensitizing as possible, in that the name of the category was a reflection of the codes in that category. For instance, instead of ‘health’ a category was named ‘animal health care’, which was descriptive; v) finally, the categories were conceptually congruent, meaning that all categories were at the same level of abstraction. The analysis then continued under the various objectives of the study.

Objective one sought to examine the gender sensitivity of TUDRIDEP as an institution. In this case study, TUDRIDEP was the major unit of analysis, which was further divided into sub-units for analysis. The organisation’s gender policy, staff organogram, and the intervention introduced were each examined

under the gender lens of the Social Relations Approach's (SRA) institutional analysis (concepts three) and the institutional gender policy (concept four).

The institutional gender policy (Figure 2) was used to classify TUDRIDEP's gender policy into gender blind or gender aware policies. If it was gender aware (gender-sensitive), whether it was gender neutral, gender specific or gender redistributive, depending on degree to which the policy recognizes and addresses gender issues. Gender blind policies are those that do not acknowledge that distinctions exist between the sexes and therefore tend to perpetuate the already existing gender biases and this often tends to exclude women (Kabeer, 1994; Kabeer, 1996; Miles, 2014; UNDP, 2014). Gender aware policies do accept that women and men are development actors and have different constraints; and that women and men tend to have unequal benefit in development efforts (*ibid*). In this study, a policy would be described as gender aware if it considered female and male issues. The background, objectives and guiding principles for execution of the TUDRIDEP gender policy and the policy itself were studied thoroughly to ascertain the orientation of the TUDRIDEP gender policy.

Next, the gender policy was examined further to determine whether it was gender neutral, gender specific, or gender redistributive depending on whether it met strategic or practical needs. Practical gender needs (PGN) are those which when met, improve the lives of the target group without changing the existing gender division of labour or challenging the women's subordinate position in society (March et al., 1999). Gender-neutral policies work within the existing gender division of resources and responsibilities.

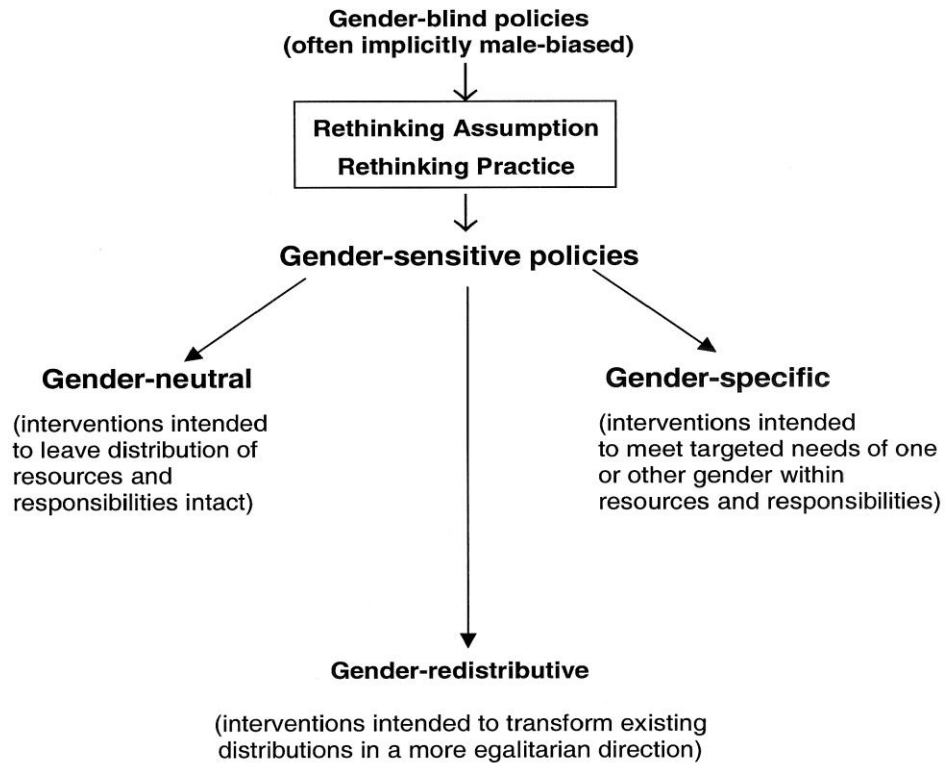


Figure 3: SRA Concept 4: Institutional Gender Policies

Source: Amoah, 2014; Hillenbrand et al. (2014); Kabeer (1994); Miles (2014).

They aim at ensuring that interventions target and benefit both sexes effectively to meet their practical gender needs (PGN). Gender specific policies also use the knowledge of gender differences in a given context to respond to the practical gender needs of either women or men; they also work within the existing gender division of resources and responsibilities (March et al., 1999). Meeting practical gender needs may entail actions such as income increasing / income generating opportunities including access to credit, markets and skills training.

Gender-redistributive policies refer to interventions that are intended to transform existing distribution of resources to create a more balanced relationship

between women and men. It may target women and men or one group specifically and are concerned with meeting strategic gender needs. When an intervention meets a strategic gender need, it leads to a change in the existing relationship of unequal power between women and men (March et al. 1999). This tends to affect the gender division of labour, power and control in the household. When a gender redistributive intervention works on the practical need of women, it tends to have transformatory potential which creates conditions that assist women to challenge unequal gender power relations and contribute to a change and consequent improvement in women's status.

In this study, indicators to determine the kind of need met would be in two categories. Indicators to show that a SGN has been met would include: a change in the GDOL- whether the daily women or men's activity and responsibilities in the household, and with regards to SRPM; and an increase in women's participation of women in decision-making (an indication of increase in control of resources and benefits). These would result in an improvement in the subordinated position of women as compared to men and one may conclude that the intervention has been gender redistributive and has met a SGN. Indicators for meeting PGN would include increased access to assets, including SR, increased income for household provisioning; increase in access to extension information, group extension training, access to markets among others, without a change in women and men's roles and responsibilities, nor control over resources and benefits. The need met would be a PGN and the intervention would be a gender neutral or specific one.

The analysis of the intervention itself ensued to determine whether the intervention was gender neutral, specific or redistributive as per the definitions given earlier. The third unit of TUDRIDEP, the small ruminant husbandry intervention package itself was analysed next.

Five aspects of the intervention were analysed namely: i) community sensitization, ii) objectives of the intervention, iii) the selection criteria, iv) components of the technology package and training offered, v) Perception of case farmers and key informants with respect to their economic situation, status at home and community as regards decision-making. Decision-making was an indication of the level of control. This analysis enabled the study team to determine which of the three types of policies the TUDRIDEP intervention pursued.

Further, in answering objective one, the SRA concept three, the Institutional analysis guided the scrutiny of other TUDRIDEP documents to undertake an institutional analysis of the organization to determine the ideological neutrality of TUDRIDEP. With this concept, Kabeer (1994) challenges two myths about institutions. The first myth is that, institutions are ideologically neutral. The second is that institutions are separate entities such that a change in one of them will not affect the other. The first myth (that institutions are ideologically neutral) guided the analysis of TUDRIDEP's organogram. Details of TUDRIDEP's organogram were analysed by considering the female: male staff composition at different levels: top management, middle and lower levels and what activities they were engaged in. The five common components of all institutions (resources, ules,

power, people and activities) aided this analysis, with people, activities and power being the most prominent.

The second myth of concept three (Institutional analysis) of the SRF was used to analyse part of objective three, which entailed finding out the rules and norms that guide the production of SR. The second myth holds that institutions are separate and do not affect each other. For example, in the present study the myth would hold that the adoption of husbandry technologies by small ruminant farmers would not affect income and decision making in the household and hence relationships within the household. Kabeer holds that a change in one institution affects another; that there is constant interaction between institutions and that institutions are capable of change and 'indeed, they adapt constantly, in order to respond to change in the external context' (ibid). The household, the community, the state and the market were analysed to determine whether the intervention introduced to the case farmers caused a change in any of the institutions and whether these changes affected the other institutions.

Ethical Issues

In order to ensure informed and voluntary consent, participants were given adequate information about the researcher and the research by the TUDRIDEP field agent before the visit. At every meeting, the purpose of the study was explained to the study participants. Each individual was allowed to participate on voluntary basis. If they consented, a consent form in English was translated to them in the local language (Waale or Sissale). Literates signed while non-literate

interviewees thumb-printed. None of the prospective interviewees declined to take part in the study.

Chapter Summary

In this chapter, the research design and methods of data collection and analysis have been outlined. A single embedded case study design using a mixed method approach was chosen for the study. The case selected was the TUDRIDEP project, which was involved in the transfer of small ruminant husbandry technologies to female and male farmers in the Wa East District of the Upper West District. The TUDRIDEP project was the primary unit of analysis. Other units of analysis were the beneficiary women and men and the community.

Quantitative data was collected using a structured interview schedule in a census, while qualitative data was collected using interview guides, through Focus group discussions (FGDs) and in-depth interviews. Female and male respondents for separate FGDs were selected purposively, while key informants were selected using purposive and snowball sampling. TUDRIDEP documents and non-participant observation and were other sources of qualitative data. Qualitative data from the field was analysed manually. Data was first coded and categorized. Analysis was guided by the Social Relations Approach (SRA). Institutional Analysis (concept three) and Institutional gender policy analysis (concept four) of the SRA guided the analysis of objective one. Analysis of objectives two and three were also guided by the institutional analysis (concept four). Quantitative data from objective four was analysed using SPSS version 21

software, to generate descriptive and inferential statistics. The next chapter describes the case selected and its context.



CHAPTER FOUR

THE CASE DESCRIPTION AND CONTEXT

In this chapter, a description of the case is provided. It is important in case study research to describe the case and the context so that the case study can be compared to other studies (Hartley, 2004). The case selected in chapter three is the TUDRIDEP project which transferred small ruminant husbandry technologies to female and male farmers in the Wa East District of the Upper West Region, Ghana. The primary unit of analysis is TUDRIDEP, the implementing organisation. The TUDRIDEP project as the primary unit of analysis is further divided in sub-units or components namely: its staff organogram, gender policy and the intervention. The other unit of analysis the farmers are also further divided into female and male farmers who were the beneficiaries of the intervention. The implementing organisation TUDRIDEP is described first, its staff organogrm, gender policy, operations, the intervention are also described. This is followed by the description of the context within which the case organisation operates and the case participants live, the Wa East District. Lastly, the farmers are described.

The Case Organisation-TUDRIDEP

The background of TUDRIDEP is described first followed by its staff organogram and gender policy. The activities that TUDRIDEP is engaged in are also described.

The background of TUDRIDEP

TUDRIDEP was formed in 1975 by the Catholic Fraternal Immaculate Conception (FIC) brothers. It started as an input supply and animal traction support at the request of farmers in the then Sissala District (now Sissala West and Sissala East Districts). The programme was later extended to Wa East District in 1987 under the auspices of the Wa Diocese. A sub-office was opened in Funsu (Wa East Capital) by the Wa Diocese to enable operations to cover the entire Wa East district (TUDRIDEP, 2012).

Vision, mission, objectives and strategies of TUDRIDEP

TUDRIDEP envisages an egalitarian, conscious and self-reliant society with sustainable sources of livelihood. Its mission is to empower rural resource poor people to claim their rightful place in the socio-economic and political environment they find themselves; and to develop skills and attitudes that lead to economic social and cultural development as a way towards greater human dignity. TUDRIDEP has the goal of poverty alleviation, food security and improved living conditions through improved sustainable farming practices, strong and viable farming cooperatives, market access and enhanced economic opportunities. This will result in freedom from hunger and improved incomes, access to quality education and health, recognition and respect for the cultural identity and equity in access to resources for all members of the society (TUDRIDEP, 2012). The next section describes the organogram of TUDRIDEP.

The organization

The organogram for TUDRIDEP can be put into five levels (Figure 5) starting with the Diocesan Development Council (DDC). The DCC is responsible for making general development policies for the Wa Catholic Diocese for implementation. The Tumu Deanery General Assembly (GA) follows with representation from four parishes of the Deanery, four District Assemblies and Non-Governmental Organisations. The General Assembly has a membership of between 21 and 25 and owns all church development projects in the deanery. It meets at least once a year to assess progress of projects. Below the GA is a seven-member board of directors who are elected from the GA. The board takes decisions, plans, monitors and evaluates development programmes and projects; sets policies and implements decisions of the GA and meets four times a year. The organization is headed by a chief executive officer (CEO) who is also the Deanery Development coordinator. The CEO/ Coordinator / Director is appointed by the Board and reports to the seven-member board of directors. The director is responsible for co-ordinating and supervising the work of TUDRIDEP's stations and proper implementation of all development programmes and projects in the Deanery. The director also implements the policies of the Board, assists the Board in planning of projects and programmes; and mobilizes local resources and external sources of funding.

The Director supervises and coordinates all development projects and reports quarterly to the Board. He is assisted by two station managers one at the

Tumu station and the other at the Funsu station. The station masters assist the director in the day-to-day administration of the stations.

One programme coordinator (formally known as head of extension) reports to each station manager. The job of the programme coordinator is to oversee the day-to-day monitoring of programmes and project activities in the field. The programme coordinators collate reports from the field officers who answer directly to them. The programme coordinators give monthly reports to the station managers through the M&E officer who reports on quarterly basis to the director. There is a management team made up of the two station managers, the M&E officer, two (2) accountants (one at each station), two (2) programme coordinators, the Gender desk officer and the director. This team takes management decisions and presents them to the board of directors for approval before implementation. The team meets every quarter, to receive and analyse field reports and comes out with successes, challenges and the way forward for the next quarter. In between the programme coordinator and the station manager are the accountant and the support staff.

The total staff strength of the organisation at the time of the study was 25, with 20 (five female and 15 male) stationed at Tumu, the head office and five (all male) at the Funsu office (Table 3). The fifth level of TUDRIDEP, which is below the director in the organogram, (is further divided into three main levels for the purposes of analysis in this study).

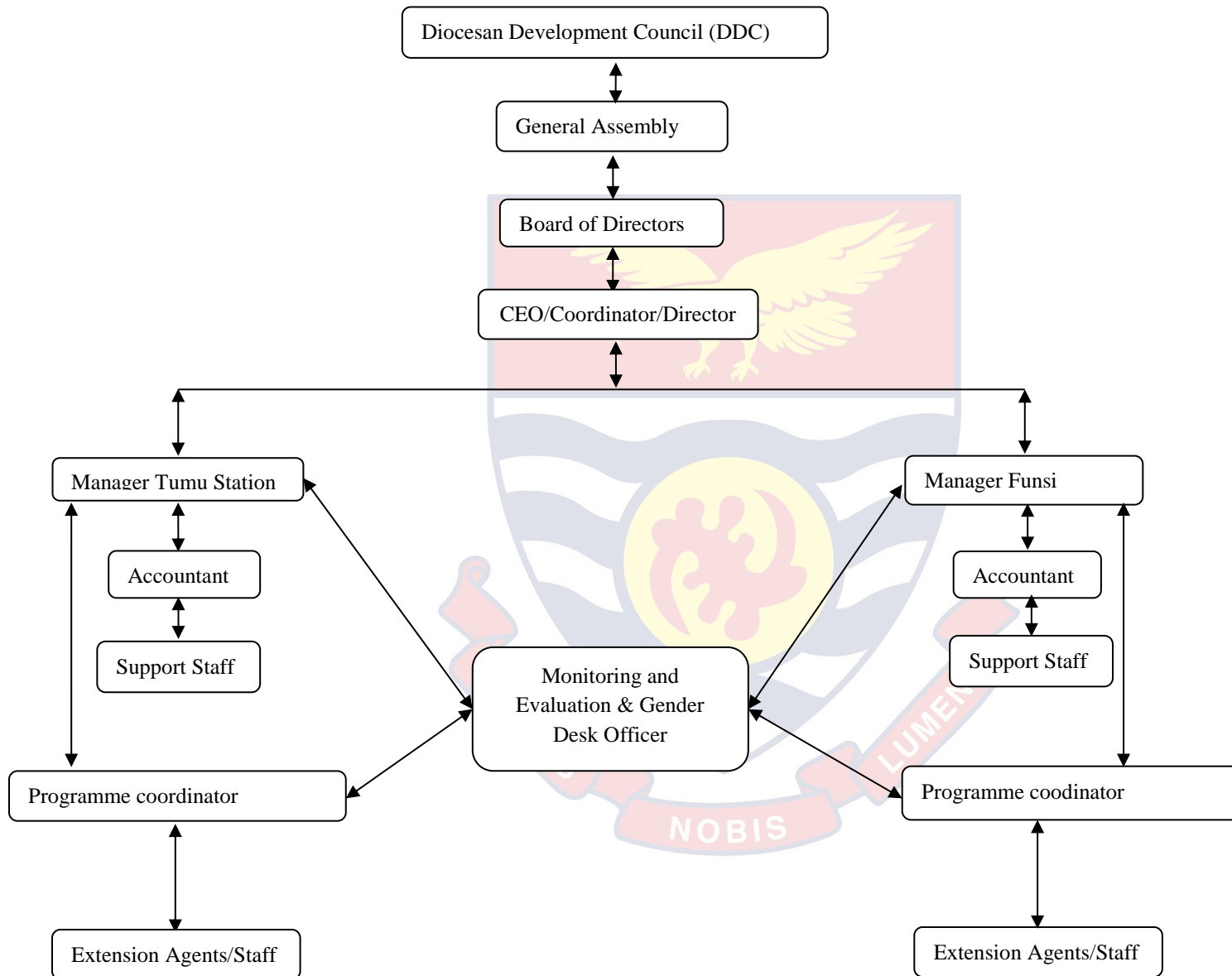


Figure 4: Organogram TUDRIDEP Source: TUDRIDEP, 2012

There are three senior level staff: the two station managers and the CEO. The middle level staff are six, comprising the two programme coordinators, two accountants (male and female), a male Monitoring and Evaluation (M & E) officer and a female gender officer. The lower level staff are 16 in all, made up of 13 field staff and administrative staff (clerical staff and drivers).

Table 3: Distribution of Staff of TUDRIDEP in Tumu and Funsu stations

Level	Tumu Station		Funsu Station		Total		Grand Total
	M	F	M	F	M	F	
Senior staff :							
Director/CEO	1	0	0	0	1	0	1
Station manager	1	0	1	0	2	0	2
Middle level:							
Programme co-ordinator	1	0	1	0	2	0	2
M&E officer	1	0	0	0	1	0	1
Gender officer	0	1	0	0	0	1	1
Accountant	0	1	1	0	1	1	2
Lower level:							
Field officer	9	2	2	0	11	2	13
Clerk	0	1	0	0	0	1	1
Driver	1	0	1	0	2	0	2
Total	15	5	5	0	20	5	25

Source: TUDRIDEP (2012)

The lower level staff comprise three females, two of whom are field staff and one clerical staff. Having described the organogram and the staff strength of TUDRIDEP, the gender policy of TUDRIDEP is described in the following section.

Gender policy of TUDRIDEP

The gender policy of TUDRIDEP has the goal ‘to enhance the social, cultural, economic and political status of women in the current patriarchal

societies they found themselves' (Board of Directors and Management of TUDRIDEP, n.d p.2). The policy is based on the Catholic Church's Principle of Development, which argues that for truly holistic development the effort of and involvement of every one is required. It stresses the need to treat everyone equally regardless of sex, religion, tribe, political affiliation or creed. That all true development needs to uphold the dignity of all, irrespective of whether or not they are beneficiaries of TUDRIDEP's work. Especially because their work is based on the principles of love, truth, faithfulness, solidarity and respect for everyone. It stresses the fact that the policy is in line with the United Nation's Human Rights Charter. The principles of the Catholic Church also stress the importance of women in the home, the economic, social, cultural and political spheres. Hence the need to create awareness on how cultural taboos prevent women from realizing their full potential through advocacy and gender mainstreaming in all TUDRIDEP's programmes and project activities (Board of Directors and Management of TUDRIDEP, n.d). With this background, TUDRIDEP's Gender policy specifically aims to:

1. Improve the living conditions of 40% of women in the programme area (The Deanery)
2. Create awareness of factors within the society which militate against holistic development in the Deanery/programme area.
3. Conscientize society to ensure cultural norms are compatible with gender and development in the programme area

4. Assist 40% of women in the programme area to pursue sustainable income generation activities (Board of Directors and Management of TUDRIDEP, n.d p. 2)

To achieve these aims the document states that there would be gender mainstreaming in the organisation's activities throughout the project cycle. Planning of projects would be participatory, with beneficiary communities, collaborators such as MoFA, other civil society organisations and NGOs being fully involved. There would be exchange of expertise and information on gender issues between collaborators. TUDRIDEP would also cooperate with other gender officers and advocates in areas of common interest. TUDRIDEP would coordinate gender activities of all women farmer-based organisations (FBO) in its catchment area.

Training and awareness creation would be on-going for all involved in TUDRIDEP programmes and specific categories of people would be trained in various areas. The field staff would be trained on family-based extension; Gender desk officers on monitoring and sensitization techniques. Training of women group leaders in the field, beneficiaries and target groups would be community based and focus on equipping women with skills to reduce poverty. In addition, capacity of existing FBOs would be strengthened in planning, financial management and entrepreneurial skills. Workshops, seminars, fieldtrips and networking strategies would be used for awareness creation. In the area of project design, implementation and funding, projects would be generated from the beneficiary level- the women's groups to enhance sustainability and viability.

Women would be involved in the whole project cycle. Target groups receiving financial assistance in projects may be asked to give some equity capital in cash or in kind to show commitment and signs of ownership, to enhance sustainability and viability of projects. The principle of self-reliance including human resources shall be emphasized and a savings habit would be encouraged among the women's groups. TUDRIDEP will give loans for income generating projects. However, loans would not be given for periods of more than 12 months.

Monitoring and evaluation shall be undertaken. Monitoring would be done at three different levels. The gender desk officer and field staff at the first level, management team of TUDRIDEP at the second level, and coordinator / board of directors at the third level. These would take the form of field visits by extension staff, submission of reports interviews and discussions. These activities would take place at different intervals and be followed by reports. Appropriate monitoring and evaluation procedures would be put in place for a mid-term or end of project evaluation. An initial baseline study would be undertaken to allow for a meaningful impact assessment to be undertaken. That would also enable proper group targeting. Group /community sensitization shall precede all project implementation. Both individual and group participation would be encouraged.

Lastly, gender awareness would be an on-going exercise to educate women and men to understand and appreciate their complementary roles in development. To this end gender sensitization of staff and policy makers at the stations and district level would be undertaken to create increased awareness of the critical role that women play in society and the need to give them the support

they need. Sensitization would also be pursued through public education of mixed groups in churches, mosques, community discussions, radio programmes and print media. TUDRIDEP would design a gender analysis framework for systematic gender analysis of programmes and projects. Appropriate Participatory Rural Appraisal (PRA) tools would be used in the communities to high light / compare the workload of women and men (Board of Directors and management of TUDRIDEP n.d)

Operations of TUDRIDEP

TUDRIDEP operates in four (4) out of the eleven (11) districts of the Upper West Region. These are the Sisalla East (capital at Tumu); Wa East (capital at Funi); Sisalla West (capital at Gwollu) and Daffiama–Busie–Issah (capital at Issah). TUDRIDEP focuses on agriculture with its main intervention areas being the propagation of Sustainable Agricultural Practices and Agricultural services, developing Farmer Based Organizations (FBOs) into cooperatives, Micro Finance to enhance women enterprise development; Village Savings and Loans Association (VSLA), enterprise and market linkages, environmental conservation, gender analysis, HIV/AIDS education, market access and value chain development and diversification of rural incomes (small ruminants production, dry season gardening and apiculture, shea nuts /butter processing, among others).

TUDRIDEP already works in 39 communities in the Wa East District and has among others developed 76 farmer-based organizations (FBOs) who are into soybean, sorghum and maize value chains. TUDRIDEP has partnered with other NGOs including Action Aid, Inter Church Development Cooperation (ICCO) and

ACDEP to link some 1200 farmers to channels where they are offered guaranteed prices. It has partnered with the Savannah Farmers Marketing (SFMC) to help with bulking and purchase soya bean cropped by farmers. (TUDRIDEP, 2012).

Another initiative of TUDRIDEP has been the Savings and Internal Lending Groups (SILG) concept which originated from the Catholic Relief Services (CRS). It was introduced in collaboration with the the Sissala Literacy Development Programme (SILDEP) as the Village Savings and Loans Association (VSLA). The scheme supports women to improve their savings and credit culture. The women are facilitated to save part of their income in a group saving box on weekly basis. The money is given out as credit to members with an interest of 10%. The interest generated is ploughed back into the capital and shared among the women later. The extra money made by the group is shared amongst them every 8-12 months, based on the contribution per member. Membership of the savings group consists of 85% women and 15% men. The scheme has helped to improve the cash and credit management of women groups in the Wa East District. The association also shared dividends when appropriate. Credit from the VSLA facility was easily accessible as compared to loans from the formal banking institutions.

Other TUDRIDEP activities have included afforestation by establishing tree nurseries, and formation of environmental awareness clubs in schools and communities. In the area of health, TUDRIDEP has among others, built two (2) clinics in the district: one at Fumsi and the other at Kundugu. It has trained 120 Traditional Birth Attendants (TBAs); trained 60 Village Health Volunteers to

facilitate health education in the communities. In education, TUDRIDEP has built eight (8) primary schools and two (2) Junior High Schools in the district. Enrolment in schools has increased to about ten times since it started its advocacy (TUDRIDEP, 2012).

Water and sanitation have improved in three districts as a result of TUDRIDEP's activities. It has facilitated the construction of household toilets, hand dug wells and boreholes across three Districts (Sissala East, Sissala West and Wa East). The programme also trains women in the proper utilization of food crops to help improve the nutritional status of the rural people especially children and lactating mothers. The next section describes the context of the case – the Wa East District.

