

**SOCIO-ECONOMIC IMPACT OF FREE RANGE LOCAL CHICKENS
VACCINATED AGAINST NEWCASTLE DISEASE IN RURAL
COMMUNITY OF MVOMERO DISTRICT, MOROGORO REGION**



**BY
JACOB TIMOTHY MSUYA**

**FOR REFERENCE
ONLY**

**A DISSERTATION SUBMITTED IN PARTIAL FULLFILLMENT OF THE
REQUIREMENT FOR THE DEGREE OF MASTER OF ARTS IN RURAL
DEVELOPMENT OF THE SOKOINE UNIVERSITY OF AGRICULTURE.
MOROGORO, TANZANIA.**

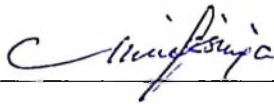
2010

ABSTRACT

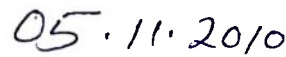
Improving free range local chicken (FRLC) production through vaccinating against Newcastle disease (ND) at the village level is an important component in improving socio-economics of the rural communities in Tanzania. This study assessed the socio-economic impact of FRLC vaccinated against ND in rural communities of Mvomero District. The Primary data were gathered from a sample of 181 respondents from Sangasanga, Changarawe, Tangeni, Kimambila, Lubungo, Mafuru and Vikenge. The primary data from the semi-structured questionnaire were analysed using SPSS 12.0 and descriptive statistics namely frequencies and percentage were used in explaining the data collected from the respondents. The survey findings reveal that on average, since 2007 to 2009 each household kept 23 FRLC and more than half 56.3 % of the respondents earned less than 50 000 Tsh through selling of FRLC and their products. Moreover, whereas women seemed to be more responsible 56.4 % in caring of the FRLC and making decision on selling of the eggs 52.9 %, men slightly dominated 35.6 % in making decision about the selling of live FRLC. In contrast, women were the ones responsible for keeping the income earned from selling FRLC and its products. Furthermore, majority of the respondents 82.9 % indicated that ND vaccination worked better than indigenous herbs whereas only 0.6 % had a negative attitude towards ND vaccines. The findings also reveal that the sustainability of the ND vaccination exercise was attained through formation of groups of the FRLC keepers and cost sharing for ND vaccines. The findings suggest that there is a need for mass education on the epidemiology and socio-economic implication of ND for the households.

DECLARATION

I, Jacob Timothy Msuya, do hereby declare to the Senate of Sokoine University of Agriculture that this Dissertation is my own original work and has neither been submitted nor being concurrently submitted for degree award in any other institution.

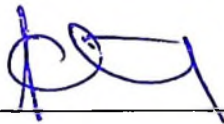


Jacob Timothy Msuya
(MA. Candidate)

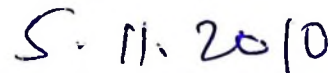


Date

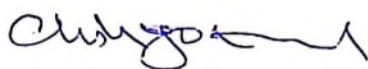
The above declaration is confirmed



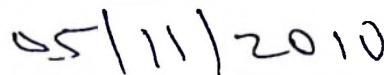
Prof. Mkumbukwa M.A. Mtambo
(Supervisor)



Date



Dr. Emanuel Emilian Chingonikaya
(Supervisor)



Date

COPYRIGHT

No part of this dissertation may be reproduced, stored in any retrieval system or transmitted in any form or by any means without prior written permission of the author or Sokoine University of Agriculture in that behalf.

ACKNOWLEDGEMENTS

I would like to extend many thanks to all those who in one way or another contributed towards the success of this research study. In the first place, I wish to thank Almighty God since this work could not be fruitful without his inspiration upon me. I acknowledge the valuable inputs of my supervisors Prof. Mkumbukwa M.A. Mtambo from the Faculty of Veterinary Medicine and Dr. E. E. Chingonikaya from Development Studies Institute both of SUA. Their intellectual guidance, patience, moral support and understanding are highly appreciated. I wish to acknowledge Dr. Carol Cardona and Dr. P. Msoffe, Project Coordinator ND-AF Control Project for providing me with the financial support for the field work and production of this Dissertation. I am highly indebted to all DSI staff members for making useful contributions during my study period.

I also appreciate the contribution of the District Director of Mvomero, Ward Secretary of Tangeni, Changarawe, Vikenge, Kimambila, Lubungo, Mafuru and Sangasanga Wards, and all the village's Chairpersons for their close attention to my study. I would like to extend my thanks to all the respondents that were involved in the study. I extend my acknowledgement to Mr. E. Kitururu, Mr. L Kiwelu, Miss C. Kigodi and Mr. E. Mlinga for their day to day moral support. Last but not least thanks are due to my parents, brothers, sisters and my relatives for their support and advice to take care of my welfare throughout my academic career

DEDICATION

This work is dedicated to my parents Timothy Mndewa and Ruth Ndoile, my child Caroline Jacob my lovely wife Catherine Philip Kigodi, my brothers, sisters and relatives and special dedication to my beloved brother Frank T. Msuya who laid down the foundation of my education.

