

**A QUALITATIVE ASSESSMENT OF THE GENDERED EFFECTS OF
CONTAGIOUS BOVINE PLEURONEUMONIA (CBPP) OUTBREAKS AND
CONTROL AMONG THE SOMALI PASTORALISTS OF IJARA SUB-COUNTY,
GARISSA COUNTY, NORTHEASTERN KENYA**

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**A Research Project Submitted to the Institute of Anthropology, Gender and African
Studies in Partial Fulfilment of the Requirements for the Degree of Master of Arts in
Gender and Development Studies of the University of Nairobi.**

2014

DECLARATION

This research project is my own original work and has not been submitted for an award or examination in any other university

Pauline Wavinya Muindi

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Signature

Date

This work has been submitted with my approval as the university supervisor

Dr. Salome A. Bukachi

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.....

Signature

Date

DEDICATION

This project is dedicated to my family whose unwavering support and guidance has propelled me to achieve a lot and has made me the person I am.

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LIST OF ABBREVIATIONS AND ACRONYMS

CIFSRF	Canadian International Food Security Research Fund
IDRC	International Development Research Centre
CBPP	Contagious Bovine Pleuropneumonia
ILRI	International Livestock Research Institute
IFPRI	International Food Policy Research Institute
PACE	The Pan African programme for the Control of Epizootics
KARI	Kenya Agricultural Research Institute
KNBS	Kenya National Bureau of Statistics
FAO	Food and Agriculture Organization
CFSPH	Center for Food Security and Public Health
IFAD	International Fund for Agricultural Development
BMZ	Federal Ministry for Economic Cooperation and Development
DFID	Department for International Development
NAFIS	National Farmers Information Service
MEMR	Ministry of Environment and Mineral Resources
ASALs	Arid and semi-arid lands
NEMA	National Environment Authority
KEVEVAPI	Kenya Veterinary Vaccines Production Institute

GOK	Government of Kenya
GAAP	Gender, assets, and agricultural development programs framework
MOLD	Minsitry of Livestock Devlopment
VIDO	Vaccine and Infectious Disease Organization
GDP	Gross Domestic Product
HIV	Human Immunodeficiency Virus
AI	Avian Influenza
ECF	East Coast Fever
DVO	District Veterinary Officer
VO	Veterinary Officer
AHA	Animal Health Assistant
CAHW	Community-based Animal Health Worker
FGDs	Focus group discussions
KIs	Key informants
MHH	Male headed household
FHH	Female headed household
PIDs	Participatory impact diagrams

ABSTRACT

Contagious Bovine Pleuropneumonia (CBPP) is considered a serious threat to women and men cattle keepers. The disease has serious implications on the livelihoods of women and men, household food security which is usually a woman's domain, control costs incurred by women and men and the social welfare of women and men. Owing to the gender relations in the prevailing culture, women and men are affected differently by CBPP outbreaks. Vaccine technology adoption can be motivated in both women and men by occurrence of frequent outbreaks. Eradication of CBPP can improve the well-being of women and men, though the positive effects are often skewed in favour of men owing to the existing gender norms.

The study reported here responds to three objectives: to examine the gendered effects of CBPP outbreaks, to determine the gendered responses in relation to CBPP control and to establish the anticipated gendered effects of eradicating CBPP. The study adopted a cross-sectional exploratory research design, and data was collected in six sub-locations from Ijara sub-county. Data was obtained through key informants interviews and they provided detailed information on the effects of CBPP outbreaks and its control strategies. Focus group discussions were held with a total number of 127 women and men discussants to obtain information on the effects of CBPP outbreaks on women and men, the strategies employed by women and men to control CBPP outbreaks and the anticipated positive and negative effects of eradicating CBPP according to women and men.

The findings show that women and men are both affected by CBPP outbreaks however the effects are gendered owing to gender norms and relations. Vaccination, treatment, quarantine and prayers are strategies employed by women and men to control CBPP. Vaccination however, remains the most preferred CBPP control strategy by women and men. Women and men derived similar benefits from vaccinating cattle against CBPP the benefits are not equal

and they faced different constraints in vaccinating against CBPP. A safe, efficacious and affordable CBPP vaccine can enhance successful adoption rates by women and men. From a hypothetical eradication scenario of CBP, the relationship and interactions of women and men may be affected positively or negatively. The study concludes that the effects of CBPP outbreaks are gendered, women and men employ similar strategies in controlling CBPP but face different challenges in adopting those strategies and eradication of CBPP is linked to affluence and happiness and on the other hand it is also associated with a series of failed marriages.

This study recommends that more studies on livestock diseases and vaccines ought to be engendered because there is need to identify the gendered effects of livestock disease outbreaks to enhance feasible ways of closing the gender impact gap. Women and men face different barriers in adopting livestock vaccines and hence there is need to employ effective strategies to close these barriers and ensure equitable adoption of livestock vaccines by women and men. More analysis on the gender differentials should be conducted on the preferences of women and men to enhance equitable benefits for women and men from vaccination and vaccine adoption. Eradication of a disease may either have positive or negative effects on the relationships and interactions of women and men hence, there is need to ensure gender-responsive eradication strategies that will enhance fair and equal outcomes for women and men.

CHAPTER ONE

Background of the study

1.1 Introduction

Livestock is considered a crucial asset for many rural households because it sustains livelihood opportunities for millions of pastoralists, intensifies small-scale mixed crop-livestock systems, reduces vulnerabilities in pastoral systems and secures food and nutrition for households (ILRI, 2012, p.1). Cattle, goats, sheep, pigs and chickens are found in many households and constitute part of the livelihood portfolios of an estimated 70 percent of the world's rural poor women and men (Njuki and Sanginga, 2013, p.1). Cattle are highly preferred by women and men because of benefits they derive from income and market value of cattle and cattle products (Waithanji et al., 2013, p.43). For poor livestock keepers, therefore, animal diseases are considered to be a major constraint because of the expense associated with treatment, losses of production and productivity and the inability to access sustainable animal-health and production inputs (FAO, 2009, p.6).

Contagious bovine pleuropneumonia (CBPP), also known as cattle lung disease, is one of the most important infectious diseases of cattle in Africa. The Pan African Programme for the Control of Epizootics (PACE) identified it as the second most important transboundary disease in Africa, after Rinderpest (Tambi et al., 2006, p.15). CBPP is economically important because it is a major cause of economic loss and the most economically important disease in Africa. CBPP is caused by *Mycoplasma mycoides* subsp. *mycoides* (*Mmm*) (Tambi et al., 2006, p.2). CBPP impacts cattle health and enhances poverty for livestock-dependent people through decreased animal productivity and production, reduced food supply and the

cost of control measures. CBPP is a barrier to trade in many African countries and this reduces the value of cattle and the income of many value chain stakeholders. Socially, CBPP can increase poverty and threatens the social wellbeing of cattle keeping communities (Thomson, 2005, p.3; Tambi et al., 2006, p.2; Windsor and Wood, 1998, p.299).

In sub-Saharan Africa CBPP has re-emerged. For example, an upsurge in its incidence and prevalence, with a prevalence 2.8 percent, was documented in Kenya (Wanyoike, 1999, p.2; Rweyemamu et al., 2000. p.23; FAO, 2004, p.11). Presently control of CBPP relies on a live vaccine and the live attenuated T1/44 strain has numerous shortcomings, which include dependence on the cold chain, a limited ability to stimulate an adequate immune response and adverse post-vaccination reactions and this consequently limits the adoption rate of the CBPP vaccine by cattle owner's (Tulsane et al., 1996, p.10).

A policy of strict movement control and slaughter as strategies of controlling CBPP is at this time not possible to implement in most regions in Africa because of public resistance, mobile production systems tailored to highly variable rainfall patterns, fragmented veterinary services and lack of funds for compensation. Publicly funded mass vaccination programs have not been sustainable leading to infrequent or sporadic control. Currently, farmers and field veterinarians rely heavily on antimicrobials to reduce the impact of CBPP, although this practice is often not permitted under official policy (Jores et al., 2013, p. 1). CBPP control also involves quarantine of endemic areas is one effective method of controlling the spread of CBPP and CBPP outbreaks (Masinga and Domenech, 1995, p.11; CFSPH, 2008, p.1).

Owing to the limitations of the current vaccine scientists from Kenya Agricultural Research Institute (KARI), International Livestock Research Institute (ILRI) and Vaccine and

Infectious Disease Organization (VIDO) in Canada have been funded by the Canadian International Food Security Research Fund (CIFSRF) to develop a new CBPP vaccine that is superior to the T1/44 strain because it will elicit a stronger immune response that lasts for longer, cause less adverse reactions at the injection site and will not require refrigeration during delivery. The proposed vaccine is expected to enhance the effectiveness of CBPP control, with a possibility of its eradication in a foreseeable future.

In addition to the vaccine development component, the study has a gender and socioeconomic component, which will investigate the effects of CBPP outbreaks on women and men, vaccine adoption by women and men and factors that influence its adoption, challenges facing women and men to adopt the vaccine, the different control strategies employed by women and men to control CBPP and the anticipated positive and negative effects of eradicating CBPP according to women and men. The acquired knowledge from the gender study will inform future interventions that will be carried out during the introduction of the new vaccine in the market to ensure efficient and effective delivery and adoption of the vaccine. The focus on gender will ensure that women and men benefit equitably from the vaccine technology.

Women and men play different roles in livestock production as is determined by the nature of gender relations in the prevailing culture. Both women and men are well placed to identify livestock diseases because of their interactions with cattle during milking and herding for example. With these relations and their vast knowledge women and men are able to identify the type of livestock by observing clinical signs of sick livestock and are also well placed to identify improvement of livestock health (World Bank et al., 2009, p.612). Owing to these gender relations and the different roles that these relations produce for men, and women, they

may be affected differently livestock diseases as well as animal related technologies meant to benefit livestock dependent communities. Both women and men care for sick cattle. Men are typically responsible for cutting branches for home feeding for sick cattle, while women are responsible for providing both feed/fodder and water for sick cattle (Twinamasiko, 2002, p.12; IFAD, 2012, p.18; Njuki and Mburu 2013, p.21).

CBPP is a transboundary diseases and it is considered an important threat to cattle keepers (Otte et al., 2004). The impact of livestock disease on the livelihoods and food security for poor livestock producers and processors, particularly women, is of great concern because they are less resilient to disease-related shocks which include: market and animal loss, diversity in domesticated animal and minimal accessibility to compensation and restocking programs (World Bank et al., 2009). Livestock diseases affect men and women differently because men and women perceive risk differently e.g. a sick cow to a man may represent a shortage of money owing to expenditure on treatment and inability to sell it, whereas to a woman, it may represent hunger owing to the drop in milk yield. CBPP vaccine technology adoption can be motivated in both women and men by occurrence of frequent outbreaks and less adverse post vaccination side effects (Waithanji et al., forthcoming).

Among women, vaccine adoption can be motivated by the anticipation of increased household food security owing to enhanced milk production associated with absence of disease and motivation stories or testimonies on improved child-health associated with absence/eradication of disease. Among men, vaccine adoption can be motivated by the anticipation of increased household wealth owing to increased annual sales of livestock associated with absence of disease and motivation stories/testimonies on improved wealth associated with absence/eradication of disease (Waithanji et al., forthcoming). Men and

women cattle owners face different and constraints in responding to livestock diseases. Women have less access to resources/assets than men owing to women's historical and cultural subordination, which is then maintained through gender roles, practices, beliefs, attitudes and discourses associated with these. Owing to established gender differences in access, therefore, women's access to veterinary technologies, including vaccines is likely to be lower than that of men (Waithanji et al., forthcoming).

This research provided the needed evidence to demonstrate the existing gender differences in relation to CBPP outbreaks, how men and women responded to outbreaks in terms of strategies of controlling CBPP and how CBPP eradication affects men's and women's lives differently either positively or negatively in a hypothetical scenario. The results from this study will contribute to the greater gender and socioeconomic study that will inform the future interventions that will be carried out in the periods preceding and during the introduction of the anticipated new CBPP vaccine in the market in order to ensure efficient and effective delivery and adoption of the vaccine by women and men alike.

1.2 Statement of the Problem

CBPP is a lung disease of cattle that causes great economic losses owing to its high morbidity and mortality. The disease has serious implications for food security, the livelihoods of men and women cattle owners and is a major constraint to cattle production in Africa. Control and where possible eradication of CBPP is important for men and women cattle keepers because it would increase their incomes, secure livelihoods and improve lives (Tambi et al., 2006, p.15; Amanfu, 2009, p.13). Gender work on adoption of livestock vaccines is limited; most of the work has been on human vaccines. Most of the qualitative studies (Wesonga, 1994, p.313; Mlengeya, 1995, p.3; Wanyoike, 1999, p.11; Tambi et al., 2006; Jores et al., 2013, p.1) have

concentrated on the impact of CBPP as compared to the differential effects of CBPP on cattle keepers, taking gender into consideration. In terms of gender dynamics, men and women may respond similarly or differently to CBPP outbreaks and owing to constraints they face, the differential aspects in relation to ownership, access and usage in relation to livestock. Women and men derive different benefits from eradicating CBPP owing to the existing gender norms and gender inequalities.

Women and men typically keep and own different livestock including cattle, individually or jointly with others, but overall, women tend to own fewer cattle than men (Kristjanson et al., 2010; p.9; Njuki and Mburu, 2013, p.21). Both women and men play a role in the prevention and treatment of animal disease, but cultural, financial and other related barriers, like illiteracy, limit women's access to proper medical treatment for their animals. These barriers have serious repercussions in terms of benefits derived from improved health of cattle (BMZ, 2013, p.2). Barriers of adoption of the CBPP vaccine by women include their inability to access extension information on the disease, how to control CBPP outbreaks and the benefits women derive from vaccinating cattle against CBPP because women's ability to negotiate over what to do with cattle and their products within the household is very weak. Barriers of adoption by men include national livestock movement and trade bans imposed on healthy cattle owing to disease outbreaks in a different geographical location. Access to vaccines by women is reported to be lower than that of men (Waithanji et al., forthcoming).

Women and men and in pastoral communities play different roles in the management of cattle hence understanding the gendered patterns of ownership and responsibilities is a necessity if future delivery and benefit from the CBPP vaccine will be gender equitable. In order for the CBPP vaccine project to intentionally target women in ways that will enable them to adopt

the vaccine just like men, an understanding of the gendered differences of the effect of the disease and benefits from vaccination and other forms of control will be a prerogative for feasible ways of closing the gender impact gap are identified and implemented. Women and men cattle owners face different constraints in responding to CBPP outbreaks and control.

Looking at the differential positive and negative effects of eradicating CBPP can be linked to whether or not women want to adopt the CBPP vaccine because of the benefits they derive from it. The differences would also show how gender inequalities continue to play out in livestock production.

Due to dearth in information about the differential effects of CBPP on women and men, control and eradication, vaccine interventions will continue being gender blind and will work against Kenya vision 2030, more specifically the strategies put in place to enhance the economic pillar which has incorporated a gender mainstreaming approach implemented in agricultural programmes to address the differences between men and women in the agricultural sector. Moreover the Millennium Development Goals (MDGs) which focuses on promoting gender equality and women's empowerment. This study established the effects of CBPP outbreaks on men and women, how men and women responded to CBPP outbreaks in relation to the strategies employed to control CBPP and the anticipated positive and negative effects of CBPP eradication according to women and men. The study was guided by the following research questions:

1. What are the effects of CBPP outbreaks on women and men cattle owners?
2. How do women and men respond and control CBPP outbreaks?
3. What are the anticipated positive and negative effects of eradicating CBPP for women and men cattle owners?

1.3 Objectives of the Study

1.3.1 Overall Objective

The main objective of this study was to establish the gendered effects of CBPP outbreaks, control and eradication among the Somali pastoralists in Ijara sub-county.

1.3.2 Specific Objectives

The specific objectives of the study were:

1. To examine the gendered effects of CBPP outbreaks
2. To determine the gendered responses in relation to CBPP outbreaks and control
3. To establish the anticipated positive and negative effects of eradicating CBPP for men and women

1.4 Justification of the study

This study was one of the first set of gender studies conducted on CBPP. Most of the studies conducted on CBPP (Masiga et al., 1998, p.5; Rweyemamu et al., 2000. p.23; FAO, 2004, p.11 Mariner et al., 2006a) have not looked much at the existing gender issues in regards to the gendered effects of CBPP outbreaks, control and eradication. This study focused on the gendered effects of CBPP outbreaks, CBPP control strategies employed by men and women and the anticipated gendered effects of eradicating CBPP in Ijara sub-county. The study was qualitative in nature, assessing the gendered effects of CBPP outbreaks, control and eradication among the Somali pastoralists in Ijara sub-county. While numerous studies on CBPP outbreaks and control have been conducted, there exists little documented gender knowledge on CBPP outbreaks and control. It was, therefore, important to study the existing

gender gaps, in relation to effects of the disease on women and men, its control by women and men and the anticipated effects of eradicating CBPP according to women and men. These findings will therefore provide information that will be useful, to policy makers and intervention programs, in narrowing the ‘gender gaps’. Information from this study will help them to implement carefully designed, gender responsive projects that will promote and ensure equality in adoption rates, and consequently, led to benefits for both men and women.