Background to the TUDRIDEP small ruminant project intervention

The project under study, which involved the transfer of small ruminant husbandry technology to female and male farmers in the Wa East District is the first involving livestock production by TUDRIDEP. It was undertaken to improve small ruminant production in the Wa East district. The small ruminant component of TUDRIDEP started when some small ruminant farmers in some of the communities that TUDRIDEP, Funi office operates in, approach TUDRIDEP to train them in animal production to supplement income from crop farming. TUDRIDEP in collaboration with Association of Church Based Development Projects (ACDEP) initiated a small ruminant project to organize farmers at the community and district levels. The project named Small Ruminant Improvement Project (SRIP) had the main aim of increasing the production and productivity of

small ruminants as a way of diversifying rural incomes towards poverty reduction in the Wa East District. Specifically, the project worked towards improving animal housing structures, the quality and availability of animal feed; facilitating linkage of livestock farmers to veterinary services; providing improved breeds to farmers, facilitating linkage of livestock farmers to marketers; and organizing livestock farmers into groups and associations.

With this background, TUDRIDEP responded to a project call by government in 2012 to facilitate increased agricultural production including livestock production and the involvement of women, through the Ministry of Local Government and Rural Development (MLGRD). Sponsorship was from the Canadian Government: the Food Security and Environment Facility (FSEF). The MLGRD/FSEF provided funding for local initiatives developed by Ghanaian non-governmental organizations and the private sector in collaboration with the Canadian and international organizations. The objectives of the call were to : 1) increase the use of innovative, environmentally sound agricultural technologies and practices in target communities; 2) enhance the ability of Ghanaian organizations to support food security and sustainable agriculture in Ghana's three northern regions; and 3) foster the capacity of local organizations to promote equality between women and men. The MLGRD/FSEF call stressed the need to increase gender equity in participation by ensuring high female participation; the female participation was to be at least 80%. Other aspects of the call covered crops and environmental issues. The next section describes the community

sensitization process before the project begun, farmer eligibility criteria, the technology package transferred and farmer training.

The project intervention: Community Sensitization, Technologies transferred and farmer training.

TUDRIDEP undertook a community sensitization activity to introduce the target communities to the proposed small ruminant improvement project. This was to create awareness and to solicit the cooperation of the community leaders and members especially, husbands. The approval from husbands for married women to participate was important, especially, since the communities were patriarchal. Ten communities were targeted by TUDRIDEP in the Wa East District of the Upper West region: Finsi, Halimboi, Yaala1, Yaala 2, Boffiama, Jumo. Chaggu, Tiisah, Tuasa, Dupari. The objectives of the intervention, the strategies, the components of the technology package and the benefits were explained to the gathering. The next section presents the objectives of the intervention, the technology package and farmer eligibility criteria as communicated to the communities.

The project objectives were to i) improve livestock production, particularly sheep and goat; ii) increase women's knowledge and skills in good management and environmental practices for sustainable livestock rearing; iii) increase women's ownership of livestock as assets; and iv) increase income for household provisioning. The criteria for selection of farmers included:

1. voluntary group formation (groups of 10 comprising seven women and three men).

2. A readiness to build an improved housing structure using local material, with the design prescribed by the project (roofing material and cement for plastering and flooring were provided by the project) to house the small ruminant stock to be provided by the project;
3. A readiness to cultivate fodder for supplementary feeding (seeds supplied);
4. A readiness to implement good animal husbandry practices (GAP);
5. A readiness to bear the cost of routine health treatment of animals
6. A readiness to practice record keeping.
7. Be available for training in husbandry practices: housing sanitation, supplementary feed preparation and practices, health care and record keeping through regular meetings and training sessions.

A farmer may be ready to abide by all the above rules, but one was deemed ready for the project when the pen to house the sheep or goats to be provided by the project had been built. The farmers formed voluntary groups of ten (10), (voluntary because they formed the groups themselves) comprising seven women and three men.

The small ruminant technology package transferred comprised 12 individual components:

- 1) Routine cleaning of pens
- 2) Providing drinking water
- 3) Cultivating tree seedlings supplied (*Leucaena leucocephala/Albezia lebbek*)

- 4) Cultivating pasture seeds i.e. *Cajanus cajan*
- 5) Feeding of ficus seed cakes to sheep/ goat
- 6) Feeding dried pasture leaves (*Cajanus cajan*) to sheep/ goat
- 7) Feeding *Leucaena sp* and *Lebbek sp* tree leaves to sheep & goat
- 8) Annual vaccination against PPR
- 9) Using the services of Community livestock workers (CLW) for minor ailments (sores; deworming; de-teaking)
- 10) Using the services of the veterinary officer for injection of sheep and goat
- 11) Practicing record keeping
- 12) Attending group meetings

Farmer training

TUDRIDEP collaborated with the Ministry of Food and Agriculture (MoFA) at the District office to obtain expertise in animal husbandry and health to train the farmers in their groups. The District Animal Husbandry Officer and the District Veterinary Officer of the Wa East (MoFA) met the farmers in groups in their communities and trained them in health and other husbandry practices. Each group had a chairperson, a secretary, treasurer and Community Livestock worker (CLW).

The project field officer was also the project veterinary technician and was responsible for annual vaccinations like Peste des Petites Ruminants (PPR) and other monthly prophylactic treatments and ailments which needed injections. The district veterinary officer trained two participants per community (one female and one male) as Community Livestock workers (CLWs). It was a three-day

residential training course held at the TUDRIDEP office at Funsu. The Trained CLWs were equipped with relevant drugs and material to administer first aid and minor treatments to be accessed at a subsidized cost by farmers. The first consignment of drugs was given free to the CLWs who were to subsequently purchase drugs from the TUDRIDEP veterinary shop to replenish their stocks from money generated by treating the animals. The CLWs were only responsible for treating minor ailments such as running nose, diarrhoea and minor sores. They were required to contact the Project veterinary technician for ailments which needed injections, to avoid accidents, since they were not experts.

The district veterinary officer also trained the farmers on health care the symptoms of common animal diseases. In the morning, the farmer was supposed to inspect the animals on opening the pen for signs of sickness. The same was to be done in the evening when they returned from grazing. Among others, the farmers were retrained to identify animals that looked dull, inactive or refused to eat. They were to contact the CLW to give first aid if they observed any anomalies. The CLW would contact the veterinary officer, where necessary. The project introduced the CLW concept due to the paucity of veterinary technicians. There were only six (6) serving the whole district. Another duty of the CLW was to alert the veterinary officer anytime there was a threat or outbreak of disease in the community or neighbouring communities. The farmers were also made aware of the need to vaccinate their animals annually against Peste des Petites Ruminants (PPR), a viral disease and to be receptive to other monthly prophylactic treatments by the veterinary technicians. The district animal husbandry officer

trained the farmers on good housing, sanitation, good supplementary feeding practices and record keeping through regular meetings and training sessions. Farmers were expected to keep the animal pens neat through daily sweeping was recommended as the best practice. Farmers were supposed to provide drinking water ad libitum (available all the time), to enable animals drink whenever they came back home from grazing.

The importance of dry season feeding was discussed and farmers were exposed to some sources of supplementary feeds. Farmers were taught how to plant, harvest and process the tree seedlings (*Luceana leucocephala* and *Albizia lebbek*) and forage plants such as *Cajanus cajan* (pigeon pea). The *Cajanus cajan* was to be planted on one acre of land on their farms to serve as a forage bank. Harvested leaves were brought home and shade dried before feeding. (Shade drying is where the cut leaves are left in the shade). Some keep the leaves under sheds or in the kitchen away from the sun. The purpose of the shade drying is to preserve the nutrient quality of the leaves. The pigeon pea is a dual-purpose plant therefore apart using the leaves as animal feed, the seeds are eaten by humans. The trees (*Luceana Leucocephala* and *Albizia Lebbeck*) were to be planted near their houses and harvested to feed the animals. The tree seedlings were planted near the house to serve as a shade tree, prevent erosion and to prevent farmers especially the women, from walking long distances. Farmers were also taught through demonstration, how to prepare ficus seed cake from the ficus fruit, as supplementary feed for the animals.

Farmers were to record births, deaths, sales, slaughter of the animals and treatment administered to sick animals. The district animal husbandry officer explained to the participants the importance of record keeping. However, due to the low literacy level of the farmers, their children in school were taught to record into exercise books supplied them by the project. Farmers were also required to continue attending group meetings since that was the forum for training the farmers and discussing pertinent issues concerning the project, both during and after the project period.

The district veterinary and animal husbandry officers were also responsible for securing the sheep and goat that were distributed to project participants. Improved sheep and goat males were purchased from Burkina Faso. The male sheep and goats were the F1 generation of improved males, crossed with local female. The animals were quarantined for one week after purchase and given the required prophylactic treatment including dewormers, and pneumonia injections before distribution to farmers. The SR were distributed to the farmers in two batches. Five animals were given to each farmer in the first batch (One improved male breed and 4 local females of either sheep or goats), according to farmer's choice, as a start-up pack. When the animals kidded or lambed, participants in the first batch would give the same number (5) back to the project to be 'passed on' to another beneficiary in the second batch. This strategy was to enable the project resource a second group of ten, making two groups of ten, totalling 20 farmers in each community.

The intervention also linked to markets through their groups. Two small ruminant traders, both males, were introduced to the project participants to facilitate marketing. The one was stationed in Funsì to service farmers in Funsì, Halimboi, Yaala 1, Yaala 2, Jumo and Bofiama (Funsì area). The other stationed in Dupari, serviced farmers in Dupari, Chaggo, Tuassa and Tisaa (Bulenga area). Both traders were already in the business of buying and selling sheep and goats before the intervention. They had both been trading with some of the case farmers before the intervention. Having described the case organisation TUDRIDEP and the intervention it implemented, the description of the case context follows in the next section.

The Case Context

It is argued that any organization involved in agricultural extension activities, 'whether public or private, operates in a context or an environment that influences the organization, form and content of the transfer activities' (Moris as cited in Peterson, 1997). The external environment in which TUDRIDEP, operates is the Wa East District. There is the need to understand the environment and the factors therein that can influence its actions, to enable it manage its services better. Peterson (1997) classified these external factors as agro-ecological, socio-cultural, political-economical, infrastructural and institutional. These factors are described in the following sections starting with the agro-ecological factors.

Agro-ecological factors

Climate, soil and vegetation

Different agro-ecological environments, reflected in the different temperatures, rainfall patterns and soil types determine the farming conditions and the system of production that pertain in an area. This also determines the kind of technology required as well as the how the extension delivery is undertaken (Peterson, 1997). The Wa East District, where the case organization TUDRIDEP is located is in the south-east part of the Upper West Region. It lies between latitude 9 55" N and 10 25" N and longitude 1 10" W and 2 5" W. The district shares boundaries with West Mamprusi District to the North East, West Gonja District to the South East, both in the Northern Region, Sissala East District to the North, Wa Municipal and Wa West districts to the South-West of the Upper West Region. The Wa East District is one of the new districts carved out of the Wa Municipal in 2004. The district capital is Funsu, which is 115 km from the regional capital Wa. It has a land mass of approximately 1,078square kilometres.

The land is generally undulating with isolated hills and is 180-1300 mm above sea level. The drainage in the district is the dendrite type. The river Kulpaw and its tributaries dominate in the district, overflowing their banks in the rainy season, rendering most parts of the district inaccessible. They dry up in the dry season. Lately however, surface water in the dry season has become almost non-existent except for a few dams and dug-outs (TUDRIDEP, 2012). The District consists mainly of igneous and metamorphic rocks, which are noted for deposits of gold, iron and bauxite. Thus, illegal mining activities take place in

communities such as Bulenga, Duu, Joan and Danyokura. Soils are mainly sandy loam and laterite and suitable for agricultural purposes, especially cultivation of tubers, cereals and legumes. These soils have however become less fertile, and are increasingly exposed to wind and water erosion.

The climate of the Wa East District is tropical as in most of the northern Ghana. Temperatures are as high as 42°C in March/April and as low as 22°C in December/January. The Harmattan season, when dry cold dusty north easterly winds from the Sahara Desert blow with occasional haze, occurs from November to April. The district experiences a single rainfall pattern annually from May to October, with a mean volume of about 1,200 mm /year. The rains are erratic, very torrential and stormy at the beginning and ending of the period, usually causing havoc to life and property. Farming therefore, is not all year round. The Wa East District, as other parts of the three Northern regions, suffers from long dry spells of nearly 7 months of the year such that in the three regions, there are periods of food insecurity between 3-7 months referred to as the 'hunger gap'. During this period households cope by selling livestock especially sheep and goats to enable them purchase food staples from the market to feed their families (Quaye, 2008).

The Wa East District as most of northern Ghana is located in the Guinea Savannah ecological zone of Ghana, characterized by short and scattered deciduous fire-resistant trees and shrubs of varying heights. The tree species include shea, dawadawa, baobab, kapok, neem, ebony, mangoes, cashew, acheapple and acacia (GSS, 2014). The main grass species are *Andropogon hyparrhenia* and *Heteropogon* spp. These grasses are very tall and are liable to

burning during the dry season. In the past decades there has been a lot of environmental degradation which has resulted in some grass species such as Vetiver grass (*Chrysopogon zizanioides*) becoming extinct (Innes, 1977). Over the years, the natural environment has been degraded and therefore the tree and grass cover has greatly reduced. The indiscriminate felling of trees for charcoal and farming activities have impacted negatively on the environment. Apart from agro-ecological factors, sociocultural factors can also influence the operations of the case organization. Thus, relevant socio-cultural factors are discussed in the following section.

Sociocultural factors

Sociocultural factors in this context will include the language, literacy levels, ethnicity and religious orientation. These can affect the delivery of the interventions with respect to communication, type of technology transferred and methods of reaching farmers (Peterson, 1997).

The people of Wa East District are from four main ethnic groups: the Wala (45%), Sissala (21%), Chakali (19%) and Dagaaba/Lobi (15%). These groups belong to the Mole Dagbani group and they co-exist with the Gonjas, Builsa and Fulani, who are other ethnic groups that live in the district. The major languages spoken are Waale, Chakali and Sissali. Islam is the most prevalent (57.9%) religion, followed by Christianity (26.3%), Traditional religion (12.7%), no religion (3%) and others (0.1%). Largely, Islam influences the culture of the people in terms of marriage rites, performance of funerals, naming ceremonies and dressing (GSS, 2014).

The society is Patrilineal, that is an individual belongs to his father's descent group which is made up of persons male and female who are descended through the male line only, from a common ancestor. Thus, the children of the male members belong to it but those of the female members do not (Nukunya, 1992). Inheritance is patrilineal, thus men have control and inheritance rights over the land while women have only access. Norms and traditions are such that males are in ultimate control of whatever property is owned by the wife and children and the household as a whole. Women and children can own sheep and goat but need to inform the head of household before they dispose of the animals (Amankwa et al., 2012; Bacho, 2004).

Political-economic factors

The economy of an area is important in that the level of poverty, the level of operation of farmers (large or small scale) influences the type of technology to be transferred in the area (Peterson, 1997). Wa East district is dominated by agriculture, which employs about 85% of the population. The industry and service sectors employ 10% and 5% respectively. Ninety percent (90%) of the district income comes from agriculture and agro processing (GSS, 2014).

Farmers are smallholders and practice mixed crop-livestock farming under rain-fed conditions with crops as the primary employer and the livestock as the secondary income earner. Farm sizes are small and range between one-half of a hectare to four hectares (0.5-4 ha), with an average farm size of about 3.6 hectares. The major crops cultivated in the district include vegetables, cereals (sorghum, millet, rice), legumes (cowpea, soya bean, groundnuts), root and tubers

(yam and cassava), vegetables, tree crops and fibre. Post-harvest losses are a major challenge that cause food insecurity (GSS, 2014).

As stated earlier, the livestock sub-sector is a secondary source of income and food security, and provides an alternate livelihood source in the lean season. Major livestock species include cattle, goats, sheep, pigs, rural poultry (fowls, guinea fowls, ducks and turkeys), however poultry is the most dominant animal kept in the district GSS (2014). SR and some pigs prevalent in the study communities. Sheep and goat are an important source of income for rural families, especially to fill the gaps during times of crop failure and off-season periods. Rearing of sheep and goats in Ghana and in the Wa East District is undertaken under the extensive system, where the animals range freely wherever they find pasture. There is little or no housing, health and breeding management, with little supplementary feeding.

In most of northern Ghana, the norm during the rainy season is to tether the sheep and goat so they do not stray to feed on other peoples' crops (home gardens), However where the farms are far from the homes (bush gardens), the sheep and goat are not tethered. Tethering in the wet or cropping season has the disadvantage of making animals lean because of inadequate feed, since they graze at one place for a long time especially where supplementary feeding is not practiced (Amankwa et al., 2012).

The major challenge in this subsector are poor husbandry practices (feeding, housing, health care, low productivity, low application of good agricultural practices (GAP), low veterinary services delivery (vaccines and

treatment) theft and inadequate water points. Influx of pastoral Fulani herders and cattle into the district have put pressure on the pasture in some areas and the results in the destruction of farms and farm produce (GSS, 2014).

Literacy levels are low as in most rural areas, with women less literate as compared to men. Of the population of 12 years and above, 61% are married (more females than male). This may be influenced by the low educational level and cultural and religious beliefs. Households live more in the extended family setting (52%) than nuclear (29%). The District population is 72,074 with 121 villages. There are 10,768 households, with average household sizes of 6.6 people.

The District is completely rural with no urban settlements (GSS, 2014). It is remote relative to other districts and is deprived of the basic social and economic infrastructure and services. The road network is poor and 40% of the roads are inaccessible all-year round. In the peak of the rainy season between July and September, some communities are cut off from the rest of the district. These include Danyokuru, Duu, Balayiri, Belepong, Grumbele, Jalun and Bintenge. Schools and health care facilities are thus difficult to access. There are three major feeder roads in the district, however two major rivers Yayunyiri and Kulun, which have not been bridged make inter and intra-district transport services almost impossible during the raining season. The main transport service is the Metro Mass Transit (Public operator) which plies Wa-Kundungu and Wa-Bulenga.

Almost the whole district (95%) is not connected to the national electricity grid. Only 5% is. As such, most of the inhabitants depend on kerosene, fuel wood

and charcoal. This has had an adverse effect on the environment, since trees are felled indiscriminately for fuel. Torchlight is used by most for lighting. Water used by households is mainly from bore holes (55.6%), rivers and streams (22%). Pipe borne water is not common in the district. Of those who have access to pipe borne water 0.1% have it within their dwelling and 0.6% outside the dwelling. Majority of households (92 %) use the bush /field as their toilet, 2.7% use pit laterine and 2.5% use KVIP and water closet 0.2%.

The 2010 National Census reports that Information Communication Technology (ICT) use in the district is very low. MTN is the main mobile phone network for communication and is available mainly at the district capital Funsì, Bulenga and a few other places. Only 3.4% of the population have access to internet with 0.3% owning laptops / desktops. Only 10.3% have mobile phones, with more men (16%) owning mobile phones than women (4.8 %).

Industrial activities in the district are on a small scale and operate mostly in the informal sector. Activities include ‘pito’ brewing (local alcohol), gari processing, shea butter extraction, weaving, pottery making. Wood works such as carving drums, hoe handles, mortar and pestle, walking stick are undertaken. The sector meets local but not external demands. There is the need for training to add value to agricultural and manufactured products, and lack of ready market.

The service sector in the district is small and underdeveloped due to poor infrastructure such as roads and electricity that provide an enabling environment. However, the sector is important because it is the medium by which agricultural and manufactured goods are exchanged. The main opportunity for exchange is

during market days in the district capital, Funsu and others in Kundungu, Bulenga, Logguu, Kpaglahi, and Kulpong. The services sector constitutes mainly of the formal sector actors and a few private sector. The formal sector includes employees in the Central Administration, Ghana Education Service (GES), Ghana Health Service (GHS), Ghana Police Service (GPS) and the Private sector, Mobile Network Operator, Transport and NGOs.

The district Assembly (DA) is the highest decision –making body in the district. There are two decision-making bodies –the area councils, one in Funsu and the other in Bulenga and twenty-five unit /electoral areas. Twenty-five (25) of the assembly members including only four females are elected and 11 are appointed, The DA has two committees, the Executive committee chaired by the District Chief Executive (DCE) and the Complaints and Public relations committee chaired by the presiding elder. Traditional governance in the district is administered by divisional chiefs and sub-chiefs. They resolve conflicts and maintain law and order in communities. The next section describes institutional factors.

Institutional factors

The Wa East District has been described as remote from other areas however, there are organisations operating in the district that TUDRIDEP collaborates with in its activities with the farmers. These include Ministry of Food and Agriculture (MoFA), Forestry Services Department (FSD), Ghana Education Service (GES), Ghana Health Service (GHS) and Environmental Protection

Agency (EPA) and the District Assembly, which is the seat of Government at the District level.

The 2010 National Census reports the non-existence of banks in the district (GSS, 2014). Organisations and people therefore trekked to Wa, the regional capital to access banking services. However, two new banks, have been opened in the district capital, Funsii, the Sissala Rural Bank in 2014 and GN Bank in 2016 (MKI₁). Another branch of the GN Bank has been opened in 2016 in Bulenga. Apart from these two banks, the other credit service offered in the district is the Village Savings and Loans Association (VSLA) which has been described in the section under 'Operations of TUDRIDEP'. The next section describes the case farmers.

Characteristics of the Case Farmers

The section describes the farmers who were involved in the project. The socio-demographic characteristics of the participants include age, educational level, religious affiliations occupation and income generating activities. The section also describes the Gender division of labour in the case communities covering the role of female and male farmers in households on daily basis. This portion serves as part of the background that will give insight into the worldview of the case farmers. It may have direct or indirect bearing on the adoption of small ruminant husbandry technologies introduced to female and male farmers by the case organisation. The description starts with the socio-demographics- age, sex and educational levels of farmers.

Age, sex and Educational Levels of Farmers

Farmers in the case study (Table 5) were youthful, with a mean age of 45 years (ranging 20 to 85 years). The men were a little (45 years) but not significantly older ($P>0.05$) than the women (44 years). However, more than two-thirds (68%) of the case farmers were less than 50 years of age, with a median age of 41.5 years. Almost three quarters of the case farmers (75%) were not literate. There was a higher proportion of women (84%) than men (56%). Of the literate farmers, who had obtained at least first cycle/basic education (primary, middle and Junior High School (JHS)), there were more men (60%) than women (39%).

Marital status, religion, place of origin and position in households.

The results showed overall, that 86 percent of respondents were married, 11 percent were widows and 3 percent were single. All the singles were male, which meant that all the females had ever married. Among the female respondents, only a few (9%) were household heads and these were widows, the rest were wives (91%). Among the males, 85 percent were household heads whilst the rest (15%) described themselves as members of the household. The fifteen percent comprised single men and those that were married but lived with their parents in the extended family system. Of the married respondents majority (64%) were in monogamous marriages and the rest (36%) in polygynous marriages.

Table 4: Distribution of Characteristics of the Case Farmers

Variable		Male %	Female%	Total%
Educational level	None	56	84	75
	Primary	8	7	8
	JSS /Middle	28	4	12
	Secondary	0	3	2
	Tertiary/Training college/Univ	3	0	1
	Non Formal	5	2	3
	Total	100	100	100
Religious Affiliation	Islam	80	79	79
	Christian	18	18	18
	Traditional	2	3	3
	Total	100	100	100
Place of origin	Native	95	25	48
	Non native	5	75	52
	Total	100	100	100
Household status	Household head	85	9	34
	Spouse/Member	15	91	66
	Total	100	100	100

Source: Fieldwork (2017)

More men (84%) were in monogamous marriages than women (54 %) were. Only 16 percent of men were in polygynous marriages, with two wives. No man had three or more wives. On the other hand, more than twice as many women (46%) than men (17%) were in polygynous marriages, with two wives. Ten percent of women were in polygynous marriages with three wives. The women described themselves as first, second or third wives depending on their position in the marriage.

Majority of the case farmers were affiliated to Islam (79%), followed by Christians (18%) and traditionalists (3%). The results showed that for all three religions majority were in monogamous than polygynous marriages: Christians (81%), traditionalists (75%) and Islam (59%). The mean household size was eight (8) persons. Most male respondents were indigenes (95%). However, most females (75%) hailed from other localities and relocated to the study area after marriage.

Amongst the widows, seven (54%) described themselves as household heads whilst the other six (46%) indicated that they were wives. Further probing with a key informant (MKI₂) revealed that widow inheritance is practised. When a man dies, the widow or widows are encouraged to stay in the dead husbands' house and take care of the children. If the widow is still of childbearing age she may be married to one of the deceased husband's brothers and either moves out to join him or stays in the house same house. Where the widow is beyond childbearing, she gets married to a small boy usually about six (6) years and above and, as the saying goes, 'boils water' for him. In other words, serves him as a husband and continues to stay in the deceased husband's house. In such instances, the father of the small boy becomes the decision maker on behalf of the small boy. However, in instances where the children of the woman are old enough to take care of their mother, they do so. According to the male key informant (MKI₂), the system of widow inheritance ensures the welfare of the widows and their children. The next section discusses the sources of income of the case farmers.

Sources of income

The case farmers practise mixed crop-livestock farming. Most of them are crop farmers that engage in livestock rearing as a secondary income generating activity. Seventy-eight percent (78%) of the case farmers are engaged in crop farming as their main income generating activity (64% males and 85% females). Another 21% are engaged in livestock rearing as their main income generating activity (36 percent males and 14 percent % females), while only one female respondent (0.8%) is engaged in petty trading as her main income generating activity.

Crop farming

The most common crops cultivated are groundnuts (80%), maize (72%) millet (33 %) and Bambara beans (32 %). Maize, yam and millet could be described as male dominated crops while females dominate the cultivation of groundnuts, soya beans, Bambara beans, and rice. Women usually cultivate okra because it is an important vegetable used for cooking. Mean farm holdings were 0.23 ha.