TABLE OF CONTENTS

ABSTRACT	ii
DECLARATION	iii
COPYRIGHT	iv
ACKNOWLEDGEMENTS	v
DEDICATION	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	xi
LIST OF APPENDICES	xiii
LIST OF ABBREVIATIONS	xiv
CHAPTER ONE	1
1.0 INTRODUCTION	1
1.1 Background Information	1
1.2 Problem Statement	3
1.3 Justification of the Study	3
1.4 Objectives of the Study	4
1.4.1 General objective	4
1.4.2 Specific objectives	4
1.5 Research Questions	5
1.6 Conceptual Framework	5
CHAPTER TWO	7
2.0 LITERATURE REVIEW	7
2.1 Overview	7

2.2	Characteristics of Free-range System of Production	7
2.3	Poultry Disease	8
2.4	Housing and Shelter for FRLC	8
2.5	Factors Influencing FRLC Production System	9
2.5.1	Environment	9
2.5.2	Farmer's management and decision	9
2.5.3	Market situation	10
2.6	Contribution of Local Chicken in the Household	10
2.7	Perceptions of Community towards ND Vaccination Exercise	11
2.8	Sustainability of ND Vaccination Programme in the Community	12
2.9	Economic Situation of the Households Vaccinated against ND	13
2.9.1	Socio-relations in rural communities practicing ND control through vaccination	14
CHAPTER THREE		16
3.0 RESEARCH METHODOLOGY		16
3.1	Location of the Study Area	16
3.2	Research Design	16
3.3	Sampling Procedure and Sample Size	16
3.4	Data Collection	17
3.5	Data Analysis	18
CHAPTER FOUR		19
4.0 RESULTS AND DISCUSSION		19
4.1	Household Demographic Information	19

4.1.1	Sex of respondents	19
4.1.2	Age of respondents	20
4.1.3	Marital status of the respondents	20
4.1.4	Education level of respondents	20
4.2	General Description of the Study Area	22
4.2.1	Main crop cultivated in the study area	22
4.2.2	Type of livestock kept by respondents	23
4.3	Contribution of Local Chicken to Socio-economics Among Rural Households	24
4.3.1	Number of FRLC kept by the respondents	24
4.3.2	Common diseases affecting chicken in the study area	25
4.3.3	Free range local chicken vaccination programme	26
4.3.4	Number of FRLC sold from 2007 to 2009	27
4.3.5	Income obtained from selling FRLC	28
4.4	Productivity of Maize and Rice	29
4.5	Social Relations Within and Among the Households	29
4.5.1	Ownership of FRLC by gender in the households	29
4.5.2	Decision in selling FRLC and eggs	30
4.5.3	Keeping money obtained from selling FRLC and eggs	32
4.5.4	Relations among households	33
4.5.5	Actions taken by respondents as a result of throwing ND infected carcass to neighbour's farms	34
4.6	Performance of ND Vaccination against Local Herbs	35
4.7	Farmers' Perceptions towards ND Vaccination Exercise	35

4.8. Policies Adopted by Communities for the Sustainability of the ND	
Vaccination Exercise	36
4.8.1 FRLC group formation	37
4.8.2 FRLC housing and shelter	37
4.8.3. Plan to improve FRLC house	38
4.9 Cost Sharing in ND Vaccination Exercise	39
CHAPTER FIVE	40
5.0 CONCLUSION AND RECOMMENDATIONS	40
5.1 Conclusion	40
5.2 Recommendations	40
REFERENCES	42
APPENDICES	50

LIST OF TABLES

Table 1:	Percentage distribution of household demographic information	21
Table 2:	Main crops produced in 2008 by the respondents	22
Table 3:	Types of livestock owned by respondents	23
Table 4:	Number of FRLC from 2007-2009	24
Table 5:	Common diseases affecting chicken and chicks in the study area	25
Table 6:	Number of vaccination from 2007-2009.....	26
Table 7:	Number of FRLC sold from 2007 to 2009 in the study area	27
Table 8:	Gross income due to selling of FRLC from 2007 to 2009 in study area	28
Table 9:	Maize and rice yield (kg) in 2008	29
Table 10:	Ownership of FRLC by gender in the households	30
Table 11:	Decision to sell FRLC and eggs in the household	31
Table 12:	Keeping money obtained from selling FRLC and eggs in the household	33
Table 13:	Reason for neighbours throwing ND infected carcasses near compounds	33
Table 14:	Actions taken by respondents as a result of throwing ND infected carcass to neighbours farms	34
Table 15:	Performance of Vaccination and Local herb	35
Table 16:	Perception of respondents against ND vaccination	36
Table 17:	Groups developed to sustain ND vaccination exercise.....	37
Table 18:	Place where FRLC sleep at night	38