Results from this study will inform targeted CBPP vaccine interventions programs/projects and other livestock technology adoption studies on ways of narrowing the gender technology gap with the ultimate goal of improving the livelihoods of women and their families. These findings from this study will also add to the body of knowledge on the gendered effects of CBPP outbreaks, gendered response to CBPP control, anticipated gendered effects of CBPP eradication and the lessons derived from this study may influence future policies, policy makers and future researchers studying livestock diseases, control and eradication to take into account the gender issues and concerns.

1.5 Scope and limitations of the study

This study was conducted in Ijara sub-county, of Garissa County, a pastoralist community who largely depend on livestock for their livelihood; however the findings cannot be generalised to the whole Garissa County. The findings provided detailed information that CBPP outbreaks affect women and men differently owing to gender norms and relations, women and men cattle owners face different constraints in responding to CBPP control and women and men may benefit from eradication of CBPP, however the benefits are not distributed evenly between women and men. It is important to note that eradication of CBPP was a hypothetical scenario as the effects of eradication are seen in 10 to 15 years. One of the

shortcomings of the study was that the researcher did not quantify the effects of CBPP on cattle in terms of the amount of milk yield losses because the study was qualitative; hence a quantitative study on the impact of the disease on cattle was beyond this study. In addition language barrier was also a limitation for the researcher because discussants from Ijara sub-county mainly speak in their local language. Hence the researcher had to employ research assistants from that area who can speak the local language and thoroughly train the assistants before the interviews.

1.6 Definition of terms

Gender: in this study gender refers to the socially constructed roles and responsibilities, relationships that determine the status of women and men.

Vaccines: these are preparations containing antigenic substances that induce a specific and active immunity that fight against a specific disease.

Outbreak: when a disease in a given community increases and the cases reported clearly exceed the normal expectancy

Control: when there is a reduction in the incidence, prevalence and mortality of an infectious disease what is often considered to be a locally acceptable level.

Eradication: this is when there is a permanent reduction to zero regarding incidence of a disease as a result of deliberate efforts and meaning that intervention measures are no longer needed.

Response: this is the capacity and ability of an individual to react, to a given disease owing to the fact that the disease has the potential to bring change that can be unexpected or expected

Anticipated effects: in this study these are at the expected or predicted the positive and negative consequences associated with eradication of a given problem

CHAPTER TWO

Literature Review

2.1 Introduction

This part of the project provides an overview of the literature review. The review follows a logical formant and was also linked to the overall objectives of the study. It consists of an overview of the livestock in sector Kenya; Contagious Bovine Pleuropneumonia (CBPP); and gender, livestock diseases and vaccine adoption and the GAAP framework.

2.2 Overview of the livestock sector in Kenya

In Kenya, the livestock sector plays an important role in the Kenyan economy, contributing to approximately 7 percent of Kenya's Gross Domestic Product (GDP) and 17 percent to the agricultural GDP. The sector employs 50 percent of agricultural labor force (GOK, 2009, p.5). It is estimated that about 60 percent of Kenya's livestock herd is found in the arid and semi-arid lands (ASALs), which constitute about 80 percent of the country. It is estimated that 10 million Kenyans living ASALs derive their livelihood largely from livestock (KEVEVAPI, 2011, p.6). The dairy cattle farming in Kenya is a dynamic enterprise with a mean animal milk production growth rate of 4.1 percent and accounting for approximately 3.5 percent of Kenya's GDP. More specifically, smallholder dairy production accounts for over 70 percent of the total milk production and supports more than 600,000 smallholder dairy farmers. It is estimated that about 80 percent of Kenya comprises of ASALs, supporting about 6 million beef cattle, and accounting for about 70 percent of total beef consumed in the country. Kenya's average annual beef production is about 320,000 metric tonnes (MOLD, 2008, p.7).

2.3 Contagious Bovine Pleuropneumonia (CBPP)

Contagious Bovine Pleuropneumonia (CBPP) is a disease of cattle caused by the bovine biotype of *Mycoplasma mycoides subspecies mycoides* small-colony type (SC), a member of the family *Mycoplasmataceae* (CFSPH, 2008, p.3; Amanfu, 2009, p.13). CBPP is a lung disease of cattle that causes high morbidity and mortality losses to cattle. More specifically, the effects of CBPP outbreak in terms of productivity include: loss of weight, working ability, reduced milk yield, reduced fertility, low birth weights, poor growth rates, poor carcass quality, losses due to abortions and decreased calving rate (Wesonga, 1994, p.313; Mlengeya, 1995, p.3). The financial implications of these losses are of great significance to cattle owner's and also costs of control (vaccination and antibiotic treatment) (Tambi et al., 2006, p.1).

Masiga et al., (1998) estimated the annual economic impact of CBPP in sub-Saharan Africa to be a loss of 2 billion US dollars through death of cattle and loss of production output (p.5). In Kenya, in the recent years, there has been an upsurge in the incidence of and prevalence of CBPP (FAO, 2004, p.21). The prevalence of CBPP is reported to be 2.8 percent in Kenya (Wanyoike, 1999, p.11). The morbidity and mortality loss owing to CBPP in Kenya was estimated at 2.5 million Euros and the total economic cost (direct and indirect production losses plus disease control costs) was estimated at 3.7 million Euros (Tambi et al., 2006, p.9). Extrapolations from Thomson (2005, p.10), indicate that the livelihoods of about 1.3 million Kenyans (4.6 percent of the population) are at risk from the effects of CBPP. The following table illustrates the estimated annual losses in cattle and cattle products caused by CBPP in Kenya (Table 2.1) (Tambi et al., 2006, p.16).

LOSSES				
Country	Cattle deaths (number)	Beef (metric tonnes)	Milk (metric tonnes)	Draught Power (1,000 ox days)
KENYA	3,033	373	2,316	494

Source: Tambi et al., 2006

The arid and semi-arid Northern and Eastern counties of Kenya are considered to be CBPP endemic zones yet cattle are the main livelihood source for many households in these areas. Most affected counties include Garissa, Turkana, Marsabit, Moyale, Isiolo, Mandera, Wajir, Ijara and West Pokot (Wanyoike, 1999, p.14). Successful eradication of the disease in United States of America and most parts of Europe has been achieved through strict movement controls, slaughter of affected animals and compensation to animal owners affected by the disease (March, 2004, p.4). In Africa, however, such stringent control measures of the disease have failed owing to lack of affordable operational funds for slaughter and compensation, deterioration in the quality of veterinary services, the widespread nature of disease, animal welfare considerations as well as the socio-economic and cultural factors that increase the risk of CBPP transmission. In sub-Saharan Africa, therefore, control of the disease is mainly by vaccination (Amanfu, 2009, p.13; March, 2004, p.6). Vaccination can be conducted by veterinary officers, cattle owners with the assistance of herders (Wesonga and Thiaucourt, 2000, p.317).

Other methods include quarantine, treatment, and restrictions of animal movement are some the control strategies implemented in Africa. Vaccination can be used in eradication, protection of a disease free zone or to decrease incidence of clinical disease where it is endemic, while protecting the healthy herds. The benefits of vaccinating and eradicating

CBPP include, increase in milk yields, reduced mortalities, reduction of vaccination costs, improved market participation, improved appetite and increase in weight. The vaccine needs to be safe and effective (McLeod and Rushton, 2007, p.313).

The current vaccine has numerous shortcomings, which include dependence on the cold chain, a limited ability to stimulate an adequate immune response and adverse post-vaccination reactions (Tulsane et al., 1996, p.14). The protection rates of the vaccine as observed in previous studies: Thiaucourt et al., (2000, p.71) and Wesonga and Thiaucourt, (2000, p.315) observed a protection rate of 60 percent afforded by T/144 vaccine strain after a single vaccination followed by challenge at 3 months post vaccination. Similarly, Mariner et al., (2006a, p.7; 2006b, p.89) estimated efficiency of T/144 vaccine to lie between 50 and 80 percent, while Thiaucourt et al., (2004, p.17) offered a value of 40-60 percent following primary vaccination, increasing to 80-95 percent upon revaccination.

Other problems associated with CBPP vaccination are farmer related. Occurrence of post-vaccination reactions in as many as 1 to 5 percent of vaccinated animals in some instances, as well as occasional deaths and the economic losses due to reaction management costs, have contributed to owner reluctance to present animals for vaccination in certain areas (Thiaucourt et al., 2000, p.33; Teshale, 2005, p.7). In cases where there is disruption and stress due to the need to collect animals in a central point, home vaccination and vaccination by owners under the supervision of veterinary personnel may be more appropriate. With female owners there may be need for special efforts to involve them and in cost recovery scenario, fewer dosage packages (McLeod and Rushton, 2007, p.34). Vaccination is harder to implement in pastoral areas due to insecurity, poor infrastructure, low cash economy, high cost of delivery, vastness of the area, inadequate veterinary personnel, existing policy and

legal framework (Okwiri et al., 2001, p.2; Kajume, 1999, p.22). Literature indicates that currently farmers need to vaccinate their cattle twice a year and a dose of CBPP vaccine is estimated to cost between 15 to 25 Kenya shillings (Waithanji et al., forthcoming). A new CBPP vaccine that is superior to the T1/44 strain because it will elicit a stronger immune response that lasts for longer, cause less adverse reactions at the injection site and will not require refrigeration during delivery. The proposed vaccine is expected to enhance the effectiveness of CBPP control, with a possibility of its eradication in a foreseeable future.

According to FAO (2007, p.12), antibiotics for treatment of CBPP offers cattle owners more advantages than vaccines, because the drugs are already available in the market and their use may have a direct impact on poverty alleviation by safeguarding poor people's main livelihood by reducing mortality cases. Movement control is difficult and often impractical in pastoral production systems because of need for transhumance, trade, socio-cultural practices. It is also difficult where there is civil strife and cattle rustling (Masiga et al., 1998, p.18 ; Egwu et al., 1996, p.875). Windsor and Wood (1998, p.299) without elaborating mentioned that quarantine affects the social well being of people. Pastoralists culturally exchange livestock for a number of reasons including dowry, loans, gifts or support in times of losses (Twinamasiko, 2002, p.4). Quarantines interfere with such social activities and the consequences of breaking traditional quarantines may break up social ties (Bbalo, 1991, p.9).

2.4 Gender, livestock diseases and vaccine adoption

Contagious Bovine Pleuropneumonia (CBPP) is considered to be a disease of great economic significance to both women and men cattle keepers because of its implications on: food security owing to reduction of beef and milk production; increased production costs due to costs of disease control; disruption of livestock/livestock product trade because of lost market

opportunities; inhibiting sustained investment in livestock production and debilitating pain and death of affected cattle (Tambi et al., 2006, p.16). Livestock diseases affect men and women differently, women are less resilient to disease-related shocks which include: market and animal loss, diversity in domesticated animal and minimal accessibility to compensation and restocking programs. For instance, a sick cow to a man may represent a shortage of money owing to expenditure on treatment and inability to sell it, whereas to a woman, it may represent hunger owing to the drop in milk yield (Waithanji et al., forthcoming).

A study in Uganda however, indicated that for men also the greatest concern of disease prevalence is its effects on livestock productivity and increase in cost of livestock rearing. Interventions to control animal diseases should also take account of gender roles. Men's income may be more at risk from outbreaks of foot-and-mouth disease, which has decimated cattle herds in many countries. But as the primary managers of poultry, women and children face greater health and economic risks from avian influenza (World Bank et al., 2009, p.22; Waithanji et al., forthcoming; Oluka et al., 2005, 151; FAO, 2014, p.1).

Women own more small ruminants than men, because they have a say in the disposal and sale of ruminants and use of income accrued from sales (Njuki and Sanginga, 2013). Poultry rearing is usually dominated by women, but as primary managers of poultry women face great health and economic risks from avian influenza (AI) than men. The differences of vulnerabilities between women and men in terms of loss of livelihoods/incomes, risks to infection based on their traditional roles and responsibilities in household care and management, and their negotiating position in the family and community have been overlooked. Despite the emergency health concerns of AI, and the critical dual roles of women in poultry-raising and health care provision for their families, AI strategies have hardly taken account women's roles and potential contributions in improving responses to AI.

There is hardly recognition of women's roles in enhancing health-seeking behaviour of their children and family (European Union, 2008, p.11).

Vaccination is mainly the preferred strategy of controlling CBPP. Women and men typically keep and own different livestock including cattle, individually or jointly with others, but overall, women tend to own fewer cattle than men (Kristjanson et al., 2010; p.9; Njuki and Mburu, 2013, p.21). Both men and women play a role in the prevention and treatment of animal disease, but cultural, financial and other related barriers, like illiteracy, limit women's access to proper medical treatment for their animals. These barriers have serious repercussions in terms of benefits derived from improved health of cattle (BMZ, 2013, p.2).

Among the barriers to the adoption of CBPP vaccination for women include their inability to access extension information on the disease, how to control CBPP outbreaks and the benefits women derive from vaccinating cattle against CBPP because their decision making power and ability to negotiate over what to do with cattle and their products within the household is very weak. Barriers of adoption by men include national livestock movement and trade bans imposed on healthy cattle owing to disease outbreaks in a different geographical location. The gender asset gap, access to vaccines by women may be lower than by men (Waithanji et al., forthcoming).

The current CBPP vaccine continues to elicit adverse reactions in vaccinated cattle. Literature has indicated that the occurrence of post-vaccination reactions occurs in as many as 1 to 5 percent of vaccinated cattle in some cases, coupled by the death of cattle and economic losses such as reduction in milk produced, has contributed to owner reluctance to present animals for vaccination in certain areas (Thiaucourt et al., 2000, p.72; Teshale, 2005, p.252). Waithanji et al., (forthcoming) argues that if one perceives more positive outcomes from

vaccination, they are likely to accept it more than if they perceive more negative outcomes. The belief that a product may cause the very harm it is supposed to prevent, for example, a vaccine causing the disease it is supposed to protect against, violates consumer trust and represents a safety product betrayal. Vaccination of CBPP is estimated to between 15 to 25 Kenya shillings per cow and gender is likely to affect affordability of vaccines because men and women often do not have equal amounts of money or resources that can be converted to money owing to the gendered differences in access and control of resources (Waithanji et al., forthcoming).

The benefits of vaccinating and eradicating CBPP include; increase in milk yields, reduced mortalities and improved market participation (McLeod and Rushton, 2007, p.313). A study to analyse the impacts of a vaccination programme for East Coast Fever (ECF) in the Maasai ecosystem of South-western Kenya and North-eastern Tanzania revealed that immunization reduced calf mortality rates from 20 to 2 percent (Prior price of East Coast Fever vaccination among smallholder farmers has been estimated at 15 to 25 dollars and a cost-benefit of 1/3); cattle owned by men were more likely to be vaccinated than cattle owned by women because cattle owned by men were more likely to be sold, and vaccinated cattle, and had an ear tag to indicate that they had been vaccinated, fetched prices of up to 50 percent higher than unvaccinated animals (Homewood et al., 2006, p.248).

Elimination of the disease permits the animal to achieve its potential productivity. In terms of eradication, successful eradication of CBPP eliminates any future control cost (vaccination, treatment, quarantine, movement control and surveillance) thus providing benefits to women and men producers and the nation. Control of CBPP is therefore important as a way to salvage the losses and increase the incomes of women and men cattle owners and CBPP also

affects the livelihoods who are employed to herd animals and stock traders as well as butchers (mainly men) may lose their livelihood (Windsor and Wood, 1998, p.299; Tambi et al., 2006, p.22). In Kenya, for women livestock primarily contributes to food security, whereas men saw livestock as a way to meet needs such as school fees, food, and a way to invest (World Bank et al., 2009, p.601). Based on the existing traditions on roles, men provide proper homes and school fees from cash income from sale of cattle and cattle products. Literature also indicates that women spend their money on their children school fees and health (Allendorf, 2007, p.2; Quisumbing, 2003, p.4).

Women's and men's custodianship of local knowledge about animal husbandry and livestock disease is important. Indigenous technical knowledge of animal husbandry covers animal management, hygiene, feeding, watering and use of animal products. Women and men have the same knowledge of the general principles of animal diseases. There are very few cases where women know less about animals than men, and when this is the case, it is mostly the result of a specialization of tasks (IFAD, 2011, p.4). CBPP can also be controlled through vaccination quarantine and treatment. Antibiotics for treatment of CBPP offers women and men cattle owners more advantages than vaccines, because the drugs are already available in the market and their use may have a direct impact on poverty alleviation by safeguarding poor people's main livelihood by reducing mortality cases (FAO, 2007, p.12).