Men had been farming longer than women had. Majority of the women (68%) had been farming for between 1 and 9 years, while most men (40%) were in the 10-19-year bracket, with only 26.3 percent of men in the 1 to 9-year bracket. Both women and men explained during the FGDs that women have been perceived for a long time, as ‘helpers’ on men’s plots, also termed the ‘family plot’. However, some women are now farming on their own plots, cultivating crops, such as groundnuts, for sale, in the raw form or processed. In the case

community, married women obtain smaller-sized plots from their husbands, while single women obtain plots from fathers for farming.

Livestock rearing

Animals reared in respondents' households were goats (91%), sheep (43%), cattle (36%), chicken (66%), guinea fowl (28%) and ducks (0.02%). In total respondents owned more goats (86%) than sheep (28%). This showed a clear preference for goats. Herd sizes were bigger for goats (11) as compared to sheep (8). Respondents indicated that they preferred goats because they are more prolific, and are a source of 'quick' cash. More than half of the respondents (57%) had been keeping small ruminants before the project intervention was introduced, however there were more men (62%) than women (54%).

Other sources of income

All the women (100%) and almost all the men (97%) were engaged in 'other income generating activities' (OIGA). More women (85%) than men (67%) named livestock keeping, especially small ruminants as 'other income generating activities'. Also petty trading (59%), shea nut collection and processing (52%) and crop farming (15%) were also named as OIGA. Some men (31%) named crop farming as a secondary activity, with few (10%) naming groundnut processing. Groundnut processing and firewood sales were other activities that women engaged in to subsidize their income. The next section describes the division of labour in households and the role of women and men in the production and marketing of small ruminants in the case communities.

Gender Division of Labour

Daily activities undertaken by women and men in a typical household in the case communities is described for both wet and dry seasons. In addition to the socio-demographic characteristics of case farmers, this serves as a background information on the case community. The findings presented are under two main themes: women's roles and men's roles in the household. Women's roles centred mainly on reproductive, while men's roles centred on productive activities. Women's roles in sheep and goats centred on cleaning, sweeping and feeding, while men's role centred on healthcare and sales. Women and men each had duties that they performed on daily basis in the wet and dry seasons.

Women and Men's daily activities in the wet season

Women and men's roles in the wet season are discussed first (Table 5), followed by their roles in the dry season (Table 6). Women slept a little earlier in the wet than in the dry season, because they wake up early to cook and carry the food to their husbands on the farm. Before the women go to the farm, they usually perform a number of 'reproductive' tasks including sweeping, fetching water, bathing children, washing dirty clothes and cooking breakfast. It was however observed that water is not fetched only in the mornings, but whenever the family needs water. The first thing men do when they wake up in the morning in the wet season is to go and pray at the mosque (Majority of the men were Muslims). After prayers, the men go as a group to greet the elders of the village. They then go to the farm. Men do not perform any reproductive roles (domestic duties in the

home). They mainly undertake productive roles, which are roles that are income generating.

On the farm, the woman usually joins the man to work on the family farm (man's farm) by planting, weeding or harvesting, as the occasion demands. Working on family farms is a demand made of women by tradition. After working on the man's farm, the woman also works on her own farm, usually already tired. Earlier studies confirm that traditionally women are obliged to assist their husbands on the family farms in addition to working on their own separate plots. A key informant in Chaggu affirmed this with the following statement, "*women spend so much time working on their husbands' farms (i.e. family farm) and little time on their own farms. That is why they cannot farm larger acreages*" (MKI 3). Earlier studies affirm that women's workload is increased, while the amount of time that they spend on their own farm plots is reduced (Apusigah, 2009; Britwum & Akorsu, 2016; Duncan, 1997).

A woman may incur the displeasure of her husband if does not work on the family plot; and the husband's displeasure may be shown by refusing to pay her children's school fees. A male respondent summed it up in the Tiisa men's MFGD₁, this way, "*Some wives are not willing to work on husbands' farms. If my wife does not work with me and there is not enough money to pay for her child's school fees, she cannot blame me*". The men explained that if the wife works with him, there would be more produce to sell to cater for such expenses. Traditionally, women are allowed to use the proceeds from their own plots, while men control the proceeds from the family plot.

Table 5: Daily calendar for Women’s and Men’s activities in the household in the wet season

Time	Women	Time	Men
4 am	Wake up, pray Fetch water if there is none Bath children Sweep compound with the help of older female children Cook breakfast Clean small ruminant pens, give water and supplementary feed	4:30 am	Wake up and pray Greet elders of the community
	Opens the pens to let out the animals	5am-6am	To farm
8-9 am	Carry food to husband at farm		
9 am-4 pm	Work on husband’s farm Works on own farm	6am-12 noon	Still on farm. Wife brings food to farm and joins in with farm work; If man is not married carries food with him early in morning
4 pm	Return from farm Cuts forage leaves and brings home Cook dinner	4 pm	Return from farm Bath and go to first prayers at 6:15pm and second prayers at 7pm
6-7 pm	Serve dinner Wash dishes and bath children	7-8pm	Eat dinner
8-9pm	Bed time	8-9pm	Bed time

Source: Fieldwork, (2017)

Women and Men’s daily activities in the dry season

In the dry season, activities on the farm are less for both women and men. Women still perform their ‘reproductive’ tasks including sweeping, fetching water, bathing children, washing dirty clothes and cooking breakfast. Men go to the mosque to pray first thing in the morning in the dry season. After prayers, the men go as a group to greet the community elders as they do in the wet season, but they may spend more time with the elders since they are not in a hurry to go to the farm. If the men have any building to construct, they mould the blocks with the help of their sons. Block moulding and building construction is undertaken during the dry season to enable quick drying. The women and girls help with provision

of water for that activity. The men may proceed to the farm to prepare the land for the next season by clearing and building mounds for planting where necessary.

Table 6: Daily calendar for women and men’s activities in the dry season

Time	Women	Daily Activities	
		Time	Men
4:30 am -5 am	Wake up, pray Fetch water if there is none Bath children Sweep compound with the help of older female children Cook breakfast Clean small ruminant pens, give water and supplementary feed Opens the pens to let out the animals	4:30am	Wake up, pray Greet elders of the community Mould blocks for building if necessary
8am -10 am	Rest		
10 am-3 pm	Fetch firewood; collect wild fruits, shea nut; dawadaw and process food-groundnut, shea etc.	10am -4pm	To the farm to clear land and back by 4 pm
3 pm-6 pm	Cook dinner First prayers at 6:15 and second prayers at 7:15	4-6pm	Bath and go for first prayers at 6:15 pm and second prayers at 7:15 pm
6-7 pm	Dinner is served Wash dishes and bath children	7-8 pm	Eats Dinner
8-9 pm	Bed time	8-9 pm	Bed time

Source: Fieldwork (2017)

Women’s activities after performing the morning’s reproductive duties in the dry season include fetching of firewood, collecting fruits growing in the wild such as shea nut and dawadaw. Also processing activities such groundnut and shea processing. It was observed that men sometimes help their wives in de-shelling dried groundnuts for further processing. These dry season activities are other income generating activities undertaken by the women. The next section describes women and men’s roles in sheep and goat production and marketing before the TUDRIDEP intervention.

Women's roles in small ruminant production and marketing (SRPM)

Women's duties in the household (Table 7) concerning SR rearing centred on cleaning, watering, feeding and preparation of supplementary feed. The extensive system of production also known as the traditional system was the common practice before the intervention. Very few of the animals slept in pens built by the owners. As one case farmer in Tuassa described the system:

Over here, the sheep and goats sleep anywhere on the home compound and graze on whatever grass and forage they find. There are no special areas for the animals to graze. The important thing is that they do not destroy other people's crops. As for our farms, they are far from here, so the sheep and goat are not a threat to our crops. When we plant something near the house, we put a fence around it for protection against the sheep and goats (MFGD₂)

In the study area, their farms are quite far from the homesteads. The nearest farm is on the average about five (5) kilometres away (indicated by farmers and confirmed by TUDRIDEP field officer), as such SR were not a threat to crops in the farming season.

Women are responsible for sweeping the SR pen if there is one. They usually add this activity to sweeping of the compound. Sweeping and pen cleaning is very important in the wet season since the weather is damp. When a woman in a polygynous marriage has animals and is on good terms with her co-wives, they sweep on her behalf, when she is away or sick. However, she gets no help if she is not on good terms with her co-wives. Besides co-wives that are on good terms sometimes house their animals together in the same pen; they only

have to ensure the animals have identification marks. As pertains in polygynous marriages in Ghana, wives alternate weekly in the performance of domestic duties. When the husband owns SR that are housed, the co-wives take turns in sweeping the husband's SR pens alongside sweeping the compound and cooking duties.

Preparation and giving of supplementary feed is the preserve of women. Although different kinds of supplementary feeds were available not all farmers fed them to the SR. This is because they were used to the SR free ranging. The different kinds of supplementary feeds include the brans, obtained from processing cereals such as maize, sorghum, millet, soya beans and rice. Another category is the hulms, like dried groundnut tops. Dried tuber and root peels including dried salted cassava peels is another category. Seeds from trees such as baobab and Ficus sp. are also processed and fed: the baobab seed is pounded and mixed with brans, such as maize and soya bean. Ficus seed cake is also prepared all year round. Since it takes a long time for the ficus fruit to dry, the women pick and pound the fresh fruit. Some farmers already knew how to prepare ficus seed cake before the onset of the project. Tree and shrub leaves are another category of supplementary feed. Cutting of tree leaves and shrubs however seems to be a shared role. Women cut and bring home leaves from shrubs, while men cut leaves from trees (especially where the trees are tall; the women cannot climb the trees) and grass. The young boys help in the absence of the men.

Under the traditional system of rearing, the SR are not always given water by the owners. They are left to search for water themselves, either at the riverside, stream or at the borehole if there is one.

Table 7: Division of Labour in Small ruminant production and marketing in a typical household

Activity	Adult female	Young female	Adult male	Young male
Sweeping SR droppings	Yes	Help if available		
Provision of water to SR	In some households, women gave water once daily to SR. In most cases, SR drunk from water bodies or boreholes.	Help with water provision	Help where necessary after water has been fetched	Help
Preparation of supplementary feed	Women prepare all supplementary feed.	Help		
Fodder cut from farm/ tree crops	Women cut leaves from small shrubs and bring home	Help	Men cut especially from big trees and bring into the house	Help
Give supplementary feed	Women give supplementary feed	Help	Help	Help
Care of sick animals	Women usually report to men when they observe sick animals.		Men take action to secure medication for animals	
Build pens	Fetch water for block moulding	Girls help with fetching water	Men mould blocks and build	Boys help mould blocks and build
Sales	Seek consent of household head to sell. Household head (male) sells SR.		Household heads (men) responsible for sales	Young men only sell if older men (HHHs) are not available
Tethering	Animals are not tethered because farms are far from the homes			

Source: Fieldwork (2017)

Men's roles in small ruminant production and marketing

Men's roles in SR production and marketing centred around health care, sale and purchase of sheep and goats, building of pens and animal identification.

Animal Health care

Women usually report to men when they observe any sick animals among the flock. Where the SR are housed, it is easier to observe the animals in the morning as they let out the animals, or in the process of locking them in the pen in the evening. The men either call the veterinary technician or treat the animals with ethno-veterinary medicine (traditional medicine). However, when the husband is not available the woman seeks medication. The cost of medication is usually borne by the owner, whether male or female. If the animals are in the custody of a caretaker (one who takes care of the animal for another), the latter surcharges the owner. The notion about health care among both male and female farmers was that, the men knew more about animal rearing than the women.

Sale and purchase of small ruminants

Women do not sell animals; men do not sell crops. There was a unanimous agreement on the traditional division of labour as regards sale and purchase of SR during the women and men's FGDs. It was not normal for women to go out to sell animals, not even at the farm gate (house). Sales are the preserve of men. If a young man owns an animal and wants to sell, he would first consult the head of the household (usually a male) to sell for him. In the absence of the household head, his wife is consulted for permission to sell. She then finds an older man to sell on behalf of the household head. Similarly, a married woman does not sell her

SR herself. It is disrespectful of her to do so. She first seeks the consent of her husband. He gives the permission for the sale and sells it for her. Both men and women were unanimous on the fact that the current generation has inherited an age-long division of labour, which states that men sell animals and women sell grains. A male focus group participant confirmed it by saying, *“Every community has their tradition. Our tradition does not allow women to sell animals. Women sell corn, beans and groundnut and the men sell the animals”* (MFGD₂). Similarly, an elderly key informant said:

Apart from respect, there should be order in the house. When the woman sells the animals, she is trying to take over the man’s duty and if the man sells the grain, he will lose respect in the community. Each person in the marriage has his or her duty (MKI₃).

The above statements show that there is a clear-cut gender division of labour and how the rules that guide the GDOL are strictly upheld. Women indicated that, the men got offended when the women sold the SR by themselves. When the woman has money to buy an animal she gives it to her husband or father to buy it for her, because that is the man’s domain. If it is a small boy, his father buys the animal. The men indicated, and the women confirmed that men know what to look out for when buying an animal. One woman in the Tiisa women’s FGD mentioned, *“The men know the animals better than us. The men will hold the waist and know whether it is a strong animal. Sometimes the animal is sick but we the women cannot tell only by visual inspection”* (WFGD₁).

Animal Identification

Traditionally, men are responsible for putting identification marks on the animals. The method they used was to cut the animal's ear lobe with a blade in a pattern that was peculiar to either the family and individual for easy identification.

Building of small ruminant pens

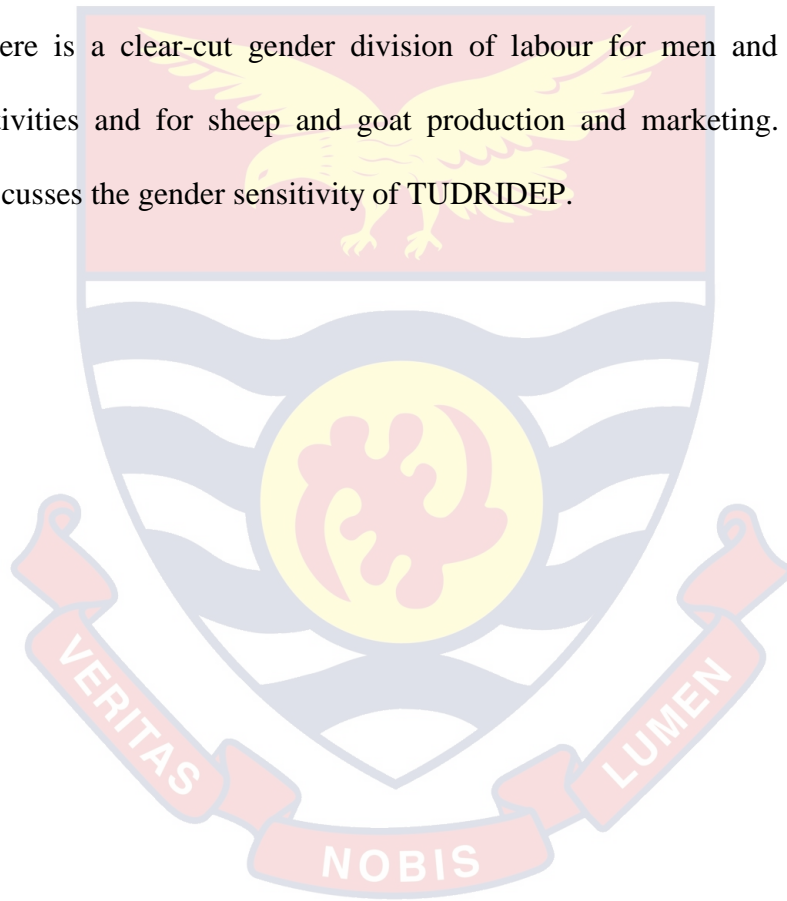
Male and female FGDs established that building pens and houses is the domain of men. The woman's duty is to fetch water for the men to mould the blocks and build. This activity usually takes place in the dry season because the blocks need to dry before use. Responses from both women and men's FGDs, confirmed that the division of labour was inherited and the men were responsible to ensure that everyone plays their part.

Chapter Summary

The environment or context within which an organization operates and people live, affects their activities. The case context, the Wa East District, is largely rural with no urban settlements. The main economic activity is agriculture, with farmers practicing mixed crop and livestock farming; crops are the primary source of income. The major livestock are cattle, sheep goats, pigs and rural poultry; challenges include poor husbandry practices and poor veterinary services delivery. The people are of Wala, Sissala, Chakali and Daggba/Lobi ethnic groups and speak mainly Wale, Chakali and Sissali, with a high Moslem background and low literacy levels. The society is patrilineal and patriarchal. The District is deprived of basic social and economic infrastructure and services with poor roads,

electricity, pipe-borne water coverage. The service and industrial sector are also poorly developed, however, there are other government and private organisations with which TUDRIDEP the case organisation collaborates. These include Action Aid, Inter Church Development, MoFA, SILDEP, ICCO, ACDEP and SFMC.

TUDRIDEP has two stations at Tumu (Headquarters) and Funsu. It has a well-structured staff organogram and a gender policy to guide its operations. There is a clear-cut gender division of labour for men and women for daily activities and for sheep and goat production and marketing. The next section discusses the gender sensitivity of TUDRIDEP.



CHAPTER FIVE

GENDER SENSITIVITY OF TUDRIDEP

Introduction

This chapter is the first of four chapters presenting results from the field. The chapter covers objective one, which examined the gender sensitivity of the Tumu Deanery Rural Integrated Development Programme (TUDRIDEP), the intervention implementing organization. TUDRIDEP is a sub-unit of the case study. TUDRIDEP was further divided into three parts for analysis and therefore the results are presented in three parts. The Social Relations Framework guided the examination. The first and second sections discuss the analysis of the TUDRIDEP gender policy and the intervention itself: the introduction of small ruminant technologies to the case farmers. These were guided by the Institutional Gender Policy (Concept 4) of the SRA (Kabeer, 1994). The third section, the analysis of the TUDRIDEP organogram was guided by the institutional analysis (concept three) of the SRA, where Kabeer's challenges the neutrality of institutions.

Analysis of the TUDRIDEP gender policy

The TUDRIDEP gender policy is discussed in relation to the Institutional Gender Policy Analysis (Kabeer, 1994). She distinguishes between gender blind and gender aware policies and posits that gender blind policies are those that do not acknowledge that distinctions exist between the sexes concerning their needs, therefore gender-blind policies perpetuate the already existing gender biases and this often tends to exclude women. Gender aware policies are those that

‘recognise that women as well as men are development actors and that women and men are constrained in different, often unequal ways as potential participants and beneficiaries in the development process’ (March et al., 1999). This later statement describes TUDRIDEP’s gender policy; therefore, it can be described as a gender aware policy. Portions of the policy confirm this. For instance, the preamble to the policy states that, the policy is founded on the Catholic Church’s Principle of Development, which argues that holistic development requires the effort and involvement of all (Board of Directors and Management of TUDRIDEP, n.d). The preamble recognizes that there is still discrimination against groups in society, in that women do not have the same rights as men in certain areas. It is summed up in the following statement:

‘True and holistic development requires the effort and involvement of everyone. We are all created equal as human beings. We must all be treated equally regardless of sex, religion, tribe, political affiliation or creed. It is only through this that the society can develop’.

The goal of the policy is “to enhance the social, cultural, economic and political status of women in the current patriarchal societies they found themselves’. This clearly shows that TUDRIDEP acknowledges the inequality between men and women and the need to work towards changing the situation.

Furthermore, the specific objectives of TUDRIDEP confirm that the organisation is aware of the constraints women face and the need to work towards improving their underprivileged position. The four specific objectives state:

- “- Improve the living conditions of 40% of women in the programme area (The Deanery)
- Create awareness of factors within the society, which militate against holistic development in the Deanery/programme area.
 - Conscientize society to ensure cultural norms are compatible with gender and development in the programme area
 - Assist 40% of women in the programme area to pursue sustainable income generation activities (Board of Directors and Management of TUDRIDEP, n.d)”

Further, the policy operating guidelines stress the need to target women in all its operations and to involve them in the project cycle from the planning stage to the monitoring and evaluation stage. All new projects would have to emanate from the women themselves, at the grassroots. It also stresses the need for continuous training of the staff, as well women and men in mixed groups on gender issues and the need to involve and support women. The objectives of the policy and operating guidelines show that the policy is gender aware. However, as to whether the policy is gender neutral, specific or redistributive would be best realized by examining a particular intervention. The discussion proceeds to examine the small ruminant husbandry technology intervention itself, to determine which of the policies it exhibits

An examination of the TUDRIDEP intervention

This section examined the TUDRIDEP intervention itself. This was done by analysing five aspects of the intervention to ascertain how gender aware

TUDRIDEP is. These sections are: i) community sensitization, ii) Objectives of the intervention, iii) the selection criteria, iv) components of the technology package and training offered, v) perception of case farmers and key informants of the intervention with respect to gender dynamics at home and in the community. The fourth concept of the social relations approach guided this analysis. Community sensitization is discussed first.

Community sensitization

Community sensitization was the first activity undertaken by TUDRIDEP in their preparation towards introducing the intervention. It is an important activity at the start of every project. As stated in chapter four in the description of the context, the case communities are patrilineal and patriarchal, thus men are in control of production resources, take decisions and on behalf of the household and have oversight authority over everyone in the household, including their property. Thus, TUDRIDEP having already undertaken a gender analysis of the target communities and being familiar with the patriarchal nature of the communities decided to sensitize the men on their intention to undertake the intervention. The sensitization was important since the intervention would not be directed towards the household heads as such interventions usually did, but would have a high female participation.

The sensitization exercise showed that TUDRIDEP had recognized the inequality in ownership, access and control of resources and intended to address the situation. The community sensitization exercise showed that TUDRIDEP is not only gender aware but was targeting more women than men. Therefore, the

intervention could be any of the three options, gender neutral, and gender specific or redistributive. At this stage, the kind of need met would help determine which of the gender aware policies TUDRIDEP is exhibiting. Whether it is meeting a strategic or practical need. Next, the objectives of the TUDRIDEP intervention are examined to throw more light on the kind of need that the intervention met.

Objectives of the intervention

The TUDRIDEP intervention had four objectives which are to i) improve livestock production, (that is small ruminants); ii) increase women's knowledge and skills in good management and environmental practices for sustainable livestock rearing; iii) increase women's ownership of livestock as assets; and iv) increase income for household provisioning. All four objectives are targeting women, with the aim of increasing their resource base with tangible and intangible resources (conceptual framework). Where the tangible are the material assets in the form of small ruminants, money from animal sales and human resources, in terms of increased knowledge and skills in small ruminant production. The intangible resources are the transfer of agricultural knowledge to the women. The objectives of the intervention, shows a clear targeting of women, with the intention of improving their lives and therefore can be described as being gender aware. The next section examines the selection criteria.

Selection Criteria

The criteria for selection of farmers included:

- Interested parties to form voluntary groups of 10 farmers, comprising seven women and three men.

- A readiness to build an improved housing structure using local material, with the design prescribed by the project (roofing material and cement for plastering and flooring were provided by the project) to house the small ruminant stock to be provided by the project;
- A readiness to cultivate fodder for supplementary feeding (seeds supplied);
- A willingness to implement good animal husbandry practices;
- A readiness to bear the cost of routine health treatment of animals
- Practice record keeping.
- Be available for training in husbandry practices in good housing sanitation, effective supplementary feeding practices, health care and record keeping through regular meetings and training sessions.

The first selection criteria on the list showed that the intervention was biased towards women. It requested for 70 percent women participation in each group. That was the most important and decisive criterion. Although the other criteria sound gender-blind, they were not as important because when a person joins a group they are obliged to conform to the other criteria. Besides, although building of pens (criteria number two) is the preserve of men, the community members were informed during the sensitization activity that the intervention would benefit the household and not women only. Thus, the men were ready to help and did build for the women. This showed that there was no attempt by the intervention criteria to change the gender roles in the case communities. Men were responsible for building pens and the intervention went along with the norm.

Thus, the project worked within the existing gender division of labour (GDOL). The selection criteria can thus be described as gender aware because it targeted women and gender specific because it worked within the existing gender norms. The next section discusses the components of the technology transferred and the training offered.

Components of the technology package and training offered

The small ruminant technology package transferred comprised twelve components:

- Routine cleaning of pens;
- provision of drinking water to animals;
- cultivation of tree seedlings supplied (*Leucaena leucocephala*/*Albezia lebbek*);
- cultivation of pasture seeds (*Cajanus cajan*);
- feeding of ficus seed cakes to sheep/ goat;
- feeding dried pasture leaves (*Cajanus cajan*) and
- feeding *Leucaena leucocephala* and *Albezia lebbek* tree leaves. The rest included:
 - annual vaccination against Peste de Petites Ruminants (PPR)
 - using the services of Community Livestock Workers (CLW) for minor ailments (sores; deworming; de-teaking)
 - using the services of the veterinary officer for injection of sheep and goat
 - practicing record keeping and
 - attending group meetings.

Farmer groups formed were first given training in group dynamics and leadership skills, after which they chose their own leaders. Each group of ten had a four-member executive elected by the group. Chairperson, Secretary, Treasurer and community livestock worker. Being women dominated, the group Chairpersons were women and the Secretary a man, who was literate. In Halimboi, where the group was all-female, they had co-opted one man as Secretary for writing purposes. Farmers were trained in their groups and the training was gender sensitive as regards time. The training time was decided in consultation with the group members. Since most of them were women, they chose times that were convenient to them. For instance, training started at 10:30 am, after women had attended to the morning's domestic chores. Training meetings closed at 4:30 pm, a good time for women to prepare the evening meal. Some of the training sessions lasted five or more days; such training sessions were held between March and May (before farming season) when farmers were free.