Table 19: Plan to improve FRLC by building improved houses	38
Table 20: Readiness of farmers for cost sharing of ND vaccination exercise	39

LIST OF APPENDICES

Appendix 1: Household Interview	50
Appendix 2: Checklist for Focus Group Discussion.....	62

LIST OF ABBREVIATIONS

CBO	-	Community Based Organization
DANIDA	-	Danish International Development Agency
DSI	-	Development Studies Institute
FGD	-	Focus Group Discussion
FRLC	-	Free Range Local Chicken
HH	-	Household
ICRISA	-	International Crops Research Institute for the Semi-Arid Tropics
ILRI	-	International Livestock Research Institute
Kg	-	Kilograms
ND	-	Newcastle Disease
ND-AF	-	Newcastle Disease and Avian Flu
NGO	-	Non governmental Organization
NSGRP	-	National Strategy for Growth and Reduction of Poverty
RALG	-	Regional Administration and Local Government
SADC	-	Southern African Development Country
SME	-	Small Medium Enterprises
SPSS	-	Statistical Package for Social Science
SUA	-	Sokoine University of Agriculture
Tsh	-	Tanzanian shillings

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Smallholder poultry production or family poultry production is an appropriate system that makes the best use of locally available natural resources, supplying the fast-growing human population with high-quality protein, and providing additional income to resource-poor smallholders, especially women (Guèye, 2000a). Although intensive commercial poultry operations exist in most developing countries, the dominant production system is extensive, based on local indigenous types of poultry breeds and on scavenging feeding systems (Kitalyi, 1996). This is also the only affordable system available to poor people (Kusina and Mlhanga, 2000).

The extensive scavenging system has been described as a low-input and low-output system. In recent years, however, a smallholder poultry model has been identified as an important tool in poverty alleviation. This model which has been successfully developed in Bangladesh (Saleque, 2000) is based on a few essential inputs such as micro-credits, improved breeds, feed supplementation and vaccinations. The model is presently being adapted to the conditions of other developing countries, Tanzania inclusive.

There is scant published information on the constraints to smallholder poultry production, but a number of studies reveal that mortalities of 50 % or more are by far the most important reason for the low outputs of this production system, and that half of the recorded mortality is attributed to infectious diseases, including

Newcastle disease (ND) which is the major cause of disease-induced deaths (Mtambo, 2000).

However, it is evident that as the village bird resource is not very productive, reduction of the major source of deaths by vaccinating could make this resource produce a more sustainable output, and it was calculated that in the case of implementation of the Newcastle disease vaccine program, the productivity could be almost 14 times greater than the costs (Johnston *et al.*, 2000; Oakeley, 2000). The realisation of increased productivity could thus improve rural people's socio-economies.

Disease control delivery programs for smallholder poultry producers have to date been restricted to vaccination campaigns against Newcastle Disease (ND) which is the most important and devastating disease in poultry production in Africa. In Tanzania, ND vaccination had been conducted in Mvomero District in 2006, Iringa Region in 2006, and Mtwara Region in 2006. This was aimed at increasing village chicken productivity thus improving rural communities' wellbeing. In Mvomero District, the vaccination exercise is said to be successful in seven piloted villages. However, despite its success, very little is known on its contribution to socio-economies of local communities that keep local chicken. This study therefore, was aimed for such purpose.

1.2 Problem Statement

Improving poultry health and productivity at the village level can be an important component to program of reducing malnutrition among poor rural communities, since poultry is one of the few animal food and income sources available to poor families. In Tanzania, as in many developing countries, 80 % of poultry production is village-based (Permin and Madsen, 2002). Unfortunately, the productivity of village poultry has been severely limited by devastating poultry diseases especially Newcastle Disease (ND) hence a need for vaccination.

Moreover it is envisaged that the increased productivity could either strengthen or weaken social cohesions within and among the households of the same locality. People's perception, on the other hand, can stir up or close up the possible actions for the continuation of the intervention of Newcastle Disease (ND) vaccination programme. With this intervention, it is expected that there shall be an increased productivity. Despite ND vaccination program being successful in various parts of the world (Permin and Madsen, 2002) including Tanzania, very little is documented of its socio-economic impacts on local communities.

1.3 Justification of the Study

The study aims at investigating the impact of vaccination programme on the socio-economies of local communities which would contribute to the knowledge base on the importance of chicken vaccination against Newcastle disease. In addition, the study is going to benefit different levels of government including local government, policy makers and other development agencies such as Non Governmental

Organisation (NGO), Community Based Organisation (CBO) and Small Medium Enterprises (SMEs) in terms of getting information with regards to the influence of vaccination related programme on the well being of local communities in Tanzania. Furthermore, the study is in line with National Strategy for Growth and Reduction of Poverty (NSGRP), Livestock Policy, Tanzania Development Vision 2025 and Rural Development Policy, all of which emphasize the need for increasing household income and nutritional status of people as a prerequisite of development and poverty reduction in Tanzania (URT, 2002; URT, 2003; URT, 2005).