CBPP control also involves quarantine of endemic areas as one effective method of controlling the spread of CBPP and CBPP outbreaks (, Masinga and Domenech, 1995, p.614; CFSPH, 2008, p.1). Research among Afghan Pashtun nomads not only shows that the women play a greater role in the care of livestock than previously described, but suggests that they also know as much, and sometimes more, about livestock health and disease than the men

(Davis 1995, p.7). As described above women have a close relationship with many of the herd. Because they do the milking, women are often the first to notice behavioural changes and other initial signs of disease (Köhler-Rollefson and Rathore 2000, p.4).

2.5 Theoretical Framework

To answer the research questions this study utilized the Gender assets and agricultural development programs framework to examine the effects of CBPP outbreaks on women's and men's cattle assets, livelihoods, how women and men control CBPP using their incomes and how possible eradication of CBPP affects the well-being of men and women.

2.5.1 Gender, Asset and Agricultural Development Programs Framework (GAAP)

The Gender assets and agricultural development programs framework was developed to look at the different assets, the gendered nature of these assets, impacts of shocks on these assets, and the links to livelihood outcomes and welfare impacts by the International Food Policy Research Institute (IFPRI) in 2011. This framework is explicitly gendered, and applies a "gender lens" that examines assets and livelihoods from a gendered perspective. The Gender, assets, and agricultural development programs (GAAP) framework shows the links between assets and well-being while making clear that gender relations influence the constraints and opportunities that occur within a household (Meinzen Dick et al., 2011 p, 21). Women and men often have separate assets, activities, and consumption and savings or investment strategies that help cope with shocks such as disease, but households can also have joint assets, activities, and consumption strategies that also help them cope with shocks. Women and men frequently have different abilities to withstand shocks, and their assets are often used differently to respond to shock. Flexibility of assets to serve multiple functions provides both security through emergencies and opportunities in periods of growth. It is important for

the poor women and men farmers to manage assets such as livestock as a way to cope with their vulnerability. Women and men have different asset accumulation trajectories and that their respective asset holdings respond differently to different types of shocks (Deere and Doss 2006, p.5; Quisumbing and Maluccio 2003, p. 283).

This framework leads us to look at a gender-specific hypothesis that can be tested empirically:

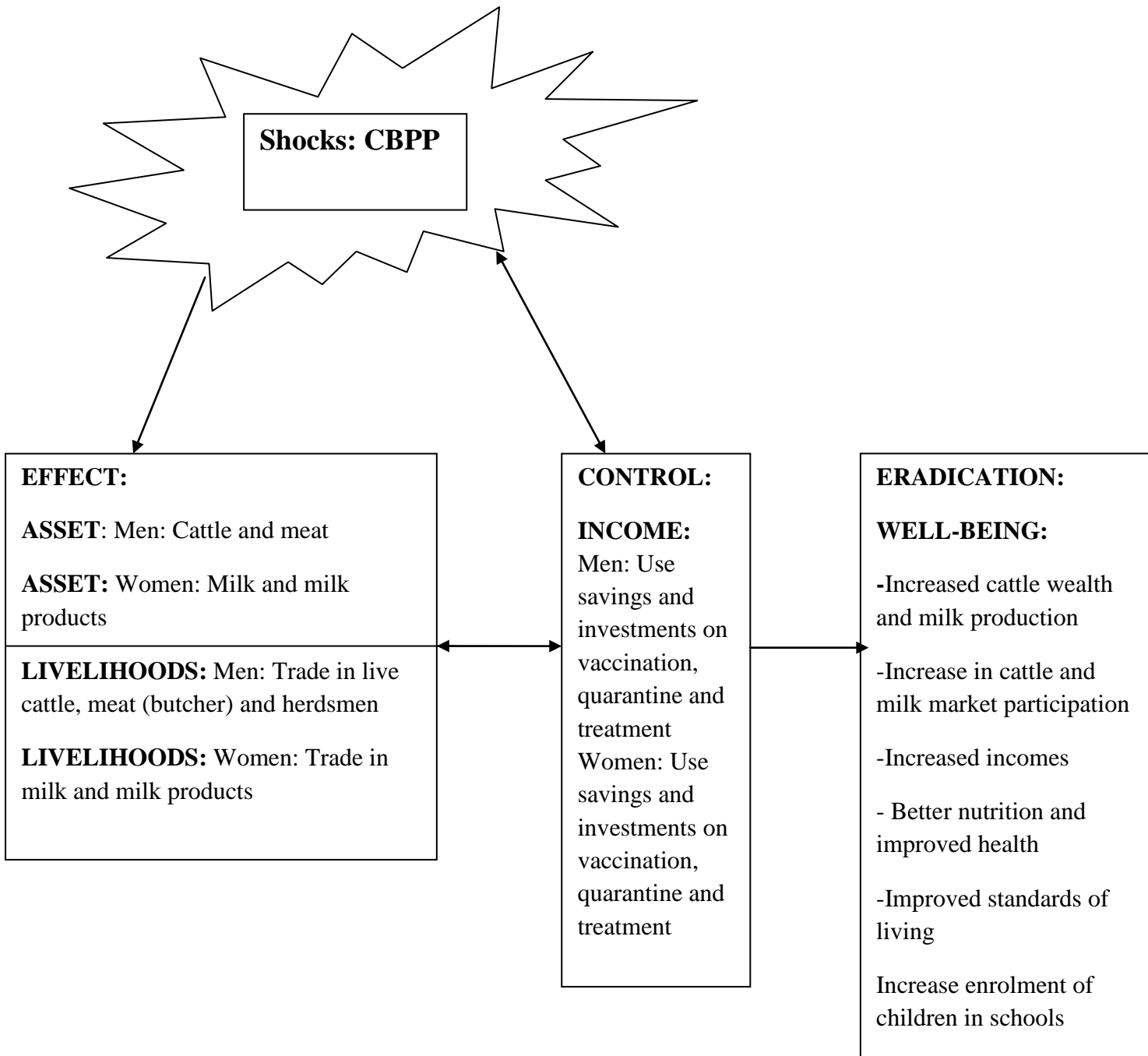
- Women and men use different types of assets to cope with different types of shocks such as disease that affect their livelihoods and asset wealth.

How are shocks gendered? First, men and women experience shocks differently depending on their different roles and responsibilities. Men who own livestock are more directly affected by cattle diseases that reduce the livelihoods, market participation; women who take care of sick cattle are also affected by diseases that reduce milk production for household consumption. The second way that the impact of shocks is gendered is through differential ability to withstand shocks. Do men and women have equal access to veterinary services? Thirdly, assets can play an important role in withstanding or responding to shocks, and men's and women's assets are often used differently to respond to shocks (Meinzen Dick et al., 2011 p, 22). For example, in Bangladesh, Quisumbing et al., (2011) found that women's assets are disposed of to respond to family illnesses, whereas men's assets are used for marriage expenses and dowry (p.220). This has important implications for gendered asset accumulation if the incidence and magnitude of both shocks and asset disposition vary over time. In addition to general shocks, there are also shocks that specifically affect women and men and lead to loss of their assets and a threat to their livelihood strategies (Peterman, 2010, p.17).

Measures of or changes in savings and assets are not always positive. In the case of a severe shock (diseases), a household may need to dip into its savings or liquidate particular assets in order to maintain a certain level of consumption especially during shocks. As described above, men's and women's assets may be used differently to buffer shocks. Children, especially girls may be kept out of school, reducing human capital accumulation. In cases of negative savings and investment it is important to ask whose savings or assets are being liquidated to keep the individual or household consumption levels and whether there will be other mechanisms for those who lose to replace their assets during shocks such as diseases (Meinzen Dick et al., 2011 p, 22).

Women's jewellery for example, is often used to meet family emergencies. Shocks may also have effects that go beyond their (economic) impacts on production or consumption, if such unforeseen events also affect social status, self-esteem, and leadership. For example, death of cattle in many pastoral communities can lead to loss of social status and leadership which is associated with cattle wealth in many contexts (Meinzen Dick et al., 2011 p, 22). This framework served as a reminder of how shocks affect the lives of poor men and women farmers, and to assess the effects of CBPP outbreaks, how men and women control CBPP and the anticipated gendered positive and negative effects of eradicating CBPP. Use of this framework can draw attention to other types of shocks that may affect particular livelihood strategies. For example, if malaria, HIV, or other diseases are a constraint on labor availability. As noted above, women often bear a disproportionate burden for illness shocks, so health interventions may be especially important for gender-equitable participation (Peterman, 2010, p.16).

Figure 2.1: The Gender, assets, and agricultural development programs framework- conceptual model adopted for this study



2.5.2 Relevance of the theory to the study

This framework provided an understanding for this study on how men and women cope with different types of shocks using incomes derived from assets and livelihoods. CBPP disease is a shock affecting women's and men's assets livelihoods and incomes. Cattle are important assets to women and men cattle owners to buffer against shocks such as CBPP disease. CBPP threatens cattle owner's cattle wealth and in many pastoral communities' cattle is one of the main livestock preferred by both men and women because of its high productivity and production output for securing livelihoods for women and men, improving nutrition provided by women and improving men and women's well-being. CBPP threatens women's and men's cattle wealth through cattle mortality and morbidity and reduced market participation.

Women and men are both affected by CBPP outbreaks however the effects are not the same for men and women. CBPP affects men's participation in live cattle markets and meat markets and for women CBPP affects women's participation in milk and milk products markets hence affecting their incomes derived from market participation. CBPP ultimately affects nutrition and incomes, for example, milk is a major source of nutrition for children especially and a means by which women generate income from sale of cattle milk and this income can be used to pay for health care and buy clothes. While men mainly sell cattle and cattle products such as meat, and income from this is spent on children school fees and build better homes.

CBPP is controlled mainly through vaccination, and other methods of control that include quarantine, treatment, and restriction of animal movement are some the control strategies implemented in Kenya by cattle owners. Women and men cattle owners use their incomes to control CBPP. It is widely recognized that women own less cattle wealth than men. Owing to

the gender inequalities in ownership and control of cattle wealth and access to veterinary services, men who own and control more cattle than women are more likely to afford and access vaccines as compared to women. Women often do not have equal amounts of money (incomes) or savings and investments that can be converted to money owing to the gendered differences in access and control of resources especially cattle.

The GAAP framework showed the links between assets and well-being. Eradicating CBPP can benefit both men and women however the benefits vary by gender. Establishing the gender inequalities that interact significantly with the process of disease eradication was necessary and indeed, if there is a gap that exists between the benefits men and women anticipate from eradicating CBPP, it should be closed or, in the least, mechanisms put in place to close it. The first intention was to identify these gaps.

2.6 Assumptions of the study

1. Women are more adversely affected by CBPP outbreaks than men
2. Men respond faster to CBPP outbreaks than women
3. Men will be the greatest beneficiaries from the eradication of CBPP than women

CHAPTER THREE

Methodology

3.1 Introduction

The scope of this research was to gather information on the gendered effects of CBPP outbreaks, gendered response to CBPP control and the anticipated gendered effects of CBPP eradication. This chapter entails a comprehensive approach and procedure of how the study was conducted. A detailed description of the study site, the study design, population, data collection method and data analysis, challenges faced and ethic considerations have been well defined.

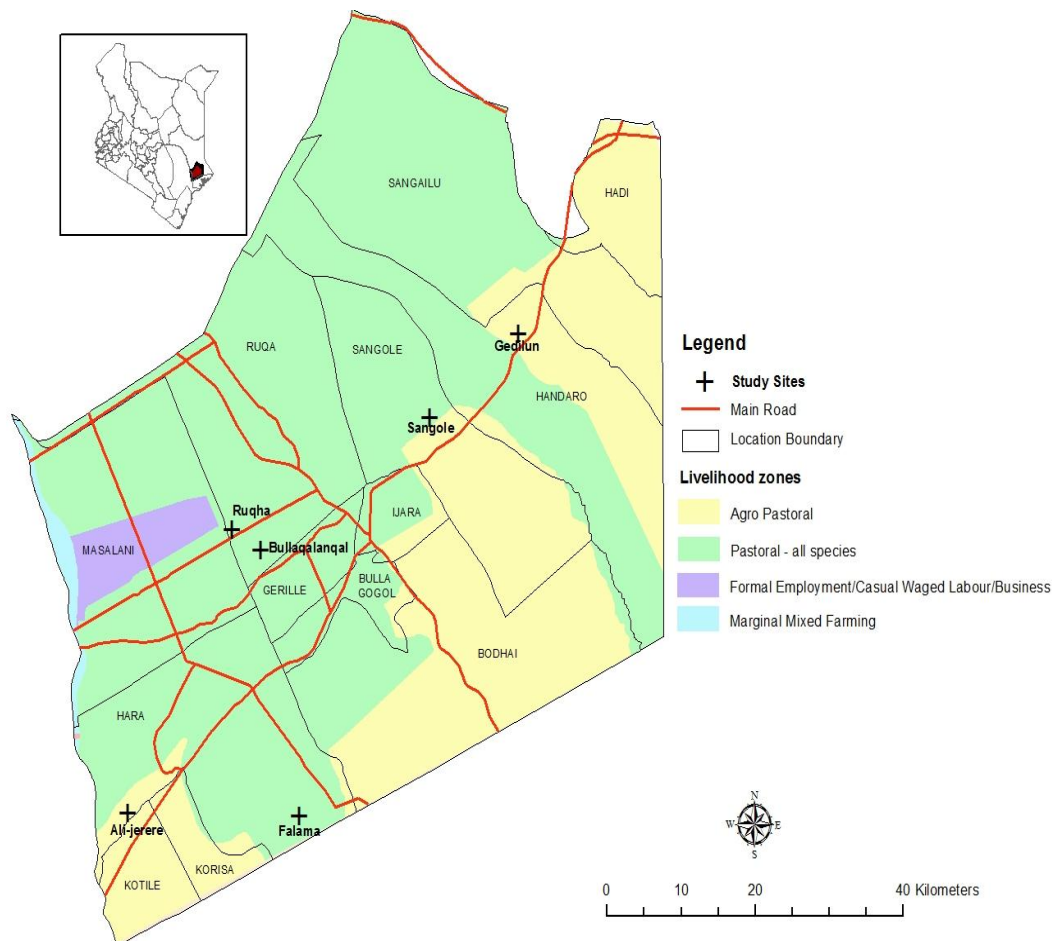
3.2 Research site

The study was carried out in Ijara sub-county of Garissa County (Map 3.1). Ijara sub-county is situated at the South East of Garissa County covering 11,332 square kilometres. The area generally has a flat topography interspersed with undulating plains with low-lying altitude ranging between 0 meters and 90 meters above sea level. The mighty Tana River is an important source of water supply in Ijara sub-county. Ijara sub-county has a total forest cover of 2,484 square kilometres. The mean annual rainfall ranges from 750 millimetres to 1000 millimetres, due to the influence of the coastal winds (MEMR and NEMA, 2013, p.2).

In 2006, Ijara sub-county had a population of 8,969 males and 8,267 females spread out in 17,236 households (MEMR and NEMA, 2013, p.4). Most recently following the 2009 census, Ijara sub-county had a population of 92,633 (KNBS, 2010, p.4). The local community depends on pastoralism for their livelihood as such the economy of Ijara sub-county solely relies on natural resources, especially pasture and water and this has significantly affected the

environment significantly. Cattle are the main source of livelihood source for many households in Ijara sub-county. Ijara sub-county is considered a CBPP endemic zone, with CBPP prevalence and incidence and therefore CBPP threatens the livelihoods of many cattle owners (Wanyoike, 1999, p.5). Livestock production can cause overgrazing which in turn results in land degradation and as a result the ever-declining returns in animal production. Environmental degradation has detrimental impact such as, poor health of livestock, high prevalence of animal diseases, death of animals and thus threatening the livelihoods of livestock keepers driving them into chronic poverty (MEMR and NEMA, 2013, p.9).

IJARA SUB-COUNTY



Map 3.1: Administrative map of Ijara sub-County

(Adopted from MEMR and NEMA, 2013)

3.3 Research design

The study adopted a cross-sectional exploratory research design, to obtain in-depth information on the gendered effects of CBPP, the gendered responses employed to control CBPP outbreaks and the anticipated gendered effects of eradicating CBPP in Ijara sub-county. Ijara sub-county was purposively selected because of CBPP prevalence and incidence and many households depend on cattle for their livelihoods in Ijara sub-county.