Content of the training was based on the components of the technology being transferred. Demonstrations were done to ensure both women and men understood what was being taught. For instance, how to prepare supplementary feed for the animals, using ficus fruit to produce ficus cake and shade drying of forages such as *Cajanus cajan*. There was a demonstration on building the appropriate housing structure using local material for the small ruminants. Husbands built for their wives and farmers were supplied with the small

ruminants of their choice only when their pens conformed to the prescribed design.

The technology components were in conformity with the gender division of labour in the case communities. For example, routine cleaning of pens, providing drinking water for the animals, preparation of supplementary feed was the domain of women, while seeking solution to animal health issues was the domain of men. There was no attempt to change the existing GDOL in the household. However, the practice that was at odds with the norm for both men and women, was the use of females as community livestock workers, to provide first aid and minor health care to the animals. This was an attempt by the intervention to integrate women into health care provision. However, in general the intervention worked within the existing GDOL in the case communities. The components of the intervention and the training was gender aware and gender specific. The next section discusses the perception of women and men farmers, and key informants of the intervention with respect to gender dynamics at home and in the community.

Participants' perception of the gender dynamics after the intervention with respect to their economic situation, status at home and community and decision making

The section starts with a discussion of participants' impressions of decision-making after the intervention at the household level.

Decision-making and household income

The women were asked during the FGD, if they had noticed any changes in their involvement in decision making in the production and marketing of sheep and goat in the household. The major response was “yes”. Women confirmed in all the FGDs, that after the interventions they were more involved in decision-making as regards animal husbandry practices. There were two categories of women, those that owned sheep and goat alongside their husbands before the intervention. They stated that they used to take instructions on various aspects of animal husbandry from their husbands. However, after the training, they began to take initiative and no longer waited for the men. Asked why, the women indicated that the training had made them aware of the benefits of good husbandry practices. However, the practice of consulting husbands before having their SR sold still held.

The second category were women who did not own animals before the intervention. Their response was that the the project had given them the opportunity to become owners; as such they could take decision about their animals concerning what to feed, since they were the ones who prepared the supplementary feed. They also had the liberty of deciding when to sell. They just needed to seek the consent of their husbands to sell and the husbands did the selling. Both categories of women had observed that the animals were healthier, suffered less mortalities and had increased in number, due to the husbandry practices they had adopted.

Women had also observed that their husbands had begun to involve them in other decision-making outside animal husbandry: concerning children's education, family health care and handling extended family issues. The reason the women gave for this change was that they were contributing more towards provisioning. Men also alluded to their wives' increased contribution to the household expenditure. They explained that a woman would normally give a sheep or a goat to her husband to sell when she noticed a need or when the husband approached her for help. However, after the intervention women's help had increased due to the increase in the SR numbers. The men admitted that women's involvement in the project had relieved them of some of the household financial burdens. One man summarised it this way, *"Since my wife joined the project, she contributes more to the household. The other day she gave me a goat to sell to enable me pay school fees"* (MFGD₃). Also, another man stated, *"When we are short of food, I ask for a goat to sell and we buy grains in the dry season"* (MFGD₄). Other men stated that their wives helped with sheep for performing sacrifices and other ceremonies.

There was a consensus among the women during the FGDs that their marriage relationships had improved. They felt better appreciated by their husbands. One woman stated *"My husband's love has come alive"* (WFGD₂). Also, another indicated, *"Our house is sweeter than at first. These days my husband calls me when he wants to take decisions about domestic issues. At first he would take all the decisions himself"* (WFGD₃). A third woman stated, *"These*

days my husband talks more with me than before, even if it is not about decision-making'(WFGD₄)

On the part of men, there had not been much change because they were already the decision makers in the household. However, most of them indicated that they had decided to pay more attention to certain aspects of animal husbandry, including cleaning of pens and provision of drinking water for the animals. The men had realized the importance of the practices from the training sessions. For instance, most of them had learnt to preserve the animal droppings from sweeping, to use as manure on their farm plots. Some men also mentioned that they had learnt the importance of paying attention to preparation / provision of supplementary feed.

As regards widows and decision-making, the few among the women, who were also household heads, indicated that there had been no change in their involvement in decision-making, since they were already the major decision makers. However, they indicated that the training sessions had given them a better understanding such that they took the husbandry practices more seriously.

Changes at the community level

At the community level, various people had observed a number of changes. The women had observed some changes in their status in the community. During the women's FGDs, some women stated that other women not involved in the project sometimes approached them for soft loans to solve problems. They would either give them a mature goat to sell and use the proceeds,

or in a few cases, they would lend them cash. Further, other women, especially those not on the project addressed them with more respect.

There had been an increase in the voice of the case women farmers. Some of the women had begun to express themselves during community meetings; and did so with more confidence. For instance, concerning the community sanitation and borehole maintenance meetings, one woman in Tuassa stated, *“Now, when we talk at meetings they listen, because they know that we can help with money”* (WFGD₅). This statement was confirmed by the Tuassa Assemblyperson, a male, who indicated that participation in the project had given the women a better position in the community. He explained that the case women farmers now have more disposable income and are able to contribute towards needs in the groups to which they belonged. Some case women farmers had become leaders (Magadzia) of other women’s groups where they belonged.

These changes in the household and community did not affect the gender division of labour (GDOL) at the household level, although participation in decision-making had increased. Increase in decision-making is one of the indicators for meeting a strategic gender need however, the women were still under the oversight control of their husbands. For instance, they still had to seek the consent of their spouses before selling their small ruminants. Women still swept and provided water for family and SR, and prepared the supplementary feed. Men were still responsible for purchase and sale of the small ruminants in the household, among other duties. The gender division of labour had not changed, therefore this intervention is gender specific. This is because the

implementers TUDRIDEP have used the knowledge of gender differences in the case communities under study. They targeted women and worked within the existing gender division of resources and responsibilities to meet their practical gender needs. Practical gender needs have been met in this intervention, because the lives of the target group have been improved (women in the case communities) without changing the existing gender division of labour or challenging the women's subordinate position in the households (March et al., 1999). Meeting practical gender needs is a strategy used by NGOs and women's organisations as an entry point into communities (Reeves and Baden, 2000). This intervention succeeded in increasing women's income, improving their livelihoods, and consequently that of their households, which was one of the aims of the FESF call to which TUDRIDEP responded. Interventions that meet women's practical gender needs as this one did are less likely to be resisted as compared to those that meet strategic gender needs. Coates (cited in Boateng et al., 2013) however posits that every intervention that meets a practical gender need has an effect on strategic areas of life (power relations and control) whether it is intended, or not. In this study, increased participation in decision-making tended towards meeting a strategic need. The results of this study are also corroborated by previous research which states that when Practical Gender Needs of both men and women are met by projects there is no change in their relative positions in society and social conflict is not generated (Boateng, Brown & Tenkorang, 2013; Sayadi & Calatrava-Requena, 2008). In this study, there was a cordial relationship between spouses in the beneficiary households. Reeves and

Baden (2000) also posit that there is no obvious distinguishing feature between the two kinds of needs and that any policy or programme may meet both sets of needs. However, in this study, the absence of a change in the GDOL makes the need met a practical gender need. The next section discusses the organisational structure of TUDRIDEP, the case organisation and the implementer of the intervention.

Analysis of the organizational structure of TUDRIDEP

This section assesses the organizational structure of TUDRIDEP. The basis of the assessment was the social relations approach concept three, which challenges the myth that institutions are ideologically neutral. According to Kabeer (1994), one needs to move beyond the surface to scrutinize the actual rules and practices to uncover the core values and assumptions that institutions hold.

The staff organogram and staff composition show a high gender imbalance. The total staff strength that operates in all areas where TUDRIDEP works (Sisalla West, Sisalla East, Dafiama-Busie-Issah and Wa East Districts) was 25. Out of this number, 20 were stationed at Tumu whilst five were at Funsu. The breakdown of the staff in Tumu showed that there were only five females making one quarter of the staff numbers: one female to five males. In Funsu, all the staff were males. Asked why there was no female on the Funsu staff, the station manager explained that there used to be one but TUDRIDEP disposed of her services after a particular project ended, as she was no longer needed.

At the various staff levels, the same trend was noticed. For instance, with the lower level staff, while there was no female field officer at Funsu, there were only two females out of 11 at Tumu. Further, the third female held the position of clerk. With the middle level, there were two females out of six and at the senior level, there was no female out of the three. A management team of nine reports directly to the Board of Directors and it comprised of only two females. The nine members comprised of two station managers, the Monitoring and Evaluation officer, two accountants (one at each station), two programme coordinators, the Gender desk officer and the coordinator. Thus, in all, there were only two (22%) females in management position in TUDRIDEP, the female accountant and Gender Officer both in Tumu. The gender imbalance in the management composition showed that a gendered group of people with men in the majority are the ones who make the rules for the organization. It was expected that there would be a higher number of females on the ground to work with the women farmers.

Although TUDRIDEP had a gender policy, which aims at bringing women to a place of empowerment, their organogram does not show much consideration for gender balance in the area of the work force. Table 8 shows a summary of the different aspects of TUDRIDEP examined. TUDRIDEP's intervention has improved the livelihood of the women it targeted by increasing household income but did not challenge the existing gender division of labour in the household. Thus, TUDRIDEP had met a practical need of the women and therefore the intervention was gender specific. The gendered nature of the organization may have contributed to TUDRIDEP meeting a practical as opposed to a strategic

need. As indicated earlier decisions taken by a gendered staff was likely to favour men.

Table 8: Summary of examination of TUDRIDEP for gender sensitivity

Item Examined	Analysis Tool	Level of gender sensitivity
TUDRIDEP gender policy		
Objectives	SRA Concept 4	Gender Aware
Policy Guidelines	SRA Concept 4	Gender Aware
TUDRIDEP intervention:		
Community Sensitization	SRA Concept 4	Gender Aware
Objectives of Intervention	SRA Concept 4	Gender Aware
Selection criteria	SRA Concept 4	Gender Aware/Gender Specific
Components of the technology package and training offered	SRA Concept 4	Gender Aware/ Gender specific
Perception of case farmers and key informants of the gender dynamics after the intervention with respect to their economic situation, status at household level	SRA Concept 4	Gender specific
Perception of case farmers and key informants of the gender dynamics after the intervention with respect to their economic situation, status at community level	SRA Concept 4	Gender specific
TUDRIDEP organogram and staff ratios	SRA Concept 3	Gendered Institution

Source: Fieldwork (2017)

The next section gives a summary of findings in the chapter.

Chapter Summary

Chapter Five examined the gender sensitivity of TUDRIDEP. It examined the TUDRIDEP gender policy, its intervention and organisational structure in the light of the Social Relations Approach (SRA). The findings showed that the TUDRIDEP's objectives, its gender policy and operating guiding principles were all gender aware. The components of the intervention package and the training offered were also gender aware. The case farmers and key informants perceived that the TUDRIDEP intervention had resulted in a cordial relationship between spouses in participating households. There was also an increase in women's income and participation in decision-making concerning animal husbandry and other domestic issues. At the community level, women gained more respect and voice, took up leadership positions and contributed better financially. Women's increased participation in decision-making was an indication of control and meeting a strategic gender need. However, the change in decision-making experienced by the women did not alter the GDOL in the case communities. The TUDRIDEP intervention therefore met the women's practical need and can be described as gender specific intervention.

The TUDRIDEP was not ideologically neutral. It was gendered with very few female staff in general and at management level. Rules and regulations from such a team are likely to favour men. TUDRIDEP has implemented a gender aware and gender specific intervention that met the practical gender needs of women. The highly gendered nature of the TUDRIDEP staff structure could have contributed to the intervention meeting only practical gender needs and not

strategic gender needs. The next chapter discusses the adoption of small ruminant husbandry technologies transferred among female and male farmers.



CHAPTER SIX
ADOPTION OF SMALL RUMINANT HUSBANDRY TECHNOLOGIES
TRANSFERRED AMONG FEMALE AND MALE FARMERS.

Introduction

This chapter presents results relating to objective two, which sought to examine adoption of the small ruminant husbandry technologies transferred to female and male farmers. The chapter first reports on the the attributes of husbandry technologies transferred, which include ease of use, relative advantage, observability and compatibility. This is followed by female and male farmers' level of adoption of husbandry technologies. The presentation, structured along the conceptual framework, shows that the attributes of a technology influence adoption of the technology transferred.

Attributes of the Small Ruminant Husbandry Technology Interventions Introduced

The perception of male and female respondents of the attributes of the small ruminant technologies transferred were measured on a six-point Likert scale. The attributes studied were relative advantage, compatibility, complexity / ease of use and observability. The results of an independent sample t-test (Table 9) showed no significant difference between the overall perceptions of female and male respondents of the attributes (4.58 female; 4.45 male; P-value 0.19, $t=1.33$). Thus, the null hypothesis that there was no difference between female and male perceptions of technology attributes was accepted. This showed that both female

and male farmers agreed to a high extent on their perception of the overall attributes of the technology package introduced.

On the attribute “ease of use” both female and male farmers agreed to a very high extent on their perception of the technology package ($\mu = 4.85$; $\sigma 0.30$) for female and ($\mu = 4.93$; $\sigma 0.24$) for male farmers respectively. Further, the low standard deviations (<0.5) showed consistency in their perceptions. This indicated that both female and male respondents found the new technology very easy to use and this had positive implications for adoption.

Respondents agreed to ‘a high extent’ on their perception of the attribute ‘observability’ ($\mu 4.80$; SD 1.02) for female and ($\mu 4.53$; SD 1.02) for male farmers. This meant that it was quite easy for farmers to appreciate the difference between the old and new practices leading to decision to adopt the technology. However, considering the items under ‘observability’ (Appendix L), the perception of the females was significantly different from that of males ($p=0.04$) for the item, ‘people commenting on the improvement in the health of my animals’. The women’s perception was significantly different because the gender division of labour was such that it is the women who let the animals out of the pens in the morning and put them back in the evening. This role played by the women gave them more contact with the animals than men had. The women confirmed during the FGDs that people commented about the visible changes in the health of the animals.

There was again no significant difference in mean perception scores for female and male ($p=0.26$) for the attribute ‘relative advantage’ (the benefits of the

new technology were better than the old were). However, the women scored slightly higher (μ 4.47; σ 0.67) than men (μ 4.27; σ 1.01) meaning the women agreed to a ‘very high extent’ while the men agreed to a ‘high extent’ that the new technology package was more advantageous than the old practices were. This implies that the women found the technologies introduced to be slightly more advantageous to them than the men did.

With the attribute compatibility (consistent with the old norms that were in use before the intervention), the mean score for both male and female were in the category ‘high extent’ (μ 4.20; σ 0.59) for women and (μ 4.06; σ 0.61) for men with no significant difference between mean perception scores.

Table 9: Independent Sample t-test of difference between the perception of male and female respondents of attributes of small ruminants technologies

Technology attributes	Sex	Mean Score (μ)	SD(σ)	Mean diff.	t values	Df	P-value
Ease of use	Male	4.92	0.24	0.07	1.41	94.17	0.16
	Female	4.85	0.30				
Observability	Male	4.53	1.02	-0.28	1.64	44.52	0.11
	Female	4.80	0.42				
Relative Advantage	Male	4.27	1.01	-0.20	1.13	55.17	0.26
	Female	4.47	0.67				
Compatibility	Male	4.06	0.61	-0.14	1.16	116	0.25
	Female	4.20	0.59				
Mean Score	Male	4.45	0.58	-0.14	1.33	53.71	0.18
	Female	4.58	0.37				

Source: Fieldwork, 2017. Male=39, Female=79, Total N=118 Scale: 0 = not at all, 1= very low extent, 2= Low extent, 3= Moderate extent, 4=high extent, 5=Very high extent. Alpha level=0.05

To find out which of the attributes was ranked highest by respondents, the mean ranks were subjected to the Friedman’s test and this showed significant differences ($p=.00$) between the rankings of the attributes (Table 10). In order to find out where the differences lay, the Wilcoxin’s test was used to separate the mean ranks. The results of the Wilcoxon’s test showed that ‘ease of use’ was ranked significantly higher than observability, which is also ranked higher than relative advantage and lastly compatibility. The differences in ranking of the attributes were all highly significant ($p=0.000$) except for the comparison between observability and ease of use which was significant at $p<0.05$ alpha levels. The results of the Wilcoxin’s test (Appendix M) confirms the Friedman’s test.

Table 10: Mean Ranks of attributes by respondents using Friedman’s test

Attributes of technology	Mean Rank
Ease of use / complexity	3.17 ^a
Technology easily observed	2.98 ^b
Relative advantage of technology	2.40 ^c
Compatibility of technology	1.45 ^d

Source: Fieldwork 2017. N=118 chi-square 162.05; df= 3; Sig=0.00

The implications of the results is that the farmers perceived the package presented by TUDRIDEP first, as easy to use. Secondly, farmers could observe the differences between the old and new practices; thirdly, the package introduced had more advantages than what they were practicing before, and lastly the package was more consistent with the old norms that were in use before the intervention. Compatibility was ranked lowest because about half of the males (46.20%) and at least a quarter of the females (26.60%), representing a third of

the total respondents had scored ‘not at all’ for the statement that the technologies introduced were “similar to what they had been practising before’ (Appendix L). However, during the FGD most of the women asserted that the division of labour had not changed after the interventions. For example, before the project intervention, it was the role of women to prepare supplementary feed, fetch and give water to the SR and clean (sweep) the pens. With the intervention, they just had to be more diligent with giving water, supplementary feed and be more particular about the health of the animals because they had realised the importance of the practices.

Thus, one may surmise that the gender division of labour in SRPM before the intervention influenced farmers’ perception of the attributes of the technology package introduced to them and contributed to the high adoption levels. The high adoption level of farmers in the study (discussed in the next section) shows a positive influence of the farmers’ perception of the attributes of the technology introduced. This confirms the assumptions made in the conceptual framework that attributes of the technology influence farmer adoption. According to Rogers (2003), the perceived characteristics of a technology are very important in the adoption process. Perceptions also account for 49-87% of the variance in whether or not the target group adopts an innovation (Rogers, 1995; Packrats, Hallfors and Cho, 2002). Previous authors also found that the perception of an innovation might enhance or limit its adoption (Mignouna, Manyong, Mutabazi, & Senkondo, 2011). The next section discusses the adoption levels of the farmers.

Level of Adoption of Individual Technologies

In this study, a technology is labelled ‘adopted’ when the frequency of practice is in accord with what TUDRIDEP taught the respondents to do. Overall results showed no significant difference ($p > 0.05$) between the level of adoption by women and men farmers (Table 11), although the mean level of adoption was higher for women than men (71.67 female; 67.28 male; P -value= 0.16, $t = 1.40$).

Table 11: Chi-square of difference between adoption levels of female and male respondents of individual technologies.

Technology	Male (%)	Female (%)	Total (%)	Chi-square value	$p < 0.05$
Routine Cleaning of pens	94.90	100.00	98.30	4.12	0.04*
Providing Drinking water	100.00	100.00	100.00	0.00	0.00
Planting tree seedlings supplied (<i>Lucaena sp/Lebeck sp</i>)	61.50	78.50	72.90	3.80	0.05
Planting forage seeds – <i>Cajanus cajan</i>	61.50	81.00	74.60	5.22	0.02*
Feeding ficus seed cake	87.20	92.40	90.70	0.84	0.36
Feeding <i>Lucaena/Lebeck</i>	56.40	73.40	67.8	3.5	0.06
Feeding dried forage - <i>Cajanus cajan</i>	56.40	68.40	64.40	1.63	0.20
Annual PPR vaccination	23.10	26.60	25.40	0.17	0.68
Using the services of the Community Livestock Worker	92.30	70.90	78.00	6.98	0.01*
Using the services of the veterinary technician for routine prophylactic treatments	53.80	51.90	52.50	0.40	0.84
Practice record keeping	0.00	0.00	0.00	0.00	0.00
Attending group meetings	87.20	88.60	88.10	0.051	0.82

Hypothesis testing

Independent sample t-test of difference between female and male mean level of percentage adoption

Variable	Categories	n	Mean	Std. Dev.	Mean Diff.	Df	t-value	p-value
Adoption levels	Females	79	71.67	14.96	4.41	116	1.40	0.16
	Males	39	67.26	18.14				

Source: Fieldwork (2017).

Thus, the null hypothesis that ‘there is no significant difference between adoption levels of male and female farmers is accepted.’

In considering the adoption levels of the individual components of the technologies, significant differences at 5 percent alpha level, were observed between women and men for three components of the technology package. The first was ‘routine cleaning of the SR pens’, where women’s adoption level was significantly higher than men ($p=0.04$) were; secondly the ‘cultivation of forage seeds’ (*Cajanus cajan*) where women’s adoption level was significantly higher than that of men ($p=0.02$); lastly ‘using the services of community livestock worker’, where men’s adoption level was significantly higher than women ($p=0.01$).

The differences in adoption levels for all three components was due to the traditional division of labour described earlier in the case context (Chapter 4) and in the section on perception of technology attributes. The cleaning of pens was traditionally part of women’s roles in the production and marketing of small ruminants (PMSR) before the introduction of the husbandry interventions. As a result, women took easily to performing that task. Secondly, the *Cajanus cajan*, also known as pigeon pea, is a dual-purpose crop. Apart from feeding the leaves to the animals, the seed is also eaten as a legume. Thus, its cultivation was more attractive and beneficial to the women, since it was an addition to the family menu.

The component, ‘using the services of the community livestock worker’ bordered on health provision, which was the traditional domain of men in the

PMSR. Both men and women approached the CLWs introduced by the intervention to treat their animals for minor ailments. However, the responses from the CLWs interviewed indicated that although more women started calling the CLWs to attend to their animals after the intervention, men were the most frequent callers. According to the CLWs, men called more because the women were still reported health problems to the men, for them to call on their behalf using their mobile phones; since more men owned phones than women.

The results showed that the level of adoption of the component 'feeding dried forage - *Cajanus cajan*' to SR (68 percent for women; 64 percent for men) was much lower than for planting the forage (81 percent for women; 62 percent for men). One female key informant explained that while the culture of feeding *Cajanus cajan* to SR was new to the respondents, others were also more interested in using the seed for human consumption. Similarly, for both women and men adoption levels for planting of tree seedlings was higher than feeding the cut leaves to the animals. It was observed that some respondents did not have the trees that they were supposed to have planted; their explanation was that the seedlings supplied did not survive. However, after further probing, it was observed that some of the respondents planted the seedlings supplied near their houses as had been instructed, but did not erect hedges around them as advised. Therefore, the SR ate and destroyed the seedlings. The few trees of *Albizia lebbek* that were seen around the houses were from tree seedlings that had been protected with fences or baskets. A few respondents had planted on their farms.

Record keeping was the least adopted component, recording zero percentage adoption by both women and men. Most respondents admitted their children started keeping the records for them in exercise books provided by the project, but they later permitted the children to take the books to school. The project field officer indicated that in the absence of the farmer written records, he took his own records by interviewing the farmers on monthly basis. The inability of sheep and goat farmers to keep written records on their animals have been reported in previous studies (Aboe et al., 2013 a, Aboe et al., 2013 b; Adams & Boateng, 2014). Farmers however have been found to keep oral records on birth, death and sales (Aboe et al., 2013 a & Aboe et al., 2013 b). Although this study did not investigate factors that enhance record keeping among farmers, Adam, Atengdem and Al-Hassan (2010) found out in a study of sheep and goat farmers in Tolon-Kumbungu that credit was significantly ($p < 0.01$) related to adoption of record keeping.

The component with the second lowest level of adoption after record keeping was 'annual Peste des Petits Ruminants (PPR) vaccination'. To avoid mortalities, farmers are supposed to vaccinate their sheep and goats on annual basis against this virus. The first shot was free when the project started and some farmers refused to pay for subsequent shots, protesting that subsequent vaccinations should also be free.

Respondents' adoption levels were put into four categories (Appendix K) which include very low (1-25 %), low (26-50 %), high (51-75 %) and very high (76-100 %). More than three quarters (85 %) of both women and men respondents

were in the high and very high categories and this has positive implications for the up scaling of the technology package. This study corroborates one by Doss and Morris (2001) who working in Ghana found a differential in men and women's planting of improved varieties of maize (39 percent for women and 59 percent for men). This was explained by a difference in access to complementary inputs including land and extension services. However, when the difference in access was reduced, there was no statistically significant difference in adoption decision. In the present study, given the same inputs (SR), exposed to the same training sessions, extension support and information, no significant difference was observed in adoption levels. This corroborates the assertion that when opportunities are equal, women will perform as well as men (FAO, 2011), although adoption does not automatically translate into improved performance of a practice that has been introduced. The results confirm the assumption made in the conceptual framework that farmer perception of technology attributes influences the adoption of the technology and that the GDOL also influences farmer perception of attributes and farmers' adoption decision. Small ruminant husbandry technologies transferred could be up-scaled to other farmers in the community and to other nearby communities.

Chapter Summary

Objective two examined the adoption of the small ruminant husbandry technologies transferred to the small ruminant farmers in the study area. Farmer perceptions of four attributes of the technologies investigated including relative advantage, ease of use, observability and compatibility showed no significant

difference between female and males. Therefore, the null hypothesis that there was no significant difference ($p=0.19$) between female and male perception of the attributes of the technologies transferred was accepted. The farmers perceived the attributes to be in the high extent category of the Likert scale; however, the compatibility had the lowest mean score of (4.04 for males and 4.20 for females).