1.4 Objectives of the Study

1.4.1 General Objective

Generally, the study aimed at assessing the socio-economic impact of free range local chickens vaccinated against Newcastle disease on the well being of rural community in Mvomero District.

1.4.2 Specific objectives

- i To assess the contribution of local chicken to socio-economies among the rural households.
- ii To assess the social relations in rural communities practicing ND control through vaccination.
- iii To evaluate small holder poultry producers' perception on the ND vaccination exercise.
- iv To determine the appropriate actions adopted by communities for the sustainability of the ND vaccination exercise.

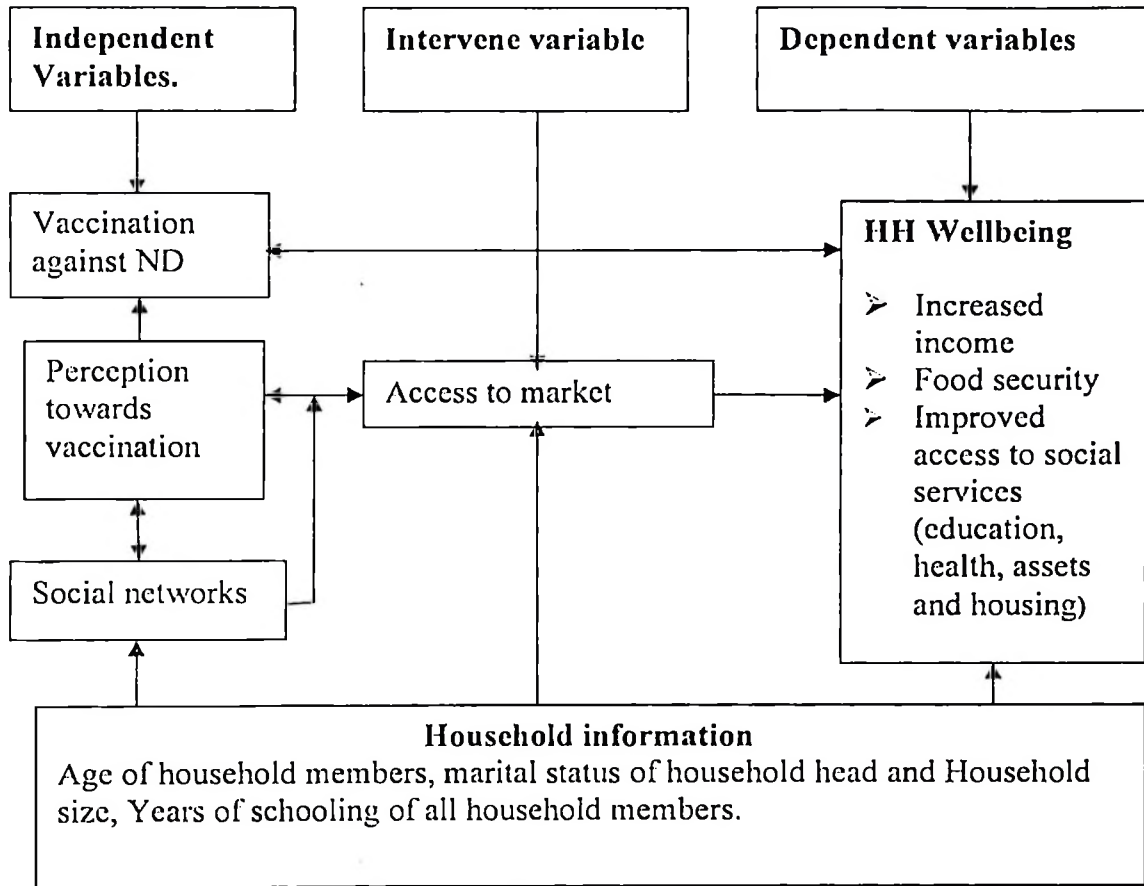
1.5 Research Questions

In order to achieve the above objectives the study was guided by the following questions:

- i What is the contribution of vaccinated chicken against ND to the socio-economies of the households?
- ii How does the ND vaccination exercise strengthen or weaken the social relations of people within and among the households in rural communities practicing ND control through vaccination?
- iii What are the people's perceptions on the ND vaccination programme?
- iv What are the appropriate actions adopted by communities for the sustainability of the ND vaccination exercise?

1.6 Conceptual Framework

In order to achieve the above stated general and specific objectives, a conceptual framework was developed. The framework (Fig. 1) shows a set of independent variables that influence the contribution of local chickens vaccinated against ND to household socio-economies, which are income (household monetary value), wellbeing (access to social services like education and health) socio relations and food security. The household's characteristics (age, household head, household size and education status) would influence the social network of the people involved in the programmes and which would, in turn, determine the contribution of the vaccination against ND to people's social relations.