3.4 Study population

The study population consisted of pastoralists from Ijara sub-County in Garissa County. The disease primarily affects cattle therefore individuals who owned a minimum number of 10 cattle were selected and participated in the focus group discussions.

3.5 Sampling procedure and sample size

Ijara sub-county was purposively selected based on the fact that the area is a CBPP infected zone and vaccinations against CBPP are carried out in the area. A list of 5 locations and their 15 sub-locations was drawn up where six sub-locations were selected from each one of them (location), using stratified random sampling method. From each sub-location, two focus group discussions were held with a total of 12 (6 men only and 6 women only FGDs). A total number of 127 women and men discussants were interviewed. Discussants in the FGDs were selected purposively based on whether they come from cattle owning households with a minimum of 10 cattle. This was determined by chiefs who identified households in the community with a minimum of 10 cattle. Key informants were purposively selected based on their knowledge and experience on the issues related to the community practices in relation to livestock. Key informants interviewed included administrators e.g. chiefs; livestock professionals: District of Veterinary Officer (DVO); and Paraprofessional e.g. Community-

based Animal Health Workers (CAHW) to provide detailed information on CBPP outbreaks and CBPP control strategies.

3.6 Methods of data collection

3.6.1 Key Informant Interviews

The key informants were carried out to get information about the research questions and also authenticate information obtained from discussants in the FGDs. The key informants were primarily selected because of their knowledge and expertise on the community dynamics, CBPP outbreaks and CBPP control strategies employed by cattle owners in Ijara sub-county. A total of 13 key informants were interviewed and they included chiefs, community animal health workers (CAHW), chairman of district livestock marketing council (DLMC) and the District of Veterinary Officer (DVO). The main objective of this method was to enhance the information provided by the discussants in the FGDs. An informant guide (Appendix 1) was used to conduct the interviews.

3.6.2 Focus group discussion

Focus group discussions (FGDs) were the primary mode of data collection. A total of 12 (6 men only and 6 women only FGDs with 8 to 12 individuals each) were held. A total number of 127 women and men discussants were interviewed. The FGDs were carried out to gain obtain information on the gendered effects of CBPP outbreaks, the gendered responses employed to control CBPP outbreaks and the anticipated effects of eradicating CBPP for men and women cattle owners. Among other topics discussed were the distribution of the population by sex, the main wealth categories and the average family size in male headed household and female headed household. Quantitative data was from the FGDs was collected

using pebble tools (mainly proportion piling). The discussions were conducted with the help of an FGD guide as presented in (Appendix 2).

3.7 Data management and analysis

This study mainly used qualitative method of data collection. Qualitative data was sorted, organized, coded and interpreted. The information obtained from the key informants transcribed and studied to identify the categories of themes to enrich information collected from the focus group. The FGD data was entered into a template. The qualitative data was analysed inductively and larger volumes of narrative information coded and analysed using NVIVO software. NVIVO is a platform for analysing all forms of unstructured data and interrogates data using powerful search, query and visualization tools. The researcher used word frequency queries to list the most frequently occurring words in data and observe data using word clouds. The most frequently mentioned words are in large fonts and least words mentioned are in small fonts. Quantitative data from FGDs was analysed using descriptive statistics including means and proportions and was calculated using formulae available in excel software.

3.8 Problems Experienced in the Field and their Solutions

The study took place in Ijara sub-county, Garissa County where the local spoken language is Somali and for this reason local research assistants from Ijara sub-county were used during the focus group discussion to translate during discussions.

3.9 Ethical considerations

Before the focus group discussion and key informant interviews were conducted, the researcher identified herself and explained the purpose of the study and the importance of

their participation. This was achieved through clarifying the topic of the study and explaining to them the methods that would be used to collect data and also that their participation would benefit them as well as the society at large. In addition, the researcher asked for their consent to be interviewed and assured the discussants of confidentiality and that the information they provided was solely for research purposes. All the focus group discussants participated voluntarily. The researcher employed research assistants from the local communities who were thoroughly trained to assist the researcher ask questions to the discussants because of the language barrier.

CHAPTER FOUR

Gendered effects of CBPP outbreaks, control and eradication

4.1 Introduction

This chapter first presents findings on the background information of the discussants including: the proportion of women, men and children, wealth categories and proportions, household size, the cattle roles and responsibilities by gender and cattle ownership in male and female headed households in Ijara sub-county. This is then followed by presenting findings on the effects of CBPP outbreaks on women and men cattle owners, the different CBPP outbreak control strategies employed by women and men cattle owners and the anticipated positive and negative effects of eradicating CBPP according to women and men.

4.2 Socio-demographic characteristics of discussants

4.2.1 Total number of focus group discussants and the focus group discussion composition

A total of 12 focus groups discussions (6 female and 6 male focus groups) were held, consisting of a total number of 127 women and men discussants. Of the 127 discussants, 61 were women and 66 were men as tabulated (Table 4.1) below.

Table 4.1: FGD composition

Name of location	Number of women	Number of men
Gedilun	12	11
Sangole	8	12
Ali-jarere	9	12
Falama	12	8
Ruqha	10	11
Ruqha bulaqalanqan	10	12
Total	61	66

Source: primary data

4.2.2 Proportion of women, men and children in the community

Women and men discussants were asked to state the proportion of women, men and children in the community and according to women and men discussants there were more children than women and men in the community hence children made up the majority of the population in the community. The ratios indicate that women were 33 percent, and men were 23.5 percent in the community (Figure 4.1).

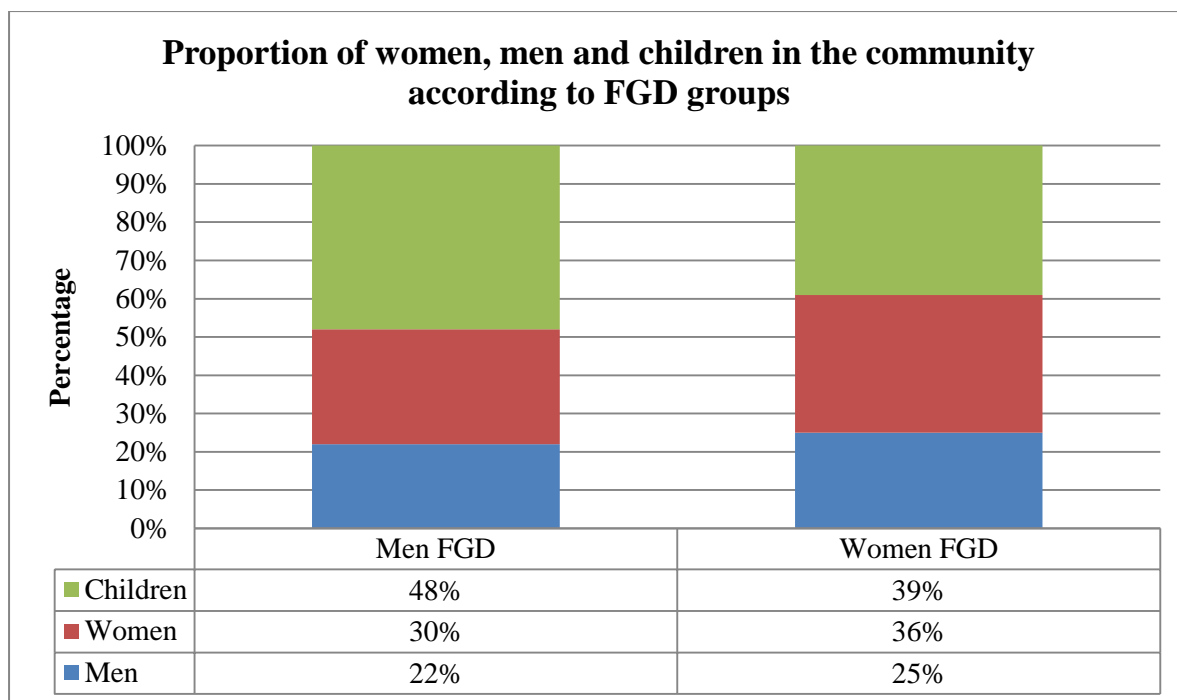


Figure 4.1: Proportion of women, men and children in the community according to FGD groups

Source: primary data

4.2.3 Characterization and distribution of community members by wealth

Overall, according to both women and men in FGDs there were three main wealth categories, namely, rich, medium and poor. Women and men discussants indicated different proportions for all three wealth categories with men indicating that half the population was poor and women indicating that half the population was rich (Figure 4.2).

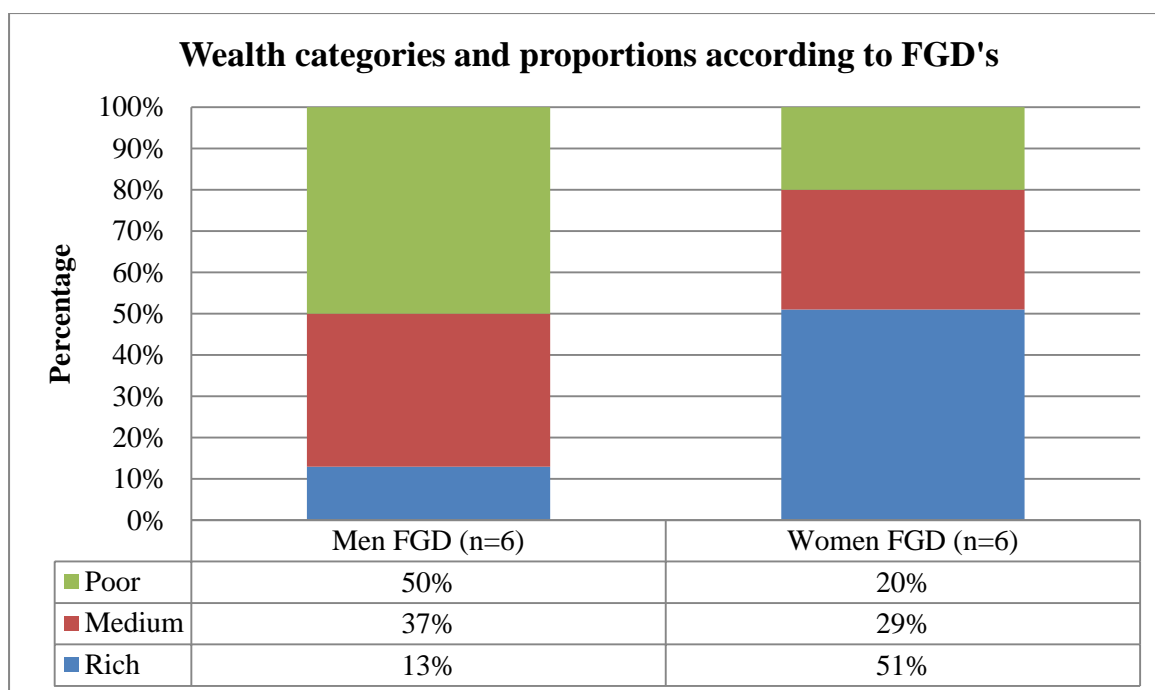


Figure 4.2: Wealth categories and proportions according to FGD groups

Source: primary data

4.2.4 Average family size in female and male headed households

Both women and men in FGDs reported a higher proportion of male headed households (MHH) than female headed households (FHH) in the community (Table 4.2).

Table 4.2: Households size in MHH and FHH according to FGD groups

FGD	MHH	FHH
Men FDG (n=5)	7.6	4.2
Women FGD (n=6)	20.3	9
Average total	13.9	6.6

Source: Primary data

4.2.5 Cattle related activities conducted in a household by gender

Women and men in FGDs were asked to state the different cattle related roles and responsibilities done by women and men in the community. According to women and men discussants there were some specific cattle related activities that were carried out by men only, others by women only and still others jointly by women and men (Table 4.3).

Table 4.3: Cattle related activities by gender

Activities by men only	Activities by women only	Activities by men and women
Herding	Milking	Removing thorns
Selling cattle	Selling milk	Taking care of sick cattle
Treatment	Feeding calves	Treatment
Vaccination	Fencing calf boma	Dipping/spraying
Dipping/spraying	Fetching water for cattle	Building the cattle boma
Branding	Cleaning the boma	Separating calves from herd after herding
Castration	Taking care for sick cattle	
Hoof trimming		
Pasture management		

Source: primary data

4.2.6 Average number of cattle in male headed households and female headed households

According to women and men discussants there were more cattle owned in male headed households (MHH) than female headed households (FHH) (Table 4.4).

Table 4.4: Average number of cattle in MHH and FHH

Focus Group Discussion	Average number of cattle owned by household	
	MHH	FHH
Men FGD (n=6)	39.25 (n=4)	5.25 (n=4)
Women FGD (n=5)	82	36

Source: Primary data

4.3 The different gendered effects of CBPP outbreaks

4.3.1 Effects of CBPP outbreak on households

Women and men discussants identified six main effects of CBPP outbreaks on households. The first effect was a reduction in cattle productivity, the second effect was a reduction in market participation, the third effect was poor living standards, the fourth effect was cattle mortality, the fifth effect was a reduction in social activities in the community and the last effect was expenses incurred in taking care of sick cattle.

Reduction in cattle productivity: Women and men discussants said that a reduction in cattle productivity was an effect of CBPP outbreaks (Figure 4.3). Cattle productivity was characterized by a reduction in milk production and was associated with a lack of appetite and loss of weight. This resulted in reduced consumption of milk and meat by household members. Milk and meat contributed to household diets according women and men discussants. Milk compared to meat was affected more by CBPP. A sick and unhealthy cow does not produce the same quantity of milk it does when healthy. There was an agreement between women and men discussants, that CBPP mainly affects milk produced by cattle as shown in the following excerpts:

‘.....An unhealthy cow produces lower milk yields than a healthy cow’ (45 years old male. FGD, Sangole, sub-location).

‘.....Milk is the most affected cattle product by CBPP’ (36 years old female. FGD, Ruqha, sub-location).

The loss of weight was associated with the lack of appetite because sick cattle usually lose weight because they have decreased appetite. Pastoral women in Ijara sub-county determine what proportion of milk is to be provided for household members. Pastoral men in Ijara sub-

county are in charge of meat from cattle hence determine what proportion of meat will be sold most importantly and then the remainder consumed by household members.

Reduction in market participation: Women and men discussants stated that CBPP causes a reduction in market participation by women and men cattle keepers (Figure 4.3). CBPP outbreaks can bring economic losses for many women and men cattle keepers who largely depend on cattle for their livelihoods. The effects of CBPP outbreaks in terms of productivity include a reduction in milk yields. Marketing milk in Ijara sub-county is exclusively the responsibility of women and they decide what proportion of milk will be sold in markets. Cattle mortality also hinders the number of live cattle that can be sold in markets by men. Marketing of live cattle is mainly the responsibility of pastoral men in Ijara sub-county.

Men and women cattle keepers cannot sell cattle and cattle products (milk) infected with CBPP. If they do sell the cow it usually sells at a low price because the cow is emaciated, hence the value of the cow reduces in the market, and this is was also associated with reduced incomes. Cattle infected with CBPP are usually restricted to move especially in international markets because of the contagious nature of the disease and also because of the strict regulations in international markets according to women and men discussants.

Cattle mortality: According to women and men discussants, CBPP was cited as the most important disease affecting cattle because it causes high mortality losses of cattle (Figure 4.3). During women and men discussions it was very clear that CBPP was a very important disease affecting cattle owners as shown in the following excerpts:

‘.....CBPP is the most important cattle disease in this area’ (32 years old female.

FGD, Ali-jerere, sub-location)

‘.....Compared to other cattle diseases, CBPP is most important cattle disease’

(38 years old male. FGD, Sangole, sub-location)

Cattle mortality included the loss of herds through deaths and abortions by sick animals with CBPP. Cattle mortality was also intrinsically linked to milk and meat losses, a reduction in participation in milk and live cattle markets by women and men, loss of income and an increase in poverty according to women and men discussants.

Poor living standards: The effects of CBPP outbreaks such as a reduction in cattle productivity and market participation, increase in cattle mortality and the cost of CBPP control measures resulted in poor living standards (Figure 4.3). This was characterised by a reduction in enrolment of children in schools owing to lack of school fees and also poor living conditions. When women fail to sell milk and when men fail to sell live cattle because of CBPP they do not generate income and both cannot contribute money towards paying school fees, though women’s contributions may be minimal because compared to live cattle, milk fetches a lower price in markets.

The main strategy of controlling CBPP is vaccination according to women and men discussants. However men and women have adopted alternatives for controlling CBPP which include quarantine and treatment. These strategies are expenditures that men and women incur. Money spent to control CBPP outbreaks can be utilised much better, for example, ensuring that boys and girls get quality education. Men discussants indicated that building better homes (stone houses) for their families was hindered by the death of cattle. It was evident that cattle are an important asset for households in Ijara sub-county because it is a means of generating income and improving their lives as stated below by one of the men discussants:

‘.....life can become more difficult and people are forced to live in poor conditions because they cannot afford to build better homes because of CBPP’ (55 years old male. FGD, Falama, sub-location).