Overall there was no significant difference ($p>0.05$) between the level of adoption of the small ruminant technologies transferred to female and male farmers although the mean level of adoption was higher for the females than the males (69.30 female; 64.53 male; P-value 0.16, $t=1.40$). There was however a significant difference between adoption levels of females and males for three of the technology components namely, routine cleaning of pens ($p=0.04$) cultivation of forage seeds (0.02) and using the services of the community livestock worker (0.01). These were explained by the GDOL in SRPM households. The results confirm the assumption by the conceptual framework that farmer perception of the technology attributes influences the technology adoption, that the GDOL influences farmer perception of attributes and farmers' adoption decision. The next section discusses the ownership, access and control of resources.

CHAPTER SEVEN

OWNERSHIP, ACCESS AND CONTROL OF RESOURCES

Introduction

This chapter presents findings on the third objective, which sought to describe ownership, access and control of production resources needed for small ruminant (SR) production and marketing. The presentation of findings follows the conceptual framework. The resources considered in this study are both tangible and intangible. The tangible resources are SR, land, feed resources, water and credit, while the intangible resources are agricultural extension information and group affiliation. Each of these resources is presented in the light of ownership, access and control. The root causes of unequal ownership access and control of resources among female and male farmers based on the Social Relation Approach (SRA) concept two (social relations) are discussed. In addition, the effect of rules and policies of the FSEF and TUDRIDEP, on ownership access and control of tangible and intangible resources based on the institutional analysis (concept 3) are discussed. The discussion starts with SR as a resource.

Sheep and Goat as a Resource

The reasons for keeping SR are discussed followed by farmers' preferences. Ownership, access and control of sheep and goat as a resource, the root causes of inequality in ownership, access and control and the effect of the intervention are also discussed. Both female and male respondents gave reasons for keeping sheep and goats, establishing the socio-economic importance of the

animals. However, there was an overwhelming choice of economic (80%) over social reasons (20%) for keeping SR in all the communities investigated.

The economic reasons given included animals being sold to pay school fees and hospital bills, purchase of children's school uniforms, renewing health insurance and investing in crop farming (i.e. paying for tractor services or buying fertilizer for crops in the wet season). Also, during the dry season, goats, are sold to purchase grain for family feeding. In Tiisa, one female respondent affirmed the importance of the sheep and goat for economic purposes during the FGDs with the statement *'We sell to get 'quick money' to solve our problems, especially the goats'* (WFGD₁). In the same vein, a male respondent in the Yaala2 FGD indicated that *"Sheep and goats help us a lot. We sell to pay for tractor ploughing and fertilizer during the farming season"* (MFGD₄). Previous findings confirm selling SR to pay for cost of labour and other inputs at the beginning of the farming season (Aboe et al., 2013a; Amankwa et al., 2012). SR are also used during unforeseen circumstances: drought, crop failure, disaster or funerals (Amankwah, 2012; Asafu-Adjei & Dantankwa, 2001; Okunlola, 2002; Rahman, 2007).

Small ruminants are important for social activities including funerals, festivals, sacrifices, marriage and naming/outdooring ceremonies and as gifts. Sheep are used for socio-cultural purposes, they are slaughtered during festivals and the blood and liver are used to perform rituals, whilst the meat is consumed. During funerals, a sheep is given by the son-in-law of the deceased (if the deceased does not have a married daughter, husbands of the nieces perform that

duty). The sheep is slaughtered and used to prepare food for visitors. Any animal that is not slaughtered is left to reproduce. Sheep and goats are added to cows for payment of bride wealth. During naming ceremonies, the husband provides a sheep to be slaughtered early in the morning to prepare food for the celebration. Both women and men affirmed that sheep are preferred for performing ceremonies and rituals than goats. Some male respondents stressed the importance of having a few sheep in the flock for such purposes. Previous studies corroborated the findings of this study on the socio-cultural importance of small ruminants for occasions as festivals, funeral rites, payment of social dues, for religious ceremonies, bride wealth, medical and school fees (Apori, Osei, & Oppong-Anane, 2010; Fakoya & Oloruntoba, 2009; Oluwatayo & Oluwatayo, 2012).

Preference for small ruminants

Both women and men indicated their preference for goats over sheep. They agreed during the FGDs that sheep are more docile and easier to manage. Additionally, sheep grow bigger and bring in more money however, goats are preferred because they are more prolific (Aboe, 2013 b; MoFA, 2010; Oppong-Anane, 2011). Respondents who preferred sheep to goats indicated the destructive nature of goats as the main reason. The following statement from the Men's Focus Group Discussion in Yaala 2 supports the finding:

The goats enjoy eating dried cassava peels with salt added, but what happens is that they enter other people's houses looking for the peels and sometimes destroy their property. This results in

people stoning them and thus resulting in quarrels at times
(MFGD₄).

In the case communities, some men stressed the importance of elderly men keeping a few sheep for the purposes of performing social duties such as payment of bride price, funeral rites, festivals and ritual purposes (Aboe, 2013 b).

Ownership of sheep and Goats

More than half of the respondents (57%) indicated that they were keeping sheep and goats before the project started. Of this, there were more males (62%) than females (54%).

To understand the ownership of sheep and goats as a resource in the target community, the question posed to men and women during FGDs and to key informants was, 'Who would you describe as the owner of a sheep or goat?' Unanimously, the response was "the one who acquired the animal". To be sure, they understood the question, they were asked to explain the difference between the owner of an animal and the caretaker. The farmers explained that the owner of an animal is the one who acquired it and who takes decision on it, especially on its disposal (to sell, give away or to use for any other purpose). The caretaker is the one who takes care of the animal. She/he feeds the animal, seeks medication when the animal is sick, and surcharges the owner for the cost of treatment.

In all the communities studied, the responses from the FGDs and in-depth interviews for both women and men indicated that the common method of acquisition of sheep and goats was by purchase. This response was confirmed by the survey results that showed that the main source of acquisition of the sheep and goat was by purchase (92%). The other sources were gift (6%) and dowry (2%).

The six percent (6%) who received gifts were all women. Acquisition by men was mainly by purchase using proceeds from crop farming. Men could also inherit following the demise of the household head. In extended family households, when the next of kin, a male, became the new head of household, he inherited the deceased Person's herd and became the automatic owner of all the animals in the herd. He also had oversight responsibility of all the animals in the household and had the right to sell any animal from the herd to take care of household matters including paying school fees of any child in the household. One female respondent stated that, as a reaction to the arbitrary right of the head of the household to dispose of the animals, some women left their SR in the custody of their brothers. Since the brothers were in different households, the women were able to dispose of the animals as they wished, without consulting their spouses.

The farmers indicated that there has been a shift in the last 20 to 25 years from the extended family system, with large household numbers, and animals under the authority of one man, towards the nuclear family (the man, wife and children). Therefore, sons are now taking care of their homes themselves and taking charge of both their own livestock and crop farms. Women on the other hand, still defer to their husbands in the sale of sheep and goats that they own. They had to inform their husbands before selling a sheep or goat that they have acquired themselves.

A not so common way of acquiring sheep and goats in the study area was through 'maintenance payment'. This is where the owner gives the caretaker an animal for services rendered. In other instances, parents gave animals to children

as gifts, while the animals were in the custody of the parent. Two men, one in Dupari and the other in Tuassa, explained that the gesture helps to develop and keep the interest of children in animal husbandry. The Dupari respondent stated, *“Because I have given each child an animal, they are more involved in taking care of the sheep and goats. I do not have to force them to do so”* (MFGD₅).

Giving of sheep and goats as gifts was not common in the study area. Some respondents explained that people want more animals, so they did not see why they should give out to others. The general trend was that women were expected to acquire sheep and goats themselves and this was confirmed by the Tuassa men’s FGD. The women of Tiisa and Tuassa indicated during the FGD that they bought their sheep and goat from proceeds of sale of shea nut and firewood. Husbands did not give sheep and goats to wives. A key informant in Halimboi indicated that he had encouraged his two wives to start rearing sheep and goats by selling an animal to each of them. However, the Community Livestock Worker (CLW) in Tuassa boasted that he was the only husband in his community that had started off his wife with one goat free of charge. He said, *“I am the only man in this village who has given my wife a goat to start rearing. You can ask anyone in this village. They all know”* (MFGD₂)

To understand the ownership patterns, the study probed further into the history of ownership. The question asked to the FGDs and key informants was; ‘why could women not own animals in the past? They gave four main reasons. The first reason was that, it is the culture of the people. According to the Sisala and the Wala cultures women do not own any property, and this includes SR.

Marriage makes the woman the property of her husband. As a result, any property a woman owns belongs to the man. When a woman acquires property in marriage, she is accused of trying to usurp the authority her husband. She is labelled 'hawajia'. This means she is behaving as though she is independent and is no longer under the authority of her husband. Women were therefore reluctant to acquire sheep and goat to avoid such labelling. Two key informants confirmed the cultural nature of ownership. One stated in Yaala 2 that, "*Rearing of animals is meant only for men. It is the culture of the people of Sisala. In the olden days, only men kept sheep and goats. These days women are also keeping some*" (MKL₄). The second male key informant in Dupari stated:

In the olden days, everything belongs to the man. The woman also belongs to the man. Everything a woman buys is for the man, whether sheep or goat. Women do not own themselves. The man takes care of the woman, so if she has anything it belongs to the man (MKI₅).

A second reason, reported by the women was that, they feared to offend their husbands and incur their wrath. According to most women, men were sometimes offended to the point of using supernatural power referred to as 'black magic' to cause the death of their wives when they acquired SR. Women were thus not encouraged to own animals.

Another reason given was on the system of animal husbandry at the time, which was largely an extensive system. The males (young and old) herded the SR in the bush to graze during the dry season and only brought them back home in the farming season to prevent them causing damage to peoples' farms. Further, since there was no housing for the animals at the time, the animals roamed and

slept anywhere, making it difficult to track them. This extensive system of husbandry ruled out women's involvement, given that the domestic division of labour confined the women to the house as they performed their household chores and care work. Women often handed over their SR to their male relatives: father, husband, brother or sons for caretaking. The ear-lobes of the SR were slashed as a form of identification and the SR were added to the general pool.

A fourth reason given was poverty. Most of the women indicated that they had never thought about the possibility of owning such animals since they did not have money. Two women in Yaala 2, however indicated that older women had advised them in their youth to save money from the proceeds of shea nut sales and acquire their own animals since it was beneficial.

A male key informant in Halimboi indicated that in the recent past, there has been an increase in women's ownership of sheep and goats. This was due to the presence of NGOs. Citing the present study as an example, he explained that NGOs supply women with animals to rear and the women can further increase their stock once they have enough money to buy more. He however stressed that the woman is still under the authority of the man. He summed it up this way:

Women own animals these days because NGOs gave it to them. They also buy more once they have their own money, especially from shea nut and firewood sales. One thing is that no matter how many animals she has, she will always have to consult me before she sells, because she is under my authority (MKI₃).

This expression confirms the patriarchal nature of the case communities as stated in the case context (chapter four) and confirms the assertion that cultural

and social practices that affect gender equity do not change quickly (Stacki & Monkman, 2003). While cultural norms worked towards limiting women's ownership of SR, the state policy that stressed increased women's participation in the SR intervention and TUDRIDEP's adherence to the state policy worked against the norm. In addition, TUDRIDEP's pass-on strategy, the technologies introduced (including encouraging a shift from the extensive system of SR rearing) worked towards subverting the prevailing cultural norms and rules that did not encourage female SR ownership. The intervention thus worked towards increasing tangible assets in the form of SR, with a consequent increase in women's income.

Access and control of sheep and goat resources and benefits

Access by definition in this study is the ability to use a resource, while control is the ability to take decision on the resource. Although both women and men own SR, husbands/households head have oversight control or authority over the household members and their property. Thus, all household members need the permission or the consent of the household head before selling their animals. Respondents were unanimous in this regard. According to them, the household head has the sole prerogative to give consent for sales. This was the norm for purposes of order and control in the household.

The following statements from two key informants support the finding. The first states, *"When you want to sell your animal you have to inform the head of the house for his permission before you sell, although the animal is for you"* (FKI₂).

The second states:

When you marry, the man is the leader of the house and he has to give orders before anything is done. He will give permission for the sale and then go and sell the animal for the woman' (FKI₃).

When a woman wants to sell one of her animals, she first informs her husband of her intention. The couple discuss her intention, expected revenue and use of the proceeds. The man then bargains and sells at the farm gate. The same finding was made by Bacho (2004) in northern Ghana, in his paper titled 'Can I sell one of my cows'. Once sold, the full proceeds were handed over to the woman by the man. She had full access to and control over the proceeds and subtracted the amount needed to solve her problem. She would give a token, referred to as 'Cola' to the husband if there is extra money. The 'cola' served as gratitude for his service in selling the animal.

In order to avoid being under the authority of the man in such issues, some women left their SR with their brothers when they moved to stay with their husbands. As such, they did not need the husband's permission to sell (Aboe et al., 2013a). When household heads / husbands wanted to sell an animal in the flock, they first informed the owner, whether it was the wife, son or other family member of their need. Often times the owner granted the request.

The intervention increased ownership of and access to SR as a resource, especially in the case of women. This is because the starter pack of free sheep and goats given to the farmers on the project increased the resource base of SR for the women as well as income. Women's ownership of SR increased and they had

access to more benefits from sale of proceeds. However, the oversight control that men had over female spouses and other household members and their property did not change with the intervention. Also, owners' control over benefits of proceeds from SR sales were not affected by the intervention and this has positive implications for women's income. The next section discusses the ownership, access and control of land.

Ownership, Access to and Control of Land

In all the case communities, land was not for sale. The land belongs to families. The Tendana (earth priest), the oldest person in the family holds the land in trust for the family. Access to land was not a problem in the study area. A key informant in Halimboi confirmed it by the statement, "*There is enough land for generations to come*" (MKI₃). Men who hailed from the case communities acquired land from their fathers. Fathers gave sons as much land as they could farm, and men had inheritance rights and control over the land. Unmarried women had access to the land through their fathers, while married women received land from husbands. In the past, men in polygynous marriages gave bigger portions of land to the most senior wife. However, in recent times, men give wives varying sizes depending on the wife's financial strength for farming. Further, a women's access to virgin land depended on whether she was prepared to hire labour to cut trees and uproot tree stumps. The virgin lands were also farther away from the homes, women therefore settled for already used plots near their husbands' fields, because they did not have money to hire labour. Previous findings which argued that husbands gave their wives smaller sized and poor-quality land, corroborate

the findings of this study (Britwum et al., 2016; Duncan, 1997; Duncan and Brants, 2004 & Manfre et al., 2013).

When a woman loses her husband, she can still have access to the land if she marries within the same community, but if she moves from the village, she loses access. Men however, retain the lands they farm. They may travel or move out but can re-possess the land on their return. Thus, both women and men have access to the land, but men have control and inheritance rights.

Land in the study area was important for SRPM purposes in many ways. Land was needed for building small ruminant pens; free range grazing; collecting of feed resources either by cutting branches of trees or forage growing in the wild; and land for cultivation of forage introduced by the TUDRIDEP intervention. Land for building SR pens was allocated by the men on the home premises and the men built the pens for the women. Women who had SR before the intervention confirmed that men built for their wives in order to maintain a cordial relationship at home. When asked whether women respondents encountered challenges in acquiring the one acre of land, they needed to establish the forage bank with the *Cajanus cajan* seeds supplied by the project, the response from women and men was negative. Most of the women indicated during the FGDs that they had planted the *Cajanus cajan* seeds on their own plots, stressing that access to farmland was not a problem for the women. The case communities did not have lands demarcated for grazing so SR grazed anywhere in the community, as long as they did not destroy other people's crop.

The discussion shows that although the intervention made certain demands on land, ownership, access and control of land did not change with the intervention. Land needed for building pens were provided freely by husbands and the one acre of land needed for the cultivation of forage (*Cajanus cajan*) did not pose a problem. The patrilineal system of inheritance gave the men control of the land, however the intervention did not affect the control of men over land. Access to land also did not change for both women and men. The next section discusses feed resources in more details.

Ownership, Access and Control of Feed resources

As mentioned above wild pasture in the case communities was communally owned and there were no areas demarcated for grazing, therefore sheep and goats could graze anywhere. Land for animal grazing was not a problem, as stated earlier. However, as is typical with the three northern regions, Upper West, Upper East and the Northern Region, dry season feeding was a problem, therefore SR travelled far looking for pasture.

The farmers had a variety of feed resources that they used as supplementary feed before the intervention started, although they were not very consistent in using them. These included cut grass, which they dried in the shade before giving to the animals; leaves of shrubs such as *Leucaena leucocephala* and tree leaves including 'kpakpala', 'bonia' and mango. Crop by-products such as groundnut and soybean haulms and maize stalks; Baobab seed and *Ficus gnaphalocarpa* seed. Others include brans from millet, sorghum, rice maize, soya beans; and peels of roots and tubers, such as cassava. Agro-industrial by-products

such as corn mill waste flour, and brewers' spent grain of sorghum are also available. Crop residues are available and accessible to SR on farms after crop harvest, when animals are allowed to graze freely (Annor et al., (2007).

Both women and men in the case communities have access to the feed resources that grow wild, since the land is communally owned. Therefore, one can cut leaves of trees and forage from any land to feed the SR. Women's access to cut tree leaves however is dependent on help from men or younger sons, especially where the trees are tall. Fruits and seeds used to feed animals such as leaves of trees *Ficus gnaphalocarpa*, dried fruits of *Faiherbia albida* known locally as Goozie, and Baobab can be picked anywhere in the wild by the women for processing to feed the animals. Basically, women have access to sources of supplementary feed because they are free to collect on community lands, their own and their husbands' farms.

Supplementary feed preparation as stated in the context of the study (chapter four) was the preserve of women. Some of the farmers learnt the preparation of some supplementary feeds from Agricultural Extension Agents (AEA) of MoFA before the project intervention. According to respondents, some of the supplementary feeds such as dried salted cassava peels were a delicacy for the animals. This statement from a female participant in the Yaala 2 FGD confirms the point: *“Goats like it when you sprinkle salt on their food, especially on dried cassava peels”* (FFGD₄).

Women's desire to own SR would increase due to the knowledge imparted to them by the TUDRIDEP intervention. Women had access to supplementary

feed before the intervention. However, their control over supplementary feed increased after the intervention. This is because they were the ones who processed and they became more involved in decision-making concerning what and when to prepare and give supplementary feed. The next section discusses ownership, access to and control of water resources.

Ownership, Access to and Control of Water Resources

Water used in the case communities was sourced either from boreholes or as pipe borne water, however, boreholes are the main source. The control of the water sources was in the hands of a water committee (women and men) whose duty was to maintain the boreholes. Community members contributed when there was the need for repairs, and men contributed twice as much as the women. The men on the committee supervised the repairs.

Women and men had access to water. However, the women and girls were responsible for fetching the water. Most households had water containers with which they stored water. Although the usual time for fetching water was early in the morning and after 4 pm, observation showed that women and girls fetched water at any time of the day, when the household needed water. Water from the boreholes was used for domestic activities (e.g. washing) and, drinking by human and animals. Before the intervention, most case farmers did not provide water for their animals. SR drunk water from pools and any other open sources. However, most respondents reported that after the intervention they begun to provide drinking water in bowls to the SR at least twice daily. Since it was women who

gave the water to the SR they had more access to and were in closer contact with the SR than men were, and could single out sick animals on sight.

Water bodies in the study area, including streams and pools dried up during the dry season. Water was available all year round from boreholes. Previous studies reported that in cases where the animals drunk from open sources (e.g. rivers) stray dogs (Amankwah et al., 2012) and pigs (Aboe et al., 2013a) sometimes preyed on them. The next section discusses labour as a resource.

Ownership, Access and Control of Labour

Discussions with key informants, women and men's FGDs showed that the source of labour for sheep and goat husbandry was the family irrespective of who owned the animals, woman or man. There was a clear-cut division of labour for females and males in the household regarding sheep and goat husbandry, with girls and boys helping the parents when they were available. The male as the head of the household-controlled labour by making sure that household members adhered to the traditional division of labour. However, both women and men had access to labour, as was explained in the FGDs. The women and men's FGDs indicated that if the woman was absent, the children swept and gave water to the SR. If the children were not in, the man played the woman's role and vice versa. In polygynous households, the co-wives filled the gap for each other where there was a good relationship between them. Otherwise, the absentee wife's children filled the gap.

The findings on labour use were similar to previous findings that sheep and goat husbandry was undertaken by family members with very little hired

labour (Duku et al., 2011 & Amankwah et al., 2012). Where flocks were more than 80 sheep, the small ruminants were herded during the rainy season by older men above 60 years, while the children went to school and the younger men engaged in crop farming. Where numbers were small, sheep and goat were tethered on uncropped and marginal lands near homesteads for grazing during the rainy seasons (Aboe et al., 2013 a & Amankwa et al., 2012).

The division of labour as revealed in the context of this study showed that men are responsible for building pens, sale and purchasing; and health care of animals as reported by earlier studies (Aboe et al., 2013 a; Adams & Ohene Yankyera, 2014 & Bacho, 2004). However, with an activity such as sweeping there are varying reports. Adams and Yankyera, (2014a) corroborated by Javed, Sadaf and Luquman (2006) report that in the three northern regions women are responsible for cleaning of small ruminant pens as this study reports. Aboe et al., report that in other districts in the Upper West Region of Ghana, men and children cleaned pens, while women carted the dung to the farms, usually the family farm. On the other hand, where sheep and goats lie in the compound and kitchen areas, it is the women who swept (Aboe et al.,). The intervention did not seem to have any effect on access and control of labour in the household. The next section discusses the ownership, access and control of credit as a resource.

Credit as a Resource

Credit is one of the tangible resources, however it was not an important resource for sheep and goat production in the case communities. This is because the case respondents perceived small ruminants as a source of credit in

themselves. They referred to SR as a source of ‘quick cash’, especially goats. Women and men affirmed this perception in their FGDs. For instance, in the Tuassa men’s FGD, one respondent summarised it this way: “*Nobody takes credit to buy a sheep or goat over here. Sheep and goat are cash. When we need money to solve our problems, we catch one and sell*” (MFGD₂). This finding supports the views in the literature on sheep and goats, as source of ‘liquid cash’ (Adams & Ohene Yankyera), ‘quick cash’ (Aboe et al., 2013 a & b) and a ‘walking bank’ (Terril, 1985 b) for farmers.

From the survey results a little over half (55%) of respondents used credit facilities, with a significant percentage of them being women (85%; $p=0.00$) than men (15%). The source of this credit was informal, the Village Savings and Loans Association (VSLA). The VSLA is a community-based loan and savings scheme introduced to the farmers by two NGOs, TUDRIDEP and SILDEP (Chapter 4). Although with this project credit in the form of cash was not given, the findings showed that women (97%) took advantage of the VSLA (already in operation in the community) more than men did (3%) and they used the cash credit to meet personal needs, such as paying school fees. This supports the FAO (2012) position that women benefit more from NGO credit sources than men do. Credit taken for crop farming from VSLA was either in cash to pay for tractor services, or in kind as fertilizer, seed and other inputs. Bank loans were another source of credit, which had been accessed by only two male respondents. A not so common source of credit in the study area is pre-financing of crop farming activities, either in cash or in kind (tractor services, seed, fertilizer) where farmers paid back in

kind after the harvest. The reasons given by respondents who had never taken loans (about 45%) was either, they: do not need credit; do not have access because they do not belong to a group; or are yet to receive credit from the (VSLA) scheme. The next section discusses group affiliation.

Group Affiliation as a Resource

The case farmers belonged various groups including male only, female only, mixed (male and female) and voluntary groups (Table 12). Groups with a savings component seemed to be the most patronized (92% female and 58% male). This was followed by groups with a training component in SR rearing (64% female and 21% male). Findings from the FGD females showed that joining savings groups enabled them take loans to solve their problems.

The farmers indicated that they had joined sheep and goat groups before the TUDRIDEP intervention to learn about small ruminant production. One such group was facilitated by Agricultural Extension Agents (AEAs) from MoFA. They emphasized the importance of group membership as AEAs from MoFA and the NGOs provided extension services to only farmers in groups. They were therefore obliged to join or form groups. According to the farmers (both women and men) group membership enhanced group learning, exchange of ideas and encouraged joint decision-making. It also enabled members to encourage, assist and motivate each other to implement technologies transferred. Similar findings in the literature indicate that group membership among others, enhances exchange of ideas, information exchange and decision making (Bahadur Gharti Magar, 2011; Mignouna, Manyong, Mutabazi & Senkondo, 2011; Mwangi & Kariuki,

2015; Uaiene et al., 2009) and increased the likelihood of adoption (Buyinza, Bukenya, Bbale & Ndemere (n.d). The rule TUDRIDEP introduced for farmers to form mixed groups was not altogether new to the farmers. However, it enhanced women’s participation because members negotiated meeting times to the advantage of women. The next section discusses agricultural extension as a resource.

Table 11: Distribution of respondents by groups and purpose

Purpose	GROUP							
	Men	%	Women	%	Mixed	%	Voluntary	%
Animal Rearing	5	21.00	2	3.00	-	-	-	-
Savings	13	54.00	20	31.00	9	75.00	-	-
Savings / Animal Rearing	-	-	39	61.00	-	-	-	-
Preparation of iodate Salt	-	-	1	2.00	-	-	-	-
Rice Cultivation	5	21.00	1	2.00	3	25.00	-	-
Social	-	-	1	2.00	-	-	-	-
Health Education	-	-	-	-	-	-	1	100.00
Savings / Social	1	4.00	-	-	-	-	-	-
Total	24	100.00	64	100.00	12	100.00	1	100.00

Source: Fieldwork (2017)

Agricultural Extension as a Resource

This section reports on the sources of agricultural extension information that farmers receive for sheep and goat production. It also covers crop farming. According to the conceptual framework, extension information is one of the intangible resources needed for SRPM. The ownership, access and control of the

sources of extension, and the effect of the TUDRIDEP intervention on ownership access and control of 'extension as a resource' are also discussed.