Conceptual framework for analysis of the study data.

- ↔ **Backward and forward**
- **Direct influence**

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Overview

Production system of poultry in developing countries can be classified into three groups namely: scavenging (backyard), semi-scavenging (semi-intensive) and intensive (industrial) (Kitalyi, 1996). Of these classifications, the most dominant production systems in developing countries are the scavenging (backyard), and the semi-intensive system, which have developed with higher input and output (Kitalyi, 1996).

2.2 Characteristics of Free-range System of Production

The free-range system is synonymous to scavenging, rural, traditional and backyard production system (Pandey, 2000). In this system, the farmer makes no attempt to control the flock's food or water intake, although s/he may occasionally throw food scraps or a handful of grain onto the flock (Gunaratne *et al.*, 2002). Availability of feeds for free-range chicken depends mainly on scavenging household refuse, herbage, seeds and insects around the homestead. The farmers provide no sanitation and no disease control measures such as vaccinations (Minga *et al.*, 2001). Losses, especially of chicks due to diseases, predators and theft are high, hence the performance of these chicken is generally low (Pandey, 2000).

Studies show that well fed free-range chicken seldom suffer from nutritional deficiencies and diseases (Ologhobo, 2004), and have natural disease resistance potential (Msoffe *et al.*, 2003). Payne (2003) reports a free range-system requires an

area of between five and eight meters square per chicken for good nutrition. The major advantage of this system is that, there is little or no inputs used as the birds acquire most of their diet from the surroundings (Kitalyi, 1996).

2.3 Poultry Disease

In a study about the poultry in Tanzania (Boki, 2000), it was reported that poultry diseases are the major constraint to the quick increase in chicken production. The study found that, ND, fowl typhoid and infectious coryza are the major poultry diseases in Tanzania. In a similar study on the disease trends and prospects of reducing losses in Full Range Local Chicken (FRLC) in Tanzania, Muhairwa *et al.* (2001) reported that fowl pox, infectious coryza, ND, Marek's disease, chicken infectious anaemia and ectoparasites are the causes of mortalities. However, chicken infectious anaemia and Marek's disease were reported for the first time in FRLC.

2.4 Housing and Shelter for FRLC

Host (2000) emphasized on the importance of housing in protecting FRLC against diseases, predators, adverse temperatures, radiation, rain and chilling weather. According to the author the construction of houses is in such a way that they are easy to clean, well-ventilated and cheap to construct. "Most of the studies on FRLC production indicates housing as being a problem area ranging from a rather poor state of the house to no housing at all." whereby chicken roost on trees or roof top of houses, to simple shelters (Minga *et al.*, 2001; Mwalusanya *et al.*, 2001; Gunaratne *et al.*, 2002). Poor quality shelters, which are mostly used at night, are made of local building materials such as tree poles and thatched grasses. Such shelters are usually

small with a door just enough for the chicken to pass (Mwalusanya *et al.*, 2001). Chicken are also kept in the kitchens or human quarters at night or covered in woven baskets (Mwalusanya *et al.*, 2001; Njue *et al.*, 2001) implying that the designing of village chicken housing would go a long way into controlling parasitic disease and losses associated with predation.

2.5 Factors Influencing FRLC Production System

FRLC production system is very complex and controlled by a number of factors namely:-environment, management decision making and market situation.

2.5.1 Environment

Village chickens scavenge in the vicinity of the household. In order to have nutrition, health and growth, the chicken are very dependent on the amount and quality of feed available in the area. Rahma *et al.* (2000), observe feeds availability in the area depends on climatic conditions. The climatic conditions have an impact on the vegetations and insects available for feeding. Furthermore, the farming system, which depends on the type of crops grown and the intensification level, has an effect on the edible grain spillage in the fields as well as the amount of vegetation cover.

2.5.2 Farmer's management and decision

The production level of village chicken highly depends on the farmer's management level, which includes supplementing chicken with feed and water, provision of good shelter and prevention or cure of diseases. Farmer's decision making covers the

destiny of eggs and chickens, that is, whether the eggs are hatched, sold or consumed and, similarly, whether the chicken are sold, consumed, used as gifts or kept as replacement birds (Pedersen and Kristensen, 2004).

2.5.3 Market situation

Most of the farmers manage chicken flock not only according to the environment, but due to the market demand for chicken. Higher demand leads to higher prices hence higher returns. In many African countries, the traditional system gives low output thus the market is not a problem to the farmer. Therefore, if large production is considered, many questions related to marketing such as price, customers, input price and input availability will suddenly become important and will influence the farmer's strategy and decision making (Kitalyi, 1998; Pedersen, 2002; Mlozi *et al.*, 2003).