Reduction in social activities: Both women and men discussants stated that CBPP causes cattle mortality therefore causing a reduction in cattle dependent social activities such as marriages and gifting of cattle to religious leaders and family members(Figure 4.3). Marriages and gifting of cattle are important traditions in the Somali communities. Cattle constitute the main source of dowry in Ijara sub-county. Herd quarantines prevent transmission and spread of CBPP for example and this affects socio-cultural activities within the community such as gifting cows to *duksi* sheikh for educating children on Islam as stated by women discussants. *Duksi* is a Quranic (pre) school for children practiced widely by the Somali. It was evident that marriage is an important part of culture in Ijara sub-county as illustrated below according to discussants who stated that:

‘.....the number of marriages in the community will reduce, because cows are a source of payment for dowry’ (55 years old male. FGD, Gedilun, sub-location)

‘.....CBPP causes death of cattle and this will have an impact on the number of marriages in the community, which will reduce, because many young boys who intend to get married depend on cows as a major source of payment for dowry’ (50 years old female. FGD, Gedilun, sub-location).

Expenses incurred in taking care of sick cattle: Cattle with CBPP are usually very weak and have reduced draught power. Women and men discussants reported additional expenses incurred by households because cattle owners sometimes hired labourers to assist in taking care of sick cattle and they also spend money on vaccination and treatment of sick cattle (Figure 4.3). An unhealthy cow is too weak to walk for many hours in search of food and

water. Men and women discussants stated that taking care of sick cattle was an activity done by women and men. Women fetch water for sick cattle according to women however it was not reported if men provided feed and water for sick cattle and neither was it reported if women also provide feed/fodder for sick cattle.

Treatment as control strategy was considered an expense by women discussants, though women did not state how much treatment costs. CBPP is a contagious disease and usually an entire herd has to be vaccinated twice in a year. This is usually considered expensive by women. An expensive vaccine was one of the financial challenges women faced in vaccinating cattle. There was a consensus amongst women discussants that the current CBPP vaccine was too expensive as shown below:

‘.....the estimated cost of vaccinating a cow is 25 Kenya shillings and it is required that a cattle owner must vaccinate twice a year’ (32 years old female. FGD, Ruqha bulaqalanqan, sub-location).

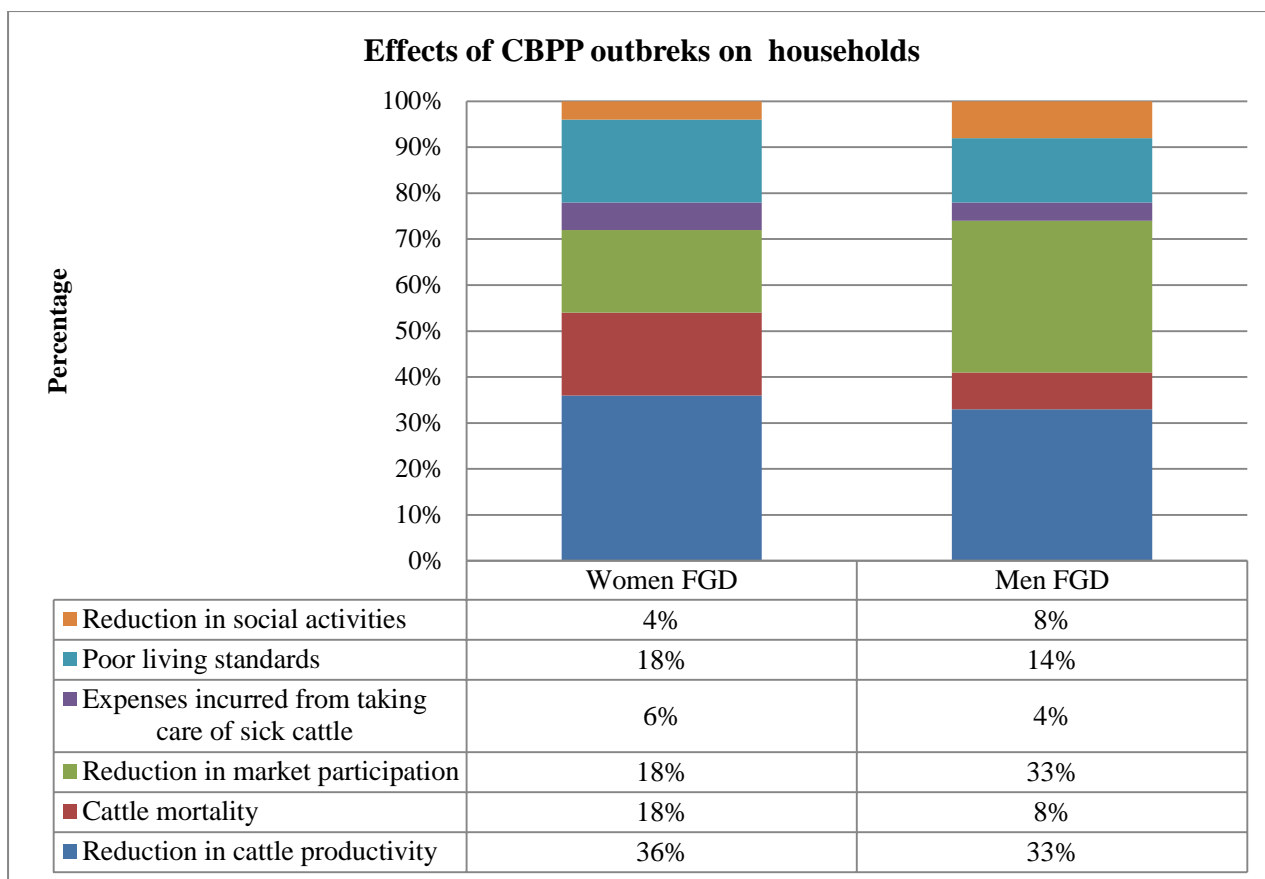


Figure 4.3: Effects of CBPP outbreaks on households

4.4 The gendered responses in relation to CBPP outbreaks and control

4.4.1 CBPP control strategies by men and women FGDs

Women and men discussants stated that there are four main strategies employed by women and men cattle owners to control CBPP outbreaks. These include vaccination, treatment, quarantine and prayers. However, the control strategies adopted depend on the importance and the challenges women and men discussants place for each strategy. Vaccination is the most preferred control strategy of controlling CBPP outbreaks. A high proportion of cattle owning households vaccinate cattle against CBPP and this can be linked to the benefits women and men discussants derived from vaccinating cattle against CBPP. A low proportion

of cattle owning households do not vaccinate cattle. Women and men discussants faced different challenges of vaccinating cattle against CBPP. Women and men discussants were also asked to recommend characteristics of an ideal CBPP vaccine.

4.4.2 Vaccination

Proportion of cattle owning households that vaccinate their cattle and proportion that does not if an outbreak is reported (CBPP): Both women and men discussants reported that a high percentage of cattle owning households vaccinate their cattle against CBPP, though men discussants reported a higher proportion than women discussants (Figure 4.4). Women and men discussants reported that a high proportion of households vaccinate cattle because of their knowledge of the disease and its impact on cattle production and productivity. Both women and men discussants reported that vaccinating cattle against CBPP can increase cattle productivity and reduce cattle mortality.

The high proportions of cattle owning households that vaccinate cattle against CBPP can be associated with the benefits women and men derived from vaccinating cattle. Men discussants reported that a very low proportion of cattle owning households do not vaccinate cattle against CBPP because at the time of vaccination, cattle owners who fail to vaccinate may have moved to another location during vaccination owing to transhumant nomadic system of production. Calves less than six months old are normally not vaccinated against CBPP because they may have neutralizing antibodies against the vaccine especially if their mothers had been vaccinated during pregnancy. A key informant from Ijara sub-county indicated that the timing of vaccination is important as shown in the following excerpt:

‘.....In the dry season when the roads are passable, cattle are moved in search of pasture, therefore the best time to vaccinate is immediately after the rains once the

roads are impassable and there is still pasture' (32 years old male. Community-based animal health worker, Sangole sub-location).

Women discussants also stated a low proportion of cattle owning households do not vaccinate cattle because of financial constraints and inaccessibility of the vaccine. Sometimes cattle owners may also fail to vaccinate cattle herds that were not affected during a previous CBPP outbreak (Figure 4.4).

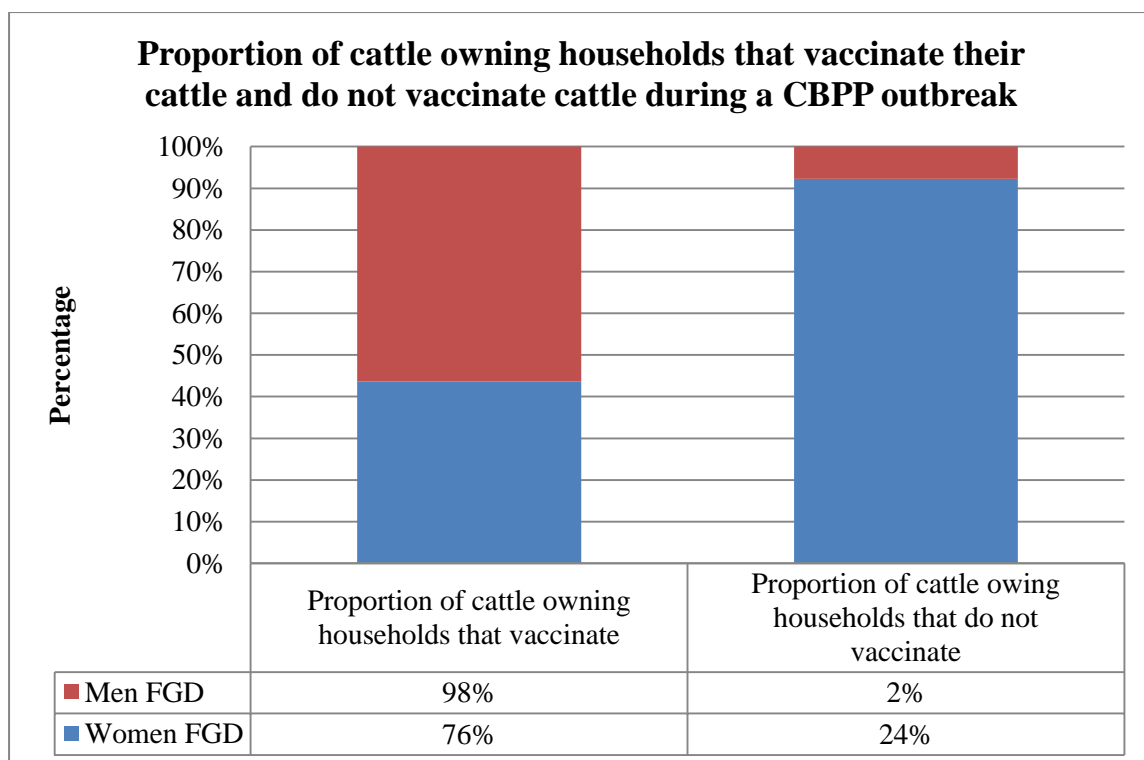


Figure 4.4: Proportion of cattle owning households that vaccinate their cattle and do not vaccinate cattle during CBPP outbreak

Benefits of vaccinating cattle against CBPP by women and men FGDs: A NVIVO word cloud was used to illustrate the most frequently mentioned words in word frequency queries. Words in large fonts are the most frequently mentioned words and least mentioned words are in small fonts. An increase in milk yield by cattle according to six women and five men FGDs was the most frequently stated benefit of vaccinating cattle as shown in large fonts in

the word cloud (Figure 4.5). The second most frequently mentioned benefit of vaccinating cattle by five women and four men FGDs was improvement of cattle health. The third most important benefit of vaccinating cattle was selling cattle mentioned by three women FGDs whereas two men FGDs stated that the market value of cattle increased.

Women FGD

Men FGD



Figure 4.5: Benefits of vaccinating cattle against CBPP

Challenges of vaccinating cattle against CBPP: In order of frequency of mention, according to six women FGDs the main challenge associated with CBPP vaccination, was the occurrence of post-vaccination reactions while five men FGDs mentioned the main challenge was unavailability of the CBPP vaccine as shown in large fonts in the word cloud (Figure 4.6). The second challenge of vaccinating cattle against CBPP mentioned by five women FGDs was that the CBPP vaccine was expensive. Four men FGDs stated poor roads in Ijara sub-county made it difficult to access the vaccine. The third most frequent mentioned challenge faced by three women FGDs in vaccinating cattle against CBPP was that cattle owners could not access the vaccine, but for three men FGDs the lack of veterinary officers,

to vaccinate cattle against CBPP was mentioned as the third challenge (Figure 4.6). Key informants stated that there are challenges in vaccinating cattle against CBPP as shown in the following excerpts:

‘.....CBPP vaccine is administered at the tip of the tail and an improvement in cattle health may be associated with tail falling off’ (46 years old female. Community-based animal health worker, Sangailu, sub-location).

‘.....Even after confirmation of a CBPP outbreak, there may be no available vaccine’ (33 years old male. Community-based animal health worker, Gedilun, sub-location).

Women FGD

Men FGD

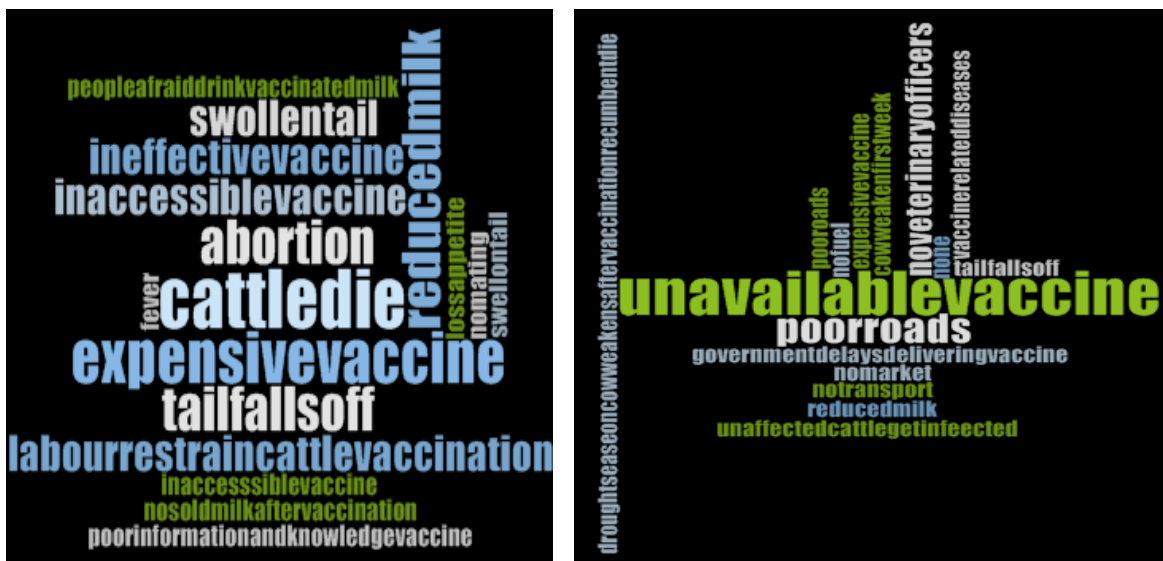


Figure 4.6: Challenges of vaccinating cattle against CBPP

4.4.3 Alternative strategies of controlling control CBPP

Other strategies employed by women and men cattle owners to control CBPP outbreaks to vaccinating cattle against CBPP included treatment, quarantine and prayers. The four most popular alternatives to vaccinating cattle against CBPP listed by the women discussants were

as follows: quarantine, treatment, prayers and dipping while for men discussants prayers were the most popular alternative to vaccinating cattle against CBPP. Quarantine and treatment were also popular alternatives according to men discussants (Figure 4.7).

Prayer was one of the most popular alternatives to vaccinating because prayers heal cattle according to women and men in FGDs. Women and men discussants stated that quarantine prevents transmission and spread of CBPP. Treatment according to women discussants was an effective alternative to vaccination because the administration of local drugs such as, capsules, novidium and trypanocides improved the health of cattle. Treatment using local drugs was considered popular owing to the fact that they were readily available and affordable for many cattle owners according to women discussants. According to men discussants treatment using capsules such as amoxicillin was considered a popular effective alternative which had been used for many years as it helped treat the disease however only to a certain extent and cattle do get some relief. It should be noted that novidium, trypanocides and amoxicillin are not used to treat CBPP. Tylosin, tetracyclines and sulfadimidine are the main treatment drugs in use today and they can be effective in modulating clinical symptoms and progress of disease.