The case farmers receive extension information from multiple sources (Table 13). These sources were in two categories: direct personal contact and Information and Communication Technology (ICT) sources. Personal contact sources comprised of public extension service offered by the Ministry of Agriculture (MoFA) through its Agricultural Extension Agents; and non-governmental organizations (NGOs) such as Masara N'Arziki and TUDRIDEP. Information and Communication Technology (ICT) sources comprised radio, television, mobile phones and internet). Although there were no significant differences between women and men's access to extension information from personal contact, more men than women benefitted from extension information from such sources. In the case of TUDRIDEP, there was 100% patronage for both women and men. The absence of a significant difference in access to information between women and men was explained during the women's FGDs. According to them, the AEAs dealt with farmers in groups (women, men and mix groups), however, TUDRIDEP had insisted on mixed groups of ten with women being in the majority (at least 70%). Thus, with TUDRIDEP's SR groups, both women and men received extension information together and the meeting times were convenient, especially for women. Women's participation in extension activities therefore increased with the intervention. Findings from this study are similar to earlier findings that farmers used multiple sources of information, as no one source was sufficient in itself. Also that the predominant source of extension

information was the public extension service offered by the Ministry of Agriculture (MoFA) that disseminates information through the Agricultural Extension Agents (Mittal & Mehar, 2016).

Whereas receiving extension information from personal contact sources (MoFA and NGO) had no issues with ownership, access and control, receiving information from ICT sources did. The findings showed that ownership was key to access to information from ICT sources (Table 13). There were significant differences ($P=0.00$) between women and men's access to information from ICT sources (radio, television and mobile phone and internet) with men having more access. Separate FGDs with women and men respondents confirmed these results from the structured interview. The men purchased the radios and televisions; therefore, they owned and had control over them. The women had access, where access meant having the opportunity to watch television or listen. Women's access to radio and television depended on their free time, considering the multiple reproductive and productive roles they played daily in the household (chapter four), which left them little time for such activities. Besides some of the women had never seen a television. One woman in the Tuassa FDG stated, *"I have never seen a television. Madam, please bring me one from Accra when you are coming again"* (WFGD₂).

The results of this study indicate a higher patronage of television than in an earlier study among farmers in the Upper West Region (Anaglo et al., 2014). They found that very few farmers had used ICT to access agricultural

information: only two men out of 148 and one woman out of 134 received agricultural information from television.

Table 12: Distribution of access to Extension Information Sources by respondents

Source	Male (n)	%	Female (n)	%	Total (n)	%	p-value
MoFA AEA SR	33	85.00	64	81.00	97	82.20	0.63
MoFA AEA crops	34	87.00	64	81.00	98	83.10	0.40
TUDRIDEP SR	39	100.00	79	100.00	118	100.00	---
TUDRIDEP crops	15	38.50	39	49.00	54	45.80	0.26
Masara Crops	1	2.60	5	6.30	6	5.10	0.36
Radio SR	38	97.00	53	67.10	91	77.10	0.00*
Radio Crops	38	97.00	53	67.10	91	77.10	0.00*
Television SR	29	74.40	27	34.20	56	47.50	0.00*
Television crops	29	74.40	27	34.20	57	48.30	0.00*
Mobile phone SR	11	28.20	3	3.80	14	11.90	0.00*
Mobile phone crops	11	28.20	3	3.80	14	11.90	0.00*
Internet SR	0	0.00	0	0.00	0.00	0.00	---
Internet crops	0	0.00	0	0.00	0.00	0.00	----

Source: Fieldwork (2017) P<0.05* Significant

It was clear from the FGDs that more men owned mobile phones than women did and that women did not fully have access to phones owned by their husbands. In Yaala 2, for instance, a retired educationist, in the men’s FGD indicated that he uses his mobile phone to make free calls for the community members, especially women, since they do not own mobile phones. He stated, *“I buy units every month and use my phone to make calls free of charge for community members. That is my service to the community because most of them especially the women, do not own mobile phones”*.

Responses from the FGDs revealed that the ICT gadgets (television, radio and mobile phones) possessed by the farmers were used more for social purposes than for receiving information on agricultural extension. The literature has reports on the use of mobile phones for conversing with relatives and friends and the television for watching telenovelas, African movies and soccer (Adjoe, Freeman

and Boateng, 2010; Anaglo et al., 2014). The few farmers that had received and sourced for agricultural extension messages with mobile phones (28.2% men and 3.8% women) had been exposed to e-extension from workshops. These results conform to the 2010 National Census report (GSS, 2014).

None of the farmers on the project used the internet to access agricultural information. Similar results by Anaglo et al. (2014) showed no use of internet to access agricultural information in the Upper West Region of Ghana. This showed an ICT deficiency in the region, which according to Anaglo et al. was due to lack access to computers and the Internet; as well as the knowledge to operate such systems. The context of the study confirmed the paucity of ICT use in the district, by the 2010 National Census, that ICT use in the district was very low (GSS, 2014). Only 3.4 percent of the population had access to internet with 0.3 percent owning laptops/desktops and 10.3 percent had mobile phones (GSS). Although ownership of ICT gadgets affected farmers' access and control of information from ICT sources, the situation was not affected by the small ruminant intervention.

Chapter Summary

Chapter seven has presented findings on objective two which sought to describe ownership, access and control of production resources needed for small ruminants' production and marketing. The resources were discussed in the light of ownership, access and control. The root causes of unequal ownership, access and control of resources among female and male farmers based on the Social Relation Approach; and the effect of rules and policies of the FSEF and TUDRIDEP on

ownership access and control of tangible and intangible resources were discussed.

SR were reared primarily for economic reasons, followed by socio-cultural reasons. The farmers preferred the rearing of goats to sheep because goats are prolific. The owner of an animal is the one who purchased it and has the right to take decisions on it, while the caretaker carries out the instructions from the owner. Although the owner of the animal has access to the proceeds after sale, men have oversight authority over everything in the house including the wife, her property and children.

Four main reasons given that limited women's ownership of small ruminants were cultural norms that women are not supposed to own property; the fear of reprisal by women from their husbands for owning SR; the extensive system of animal husbandry that ruled out women's direct involvement in SRPM and direct contact with the SR and finally, poverty. However, TUDRIDEP's intervention including its criteria of women targeting; its pass-on strategy; the technologies introduced (including encouraging a shift from the extensive system of SRPM) worked towards subverting the prevailing gender orders that have not encouraged female ownership of SR. Men's oversight control of women, other household members, and their property did not change with the intervention. However, the fact that the norm of the owner's control over the proceeds of SR sales did not change, has positive implications for women's income.

Land was an important resource for SR husbandry purposes because it was needed for building small ruminant pens; for free range grazing; and gathering of SR feed resources from the wild. The feed resources included fruits and seeds,

and branches of trees and forage. These were gathered either from farmers' own land or communal lands. The feed resources were processed and fed to the SR as supplementary feed, during the dry season, when pasture was scarce. Land was also needed for cultivation of forage introduced by the TUDRIDEP intervention, and land for that purpose was not a challenge for the women. Although the intervention made certain demands on land, its ownership, access and control did not change with the intervention.

Labour for sheep and goat husbandry was family labour and the household head ensured that household members adhered to the traditional division of labour. Boreholes were the main water source and were maintained and controlled by a water committee made up of women and men. Women, men and animals all had access to the water from the boreholes. Womens' role of giving water to the animals gave them more access to the SR after the intervention because they had to give water at least twice a day. Some farmers did not provide water before the intervention.

Credit facilities were not an important resource required for SRPM because respondents perceived SR as a source of cash. Farmers took credit for crop farming and 'personal needs' including paying children's school fees. The main credit source, the Village Savings and Loans Association (VLSA) was community based and was patronized more by women than men did. More than three-quarters of case farmers belonged to groups (male only, female only, mixed and voluntary groups). Farmers indicated that group membership was the medium

of information dissemination by AEAs from MoFA and NGOs. Group membership also enhanced learning, exchange of ideas and technology adoption.

Farmers received extension information from multiple sources that were in two categories: direct personal contact with AEAs, and the other was Information and Communication Technology (ICT) sources. Personal contact sources comprised of MoFA and NGOs, while ICT sources comprised radio, television, mobile phones and internet. Access to agricultural information from the traditional MoFA and NGO sources showed no significant ($P>0.05$) differences between women and men. However, significant differences observed between women and men's access to information from ICT sources (Mobile phones, television and radio) with men having a higher access than women was because the men owned the gadgets and therefore had control. This situation of ownership of ICT gadgets, access and control from such sources, was not affected by the small ruminant intervention. Farmers used mobile phones more for social purposes than for receiving information on agricultural extension. Internet services were non-existent.

CHAPTER EIGHT

INSTITUTIONAL RULES AND NORMS THAT GUIDE SMALL RUMINANT PRODUCTION AND MARKETING

Introduction

This chapter presents findings on objective four, which sought to describe institutional rules and norms that guide small ruminant production and marketing (SRPM). The presentation of findings was structured along the conceptual framework. Kabeer (1994) in her Institutional analysis based on the Social Relations Approach concept three, challenges the second myth about institutions, that institutions are separate entities such that a change in one of them will not affect the others. This myth guided the analysis of the institutions (the household, the community, the state and the market) to determine whether the intervention introduced by TUDRIDEP to the case farmers caused a change in any of the institutions and whether these changes affected other institutions. The presentation is in two parts, the first part describes the norm or rules in the institutions and the second part describes changes introduced, whether and what changes were triggered in other institutions.

Rules at the Household level

Informal rules / norms in the household concerning SRPM were observed in the gender division of labour (GDOL), which has been captured in chapter four as part of the background information on the case farmers. The findings showed a division of labour, where sale and purchasing, health care of sheep and goats, identification of animals, building pens were male roles. Females were

responsible for cleaning of SR pens, feeding and preparation of supplementary feed. Cutting of leaves from shrubs and trees was a shared role, in that women cut the shrub and men the tree leaves, while young girls and boys helped the women and men respectively. Men were responsible for ensuring that household members performed their roles.

It was observed that rules affected the women and men's roles both in the household and community. In the household for instance, selling and purchasing of animals was not only a role of men but also a rule. The men guarded the rules and the women adhered to them. The same applied to healthcare of the animals, where the women would look out for sick animals, report to the men who then sought veterinary care. The practice of women seeking the consent of their husbands before selling their SR and the same husbands selling the animals, was a norm upheld in other parts of northern Ghana (Aboe et al., 2013 & Bacho, 2004).

In targeting women for this study, the norm of household heads (mostly men) being the target of intervention has been challenged. The perception that men were the main farmers and women the helpers in farm families has resulted in extension workers and other stakeholder targeting men and household heads for interventions (Kristjanson et al., 2010; Twyman et al., 2015). Rules and norms that existed at the community level are discussed in the next session.

Rules and norms at the Community level

The female and male community elders, the two male assemblypersons and the case farmers itemized rules and norms that guided SRPM at the community level. As a rule, SR were not allowed to roam about in the

community. This was to avoid SR damaging people's crops on farms or home gardens. Observation however, showed that the community did not have the culture of home gardening and the few that were noticed were well fenced. Sometimes, SR strayed into other peoples' compounds in search of supplementary feed such as dried salted cassava peels and in the process, they destroyed items.

Another rule enacted by the community was identification marks on the SR. Traditionally the animal's ear lobe was cut with a blade in a peculiar pattern for easy identification (Chapter Four). This rule was further reinforced by the TUDRIDEP intervention and the project supplied ear tags to participants to put on the ear-lobes of the SR. This activity was done by the men in the households. The rule held in both the household and community and enabled easy identification of straying or stolen animals.

Other rules included not allowing sick animals into the community, prohibition of theft or condoning the act. Spraying of weedicide around the homesteads to control weeds in the rainy season also was prohibited. Such practices often resulted in death of the SR that grazed around the houses early in the morning.

When asked who set the rules in the community, the response was unanimous: the chiefs, community members, elders and the *Tendana*. Enforcement of the laws was the responsibility of the Assemblyperson in association with the chief, elders and the *Tendana*. Often however, the assemblyperson, the chief and the elders enforced the laws. There was a complaint by some community members during the FGDs about the non-

enforcement of rules. Others explained that sometimes the victims did not report the incidents because community members saw themselves as one family. One male FGD participant in Yaala2 explained, “*We are all family members in the community so when such incidents happen, we just try to forgive and forget about it*’ (MFGD₄). Similar observations were made on the enforcement of community laws in an earlier study in the Upper West Region where ‘the traditional authorities seemed incapable of addressing livestock theft due to kinship ties’ (Amankwa et al., 2012 p. 43). The next section discusses rules and norms in the market.

The Rules and Norms in the Market

The market in this study was represented by small ruminant traders. The other input providers did not operate strictly on market principles, therefore are considered in this study as representing the community. The Community Livestock Workers (CLW) for instance, started with a free package of drugs from TUDRIDEP that they used to provide veterinary service. A token fee was charged that was used as a revolving fund for restocking. The Village Savings and Loans Association (VSLA) was also a community-based credit facility, which was not accessed for SRPM.

As stated earlier, buying and selling of small ruminants in the case communities was the preserve of men (Chapter four on division of labour). The norm was for itinerant small ruminant traders to buy from men at the farm gate. The case farmers hardly sold at the market because prices at the market were

lower, since market prices depended on demand. One male case farmer put it this way in a FGD:

It is better to call the small ruminant trader to come home and buy, because when he comes you can call your price. If he does not like the price, he will go away. If you carry the animal to the market, especially after planting, you will get a lower price because other people have brought their animals so the price falls and you cannot carry the animal back home, so you sell and get a smaller amount. It is better to sell at home unless it is an emergency (MFGD₃).

Amankwa et al., (2012) referred to such sales as demand sales, which are more common during festivals and religious celebrations such as Easter, Christmas and Ramadan. They confirmed indications by case farmers about 'distress sales' that they made between June and August when planting had ended and they had to wait for the next harvest because their food stocks had run out. The next section discusses rules introduced by the state through the Ministry of Local Government and Rural Development (MLGRD) on one hand and TUDRIDEP in collaboration with the Ministry of Food and Agriculture (MoFA), on the other.

Rules introduced by the State represented by the Ministry of Local Government and Rural Development

The state represented by Ministry of Local Government and Rural Development (MLGRD), invited proposals to facilitate among others, increased agricultural production including livestock production and the involvement of women. The Canadian Government sponsored the call: the Food Security and

Environment Facility (FSEF). The objectives of the call included the need to increase the use of innovative, environmentally sound agricultural technologies and practices in target communities; enhance the ability of Ghanaian organizations to support food security and sustainable agriculture in Ghana's three northern regions and foster the capacity of local organizations to promote equality between women and men. The MLGRD /FSEF call stressed the need to ensure at least 80% female participation.

TUDRIDEP responded to the call with objectives stated in chapter three and five. Objectives focused on the improvement of small ruminant production with a targeted women participation of 70 percent (TUDRIDEP, 2012). Thus, TUDRIDEP responded to a policy that stressed targeting of female farmers and an improvement in livestock production. For lack of expertise in animal husbandry and health personnel TUDRIDEP collaborated with the district animal husbandry and district veterinary officers of MoFA to implement the intervention. In the process of implementation TUDRIDEP gave some rules, regulations that the case households and community members needed to comply with (*ibid*) and the next section reports on that.

Rules, criteria and strategies introduced by TUDRIDEP

TUDRIDEP used a combination of selection criteria, strategies and rules in the implementation process. Some of these affected the status quo in the case households, communities and markets, as regards their rules and norms before the intervention. In summary, the rules included:

The sensitization exercise

- Free supply of five sheep or goats to each participating farmer
- ‘Pass on’ strategy of sheep and goats
- Farmers’ willingness to:

Build prescribed housing structure

Form group of ten with more women (70%) than men (30%)

Attend group meetings for training

- Willingness to adhere to good husbandry practices such as :

Routine cleaning of pens

Providing drinking water

Preparation and feeding of prescribed supplementary feeds

- Willingness to adhere to prescribed health practices such as:

Annual vaccination against Peste des Petite Ruminants,

Using the services of the Community livestock worker (CLW) for minor ailments

Using the services of the veterinary officer for injections

- Willingness to use marketing channels prescribed by TUDRIDEP

Changes observed at the household, community and market levels

The implementation of the community sensitization exercise, criteria for selection, strategies and rules have been discussed in chapter three. As stated, the objectives of the intervention, the strategies, the components of the technology package and the benefits, were explained to community members during the

sensitization exercise. It resulted in the community members, especially the men accenting to the intervention. One male key informant in Tuassa commented:

If we the men had not agreed this project would not have come to this community. The people who brought the project called all of us and told us about the benefits of allowing the women to also receive the animals and be trained. We realized that we are one family. If the animals increase, we will all benefit. If we did not agree, we would not have built the pens for the women. Over here, it is the men who build pens not the women (MKI₅).

The starter pack of free sheep and goats given to the farmers after they built the prototype housing structures affected the household. This is because the resource base (SR) of the targeted women farmers increased. The ‘pass on’ strategy was another rule introduced by TUDRIDEP that affected households in the community. Farmers in the first group of ten farmers were each obliged to give five animals back to the project. These animals were given to another group of farmers, resulting in an increase in the number of farmers that owned sheep or who had an increase in stock in the community. Animals given out by the first group were not given to other farmers in the same community for two reasons. First to avoid inbreeding, and secondly to prevent the weaned animals from going back to their original owners. The distribution of SR to women and the ‘pass on’ strategy used to increase the resource base of women was a move to change the gender order of men being the main owners of SR in the household and community. Some farmers indicated during the FGDs in Yaala, that they did not give back the required number of SR to the project. This was because the animals given them had fallen sick and died soon after the animals were supplied to them.

Although a few farmers in the case community had built pens for their SR before the intervention, farmers had to build according to TUDRIDEP's prototype design. As stated earlier, most of the farmers did not have any housing for their animals. The case farmers indicated that keeping the animals in the pens was of benefit to them. Building the pens has brought SR keepers, especially the women closer to their animals. This was because they were able to observe animals for symptoms of sickness twice daily, in the morning and evening and report to the men to take action where necessary. It also ensured SR drank water at least twice daily, which helped in improving SRPM. Housing also kept animals safe at night and reduced theft. One male focus group discussion member in Dupari commented, *"The animals come and sleep in the pen at night. We count them every morning and evening so we know when some are missing"* (MFGD₆). Housing animals has been found to reduce theft of small ruminants in other studies (Aboe et al., 2013 a & b)

The sheep and goat husbandry intervention was introduced to the case farmers in groups. The group method of training and information dissemination to the case farmers had increased women's access to extension information. Also using the mixed group approach had helped breakdown cultural barriers. A key informant (TUDRIDEP) explained the rationale for using the group method. He stated:

TUDRIDEP encourages farmers we work with to form farmer groups, which we nurture from the community to the district and then regional level. Our aim is to develop Farmer Based Organizations (FBOs) to enable them make their own decisions and

talk for themselves. Farmers' capacities are built to advocate and lobby from Government and other Institutions and duty bearers for the improvement of their lives and livelihoods. As FBOs, farmers are able to speak with one voice through their executives. It is also easier to carry out extension education through the groups and implement projects and programmes. Usually there is faster adoption and projects are more sustainable because the farmers own the Projects and Programmes (TUDRIDEP key informant 1).

Concerning the use of mixed groups, the key informant stated that they do have single men and women's groups but they encourage mixed groups to enable the women to be empowered. He explained:

We encourage everybody both male and female to participate actively without discrimination. We encourage mixed groups. Women play active roles in the group they belong and are members of the executive. However, there are also sole women groups. Through the mixed groups, women are empowered and encouraged to speak boldly in public and it is a strategy for women's empowerment and to do away with certain outmoded cultural practices (TUDRIDEP key informant 1).

There were new rules on animal health care from TUDRIDEP. The norm was for women to observe ill health, report to the men and the men would seek either orthodox veterinary care or ethno-veterinary medicine. The policy of community livestock workers (CLWs) was introduced by TUDRIDEP in collaboration with MoFA where one woman and one man in each group of ten, were trained to offer minor health care to the SR within the community. This was to make up for the inadequate coverage of veterinary services from MoFA. Involving women was a policy, which was contrary to the norm. It enabled

building the capacity of women as well in SR health care. During the period of data collection, the female CLW we interacted with in Chaggu, was very much involved with the provision of health care. When asked how she operated, she explained that she worked by herself without her male counterpart. She explained:

Both men and women in the group come and ask me to treat their sick animals. All they need to do is to tell my husband that they need my services. If the farmer is male, it is important they seek my husband's permission You understand what I mean.... (Smiling). Farmers who are not in the group also call me and I charge them double what I charge my group members (One cedi and fifty pesewas respectively). Some also come for advice and I show them what to do (CLW₃).

The statement of the female CLW brought attention to the rule that she needed the permission of her husband before she could attend to her clients, especially the males.

The TUDRIDEP intervention started a process of change in the husbandry practices of SRPM in case households. The concept of CLW was introduced by the government of Ghana to make up for the shortage of veterinary service officers and technicians after the Structural Adjustment Programme (SAP) reforms in the agricultural and veterinary services (Amankwah et al., 2012). The advantage of introducing Community Health Workers was that they were often members of the same ethnic groups as their clients and resided in the communities where the livestock were found. They were able to handle 80-90 percent of the veterinary interventions in the extensive production systems (Amankwah et al., 2012).

At the market level, the introduction of the two itinerant traders to the case farmers resulted in a more regular and assured market for both farmers and traders, however the norms did not change. The norm was for women to inform the men of their intention to sell an animal. The man calls the trader, bargains and sells the animal. During and after the intervention, both women and men called the traders but the men/husbands were still responsible for bargaining and selling. Both traders confirmed this in the case communities. Trader 2 noted, *‘Over here it is the men who sell the animals not the women. The women call me but it is the men who do the bargaining and selling’* (Trader 2 Bulenga area). However, both traders noted that after the project was initiated more females were calling them than before. Trader 1 stated, *‘Because of the project I now have more customers calling me. Even now, more women are calling me than before the project. I am now very busy buying and selling.’* (Trader 1 Funsi area). The traders’ comments attested to the fact that although more women were disposing of their animals due to an increase in animal numbers (sheep and goats); the intervention did not affect the norm. Sales and purchasing of animals were still the preserve of men in the case communities. However, linking the case farmers with the itinerant traders guaranteed regular and reliable marketing outlet for the case farmers. They did not have to carry their animals to the market to sell and engage in ‘stress’ selling in the lean season, as mentioned earlier. The arrangement also resulted in the traders securing more clients. The next section describes how the intervention affected all the four institutions, the community, the state, the market and the household and shows the interrelatedness of the institutions.

The TUDRIDEP small ruminant husbandry package intervention showing the interrelatedness of the four institutions

The preceding discussion shows the interrelatedness of the four institutions state household, community and market in this study (Figure 6). The state represented by the Ministry of Local Government and Rural Development (MLGRD) put out a call with a policy to target female farmers (80%). TUDRIDEP which represents the community responded to the call and put out a set of rules including the rule for 70% female participation to the case communities. The patriarchal nature of the communities gave way to the rule of high female participation demanded by TUDRIDEP. Since TUDRIDEP did not have expertise in animal husbandry and veterinary care, they collaborated with MoFA and this brought about a connection between the two institutions, (state and community). Women's participation resulted in more SR (resources) in the household. The 'pass on' strategy used by TUDRIDEP also resulted in more households in the community owning SR. TUDRIDEP linked the case farmers to traders ensuring a regular market for the farmers and customers for the traders. The market was therefore affected positively.

The CLW introduced by the intervention made health care accessible to case and non-case households. Animal health care of SR improved, income increased and livelihoods improved. Although the action initiated by the state resulted in bringing changes in the other institutions some norms such as men seeking health care and men selling and buying animals remained unchanged. What changed was the acceptance of females giving health care because of the

CLW concept. This study confirmed the concept three of the social relations framework that states that the institutions (state, community, household and market) are interrelated and a change in one result in a change in the others. The initial rule set by the state triggered changes in the other institutions.