2.6 Contribution of Local Chicken in the Household

In many developing countries, chicken are the livestock most commonly owned by rural families. Many of these families may be headed by women (Alders, 2000). Increasing the productivity of chicken would make a significant contribution towards increasing rural people's food security and their ability to have secure wellbeing. Village chicken provide meat and eggs, food for special festivals, offerings for traditional ceremonies, pest control and petty cash to, for instance, purchase medicines or pay school fees (Alders and Spradbrow, 2001).

According to FAO (2000), food security is achieved efficiently when people produce or have access to sufficient quantities of affordable, high quality food. It is generally acknowledged that poultry production is the most efficient and cost-effective way to increase the availability of high-protein food. Also, in rural areas there are few opportunities for employment. Despite the economic shortfalls of these areas, there exist the potential for harvesting and utilizing the existing resources for improved productivity for better living standards (Alders, 2000). Among the resources available to the rural farming community is the indigenous chicken. In order to contribute to the sustainability of livelihoods through the introduction of appropriate indigenous poultry production and marketing technologies, it is necessary to characterize the production system under traditional management conditions (Gueye, 2000c).

However, for a sustained livelihood, it is imperative that households are able to provide surpluses to generate income while ensuring that domestic food supplies are secured. Improving the protein nutrition of households and access (physical and financial) to protein food resources at local and regional levels are a necessity. Appropriate and improved strategies in small-scale poultry development that impact on household protein food security is therefore required (FAO, 2000).

2.7 Perceptions of Community towards ND Vaccination Exercise

The farmers are the clients of ND control programme and the programme should be designed to meet their needs and expectations. Farmer participation is usually not achieved easily due to their differences in perceptions. According to Pedersen and

Kristensen (2004), farmers communicate more easily with the people who display knowledge and understanding of the local farming system and who are willing to spend quality time with them. It is essential that the priorities and knowledge of farmers are respected in a way that would help them to perceive the process positively so as to have a sustainable vaccination exercise (Alders, 2000).

In the same line of thought, Alders *et al.* (2000) observe that people would perceive the exercise negatively if the project concentrated on vaccination issues only and paid little attention to social, cultural, administrative and economic issues such as gender sensitivity, extension activities, and facilitation of government policies, training of farmers and marketing networks of poultry and their products.

2.8 Sustainability of ND Vaccination Programme in the Community

A study on the smallholder poultry production in Malawi (Kampeni, 2000) reports that the vaccination against ND would be successful only if the vaccine is offered for free. Even when free, an extension campaign is required to assure farmers that the vaccine is safe and inform them on the how and when the vaccine should be administered. Where funding is limited, small-scale farmers must contribute to the cost of vaccination (Kampeni, 2000). In most cases, farmers would place a higher value on the vaccine if they are required to purchase it and such payments would assist the overall sustainability of the ND control programme. Consequently, attention must be paid to raising the awareness of farmers with regards to the prevention of ND by vaccination and ensuring that the vaccine used is efficacious, safe, appropriate to local conditions, available and affordable.

In order for the control of ND to have a sustainable contribution to the well-being of farmers and their families, the control activities must bring together the key stakeholders and who must fully appreciate the complexity of the exercise that they are about to commence (Farooq *et al.*, 2002). Since these same areas would frequently be characterised by a lack of infrastructure in general and limited human resource capacity, the vaccination and improved husbandry of chicken must therefore be accompanied by appropriate organizational, training, communication and economic practices.

2.9 Economic Situation of the Households Vaccinated against ND

The term backyard chicken designates rearing of chicken on small scale for family use and, to some extent, for the generation of cash income. According to Farooq and Mian (2001), chicken kept on small farms under extensive management system considerably contributed to the cash income of the rural families in most of the third world countries. For example, before the establishment of commercial poultry sector in Pakistan, household chicken were the only source of eggs and poultry meat supply (Farooq and Mian, 2001). Although commercial poultry sector has been expanded with a rapid speed during the last three decades, highly productive birds have been imported for boosting production. Sonaiya (2000) observes, rural poultry is still a significant source of egg production in the country. Such birds are expected to produce high number of eggs if properly managed. However, mortality rates would be high and egg production would be poor if the chicken are not properly vaccinated and managed (Sonaiya, 2000). Whereas Naila *et al.* (2001) report of higher mortality in non-vaccinated flocks, Farooq *et al.* (2002) report of poor

production performance of backyard chicken under poor management conditions. Thus, animal production activities may vary from place to place due to the specific climatic conditions and difficulties in communications and economy. Food securities, socio-economic, religious and cultural considerations, are amongst the reasons for keeping village chicken by resource-poor rural communities (Swatson *et al.*, 2001).

2.9.1 Socio-relations in rural communities practicing ND control through vaccination

It is a woman's role to deal with everything related to reproductive activities and a large part of the activities of a social nature (preparation of feasts and ceremonies). Chicken are fundamental in making a woman play this role not only because they provide food, but also because of the possibility of being exchanged for staple goods or other products within and among the household.