Dipping kills and reduces the number of ticks in infected cattle as reported by women discussants, however, it should be noted however that dipping is not effective in controlling CBPP, it only provides relief to sick cattle to a certain extent (Figure 4.7).

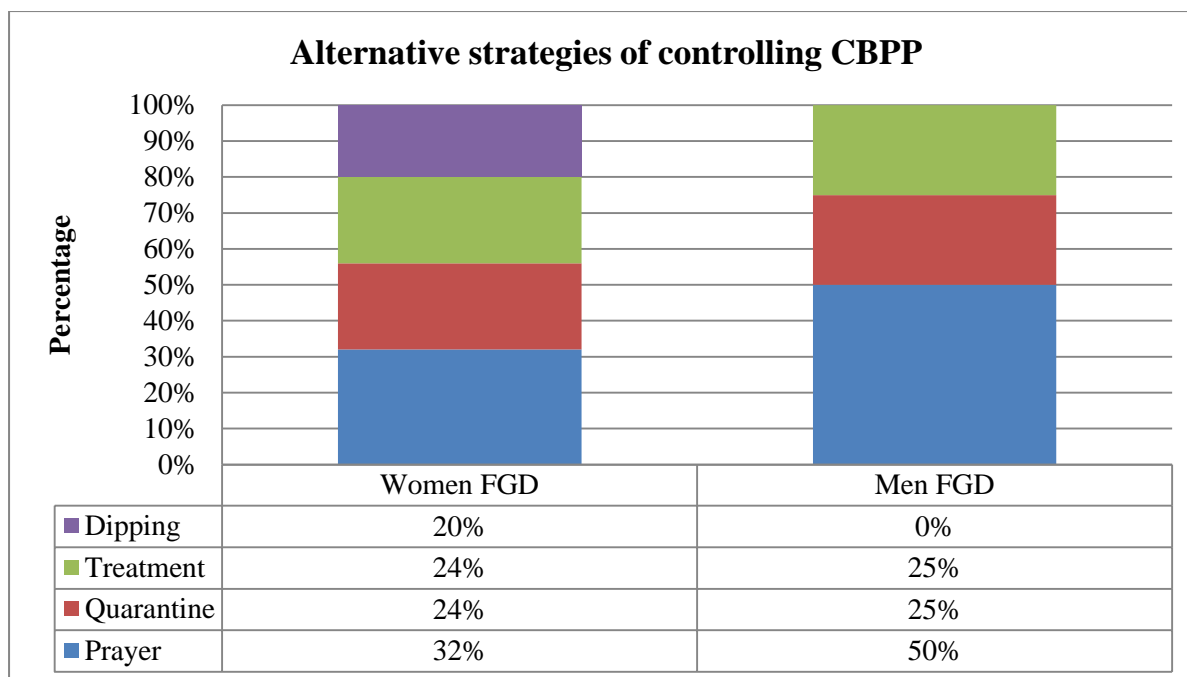


Figure 4.7: Alternative strategies of controlling control CBPP

Challenges of the alternatives to vaccinating cattle against CBPP: All six men FGDs stated that prayer and reading the Quran cannot be considered a challenge because it is the best alternative as it demonstrates God’s will for the cattle. One of the women FGD stated that praying for sick cattle does not always work and sometimes cattle die even after praying. Three women FGDs stated that treating infected cattle with CBPP was a main challenge. Sometimes treatment could cause cattle death because of the ineffectiveness of medicine used. Moreover one has to use the antibiotic more than three times so that the cow gets better. Two of the FGDs stated that spraying with acaricides (what was referred to as dipping) was a challenge because in some cases the cattle reacted negatively (cattle react to the acaricides). Communal cattle dips were almost nonexistent and also the crushes to restrain animals during spraying were few. However, it is noted that dipping is not considered an effective strategy of controlling CBPP it only provides some relief to cattle but to a small extent, it does not control the disease.

4.4.4 Community recommended characteristics of an ideal vaccine

Women and men FGDs were told that scientists were currently working on a new CBPP vaccine and the scientists would like to know what preferred characteristics they would like to have in the new vaccine. In order of frequency of mention, the most appropriate and desirable characteristic of an ideal vaccine, was a safe vaccine according to six women FGDs, while according to six men FGDs it was an efficacious vaccine. A safe vaccine for example will not cause the tail to fall off, a reduction in milk produced, cattle death and no abortions. An efficacious vaccine will eradicate CBPP completely and protect cattle annually or every two or three years (Figure 4.8).

In order of frequency of mention, an affordable vaccine was considered to be the second most appropriate and desirable characteristic of an ideal vaccine according to five women FGDs. The second most important appropriate and desirable characteristic in order of frequency of mention was a safe vaccine according to four men FGDS (Figure 4.8). According to women discussants an affordable vaccine should cost less than 25 Kenya shilling. A safe vaccine according to men discussants will not cause the tail of a cow to fall off and will not cause a reduction in milk produced. In order of frequency of mention, an efficacious vaccine was considered the third most appropriate and desirable characteristic of an ideal vaccine according to three women FGDs. An efficacious vaccine will mean cattle owners will vaccinate cattle annually or every two or three years or more according to women discussants.

Women FGD

Men FGD

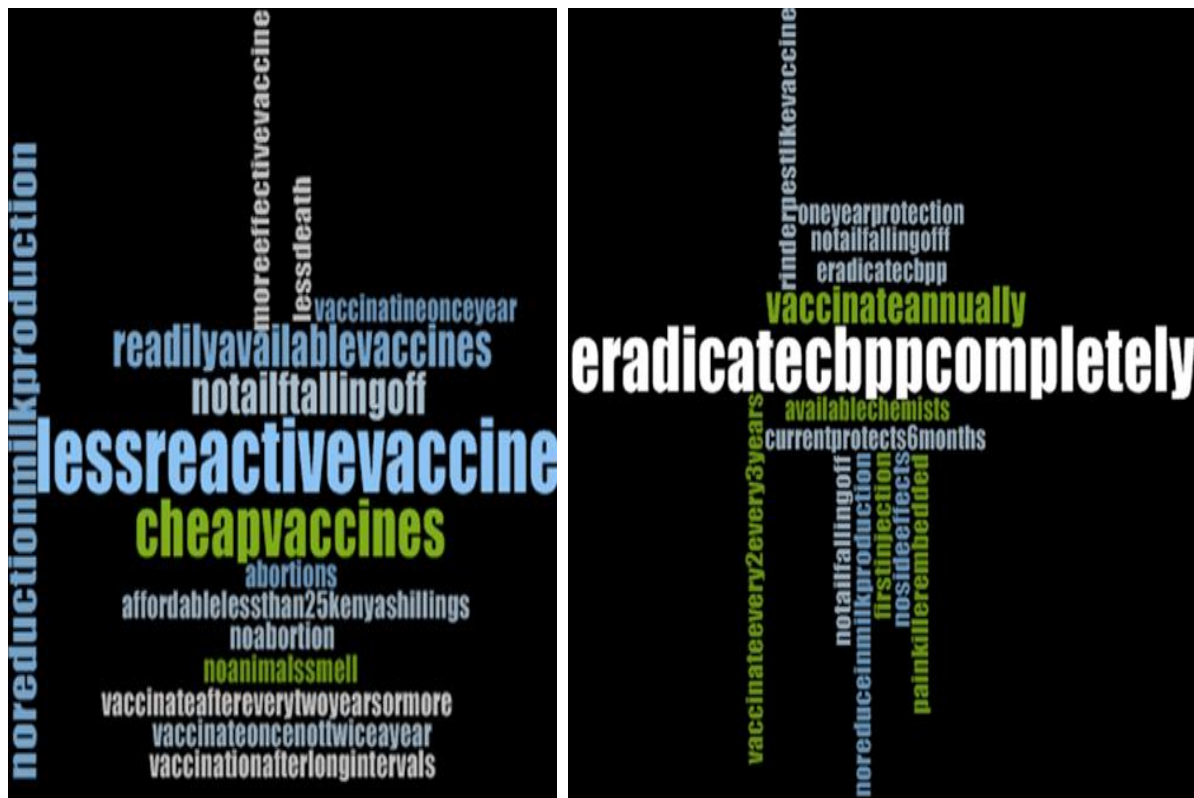


Figure 4.8: Desirable characteristics of an ideal CBPP vaccine by gender

4.5 The anticipated positive and negative effects after eradicating CBPP

Asked to envisage a hypothetical situation where CBPP has been eradicated through vaccination women and men discussants were asked to describe how their lives might change in a positive and negative way. The responses were then represented artistically in participatory impact diagrams (Figure 4.9 and 4.10). The impact diagram begins with the CBPP vaccine at the center. The right side of the diagram, are all the positive effects (+ve) of eradicating CBPP for women and men and on the left side of the diagram, are all the negative effects (-ve) of eradicating CBPP for women and men with the diagrams illustrating the effects and with brief description of the effect. Women and men discussants discussed the long-term changes because positive and negative effects are seen 10-15 years after eradicating disease through vaccination.

Anticipated positive and negative effects of eradicating CBPP: Five women and six men FGDs said that an increase in cattle production and productivity and this consisted of more calves were the positive effects of eradicating CBPP. With more calves, their cattle herds would increase, creating more cattle wealth (Figure 4.9 and 4.10). With an increase in milk yields from increased cattle numbers six women FGDs said they had enough milk to distribute to household members and also sell milk in markets (Figure 4.9). Selling milk and cattle was predominantly a woman's and man's responsibility respectively in Ijara sub-county. With increased cattle numbers, women and men participate actively in markets according to two women and two men FGDs. According to six women FGDs, when women have increased milk yields and sell surplus milk in markets, men become exceedingly jealous of the woman's wealth as stated by women discussants:

'.....our husbands are very jealous because we can afford to buy nice clothes and look beautiful' (37 years old female. FGD, Ruqha bulaqalanqan, sub-location).

According to five women and two men FGDs one of the anticipated positive effects of eradicating CBPP was going for Hajj owing to increased cattle wealth therefore women and men would be to afford to go for Hajj. Hajj is an Islamic pilgrimage to Mecca and the largest gathering of Muslim people. One of the discussants in the women's FGDs stated the following:

'...an increase in cattle wealth is a chance for good and obedient wives to be taken by their husbands to "HAJJ"' (41 years old female. Falama, sub-location).

All six men FGDs said that one of the advantages of increased cattle wealth was that older and younger men in the community can marry. Moreover men discussants said that:

‘.....The more cattle wealth a man has, the more women he can marry’ (49 years old male. FGD, Ruqha, sub-location).

Men in the community can have more than one wife, having up to four wives simultaneously and this is allowed in Islam religion according to five men FGDs. Because men are polygamous and religion allows men to marry more than one wife, women and men discussants said that this may result in a series of failed marriage in the community. Three women FGDs said that older wives have to share scarce resources with the new wives and this may result in conflict between husband and older wives, because husbands have to intervene during conflict between wives and this may cause a strain in the relationship with his first wife. Women discussants stated that:

‘.....We feel ignored by our husbands because he spends more time with his new wife’ (47 years old female. FGD, Alijerere, sub-location).

Three men FGDs said that when a man marries again, his old wife, complains that he is spending too much time with his new wife than her and this causes conflict between husband and old wives over new wives. If married men fail to get along with their old wives, the marriage usually fails (Figure 4.9 and 4.10). Men discussants stated that:

‘.....We are stressed by our wives and we suffer from high blood pressure because of the fighting between old and new wives’ (49 years old male. FGD, Sangole, sub-location).

According to two women and two men groups, eradication of CBPP may result in the improvement in the well-being for cattle owning households in terms of better nutrition and improved health status among men, women, and children household members. Eradication of CBPP can lead to the following anticipated positive effects owing to increased cattle wealth according to two women and two men FGDs: cattle owners can build better permanent stone houses, cattle owners would not be financially constrained to educate their children and even take them to private school, families can seek medical care from private hospitals and cattle owners can diversify their incomes, buy opening business such as shops (Figure 4.9 and 4.10).

A negative impact of increased cattle numbers according to two women FGDs and two men FGDs was cattle owners have surplus milk produce and more cattle to be sold in markets. The demand for cattle products and cattle however, is very poor. Poor cattle markets affect the value of cattle and the livelihood of cattle owners because surplus supply of cattle products may exceed consumer demand and cattle owners may be forced to sell their cattle products at a lower value. Additionally, with an increase in cattle numbers, two men FGDs said that cattle owners may be forced to compete over pasture owing to increased in cattle numbers (Figure 4.10).

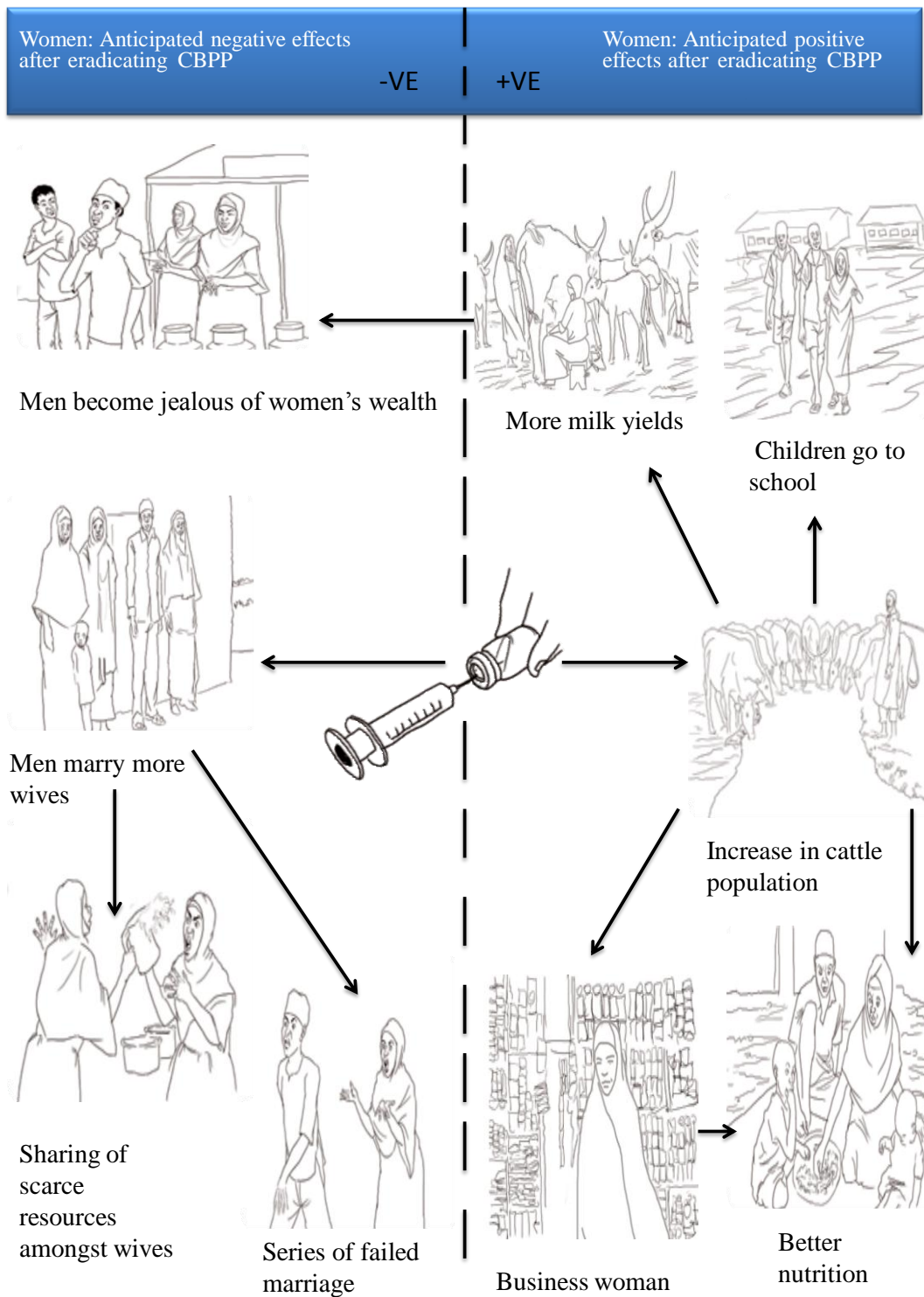


Figure 4.9: Anticipated positive and negative effects of eradicating CBPP according to women