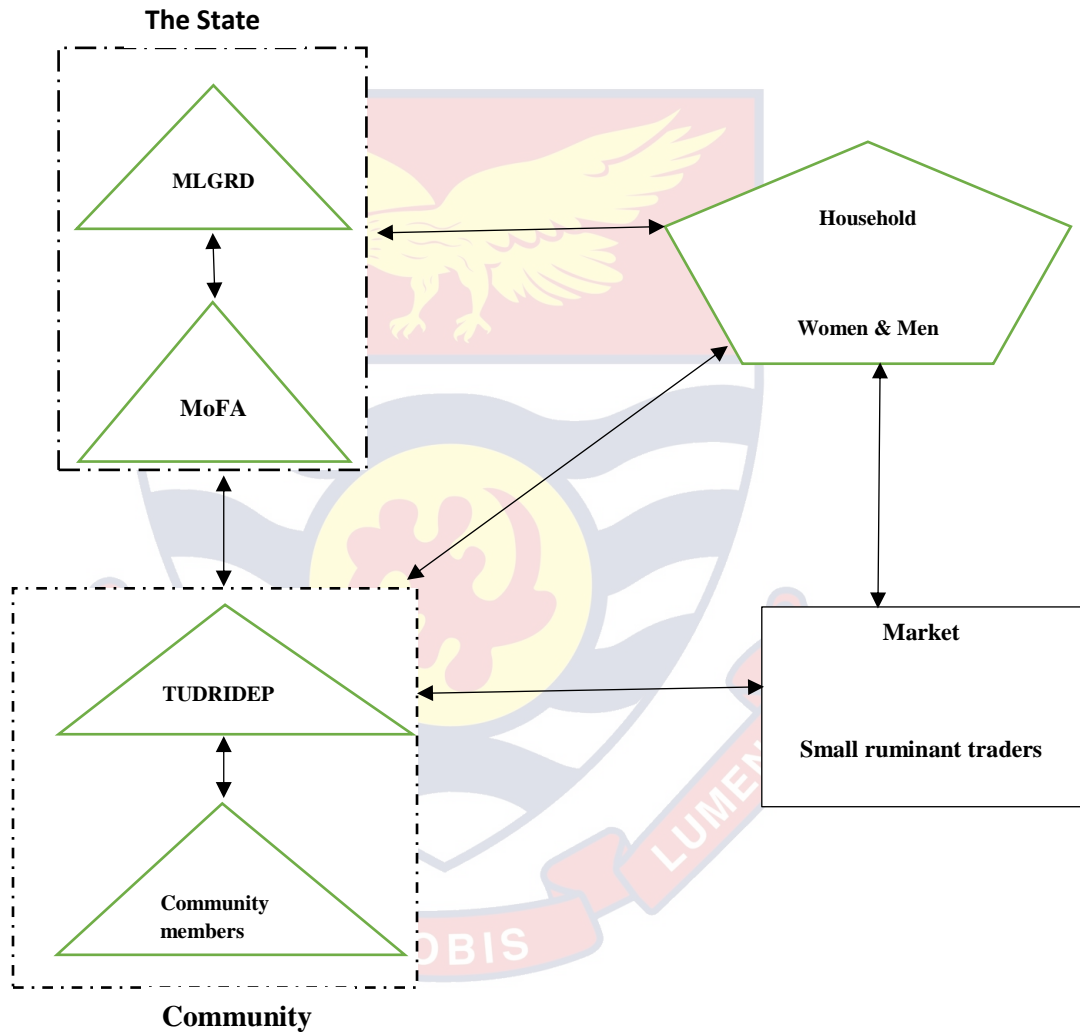


Figure 5: The interrelatedness of institutions

Source: Adapted from Kabeer (1994); March et al., (1999)

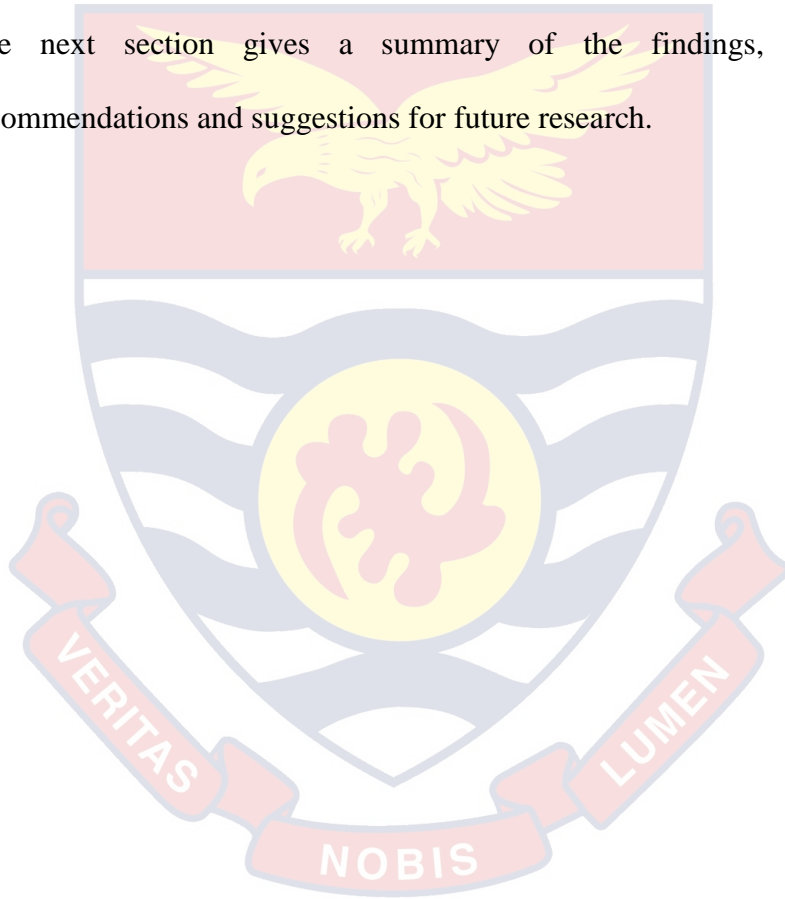
Chapter Summary

This chapter presented discussions on the four institutions the State, market, community and household in the light of the rules, regulations and norms that pertain therein. It discussed the rules introduced by the state (MLGRD), TUDRIDEP (community) to the household and community members concerning SRPM.

Some existing norms and rules were challenged at the household and community levels. The norm of household heads being the target of interventions changed, with women being the target and the majority beneficiaries of this intervention. Women's involvement in the intervention increased their asset base (SR as a resource), challenging the rule where men were the main owners of resources. Hitherto, in the area of health care women only reported cases of sickness of SR to the men, who sought for solution. With this intervention, more women moved out to seek solution to health problems of SR. Also, female CLW began to deliver health care to SR belonging to female and male community members. Both farmers and small ruminant traders were assured of regular market for their SR.

From the foregoing, the study showed that rules and norms in institutions (household, market communities and state) were subject to change. However, some practices such as men selling and purchasing SR remained unchanged. Overall, the rules and regulations introduced by the state resulted in TUDRIDEP also following up with certain rules and regulations that positively affected resource distribution (SR) in households and community. This resulted in

increased income for women. Although, not every norm changed, the study showed that institutions were not separate entities, but related to one another; that institutions were subject to change and that a change in one institution affected the others; confirming the interrelatedness of institutions. Therefore, the second myth that Kabeer challenged, that institutions were separate entities and that a change in one of them would not affect the others was debunked by this study. The next section gives a summary of the findings, conclusions and recommendations and suggestions for future research.



CHAPTER NINE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter presents a summary of the thesis. The first part covers the objectives, research questions, hypothesis and methodology. The findings as discussed in chapters five, six, seven and eight follow and the third part presents the conclusions, recommendations to various stakeholders, implications of the study, and areas for future research. The main objective of the study was to investigate the gender dynamics in small ruminant husbandry technology adoption in the Wa East District of the Upper West Region of Ghana. The study sought to examine the gender sensitivity of the TUDRIDEP project; examine the adoption of the small ruminant husbandry technologies transferred among female and male farmers. It also sought to describe ownership, access and control of production resources needed for small ruminant's production and marketing and lastly examine the institutional rules and norms that guide women and men in SRPM.

The study employed a single embedded case study design. The case study design was employed for two reasons. Firstly, because the study investigated a contemporary phenomenon, the 'gender dynamics in the adoption of small ruminant husbandry technology adoption among small ruminant farmers' that participated in the TUDRIDEP intervention; secondly because the study required the collection of data to describe the environment in which the project took place. It used a mixed methods approach to collect data. A structured interview schedule

was used to collect quantitative data in a census of 118 respondents in nine communities. Eight different interview guides (Appendices B-I) guided the collection of qualitative data from 114 respondents using participatory tools (focus group discussions, in-depth interviews and observation method). The quantitative data was analysed using SPSS and results presented as descriptive and inferential statistics, while qualitative data was transcribed, coded into categories / themes manually and analysed along the categories / themes.

Two research hypotheses were set. One was whether there was a significant difference between the adoption levels of female and male small ruminant farmers of husbandry technologies; the other was to establish whether there was a significant difference between the perception of female and male small ruminant farmers. The next session presents the summary of the findings starting with objective one.

Summary of Main Findings

The first specific objective examined the gender sensitivity of TUDRIDEP. Guided by the institutional policy analysis, the findings showed that TUDRIDEP's gender policy, its objectives and operating guiding principles were all gender aware. The objectives of the intervention, the sensitization exercise at the start of the intervention, the selection criteria, the components of the intervention package and the training offered to farmers were also gender aware. The case respondents perceived that after the intervention, a cordial relationship existed between spouses in the household. There was an increase in women's income, their participation in decision-making concerning animal husbandry and

other domestic issues increased. Increased decision-making was traced to women's increased contribution to household income. At the community level, the case respondents perceived that case women had gained more respect; women's voice and financial contribution increased at community meetings; and case women took up leadership positions. However, these improvements in the life of the women did not change the gender division of labour at the household level, thus the TUDRIDEP intervention can be described as having met a practical gender need and the intervention was gender specific.

The TUDRIDEP was not ideologically neutral. It is gendered with very few female staff in general and at management level. Therefore, rules and regulations from such a team were likely not to favour women. TUDRIDEP had implemented a gender specific intervention that had not altered the gender relations that constrain women in the case communities. The gendered nature of TUDRIDEP may have contributed to its inability to go beyond meeting practical needs to meet strategic gender needs.

Objective two examined the adoption of the small ruminant husbandry technologies transferred to small ruminant farmers. Overall, there was no significant difference between the perception of women and men of the attributes of the technologies transferred namely relative advantage, ease of use, observability and compatibility. Thus, the null hypothesis that there is no significant difference between women and men's perception of the attributes of the technologies transferred was accepted. Overall, farmers' perception of

attributes was in the 'high extent' category. This was an indication of the extent to which the technology attributes influenced their decision to adopt.

Overall there was no significant difference ($p > 0.05$) between the level of adoption of the small ruminant technologies transferred to female and male farmers although the mean level of adoption was higher for females than males (69.30 female; 64.53 male; p -value 0.16, $t=1.40$). There was however, a significant difference between adoption levels of females and males for three of the technology components: routine cleaning of pens ($p=0.04$) cultivation of forage seeds (0.02) and using the services of the community livestock worker (0.01). The differences were explained by the gender division of labour in the household.

Objective three sought to describe ownership, access and control of production resources needed for SRPM. The tangible resources were small ruminant, feed resources, water, labour, credit and land, while agricultural extension services, group affiliation were intangible resources needed. Small ruminants were important for economic followed by socio-cultural reasons, with goats preferred because they were prolific. The owner of an animal is the one who purchased it and has the right to take decisions on it, while the caretaker carries out instructions from the owner. Although the owner of the animal had access to the proceeds after sale, husband's/ household heads had oversight authority and responsibility for everything in the house including the wife and children.

Four reasons that limited women's ownership of small ruminants were cultural norms that women are not supposed to own property; the fear of reprisal

by women from their husbands for owning SR; the extensive system of animal husbandry that ruled out women's direct involvement in SRPM and direct contact with the SR, finally, women's poverty. However, TUDRIDEP's intervention including its criteria of women targeting; its pass-on strategy; the technologies introduced (including encouraging a shift from the extensive system of SR rearing) worked towards subverting the prevailing gender orders that had not encouraged female ownership of SR.

Land was an important resource for SRPM in many ways. Land was needed for building small ruminant pens; free range grazing and gathering of SR feed resources from the wild. The feed resource included fruits and seeds, branches of trees and forage. The feed resources were processed by women and fed to the SR as supplementary feed, especially in the dry season. This role gave the women more contact with the SR and increased their control over when and what to feed the SR after the intervention. Land was also needed for cultivation of forage with the introduction of the TUDRIDEP intervention. Labour for sheep and goat husbandry was family labour and the household head ensured that household members adhered to the traditional division of labour.

Boreholes were the main water source, and a water committee made up of women and men ensured that the boreholes were well maintained. Women, men and animals all had access to the water from the boreholes. Before the intervention, most farmers did not provide water for the SR. After the intervention however, SR were given water twice daily. Since it was women who gave the

water they had access to, and closer contact with the SR than men did and could easily single out sick animals on sight.

Credit was not an important resource required for SR production because respondents perceived SR as a source of cash. However, farmers took credit for crop farming and 'personal needs' including paying school fees of their children. The main credit source, the Village Loans and Savings Association (VLSA) was community based and was patronized more by women than men. More than three-quarters of case farmers belonged to farmer groups (female only, male only, mixed and voluntary groups). Farmers indicated that group membership was the medium of information dissemination used by AEAs from MoFA and NGOs. Group membership also enhanced learning, exchange of ideas and technology adoption.

Farmers received extension information from multiple sources of two categories: one was direct personal contact through AEAs (MoFA and NGOs); the other was Information and Communication Technology (ICT) sources (radio, television, mobile phones and internet). Access to agricultural information from the traditional MoFA and NGO sources showed no significant ($p>0.05$) differences between women and men. Group membership was important for extension information access, since AEAs from MoFA and NGOs disseminated extension information through groups. Meeting times were negotiated in this intervention enhancing women's access to information. Group membership also enhanced learning, exchange of ideas and adoption.

Significant differences were however observed between women and men's access to information from ICT sources, with men having a higher access. Such sources were owned and controlled by men. Farmers used mobile phones more for social purposes than for receiving information on agricultural extension. Internet services were non-existent.

Objective four examined the institutional rules, regulations and norms that guided women and men in SRPM. The findings showed that rules introduced by the state (MLGRD) and TUDRIDEP (community) to the household and community had varying effects on SRPM. Some existing norms and rules were challenged at the household and community levels. For instance, the norm of household heads being the target of interventions was challenged, as women were the target for the intervention under study. Women's involvement in the intervention increased their asset base (SR as a resource) thus challenging the rule where men are the main owners of productive resources. Hitherto, in the area of animal health care women only reported cases of sickness of SR to the men and the latter sought solution. With this intervention, more women moved out to seek solution to health problems of their SR. Moreover, female Community Livestock Workers (CLW) were trained to, and delivered health care to SR owned by female and male community members. However, clients had to seek permission of the husbands of the female CLW, if the clients were male.

The study showed that rules and norms that guided SR production and marketing in the case communities were subject to change. However, some rules such as women seeking the permission of husbands to sell, men selling and

purchasing SR remained unchanged. Overall, the rules and regulations introduced by the state resulted in TUDRIDEP also introducing rules and regulations that positively affected resource distribution (SR) in households and community. This resulted in increased income for women. Although, not every norm changed, the study showed that institutions were not separate entities but related to one another, that institutions were subject to change and a change in one institution affects the others. This confirmed the interrelatedness of institutions. Therefore, the second myth that institutions were separate entities and that a change in one of them would not affect the others was debunked by this study.

Conclusions

Based on the findings of the study, the following conclusions were made:

The gender sensitivity and gender ideology of the organisation influences the kind of gender policy intervention it implements. A gender aware organisation may implement a gender aware intervention that may improve the livelihood of the target group and their families, but may not change the subordinate position of women in the household.

The gender ideology of an organisation may influence the nature of intervention it implements and the kind of need it meets. The ability of an organisation to implement interventions that meet SGN, one that alters the subordinate position of women in households may require a more gender balanced staff structure; one with more women in general and in management positions that could push for more equality. Further, the existence and application

of a gender policy in an organisation enhances the gender awareness the organisation.

Farmer perception of the attributes of a technology package influences farmer technology adoption; while the GDOL influences perception of farmers involved in SRPM. The absence of significant differences between female and male perception of technology attributes and adoption levels shows female farmers' active engagement in SRPM.

The GDOL in households influences female and male farmers' adoption levels of certain components of the technology package transferred; depending on which husbandry activities they were involved in before the interventions.

Undertaking a gender analysis of target communities before implementing interventions enhances the choice of appropriate strategies to challenge the prevailing cultural barriers and gender orders. It enables project implementers to target the appropriate beneficiaries.

Ownership of gadgets including radio, television and mobile phones that facilitate access to intangible production resources such as agricultural extension information is key to accessing information.

Ownership of tangible resources /assets such as SR gives the owner control over the asset by way of decision-making on its disposal, however the oversight control that men and household heads' have over tangible household assets does not encourage women to acquire SR.

Although rules, norms and practices that perpetrate gender relations in institutions like the household and community are subject to change, these do not

easily change. However, interventions introduced in or by one institution are able to trigger changes in other institutions confirming that institutions are not independent but interrelated.

The extent to which interventions are able to challenge gender orders is amongst others, influenced by the criteria, strategies and methods used in transferring technologies. Some norms may be challenged, while others remain unchanged.

Recommendations

The following recommendations are made for consideration by various stakeholders:

1. Implementing organisations should be mindful of their staff structure since the gender composition is likely to affect the gender sensitivity of institutions.
2. Production and marketing of sheep and goat are highly gendered activities; it is therefore recommended that project implementers (governmental or non-governmental organizations) undertake gender analysis of targeted communities before intervention. This would give a fair idea of the gender division of labour, norms and rules that govern SRPM. The information would also guide implementers about whom to target; and the appropriate strategies for reducing gender inequalities, if any.
3. Since both women and men were involved in SRPM, project implementers should not only target household heads, but non-household heads and

women in households. Knowledge would then be disseminated to more household members to enhance SRPM and development.

4. Due to the patrilineal and patriarchal nature of some communities, project implementers need to hold community sensitization or awareness campaigns to gain the consent and cooperation of males for better cooperation and success of such projects.
5. The study showed that the gender division of labour influences the adoption of some technologies. It is therefore important for MOFA and other implementing organizations to intensify training of project staff to enhance their knowledge in the various gender analysis frameworks, including the social relations framework to enable them deal with gender issues on the field. For instance, prospective project implementers (government or NGOs) should know the resource base of their target group to guide resource allocation, especially equipping females with the requisite tangible and intangible resources.
6. The study showed that men are more knowledgeable than women are in buying and selling of small ruminants. Implementers need to educate women in SR rearing communities with rules and norms on negotiation and marketing skills, to integrate them into the market systematically. Group training method is recommended.
7. It is recommended that similar project interventions be replicated to other farmers in the Wa East district with similar norms and GDOL.

Implications of the Study for Agricultural Extension

Gender relations in target communities may limit women's ability to participate fully in and benefit from SRPM. The study revealed that SRPM is gendered; and the gender division of labour in the case communities is guided by rules and norms which are enforced by men and adhered to by women. It is necessary that Gender analysis be conducted before interventions. This would guide targeting, resource allocation and appropriate strategies for implementation of interventions. Secondly, training of agricultural extension staff of MoFA and other implementing organizations in gender analysis be intensified to enable them better understand the norms, rules and gender division of labour that pertain in communities they work in.

Knowledge from gender analysis about target communities would enable extension services to choose appropriate strategies to challenge gender orders leading to the involvement of both female and male farmers in SRPM. For instance, the assertion that women cannot price SR limits women's involvement in marketing. There is a danger that knowledge related to sheep and goat marketing may only be concentrated among men, leaving women out of that experience and consequently reducing outputs. Besides, women need to be equipped with negotiation skills in order to erase the popular refrain 'women are cheated when they sell animals / women do not know how to sell animals'. The fact that women sell grains means they are well vexed in the art of negotiation, but it is with SR sales that they do not have experience. Training farmers in groups would be an option to integrate the women in marketing. Studies showed

that both the private sector and government believe that farmer groups are better able to negotiate with traders and obtain favorable conditions (Mudege et al., 2015)

There may also be the need to include awareness- raising sessions among project implementers of their own biases and gender stereotypes. This could mean intensifying training in gender modules for extension officers and other partners involved in extension.

To guide and enhance knowledge of gender issues in extension services, it would be expedient that MoFA and other implementing organisations intensify the mainstreaming of gender in all agricultural activities.

Areas for Further Research

1. Further research is required on strategies required to break the gender order, for activities such as the norm of sales and purchasing of animals by males only.
2. A study to explore the conditions and strategies needed to implement a gender redistributive intervention that would meet SGN of women in the study area.

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APPENDIX A

STRUCTURED INTERVIEW SCHEDULE FOR GENDER DYNAMICS IN SMALL RUMINANT HUSBANDRY TECHNOLOGY ADOPTION IN WA EAST DISTRICT, UPPER WEST

Introduction

This is a student research to help us understand the TUDRIDEP project and how it could be extended to other small ruminant producing communities. Please share with us your experiences on small ruminant rearing. Your community has been selected because you took part in the project. **This interview schedule will take about thirty (45) minutes of your time.** Your answers would be carefully considered and your responses will remain anonymous and confidential. Thank you for your cooperation!

Instructions to interviewer/enumerator

1. Please all numbering should start with zero (0). For example 001.
2. Please tick within the box (). Please do not circle the answer.

SECTION A: BACKGROUND INFORMATION

Date of interview.....

(Day/month/year)

Name of Enumerator

Q1.Questionnaire number

Q2. Location:- Village/Town.....

SECTION B: RESPONDENT'S – BIO-DATA

Q1a. Where were you born? Q1b Region.....

Q2. Age

Q3.1 Sex Male [] 2. Female []

Q4. Educational Level:

1. None [] 2 Some Primary school [] 3 Completed Primary School []

4. Non Formal [] 5. Middle School Cert./ JHS [] 6. Secondary []

7. Tertiary (Training College; Polytechnic; University) []

Q5. Religion: 1. Christian [] .2. Islam []

3. Traditional [] 4. Other specify.....

Q6 a. What is your relationship with your household? 1. Household head [] 2. Spouse []

3. Member of household []

Q6b. Household Membership: How many individuals are in your household including yourself.....

Q6c. Marital Status: 1. Single [] 2. Married [] 3. Divorced []

4. Widowed [] 5. Separated [] 6. Other, specify.....

Q6d. If married, state the type of marriage? 1. Monogamy [] 2. Polygamy []

Q6e. If married state number of wives in the marriage,

To be answered by females only

Q6f. What is your position in the marriage (which wife are you- 1st, 2nd, 3rd etc)?
.....

SECTION C: OCCUPATION

Q1. What is your main source of income? 1. Crop farming []. 2. Livestock farming [] 3. Other,.....

Q2. What are your other sources of income? Q2.A. Crop farming []. Q2.B Livestock farming []

Q2.C. Petty trading [] Q2.D. Groundnut processing [] Q2.E. Shea nut processing []

Q2.F. Other, specify.....

Q4. If you are a crop farmer, please list the **Crops** you cultivated in the last year?

	Crop i	Plot size (acreage) ii
Q4a	Maize	
Q4b	Groundnut	
Q4c	Soyabean	
Q4d	Yam	
Q4e.	Bamabara beans	
Q4f	Okro	
Q4g	Rice	
Q4h	Cassava	
Q4i	Millet	
Q4j	Total	

Q5. How many years have you been engaged in crop farming?.....

Q6. Livestock Rearing

Livestock Production-Herd sizes owned by household members

		Number of animals				Total
		Respondent	Spouse	Children	Other Members	
Q6A	Sheep					
Q6B	Goats					
Q6C	Cattle					
Q6D	Chicken					
Q6E	Ducks					
Q6F	Guinea fowls					
Q6G	TOTAL					

Q6b. Were you keeping sheep and goats **before** the project? 1. Yes [] 2. No []

Q6c. What was the source of your sheep and goats before the project? 1. Purchased []
 2. Gift [] 3. Inherited [] 4. Other, specify.....

Q6d. Which year did you join the project ?

Q6e. Which animal did you receive from the project: Sheep or Goats ?

Q6f. How many project animals have you ‘**passed on**’ since you joined the project?

SECTION D: TECHNOLOGY ADOPTION

1. Tick (√) as appropriate, if you have been trained in / exposed to any the following interventions during the project period.

	Did you apply any of these animal husbandry interventions?	Yes	No
Q1.1.	Routine cleaning of pens		
Q1.2	Providing drinking water		
Q1.3	Cultivating tree seedlings supplied (Leucaena sp. / Leberk sp.		
Q1.4	Cultivating pasture seeds i.e. Cajanus cajan		
Q1.5	Feeding of ficus seed cakes to sheep/ goat		
Q1.6	Feeding dried pasture leaves (Cajanus) to sheep/ goat		
Q1.7	Feeding Leucaena and Leberk tree leaves to sheep & goat		
Q1.8	Annual vaccination against PPR		
Q1.9	Using the services of Community livestock workers for : Treatment of sores; deworming; de-teaking and dystocia (birthing)		
Q1.10	Using the services of the veterinary officer for injection of sheep and goat		
Q1.11	Practice record keeping		
Q1.12	Attend group meetings		

2. Which of the following activities are you still practicing after project ended?
 Tick (√) if you practice and state the frequency of practice.

	Animal husbandry Interventions	Tick (√)	Frequency*
Q2.1	Routine cleaning of pens		
Q2.2	Providing drinking water		
Q2.3	Cultivating tree seedlings supplied (Leucaena sp. / Leberk sp.)		
Q2.4	Cultivating pasture seeds i.e. Cajanus cajan		
Q2.5	Feeding of ficus seed cakes to sheep/ goat		
Q2.6	Feeding Leucaena and Leberk tree leaves to sheep & goat		
Q2.7	Feeding dried pasture leaves (Cajanus cajan) to sheep/ goat		
Q2.8	Annual vaccination against PPR by veterinary officer		
Q2.9	Using the services of Community livestock workers for : Treatment of sores; deworming; de-teaking and dystocia (birthing)		
Q2.10	Using the services of the veterinary officer for injection of sheep and goat		
Q2.11	Practice written record keeping		
Q2.12	Attend group meetings		

*Frequency: 1=daily; 2=twice daily; 3=weekly; 4= Twice /month; 5=monthly; 6= when necessary; 7=Occasionally; Annually/yearly =8; 9= never; 10=not sure; 11= other specify.....