In Nicaragua, for example farmers exchange chicken for food products (salt, sugar, and oil), cleaning products (soap), clothes and school supplies for the children or medicinal drugs for the different members of the household which improves their social cohesion (Farooq and Mian 2001). In the same way as cattle, chicken constitute a small-scale financial reserve, a monetary fund available to women, and a female form of a living bank. The sale of a chicken would meet a small-scale need such as the purchase of staple products, medication, or clothes, pens and notebooks for school going children.

The increase in total number of chicken is translated immediately into an increase in their sale and to a lesser extent in their consumption within the household. The need for access to cash is immediate, while the change in alimentary habits is slower, and for that reason, despite the increase in the poultry flock, it is still unusual for chicken to be eaten on a regular basis.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Location of the Study Area

This study was conducted in Mvomero District, Morogoro Region, Tanzania. Mvomero District is located between 8° - 10° S and 28° - 37° E with a total area of 7 325 km². The district is divided into four Divisions namely: Mvomero, Turiani, Mgeta and Mlali. The District has 17 Wards and 101 Villages. The district has a population of 260 535 of which 131 259 are males and 129 276 are females (URT, 2003).

3.2 Research Design

The study adopted a cross-sectional research design which allows information to be gathered at one point in time (Krishnaswami, 2006). The cross-sectional design was considered appropriate in this study as it uses survey technique in gathering data, and also because of the nature of the study objectives.

3.3 Sampling Procedure and Sample Size

The Newcastle vaccination exercise was conducted in seven villages at Mvomero District. Therefore, purposive sampling was used to select the seven villages from which the ND vaccination exercise was being carried out. The villages are located in such a way that two villages (Tangeni and Kimambila) were from remote areas and another two (Lubungo and Mafuru) were from in-between remote and peri-urban and the last three (Sangasanga, Vikenge and Changarawe) were in the peri-urban setting. A simple random sampling technique was employed to select the sample size from the sampling frame of seven purposively selected villages. On average,

there were 255 households in each village giving a total of 1785 households for seven purposively selected villages. The respondents selected were as follows: Lubungo (36), Kimambila (35), Tangeni (30) Sangasanga (26), Vikenge (23), Mafuru (17) and Changarawe (14) making a total of 181 respondents for the study. This is a reasonable sample based on the method of analysis employed for statistical significances (Hair *et al.*, 2006).

3.4 Data Collection

Both primary and secondary data were collected. Primary data were collected using semi-structured questionnaire consisting of both open and close-ended questions. The personal in-depth interviewing approach was employed to administer the questionnaire. From this, the data collected include, but not limited to, the socio-economic contribution of vaccinated chicken to the household's wellbeing, social cohesion and networks, perception of the households towards the vaccination exercise and the strategies adopted for the sustainability of the exercise. Focus Group Discussions (FGDs) were also used to collect data; a well structured checklist guided the exercise. In each selected village, two FGDs were conducted.

A Focus Group Discussion (FGD) was formed by different actors with different age and sexes. Each Focus Group Discussion (FGD) had six participants. Participant observation was employed to check and control the validity and reliability of the information gathered using structured questionnaire and FGD. Secondary data were gathered by reviewing relevant available documents that were obtained from Newcastle Disease and Avian Flu (ND-AF) Control Project at the Mvomero district head office and internet.

3.5 Data Analysis

Data were analysed thematically whereby quantitative and quantitative methods were employed. Quantitative data was analysed using the Statistical Package for Social Sciences (SPSS) and involved preparation of the variables so as to suit the research questions and the method of analysis used and explored data for the distribution of responses. Descriptive statistics using frequency, percentages; means and measures of variations were employed in analysing the qualitative data. Central tendency and dispersion were also applied to determine whether the patterns described from the sample was likely to apply in the population where the sample was drawn (Johannes, 2006). Qualitative data were analysed using structural function analysis. The method was used mainly for data collected from FGDs and Key Informant interview.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

This chapter presents the results and discusses the emerging issues in view of the objectives of the study. It gives the general overview concerning the issue of socio-economic impact of vaccinated chicken against ND. The results of the study are presented and discussed based on the specific objectives.

4.1 Household Demographic Information

The general characteristics of the selected sample households were based on the impact of vaccinated chicken against ND on the socio-economic wellbeing of the communities in the study area. The characteristics of respondents were among others age, sex, marital status, and level of education.

4.1.1 Sex of respondents

Sex is one of the important components in the development process. About 41 % and 59 % of the respondents involved in keeping FRLC were males and females respectively (Table 1). This provides an imprecations that majority of males did not consider keeping FRLC as the important activity in their households whereas female considered FRLC as the basic source of income. According to ILO (2000) majority of women in developing countries are neglected in resources ownership and FRLC is still observed as an inferior source of income for most males. In those countries, many females take the opportunity of keeping FRLC compared to males.