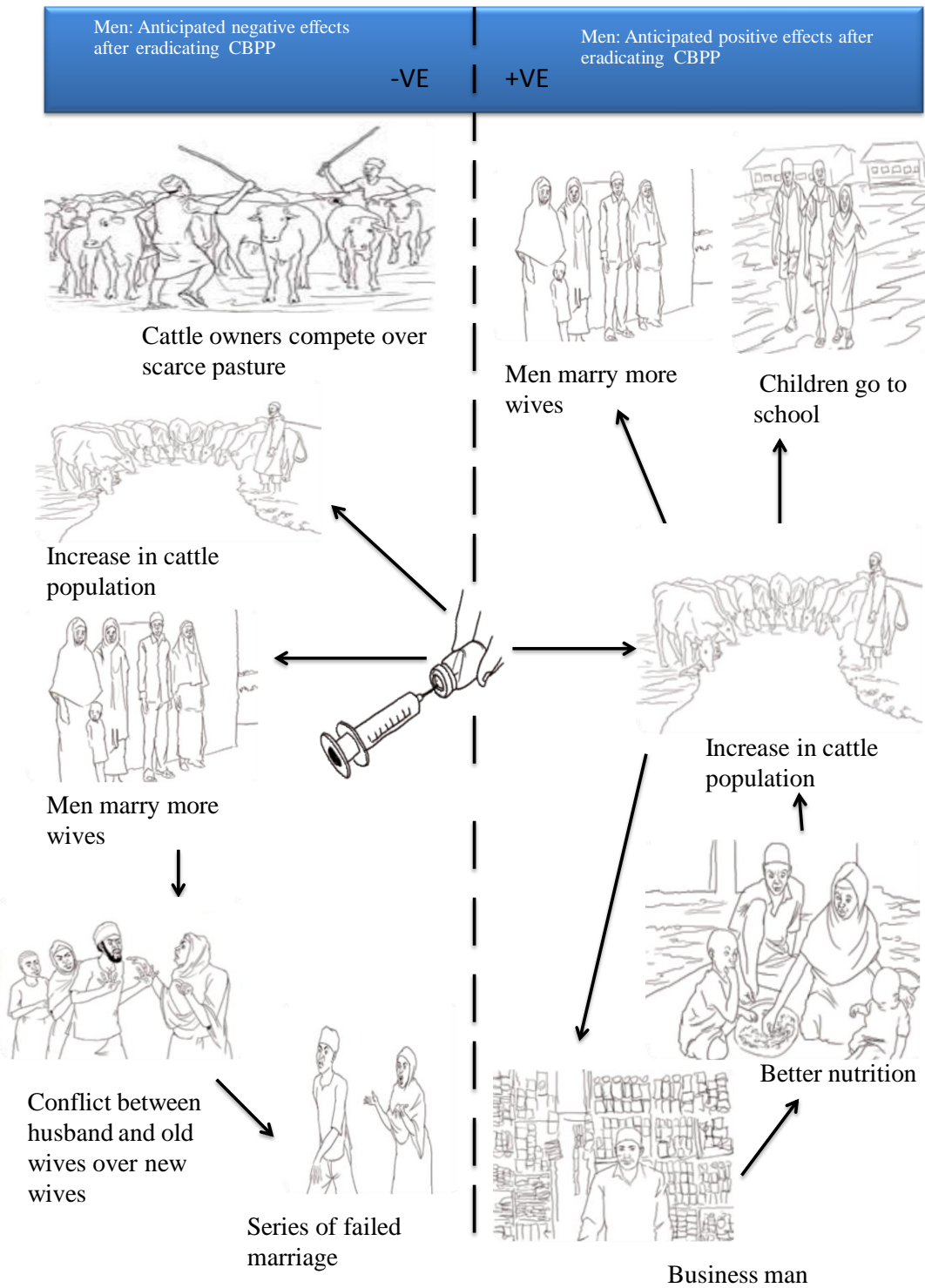


Figure 4.10: Anticipated positive and negative effects of eradicating CBPP according to men

CHAPTER FIVE

Discussion, Conclusions and Recommendations

5.1 Introduction

This chapter presents the discussion of the findings on the gendered effects of CBPP outbreaks, control strategies employed by women and men and the anticipated gendered effects of eradicating CBPP in Ijara sub-county, Garissa County. Conclusions and recommendations of the study are also included in this chapter.

5.2 Discussion

The main themes of the discussion in this sub-section are the gendered effects and responses in relation to CBPP control and the anticipated gendered effects of eradicating CBPP.

5.2.1 Gendered effects of CBPP outbreaks

Reduction in cattle productivity: The results from this study show that CBPP is a threat to food security owing to a reduction of milk and meat produced by cattle. Women are responsible for providing milk for household consumption. Milk is a source of protein and CBPP affects women's ability to ensure a sufficient intake of milk by household members and this causes a nutrition deficit especially for children because milk is essential for children's development. Nori (2010) argues that women decide how much milk to give to children and to other people within the household (p.9). CBPP also affects consumption of meat by household members and according to Smith et al., (2013) meat is one of the best sources of high quality protein and micronutrients that are essential for normal development and good health (p.2). The lack of appetite and loss of weight in cattle resulted in a reduction in consumption of milk and meat by household members. Tambi et al., (2006) indicated that

infected adult males and reproductive female cattle were assumed to lose a daily weight of 0.063 kilograms for a period of 183 days (p.10).

Reduction in market participation: Task wise women are mainly responsible for marketing milk and milk products (butter, cheese and ghee), while men are mainly responsible for selling live cattle in markets. CBPP causes a reduction in milk produced and hence a reduction in the amount of milk sold by women. It causes mortality losses to cattle hence a reduction in the numbers of live cattle sold by men therefore affecting income generated by men and women. Sick cattle and cattle products do not sell well in markets, while recovered but emaciated cattle and their products tend to fetch a lower price in markets.

Restricted movement of cattle with CBPP is a loss of market opportunities and improved livelihoods for women and men cattle keepers to participate in lucrative trade. A report by IFAD (2009) stated that CBPP affects market participation by limiting cattle owners to tap into both local and global markets, because of stringent sanitary standards for international trade in livestock and livestock products consequently limiting export of cattle products to profitable international markets (p.4).

Cattle mortality: Cattle mortality affects women and men differently especially the livelihoods of men and women. For women, CBPP mortality causes a complete loss of the amount of milk produced for household consumption and markets. Tambi et al., (2006) stated that the loss in milk was estimated from reductions due to dead cows that no longer produce milk therefore affecting income derived from sales of milk (p.12). Cattle mortality reduces the number of cattle population in a herd and additionally limits men's participation in live cattle markets hence affecting their livelihoods. Tambi et al., (2006) stated that in 2006, 3,033 cattle deaths were reported in Kenya caused by CBPP (p.16). Extrapolations from Thomson

(2005), indicate that the livelihoods of about 1.3 million Kenyans (4.6 percent of the population) are at risk from the effects of CBPP (p.10).

Poor living standards: Results from this study indicate that CBPP causes a reduction in cattle wealth and productivity which is linked to a reduction in market participation of live cattle and cattle products by men and women respectively. This is a missed opportunity for women and men to generate incomes which can be used to educate their children, improve household nutrition and build better homes. Based on the existing traditions on roles, men provide proper homes and school fees from cash income from sale of cattle. Women normally spend their money on their children's school fees (Allendorf, 2007, p.2; and Quisumbing, 2003, p.4).

Reduction in social activities: CBPP affects the number of marriages owing to a reduction in cattle numbers. Polygamy is a common practice in IJara sub-county. It is important for a man to have cattle wealth which acts as a source of dowry if he is to marry up to four wives. Women reported that CBPP affects socio-cultural activities such as gifting cows to *duksi* sheikh. A report by FAO (2012) stated that livestock such as cattle are necessary and or a requirement for entering into marriages. Livestock such as cattle continue to be part of bride-wealth or dowry, hence are considered important for many households (p.8). CBPP also affects the social welfare of cattle keeping communities. Pastoralists culturally exchange livestock for a number of reasons including dowry, loans, gifts and support in times of losses (Twinamasiko, 2002, p.15).

Expenses incurred in taking care of sick cattle: Both men and women care for sick cattle. Women provide water to sick cattle according to women though it was not reported if men provided feed and water for sick cattle. Men are typically responsible for cutting branches for home feeding, while women are responsible for providing both feed/fodder and water for sick

animals (Twinamasiko, 2002, p.12; IFAD, 2012, p.16). Cattle owners may need to hire labourers to assist cattle owners take care of sick cattle. In the case that extra labour or time is needed to take care of sick animals, other activities (both social and economic) have to be abandoned and extra resources sought owing to CBPP outbreaks. Often, women who take care of the sick as well as the family may be required to work for extremely long hours (Twinamasiko, 2002, p.10).

5.3. The gendered responses in relation to CBPP outbreaks and control

Vaccination: It was evident from this study that both men and women consider vaccination the most effective means of controlling CBPP as shown by the high proportions of households that vaccinate cattle against CBPP. Biologically, CBPP affects production through mortality (reductions in cattle numbers) and reduced productivity (lowered milk production, reduction in draft power, reduced fertility) (Tambi et al., 2006, p.9). Vaccinating cattle against CBPP can increase cattle productivity in terms of increase in milk yields and reduce cattle mortality and increase in cattle wealth.

The high proportions of cattle owning households that vaccinate cattle against CBPP can be linked to the benefits women and men derived from vaccinating cattle against CBPP. The main benefits of vaccinating cattle according to women were an increase in milk yields, more cattle sold in markets and improvement in cattle health, while for men increase in milk yields, improvement in cattle health and increased value of cattle in markets were the main benefits of vaccinating cattle (Tambi et al., 2006, p.11).

Findings from the study show that a very low proportion of households owning cattle did not vaccinate their cattle mainly because at the time of vaccination, cattle owners had moved to

another location, consequently, failing to vaccinate their cattle according to men. Mariner et al., (2006b) argued that though pastoralists clearly recognize that CBPP is contagious and that cattle movement is a major risk factor for the disease, pastoralists' relative importance of movement in the production systems may be more important to their pastoral livelihoods than the impact of CBPP (p.77). Men reported that calves younger than six months should not be vaccinated. This is contrary to a recommendation by the manufacturer for, the current vaccine in use that calves younger than two months should not be vaccinated (Masiga et al., 1998; Egwu et al., 1996).

Women also reported that low proportions of cattle owning households do not vaccinate cattle because failure by the owner's four main reasons: financial constraints, inaccessibility of the vaccine and sometimes failure of the owners to vaccinate cattle because they were not affected during previous CBPP outbreaks. Financial constraints also affected the ability of cattle owners to purchase the CBPP vaccine as reported by women. Women reported that vaccination is estimated to cost 25 Kenya shillings per cow and vaccination is twice a year. Waithanji et al., (forthcoming) indicated that currently farmers need to vaccinate their cattle twice a year and a dose of CBPP vaccine is estimated to cost between 15 to 25 Kenya shillings. Women have a lower cattle wealth than men and since cattle are the main livelihood source, women are less likely than men to afford the vaccine (Kristjanson et al., 2010; p.9; Njuki and Mburu, 2013, p.21).

Women reported that inaccessibility of the CBPP vaccine was one of the reasons some households owning cattle did not vaccinate cattle. Accessibility plays an important role in determining adoption of CBPP vaccination by cattle owners. Women have less access to public and private livestock services than men, especially because veterinary services are increasingly being privatized (World Bank et al., 2009, p.652). Women have limited

mobility, gender roles and relations, and access to cash and credit all affects women's access to the CBPP vaccine (World Bank et al., 2009, p.653). Some cattle owning households did not vaccinate cattle, because their cattle were not affected during the outbreak. Timing of vaccination against CBPP is critical. In the absence of disease, farmers may not present animals for vaccination particularly because they are engaged in other cattle-related activities such as herding and protection from raiding which causes disruption of activities and stress (Wanyoike, 1999. p.7; McLeod and Rushton, 2007, p.320; Wanyoike, 2009, p.9).

Benefits of vaccinating cattle against CBPP

More milk produced: An increase in milk yields was considered the most important benefit by women and men derived from vaccinating cattle against CBPP. Milk is the most affected cattle product by CBPP. In Kenya, it is estimated that the annual losses of cattle products such as milk is 2,316 metric tonnes owing to the CBPP disease (Tambi et al., 2006, p.16). Women in pastoral communities determine the proportion of milk that will be consumed by children and calves and sold in markets (Nunow, 2000, p.4; USAID, 2009, p.18). A study conducted in Kenya (Waithanji et al., 2013) indicated that one of the main advantages of cattle for men in Kenya were the nutritional benefits derived from milk. An increase in milk and milk products is an opportunity for women to participate in milk markets and for women to generate income. Women control milk from cattle especially through home consumption and occasional sales (Njuki and Mburu 2013, p.21).

Improved cattle health: The results from this study indicate that it is beneficial to vaccinate cattle against CBPP according to both women and men, because CBPP affects the health of the cattle which is intrinsically linked to a reduction in milk production, lack of appetite, loss of weight, weakness and reduction in draught power. Tambi et al., (2006, p.16) indicated that

lactation yields of infected cows are reduced by up to 90 percent and discussants in this study indicated that lactation drops to zero. An increase in milk yields ensures that women can increase the proportions consumed by household members and still have enough milk to sell in markets, ensuring household security and income generation (Nunow, 2000, p.4; USAID, 2009, p.18).

Increase in cattle sold in market: In Ijara Sub-County it was very clear that cattle are an important asset to cattle owners because cattle have a high economic value when sold in markets. Although women mentioned this as an important benefit, women's participation in marketing of live cattle is usually much lower than their participation in the milk market. This is because women mostly have rights milk and milk products because women access cattle through the relationship they have with men (as wives or daughters) rather than own and control them as their male counterparts (Waithanji et al., 2013, p.41).

Increase in value of cattle and cattle products: One of the benefits derived from vaccinating cattle according to men was that the value of cattle and cattle products increases in terms of pricing in markets. CBPP disrupts market participation because sick cattle do not sell and recovered but emaciated cattle tend to fetch a lower price in markets (Tambi et al., 2006. P.7). The main advantages of cattle for men are their high sale value, which is associated with cattle continuing to be predominately and sometimes exclusively men's property (Waithanji et al., 2013, p.41).

Challenges of vaccinating cattle against CBPP

Post-vaccination reactions: The current CBPP vaccine continues to elicit adverse reactions in vaccinated cattle and this was considered as the main challenge of vaccinating cattle while

men considered this as the fourth challenge of vaccinating cattle against CBPP. Women stated that the current vaccine causes a reduction in milk yields. A drop in milk production is one of the effects of vaccinating cattle (Teshale, 2005, p.7).

Unavailability of the CBPP vaccine: The unavailability of the CBPP vaccine was considered to be the main problem of vaccinating cattle against CBPP by men. A study conducted in Narok, showed that the irregularity in vaccinating cattle against CBPP was mainly because the vaccine was unavailable. The unavailability of the CBPP vaccine is intrinsically linked to the fact that the vaccine is in the custody of the government and ‘not just sold to anyone’ according to pastoralists (Wanyoike, 2009, p.11).

Expensive vaccine: CBPP is controlled mainly by use of vaccines however lack of funds was the second most important issue for women and this was associated with the lower uptake of the CBPP vaccine. Wesonga and Thiaucourt (2000) have demonstrated that a single injection cannot prevent the spread of the disease and hence the need for biannual vaccination. Cattle owners must therefore vaccinate their cattle twice, and women considered this a financial burden.

Accessibility of the CBPP vaccine: The third problem faced by women in vaccinating cattle against CBPP, was that cattle owners could not access the vaccine. Access of vaccines is one of the consumer associated drivers of veterinary vaccine adoption (Heffernan and Misturelli 2000, p.44). Women have less access to resources/assets than men owing to women’s historical and cultural subordination, which is then maintained through gender roles, practices, beliefs and attitudes (Deere and Doss, 2006, p.3; Doss and Deere, 2008, p.5; Deere et al., 2012, p.7). Owing to the established gender differences in access, therefore, women’s access to veterinary technologies, including vaccines is likely to be lower than that of men (Waithanji et al., forthcoming).

Access to veterinary officers: Access to veterinary officers was the third problem faced by men in vaccinating cattle. Men stated that there are few opportunities for cattle owners to access veterinary officers to vaccinate their cattle against CBPP. Private veterinary practitioners in Kenya are not willing to operate in pastoralist areas because areas such as Garissa County are characterised by insecurity, poor infrastructure, low cash economy, high cost of delivery of vaccines and the vastness of the area (Wainyoike et al., 2014, p.6; Okwiri et al., 2001, p.2; Kajume, 1999. p.22). According to an article published in the Star newspaper in May 2014, a pastoralist from Ijara, our area of study, stated that “we do not have anyone to report to about CBPP because we do not have any vets in Ijara (Ngotho, 2014).