3. What kind of records do you keep on your small ruminants? (Tick√)

	Record type	Yes
Q3.1.	Birth	
Q3.2.	Death	
Q3.3.	Sales	
Q3.4.	Treatment for sores, deworming, deteaking	
Q3.5.	PPR vaccination	
Q3.6	None	

3. What problems do you face in adopting the above technologies:.....

Please to what extent do you agree with the following statements concerning the technologies transferred on a scale of 0-5

Where 0= not at all; 1=very low extent; 2=low extent;3=moderate extent; 4=highestent;5= very high extent;

Relative Advantage							
The Husbandry Technologies I have been exposed to:		0=NAA	1=VLE	2=LE	3=ME	4=HE	5=VHE
Q5.1.	Have enabled me receive a higher income from sheep and goat rearing						
Q5.2	Have given me better knowledge of sheep and goat rearing than before						
Q5.3	Have resulted in more feed being available for my animals throughout the year.						
Q5.4.	Show benefits which outweigh the costs of using them.						
Compatibility							
The Husbandry Technologies I have been exposed to:		0=NAA	1=VLE	2=LE	3=ME	4=HE	5=VHE
Q5.6.	Are similar to what I have been doing already.						
Q5.7.	Easily fit into my daily work.						
Q5.8.	Meet a lot of my knowledge needs in sheep and goat rearing						
Q5.9.	Do not disrupt my daily routine						
Ease of Use							
The Husbandry Technology I		0=NAA	1=VLE	2=LE	3=ME	4=HE	5=VHE

	have been exposed to:						
Q5.10	Have been explained well enough for me to continue using them.						
Q5.11	Are quite easy to understand						
Q5.12	Are quite easy to use						
Q5.13	Can be easily explained to interested farmers						
	The Husbandry Technologies I have been exposed to:						
	Observability	0=NAA	1=VLE	2=LE	3=ME	4=HE	5=VHE
Q5.14	Have benefits that I can easily talk about to other farmers.						
Q5.15.	Show results that can be easily noticed.						
Q5.16.	Have resulted in people commenting on the improvement in the health of my animals since I joined the project.						
Q5.17.	Has resulted in other farmers expressing interest in the project since I started using them.						

SECTION E AGRICULTURAL EXTENSION SERVICES

Q1a. Apart from the **Small Ruminant Project** what other extension support do receive from other sources?.....

Q1b. Name of source.....

2. Which of the following sources of extension do you receive information?

	Source of Extension Information	A Sheep and Goats	B Crops
Q2.1	Agricultural Extension Agent (MoFA)		
Q2.2	Other NGO, state which?		
Q2.3	Radio		
Q2.4	Television		
Q2.5	Internet		
Q2.6	Mobile phone		

SECTION F 1: ASSOCIATION/AFFILIATION

1. Apart from the **small ruminant group**, state any other group you belong to.

Type of Group	Purpose of Group
Q1. 1 Women's group	
Q1. 2 Men's group	
Q1.3 Voluntary group	
Q1.4 Other.....	

SECTION F 2: CREDIT

Q1 Have you ever taken credit? 1. Yes [] 2. No [] If yes, indicate nature of credit and purpose as follows:

	Sheep and Goats (A)	Investment (B)	Crops (C)
Source2	Q2.Ai	Q2B.i	Q2Ci
Nature of credit*	Q2.Aii	Q2.Bii	Q2.Cii
Purpose	Q2.Aiii	Q2.Biii	Q2.Ciii

***Nature of credit: Cash or In kind**

If no, Give reasons for not accessing

credit:.....

.....

Thank you for your co-operation!!!

APPENDIX B

‘GENDER DYNAMICS IN SMALL RUMINANT IN SMALL RUMINANT HUSBANDRY TECHNOLOGY ADOPTION IN WA EAST DISTRICT, UPPER WEST.’

Interview Guide for female and male farmers’ Focus Group Discussions

TOPIC	AREAS TO COVER
	<p>Always use six keys: Why, how, when ,where, what , who to probe for better understanding</p>
<p>DAILY ACTIVITIES</p> <p>Tools :</p> <p>Daily Calendar</p>	<p>Daily Activities in the Household</p> <ul style="list-style-type: none"> • List activities undertaken from morning to evening • Show what men, women , youth and children do by time • Mark out the activities undertaken at home, community level, on farm ; for women, men, youth and children (Have in mind productive, reproductive and community roles). • Explore to find out the whys

TOPIC	AREAS TO COVER
<p>Small ruminant Rearing</p>	<ul style="list-style-type: none"> • Activities undertaken concerning Sheep and goat rearing; <p>Who does what and when? Women ,men, youth and children</p> <p>Housing: Kind of housing before the project?</p> <p>Who builds, helps?</p> <ul style="list-style-type: none"> • Feeding: Source of feed / type of feed before project <p>Seasonal feeding problems? (Forage cultivation?)</p> <p>Grazing lands marked out? Communal?</p>
<p>Importance of Sheep and Goats to households</p>	<ul style="list-style-type: none"> • Discuss what sheep and goats are used for by keepers (culturally, economically, religiously) • Rank uses with aid of pebbles (Rank separately for sheep and goats)
<p>Ownership of sheep and Goats</p>	<ul style="list-style-type: none"> • Discuss ownership patterns before project <p>Who owns, ways of acquiring sheep and goats?</p> <p>Taboos/ restrictions on ownership? Male / female ownership?</p>

TOPIC	AREAS TO COVER
	<ul style="list-style-type: none"> • Meaning of ownership: Differentiate owner from caretaker . e.g. Decision making on disposal, feeding, health, use of monies
Land as an Asset	<ul style="list-style-type: none"> • Land ownership in the community: who owns the land? • Process of acquisition-Male / female • Who allocates the land • Size of land /Quality of land for male and female? • Rights to land: Equal for male, female-married widowed , single etc. • Taboos/ restrictions on ownership? • Grazing lands/ pasture lands?
Credit	<ul style="list-style-type: none"> • Existence of recognized credit sources / groups in the community such as banks, money lenders, group lending schemes? Name them. • General experience with accessing credit
Intangible Resources	<ul style="list-style-type: none"> • Which institutions are present in community- NGOs, FBOs, Men/ women associations;

TOPIC	AREAS TO COVER
	<p>input suppliers;</p> <ul style="list-style-type: none"> • What are their activities and membership • Sources of extension support ; MoFA AEAs; NGOs • Extension Information sources available in community- MoFA, NGOs, also Television; Radio; Mobile phones, internet ?

<p>Rules and regulations, norms</p>	<ul style="list-style-type: none"> • Rules and regulations / taboos on sheep and goat rearing in the community concerning for example: Ownership; sales and purchases; communal grazing lands / where animals should graze; housing; stray animals etc. • Who makes and enforces the rules? • What is the contribution of traditional authorities (chiefs, elders) and local authorities (assembly persons) in the community towards <ul style="list-style-type: none"> a. setting the laws and rules b. enforcing them
--	---

TOPIC	AREAS TO COVER
<p>Access and control of resources and benefits</p>	<ul style="list-style-type: none"> • List all assets and benefits in household especially concerning small ruminant production and fill in • Discuss any changes in access and control • Discuss changes in participation in decision making in animal husbandry and household issues in general. • Changes in gender relations.
<p>Technology Adoption</p>	<ul style="list-style-type: none"> • Farmers' impressions of attributes of the husbandry technologies introduced and reasons for adoption.

APPENDIX C

‘GENDER DYNAMICS IN SMALL RUMINANT IN SMALL RUMINANT HUSBANDRY TECHNOLOGY ADOPTION IN WA EAST DISTRICT, UPPER WEST.’

Interview Guide for Key informants (Elders & Assemblymen)

TOPIC	AREAS TO COVER
	<p>Always use six keys: Why, how, when ,where, what , who to probe for better understanding</p>
<p>Importance of small ruminant Rearing</p>	<p>The role of sheep and goats in the life of its keepers (culturally, economically, religiously)</p> <p>Peoples’ preferences for sheep or goat</p>
<p>Roles in sheep and goat rearing</p>	<p>Roles of males and females in the household especially concerning sheep and goat rearing</p> <p>Any change in roles in sheep and goat rearing after the project</p>
<p>Ownership of sheep and Goats</p>	<p>Ownership patterns of sheep and goats in the community before project</p> <ul style="list-style-type: none"> • Who owns, ways of acquiring sheep and goats? • Taboos/ restrictions on ownership? Male / female

TOPIC	AREAS TO COVER
	<p>ownership?</p> <ul style="list-style-type: none"> • Observed changes in ownership patterns • Meaning of ownership: Description of owner. <p>Differentiate between owner and caretaker concerning decision making on disposal, feeding, health, use of monies.</p>
Land as an Resource	<ul style="list-style-type: none"> • Land ownership in the community • Process of acquisition-Male / female • Land allocation • Size of land /Quality of land for male and female • Rights to land: Equal for male, female-married widowed , single etc. • Taboos/ restrictions on ownership • Availability demarcation of grazing lands/ pasture lands
General Rules Laws	<ul style="list-style-type: none"> • Rules and regulations / taboos on sheep and goat rearing in the community concerning for example: Ownership; communal grazing lands / where animals should graze; housing; stray animals; theft etc. • Making and enforcing of rules and regulations

TOPIC	AREAS TO COVER
	<ul style="list-style-type: none"> • Contribution of traditional authorities (chiefs, elders) and local authorities (assembly persons) in the community towards <ul style="list-style-type: none"> b. setting the laws and rules b. enforcing them
<p>ACCESS and CONTROL OF RESOURCES</p>	<ul style="list-style-type: none"> • Change in access and control of resources and benefits since the introduction of the project i.e. access and control of resources such as sheep and goats; feed resources; income from sales; changes in participation in decision making in animal husbandry and household issues in general and at the community level. Changes in gender relations
<p>Technology Adoption</p>	<ul style="list-style-type: none"> • Impressions of attributes of the husbandry technologies introduced.

APPENDIX D

‘GENDER DYNAMICS IN SMALL RUMINANT IN SMALL RUMINANT HUSBANDRY TECHNOLOGY ADOPTION IN WA EAST DISTRICT, UPPER WEST.’

Interview Guide for MoFA-District Veterinary and Animal Husbandry Staff

TOPIC	AREAS TO COVER
	<p>Always use six keys: Why, how, when ,where, what , who to probe for better understanding</p>
Livestock as assets	<p>Role played in livestock Acquisition and distribution</p>
Training	<p>Training offered to :</p> <ul style="list-style-type: none"> • farmers in animal husbandry and health care; • Community Livestock workers • Activities of community livestock workers

APPENDIX E

‘GENDER DYNAMICS IN SMALL RUMINANT IN SMALL RUMINANT HUSBANDRY TECHNOLOGY ADOPTION IN WA EAST DISTRICT, UPPER WEST.’

Interview Guide for Sheep and Goat Traders

TOPIC	AREAS TO COVER
	<p>Always use six keys: Why, how, when ,where, what , who to probe for better understanding</p>
<p>Involvement and Role in TUDRIDEP activities</p>	<p>How did you get involved in this project</p>
<p>Mode of operation</p>	<p>Activities undertaken in the project Charges for services</p>
<p>Use of Services</p>	<p>Frequency of use / patronage of services by participants. Callers for services- Female or male participants; non participants</p>
<p>Benefits of services</p>	<p>Benefit of services to participants Sustainability of services after the project period Challenges faced</p>

APPENDIX F

‘GENDER DYNAMICS IN SMALL RUMINANT IN SMALL RUMINANT HUSBANDRY TECHNOLOGY ADOPTION IN WA EAST DISTRICT, UPPER WEST.’

Interview Guide for key informant- Community Livestock Worker (CLW)

TOPIC	AREAS TO COVER
	Always use six keys: Why, how, when ,where, what , who to probe for better understanding
Involvement and Role in TUDRIDEP activities	Choice as CLW Nature of training for CLWs were exposed to.
Mode of operation	*Activities undertaken in the project Mode of acquisition of drugs Charges for services rendered
Use of CLW services	Frequency of use / patronage of services by participants. Callers for services- Female or male participants; non participants
Benefits of CLW services	Benefit of services to participants Sustainability of services after the project period Challenges faced

APPENDIX G

‘GENDER DYNAMICS IN SMALL RUMINANT IN SMALL RUMINANT HUSBANDRY TECHNOLOGY

ADOPTION IN WA EAST DISTRICT, UPPER WEST.’

Interview Guide for TUDRIDEP Manager

TOPIC	AREAS TO COVER
	<p>Always use six keys: Why, how, when ,where, what , who to probe for better understanding</p>
<p>Genesis and Involvement in the project</p>	<ul style="list-style-type: none"> • Background and Motivation for project under study • Problems identified by TUDRIDEP • Gender issues identified and solutions proposed • Target groups –beneficiaries, non-beneficiaries and other stakeholders
<p>Project Impact</p>	<ul style="list-style-type: none"> • Perceived uptake of technologies by male and female farmers • Effect of technologies introduced on household income and gender relations of participating households
<p>Office and field staff</p>	<ol style="list-style-type: none"> 1. Other services provided by TUDRIDEP to its communities 2. What are the staff male and female ratios at the senior and junior levels of your organization 3. What is the ratio of male and females field staff in contact with the farmers

APPENDIX H

‘GENDER DYNAMICS IN SMALL RUMINANT IN SMALL RUMINANT HUSBANDRY TECHNOLOGY ADOPTION IN WA EAST DISTRICT, UPPER WEST.’

Interview Guide for Key informant-TUDRIDEP Field staff

Topic	Areas to cover
	<p>Always use six keys: Why, how, when ,where, what , who to probe for better understanding</p>
Involvement	<ul style="list-style-type: none"> • Role played in project during implantation stage and after project • Frequency of visit to farmers during and after the project
Project Impact	<ul style="list-style-type: none"> • Perceived uptake of technologies by male and female farmers • Effect of technologies introduced on household income and gender relations of participating households • Operations of the CLWs and small ruminant traders during and after project

APPENDIX I

Observation Record Guide

Time started..... Time ended.....

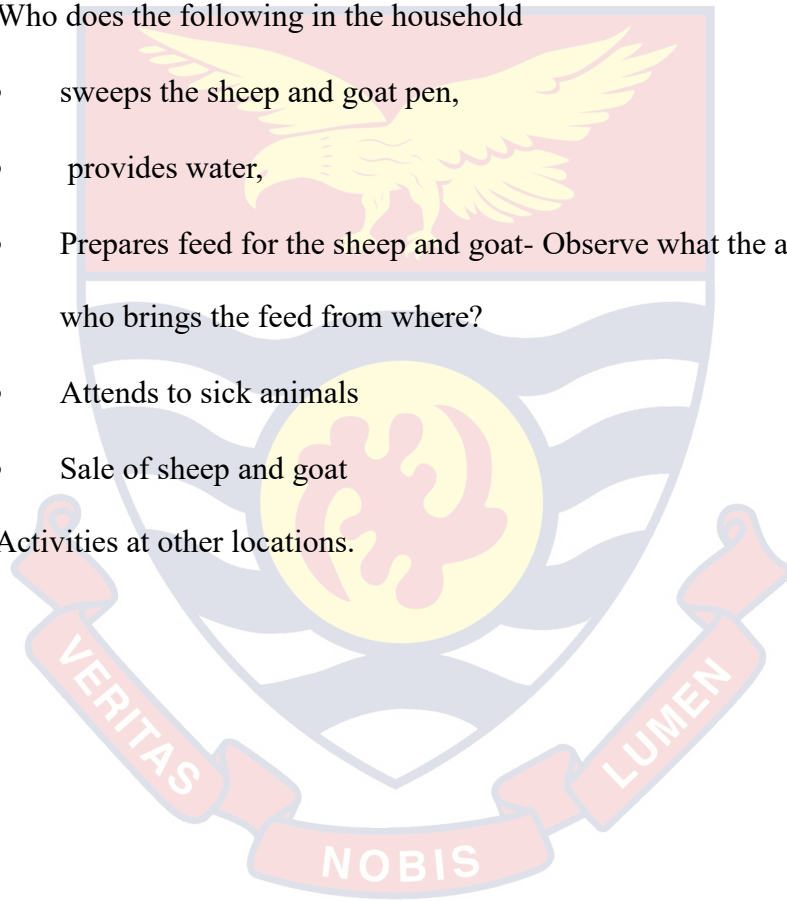
Date of observation.....

Observation Process

1. Who does the following in the household

- sweeps the sheep and goat pen,
- provides water,
- Prepares feed for the sheep and goat- Observe what the animals are fed; who brings the feed from where?
- Attends to sick animals
- Sale of sheep and goat

2. Activities at other locations.



APPENDIX J

Interpretation of the Likert-type scales of the attributes / characteristics of the technology transferred.

Ratings	Interval	Level of Agreement
5	4.5-5.0	Very high Extent (VHE)
4	3.5-4.4	High extent (HE)
3	2.5-3.4	Moderate extent (ME)
2	1.5-2.4	Low extent (LE)
1	0.5-1.4	Very low extent (VLE)
0	0.0-0.4	Not at all (NAA)

Source: Author's construct (2017)

APPENDIX K

Farmer adoption categories by sex

Category of adoption	Male		Female		Total	
1-very low	1	2%	0	0.00%	1	1%
2-low	7	18%	9	12%	16	14%
3-high	12	31%	27	34%	39	33%
4-very high	19	49%	43	54%	62	52%
Total	39	100%	79	100%	118	100%

APPENDIX L: Farmers' Perception of individual technologies transferred

	Sex	N	Mean	Std. Dev.	Mean Diff.	df	t-value	p-value
Relative advantage								
receive higher income from sheep and goats	Male	39	3.72	1.67	0.22	116	0.75	0.46
	Female	79	3.94	1.41				
better knowledge on sheep and goat rearing than before	Male	39	4.74	0.68	0.09	116	0.86	0.39
	Female	79	4.84	0.47				
more feed is available year round	Male	39	4.82	0.82	0.08	116	0.73	0.47
	Female	79	4.90	0.34				
benefits outweigh the cost of use	Male	39	4.36	1.27	0.40	46.09	1.88	0.07
	Female	79	4.76	0.58				
Compatibility								
similar to what i have been doing	Male	39	1.85	1.90	0.57	116	1.58	0.12
	Female	79	2.42	1.82				
easily fit in to my daily work	Male	39	4.72	0.60	0.05	116	0.41	0.68
	Female	79	4.67	0.57				
meet alot of my knowledge needs in sheep and goat	Male	39	4.85	0.37	0.02	116	0.30	0.77
	Female	79	4.82	0.42				
do not distrup my daily routine	Male	39	4.85	0.43	0.04	116	0.48	0.63
	Female	79	4.89	0.42				
Ease of use								
explained well enough for me to continue using	Male	39	4.85	0.81	0.04	116	0.37	0.71
	Female	79	4.89	0.36				
Technology quite easy to understand	Male	39	4.95	0.22	0.10	113.80	1.44	0.15
	Female	79	4.85	0.53				
Technology quite easy to use	Male	39	4.95	0.22	0.10	116.00	1.61	0.11
	Female	79	4.85	0.46				
easily expained to intersted farmers	Male	39	4.95	0.22	0.13	115.85	1.96	0.05
	Female	79	4.82	0.47				
Observability								
have benefits that I can easily talk about to other farmers	Male	39	4.69	0.92	0.09	116	0.71	0.48
	Female	79	4.78	0.50				
show results that can be easily seen	Male	39	4.56	1.02	0.21	50.29	1.18	0.24
	Female	79	4.77	0.58				
people comment on improvement in animal health	Male	39	4.33	1.42	0.46	43.51	1.97	0.04*
	Female	79	4.80	0.54				
other farmers expressing interest in project	Male	39	4.51	1.17	0.35	44.28	1.79	0.08
	Female	79	4.86	0.47				

APPENDIX M: WILCOXIN'S TEST

		Ranks			
Sex			N	Mean Rank	Sum of Ranks
MALE	compatibility of technology - relative advantage of technology	Negative Ranks	29 ^a	18.16	526.50
		Positive Ranks	9 ^b	23.83	214.50
		Ties	1 ^c		
		Total	39		
	complexity - relative advantage of technology	Negative Ranks	1 ^d	1.00	1.00
		Positive Ranks	19 ^e	11.00	209.00
		Ties	19 ^f		
		Total	39		
	technology easily observed - relative advantage of technology	Negative Ranks	6 ^g	8.42	50.50
		Positive Ranks	17 ^h	13.26	225.50
		Ties	16 ⁱ		
		Total	39		
	complexity - compatibility of technology	Negative Ranks	1 ^j	26.00	26.00
		Positive Ranks	37 ^k	19.32	715.00
		Ties	1 ^l		
		Total	39		
	technology easily observed - compatibility of technology	Negative Ranks	4 ^m	27.75	111.00
		Positive Ranks	32 ⁿ	17.34	555.00
		Ties	3 ^o		
		Total	39		
	technology easily observed – complexity	Negative Ranks	12 ^p	8.92	107.00
		Positive Ranks	3 ^q	4.33	13.00
		Ties	24 ^r		
		Total	39		
FEMALE	compatibility of technology - relative advantage of technology	Negative Ranks	55 ^a	39.09	2150.00
		Positive Ranks	20 ^b	35.00	700.00
		Ties	4 ^c		
		Total	79		
	complexity - relative advantage of technology	Negative Ranks	11 ^d	12.59	138.50
		Positive Ranks	37 ^e	28.04	1037.50
		Ties	31 ^f		
		Total	79		
	technology easily observed - relative advantage of technology	Negative Ranks	13 ^g	14.00	182.00
		Positive Ranks	37 ^h	29.54	1093.00
		Ties	29 ⁱ		
		Total	79		
	complexity - compatibility of technology	Negative Ranks	2 ^j	34.50	69.00
		Positive Ranks	68 ^k	35.53	2416.00
		Ties	9 ^l		
		Total	79		
	technology easily observed - compatibility of technology	Negative Ranks	2 ^m	19.25	38.50
		Positive Ranks	65 ⁿ	34.45	2239.50

		Ties	12 ^o		
		Total	79		
	technology easily observed – complexity	Negative Ranks	16 ^p	15.69	251.00
		Positive Ranks	13 ^a	14.15	184.00
		Ties	50 ^r		
		Total	79		
a. compatibilty of technology < relative advantage of technology					
b. compatibilty of technology > relative advantage of technology					
c. compatibilty of technology = relative advantage of technology					
d. complexity < relative advantage of technology					
e. complexity > relative advantage of technology					
f. complexity = relative advantage of technology					
g. technology easily observed < relative advantage of technology					
h. technology easily observed > relative advantage of technology					
i. technology easily observed = relative advantage of technology					
j. complexity < compatibilty of technology					
k. complexity > compatibilty of technology					
l. complexity = compatibilty of technology					
m. technology easily observed < compatibilty of technology					
n. technology easily observed > compatibilty of technology					
o. technology easily observed = compatibilty of technology					
p. technology easily observed < complexity					
q. technology easily observed > complexity					
r. technology easily observed = complexity					



APPENDIX M: WILCOXIN’S TEST

Ranks					
Sex			N	Mean Rank	Sum of Ranks
MALE	compatibility of technology - relative advantage of technology	Negative Ranks	29 ^a	18.16	526.50
		Positive Ranks	9 ^b	23.83	214.50
		Ties	1 ^c		
		Total	39		
	complexity - relative advantage of technology	Negative Ranks	1 ^d	1.00	1.00
		Positive Ranks	19 ^e	11.00	209.00
		Ties	19 ^f		
		Total	39		
	technology easily observed - relative advantage of technology	Negative Ranks	6 ^g	8.42	50.50
		Positive Ranks	17 ^h	13.26	225.50
		Ties	16 ⁱ		
		Total	39		
	complexity - compatibility of technology	Negative Ranks	1 ^j	26.00	26.00
		Positive Ranks	37 ^k	19.32	715.00
		Ties	1 ^l		
		Total	39		
	technology easily observed - compatibility of technology	Negative Ranks	4 ^m	27.75	111.00
		Positive Ranks	32 ⁿ	17.34	555.00
		Ties	3 ^o		
		Total	39		
technology easily observed – complexity	Negative Ranks	12 ^p	8.92	107.00	
	Positive Ranks	3 ^q	4.33	13.00	
	Ties	24 ^r			
	Total	39			
FEMALE	compatibility of technology - relative advantage of technology	Negative Ranks	55 ^a	39.09	2150.00
		Positive Ranks	20 ^b	35.00	700.00
		Ties	4 ^c		
		Total	79		
	complexity - relative advantage of technology	Negative Ranks	11 ^d	12.59	138.50
		Positive Ranks	37 ^e	28.04	1037.50

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		Positive Ranks	37 ^h	29.54	1093.00
		Ties	29 ⁱ		
		Total	79		
complexity - compatilby of technology		Negative Ranks	2 ^j	34.50	69.00
		Positive Ranks	68 ^k	35.53	2416.00
		Ties	9 ^l		
		Total	79		
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		Positive Ranks	65 ⁿ	34.45	2239.50
		Ties	12 ^o		
		Total	79		
technology easily observed - complexity		Negative Ranks	16 ^p	15.69	251.00
		Positive Ranks	13 ^q	14.15	184.00
		Ties	50 ^r		
		Total	79		
a. compatilby of technology < relative advantage of technology					
b. compatilby of technology > relative advantage of technology					
c. compatilby of technology = relative advantage of technology					
d. complexity < relative advantage of technology					
e. complexity > relative advantage of technology					
f. complexity = relative advantage of technology					
g. technology easily observed < relative advantage of technology					
h. technology easily observed > relative advantage of technology					
i. technology easily observed = relative advantage of technology					
j. complexity < compatilby of technology					
k. complexity > compatilby of technology					
l. complexity = compatilby of technology					
m. technology easily observed < compatilby of technology					
n. technology easily observed > compatilby of technology					
o. technology easily observed = compatilby of technology					
p. technology easily observed < complexity					
q. technology easily observed > complexity					
r. technology easily observed = complexity					

APPENDIX M: WILCOXIN'S TEST CONT'D

		Test Statistics ^a					
Sex		compatibility of technology - relative advantage of technology	complexity - relative advantage of technology	technology easily observed - relative advantage of technology	complexity - compatibility of technology	technology easily observed - compatibility of technology	technology easily observed - complexity
	Z	-2.269 ^b	-3.886 ^c	-2.663 ^c	-5.044 ^c	-3.516 ^c	-2.682 ^b
Male	Asymp. Sig. (2-tailed)	.023	.000	.008	.000	.000	.007
	Z	-3.836 ^b	-4.616 ^c	-4.400 ^c	-6.916 ^c	-6.914 ^c	-.739 ^b
Female	Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.000	.460

- a. Wilcoxon Signed Ranks Test
- b. Based on positive ranks.
- c. Based on negative ranks.