Poor infrastructure: Ijara Sub-County can be characterised by its poor roads and this has made it very difficult for cattle owners in this area to access the CBPP vaccine during outbreaks. Poor roads according to men are impassable especially during the wet season, which hampers the movement of veterinary officers and vaccines. The vast Garissa County has very poor road and transport networks. It is estimated that only 10 percent of the 1,520 kilometres stretch of classified road surface is tarmacked while the rest is earthed and poorly maintained owing to lack of funds (NAFIS, undated). Consequently, this renders most areas of the county inaccessible, including Ijara sub-county, particularly for timely essential service delivery and interventions, for instance the CBPP vaccine.

5.2.2 Alternative strategies of controlling control CBPP

Prayers: Prayer was one of the most popular alternatives to vaccinating because prayers heal cattle according to women. For men prayer was the most popular alternative while for women prayer was one of the most popular alternatives. Islam plays a significant role in Ijara sub-

county, as most individuals are Muslims and most of them are devoted to Allah and for them the Quran is the most important book. Results from a review on community-based health care in Somali areas of Africa showed how different stakeholders treat sick livestock, according to women, livestock herders and traditional healers, koranic prayers was ranked first in order of importance among options for treating livestock that included traditional medicine and private drug sellers (Catley, A, 1999, p.40). One of the traditional beliefs of treating illnesses amongst the Somalis includes using rituals such as prayer (Kemp and Rasbridge, 2004, p.6).

Treatment: Treatment was considered an important popular alternative to vaccinating cattle against CBPP by women and men. It should be noted that novidium, trypanocides and amoxicillin are not used to treat CBPP though they were mentioned by women and men. Tylosin, tetracyclines and sulfadimidine are the main treatment drugs in use today and they can be effective in modulating clinical symptoms and progress of disease. Treatment of affected cattle with antimicrobials has been officially discouraged (Mariner and Catley, 2004, p.77) as it alleviates the clinical signs, but does not prevent the spread of infection, and may favour the creation of chronic carriers (Provost et al., 1987, p.566).

For women treatment using local drugs was considered popular owing to the fact that they were readily available for many cattle owners. According to a report by FAO (2007) antibiotics for treatment of CBPP offers cattle owners more advantages than vaccines, because the drugs are already available in the market and their use may have a direct impact on poverty alleviation by safeguarding poor people main livelihood by reducing mortality cases (p.8).

Quarantine: Quarantine is an alternative means of controlling the CBPP according to women and men and was considered an important alternative to vaccination because, quarantine prevents transmission and spread of CBPP from infected to un-infected cattle or herd.

Quarantine of endemic areas is one effective method of controlling the spread of CBPP and CBPP outbreaks are eradicated with quarantines (Masinga and Domenech, 1995, p.9; CFSPH, 2008, p.2).

Challenges of the most popular alternatives to vaccinating cattle against

Prayer and reading Quran: Men stated that prayer and reading Quran cannot be considered a challenge because it is the best alternative to vaccinating and also their strong beliefs on God's will to either make the cattle better or worse off as reported by men groups. Women however stated that sometimes prayers do not heal sick cattle and that was still Allah's will.

Treatment: A limitation of treatment as an alternative to vaccination was that, treatment was considered expensive by women. Treatment of CBPP is at the exclusive cost of cattle owners hence the cost of treatment depended on the type of antibiotic used, the dosage and method of application and the source of the product. It is estimated that the cost of antibiotic treatment was within the range of 10 to 14 Euros per head of cattle hence why women consider treatment to be financial constraining (Tambi et al., 2006, p.7).

5.2.3 Most desirable characteristics of an ideal vaccine

Safe vaccine: The CBPP vaccine is considered effective in preventing and controlling the spread of CBPP, but the issue of adverse reactions to the vaccine by cattle is a safety concern for both women and men. Women stated that safety was the most important desirable characteristics of an ideal vaccine. A drop in milk production and weight as well as abortions may be added side effects of the vaccine (Teshale, 2005, p.6). Cattle suffer side effects as the vaccination causes mild infection and, if the vaccine is injected at the tail tip, this causes the tail to become inflamed and, in 40 percent of cases, the tail drops off (DFID, undated).

Efficacious vaccine: The existing CBPP vaccine is not considered efficacious, because the vaccine tends to provide a short-lived protection and as such cattle keepers need to re-administer the vaccine annually. An efficacious vaccine was the third most important desirable characteristics for women while for men it was the most important desirable characteristics of an ideal vaccine. Wesonga and Thiaucourt (2000) have demonstrated that a single injection with the current vaccine cannot prevent the spread of the disease and there is need for biannual vaccination (p.171). The vaccine also has poor efficacy of only 65 percent, increasing to 95.5 percent only on revaccination after 6 months (Yaya et al., 1999, p.171; Wesonga and Thiaucourt, 2000, p.314)

Affordability: Women preferred that cattle owners vaccinate their cattle either once a year or vaccinate every two years because the current CBPP is expensive (25 Kenya shillings per cow) and therefore if cattle must be vaccinated twice a year this would be a financial burden for women. Waithanji et al., (forthcoming) argues that gender is likely to affect affordability of vaccines because men and women often do not have equal amounts of money or resources that can be converted to money owing to the gendered differences in access and control of resources.

5.4 Anticipated positive and negative effects of eradicating CBPP

One of the advantages of increased cattle wealth was that older and younger men in the community can marry. Men in the community can have more than one wife, having up to four wives simultaneously and this is allowed in Islam religion men. In the Quran, a man it is required that a man must be financially capable of taking care of all his four wives (Lewis, 1994, p.3). If married men fail to get along with their old wives, the marriage usually fails. Under Islamic law, all a man has to do is to repeat to his wife three times, “I divorce you.” Women, on the other hand, cannot directly obtain a divorce. A woman who finds unbearable

problems in her marriage can only have it annulled after many appeals to an Islamic court, and then only with the support of her birth family (Lewis, 1994, p.4). Eradication of CBPP reduces the number of cattle mortality (FAO, 2004, p.9), and consequently increases the cattle numbers, and this is skewed in favour of men, in terms of men marrying more wives.

CBPP is a transboundary disease and it has significant negative implications on food security and nutrition especially for poor pastoral communities that do not have supplement supplies. Ensuring food security is one of the main benefits of eradicating transboundary disease because livestock contributes to food security and nutrition as sources of proteins and micronutrients for many pastoral communities (FAO, 2004, p.12). Over a ten year period, Bbalo (1991) demonstrated positive changes in herd value, milk production, following CBPP control (p.10).

Increased cattle wealth was associated with better permanent stone houses, increased enrolment of children in private school, families can seek medical care from private hospitals and cattle owners can diversify their incomes, buy opening business such as shops. In Kenya, for men livestock is a way to meet needs such as school fees, food, and a way to invest, while for women livestock provides food security (World Bank et al., 2009, p.619). Based on the existing traditions on roles, men provide proper homes and school fees from cash income from sale of cattle and cattle products. Literature also indicates that women spend their money on their children school fees and health (Allendorf, 2007, p.2; Quisumbing, 2003, p.4).

Going for Hajj was a very significant trip for women and men especially if they had enough cattle wealth to facilitate this expensive travel. Webb (2009) stated that the fifth pillar of Islam is to make a pilgrimage (Hajj) to Mecca, in Saudi Arabia, at least once in one's lifetime (p.3). This pillar is obligatory for every Muslim male or female, provided he or she is

physically and financially able to do so. The Quran portrays that mankind are called to perform the Hajj, to a holy place (Mecca).

With increased cattle numbers, men and women participate actively in markets according to women and men. A qualitative analysis of the proportion of women and men selling different livestock products in Kenya indicated that women are responsible for most of the milk sales than men, while men are responsible for selling more live cattle than women (Waithanji et al., 2013, p.25). Eradication of CBPP will have specific benefits for women and men. At the macro level benefits of controlling infectious diseases have been discussed by McLeod and Leslie (2000). The benefits mentioned, which also apply to CBPP include increased national livestock capacity and export opportunities for cattle owners (p.9).

There would be an increase in market participation opportunities in milk and live cattle markets for cattle owners and an increase in incomes if CBPP were to be eradicated according to women and men. At the macro level benefits of controlling infectious diseases have been discussed by McLeod and Leslie (2000, p.7). The benefits mentioned, which also apply to CBPP, are increased value of off-take, diversity of market opportunities, increased national livestock capacity and export opportunities.

Cattle owners may be forced to compete over pasture owing to increased in cattle numbers as reported by men. The local community of Ijara sub-county depends on pastoralism for their livelihood as such the economy of Ijara sub-county solely relies on natural resources, especially pasture and water and this has significantly affected the environment significantly. An increase in cattle numbers can cause overgrazing which in turn results in land degradation and as a result the ever declining returns in animal production (MEMR and NEMA, 2013, p.9).

5.5 Conclusion

Women and men are both affected by CBPP outbreaks, but the effects of CBPP outbreaks vary by gender. Women have less access to resources and cattle assets than men owing to women's historical and cultural subordination, which is then maintained through gender norms and relations. A reduction in cattle productivity affects the amount of milk produced for household consumption and for milk markets. Men and women consider milk an important source of protein, but because ensuring milk consumption by household members is exclusively women's responsibility, women may therefore have to provide other protein-sourced food for their household. Cattle mortality affects women and men differently, a reduction in cattle numbers results in milk losses for women and loss of cattle for men.

A high proportion of women and men vaccinate cattle against CBPP and this is intrinsically linked to the benefits they both derived from vaccinating cattle. These benefits motivate both women and men to adopt the CBPP vaccine during outbreaks. Women are motivated to vaccinate cattle because they need to ensure household food security owing to one of the benefits women derive from vaccinating cattle which is enhanced milk production. Men on the other hand are motivated by increased income owing to one of the benefits men derived from vaccinating cattle which increased annual sales of live cattle. Women and men face different challenges in vaccinating cattle. The main challenges facing men included unavailability of the CBPP vaccine and lack of veterinary officers, while for women, post-vaccination reactions, high cost of the CBPP vaccine and accessibility of the vaccine.

The main strategy to CBPP control in Ijara is vaccination. Treatment, quarantine and prayers are the most popular alternatives to vaccinating cattle against CBPP employed by women and men. Women and men controlled CBPP by using treatment to treat sick cattle, quarantine to control the spread of CBPP and prayers were said to Allah to heal sick cattle. Prayer was a more important alternative than treatment and quarantine for men, while for women prayer,

treatment and quarantine all weighted of equal importance to women. Vaccination is the most effective strategy of controlling CBPP than treatment, quarantine, prayers as demonstrated by the benefits of vaccination over its alternatives strategies such as improved cattle production and productivity and eradication of CBPP.

A vaccine that is safe, efficacious and affordable is more likely to be adopted by men and women. Safety and efficacy concerns differed by gender. Safety concerns for women and were associated with milk production and tail loss respectively. Women preferred a vaccine that would not cause a reduction in milk yields after vaccination. Men preferred a vaccine that would not cause the tail to fall off after injection. Efficacy concerns for women were associated with vaccinating cattle every two years or more while for men it was eradication of CBPP completely. Affordability of the vaccine was also a concern for women, who preferred a vaccine that cost less than 25 Kenya shillings. Successful adoption of the CBPP by women and men can be enhanced if these factors are taken into account.

Results from a hypothetical eradication scenario of CBPP can also have positive effects on the well-being of women and men. The most important positive effects for women and men were, similar. An increase in cattle population was linked to the following: increased milk yields, increased market participation which led to, more incomes which enhanced better nutrition, enrolment of children in schools, better homes and start business. Men marrying more wives were a negative effect for women, but for men it was a positive effect of eradication of CBPP. The negative effect on the relationships and interactions between men and women for example an increase in cattle wealth is linked to on the one hand affluence and happiness, whereas on the other hand it is associated with a series of failed marriages because men can marry more wives and creating conflict between husbands and wives.

In summary, the effects of CBPP outbreak are gendered; women and men are affected differently by CBPP outbreaks owing to gender the norms and relations. Benefits derived from vaccinating cattle CBPP may be similar but the benefits are not equally distributed between women and men. Both women and men consider vaccination as the most preferred strategy of controlling CBPP outbreaks than the alternatives however, they experience different challenges in vaccinating against CBPP. Women's and men's preferences for the new CBPP vaccine being developed by scientists can enhance adoption of the vaccine by women and men alike. The eradication of CBPP can affect the lives of women and men in a positive way by improving their well-being and that of household members however the negative effects cause a series of failed marriages affecting the social structures of families and homes.

5.6 Recommendations

The study recommends that there is a necessity of engendering more livestock diseases and vaccine studies, indeed, there are gender gaps that exist in the effects of livestock diseases, control responses and eradicating diseases, hence this gap should be closed or, in the least, mechanisms put in place to close. Future interventions that will be carried out in the periods preceding and during the introduction of the anticipated new CBPP vaccine in the market, need to take women's as well as men's concerns into account so as to ensure efficient and effective delivery and adoption of the vaccine by women and men alike and consequently ensure men and women benefit equitably from the vaccine technology. Eradication of a disease may either have positive or negative effects on the relationships and interactions of women and men hence, there is need to ensure gender-responsive eradication strategies that will enhance fair and equal outcomes for women and men.

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Appendices

Appendix 1- Key Informant Interview guide

Date:

Place where resides:

Occupation:

Age:

Place of interview:

Person interviewing:

General information on Ijara (An elderly resident – man and woman)

- What are the main seasons in Ijara
- What clans constitute the communities and what are the distinguishing characteristics of the different clans
- What are the main livelihood strategies of the people of Ijara
- Are there differences in livelihood strategies for women and men – what are they and how do they differ?
- What proportion of community depend on cattle for their livelihoods
- In order to participate meaningfully in cattle trade, what is the minimum number of cattle that a household should own
- On average, how many cattle does a household own
 - What is the approximate range
- What is the one or two things that you feel every visitor should know about this community once they visit

CBPP questions (Veterinarian or livestock personnel)

- What proportion of community depend on cattle for their livelihoods
- In order to participate meaningfully in cattle trade, what is the minimum number of cattle that a household should own
- On average, how many cattle does a household own
 - What is the approximate range

- Is CBPP a common disease in this area (define according to position of interviewee – county vet officer, division vet officer)
- What is (are) the common local name (s) for CBPP
- How often do CBPP outbreaks take place in a 10 year period
- Do people normally vaccinate cattle against CBPP?
 - When?
- About what proportion of the population vaccinates cattle against CBPP
- About what proportion of cattle are vaccinated against CBPP
- What are the constraints of CBPP vaccine delivery in Ijara/ this location
- How does response to CBPP vaccination compare to other vaccinations e.g. HS
- How does delivery of CBPP vaccine differ with that of other cattle vaccines e.g. Black quarter

Appendix 2: Focus Group Discussion (FGD) guide:

Gender of the group:

Name of location:

Number at beginning:

Number at end:

Number lasting throughout the FGD:

Date of FGD

Start Time:

Finish Time:

1. Background information:

- a. Proportion of women, men and children in the community (proportion piling)
- b. Characterization of community members by wealth:
 - List the wealth categories

By proportion piling demonstrate the distribution of the population according to main wealth categories used by the community (*categories should not exceed five, but must be at least two*)

- c. What is the average family size? (Family consists of a man, his wives and children or a woman and her children)
 - Male headed household
 - [*Dejure*] Female headed household (divorced, widowed, or single never married)

2a. Cattle

Ownership of cattle by women and men

- a. What is the average number of cattle in an average wealth MHH and FHH?
MHH
FHH

2b. Cattle related roles and responsibilities

- a. What cattle related activities are conducted in a household (List)
- b. Of these, which are done by
 - men only,
 - women only,
 - children only, and
 - a combination of two or more of the above categories

3. Contagious Bovine Pleuropneumonia (CBPP)

3a. Vaccination

- a. Of the cattle owning households, what proportion vaccinate their cattle if an outbreak is reported (proportion piling)
- b. Discuss the proportions – why they are high and/or low
- c. Why don't the non-vaccinating households want to vaccinate
- d. What are the benefits of vaccinating against CBPP
- e. What are the challenges of vaccinating against CBPP
- f. What are the alternatives to vaccinating against CBPP (List)
 - What alternative is most popular

- g. What are the benefits of the most popular alternative to vaccinating against CBPP
- h. What are the challenges of the most popular alternative to vaccinating against CBPP
- i. If you were to recommend a most appropriate vaccine against CBPP, what would be its most desirable characteristics (List)

3b. Effects of CBPP outbreak

- a. How is a household affected by an outbreak of CBPP? Explain in detail what happens to an average wealth household from when they are told that their cattle have contracted CBPP to when they finally bring the outbreak under control

3c. Effects of vaccinating against CBPP (PID)

What are the anticipated (positive and negative) impacts on households that vaccinate their cattle? Effects are seen 10 – 15 years after eradicating disease through vaccination

[Let the group talk for about 5 minutes without interrupting them – the interpreter should explain what they are saying as they speak and facilitator and note-taker taking notes and probing the conversation through the interpreter]