4.1.2 Age of respondents

Out of 181 respondents, 45.9 % were aged between 18 and 35 years, while 38.7 % were aged between 36 and 55 years, 12.7 % were aged above 55 years and only 2.8 % were aged below 18 years (Table 1). Since age is the main factor of labour productivity the findings imply that majority of the respondents who kept FRLC were energetic and who could improve their level of production in this sector (ILO, 2000).

4.1.3 Marital status of the respondents

Marital status is the key component in developmental responsibilities (URT, 2005). The findings of this study show that 75.7 % of the respondents were married while 13.8% were singles, 3.9 % and 6.6 % were divorced and widowed, respectively (Table 1). This scenario was attributed to social responsibilities that require collective efforts among household members. As Alders (2001) reports married farmers are mostly successful in livestock keeping as they can be able to distribute responsibilities whereby the female takes care of the chicken and the male takes care of large animals such as cattle and goats.

4.1.4 Education level of respondents

According to Pedersen (2002), education levels of farmers contributed to the performance in FRLC keeping. The current study shows that 68.0 % of the respondents reached only standard seven, 9.9 % standard four, 9.4 % never went to school, and 7.7 % had secondary education. Very few had adult education and college education (Table 1). This implies that the FRLC keeping in the study area is likely to be influenced by the level of education of farmers as having low level of

education is a constraint in adopting new technology for a fight against ND as farmers continue to maintain their traditional methods of vaccination Alabi (2002).

According to the author also, illiteracy is heavily regarded as a major limitation to technology adoption in livestock keeping and in fight against livestock diseases. The high level of education enables the farmers to access relevant information that stimulates their production.

**Table 1: Percentage distribution of household demographic information
(N=181)**

Variables	Frequency	%
Sex		
Male	75	41.4
Female	106	58.9
Age		
< 18	5	2.8
18 – 35	83	45.9
36 – 55	70	38.7
> 55	23	12.7
Marital Status		
Single	25	13.8
Married	137	75.7
Divorced	7	3.9
Widowed	12	6.6
Level of Education		
Adult Education	7	3.9
Standard four	18	9.9
Standard seven	123	68.0
Secondary school	14	7.7
College	2	1.1
No school	17	9.4

4.2 General Description of the Study Area

The study area was characterised with different economic activities that farmers engage with. Among the main economic activities practised in the study area include farming and livestock keeping.

4.2.1 Main crop cultivated in the study area

Agriculture was the main economic activity that employs most of the people. About 35 % of all the respondents cultivated rice and maize. These crops were considered to be the main staple food in the study area (Table 2). The results also show that 11.6 % of the respondents cultivated maize only, while 1.7 % cultivated rice due to the ecological and geographical factors of the area. In general, apart from 35 % of the farmers who dealt with maize and rice production, 86.7 % of the remaining households cultivated more than two crops as a strategy to overcome risk in farming activities (Table 2).

Table 2: Main crops produced in 2008 by the respondents (N=179)

Crops	Frequency	%
Maize and Rice	63	35
Maize, Millet and Rice	38	21
Maize, Rice and Cucumber	22	12.2
Maize	21	11.4
Maize, Rice, and Cassava	13	7.2
Maize, Rice and Banana Cassava	6	3.4
Maize, Rice and Beans	5	2.8
Maize, Tomato and Cassava	4	3.0
Rice	3	1.7
Maize and Banana	3	1.7
Maize, Rice, Beans and Cassava	1	0.6

4.2.2 Type of livestock kept by respondents

Livestock keeping is another main economic activity that farmers undertake. Despite that Mvomero has a large potential area for grazing and adequate animal fodder for zero grazing; the situation was quite different for the respondents in the study area. The major type of livestock that the farmers keep is local chicken, also known as Free Range Local Chicken (FRLC). Thus, local chickens were kept by all the respondents in the study area (Table 3).

Table 3: Types of livestock owned by respondents (N=180)

Type of Livestock	Frequency	%
FRLC	153	84.5
FRLC, and Goats	12	6.6
FRLC and Ducks	5	2.8
FRLC, Ducks and Goats	4	2.2
FRLC, Cattle and Goats	2	1.1
FRLC, Pig and Goats	2	1.1
FRLC, Sheep, Goats and Pigs	2	1.1

About 85 % of the farmers in the study area were found to keep FRLC only, while the rest was found to keep FRLC and other types of livestock such as pigs, sheep, goats and ducks. There was only one 1.2 % who kept FRLC, sheep, goats and pigs. According to the focus group discussion conducted in Changarawe and Lubungo, farmers were asked for reasons of keeping FRLC only, one of the participants reported that “FRLC is very easy to keep and it is not labour intensive, it requires only small capital to start the project compared to cattle or other livestock.” This statement implies that farmers have seen the advantage of keeping FRLC as opposed to other types of livestock. During group discussion in Zimbabwe, conducted by International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) (2004),

farmers reported that they raised chicken for eggs and for sale. If a child fails to get school fees, the chicken would be sold to get the money. The farmers also, indicated that chicken gave manure used for growing green vegetables.

4.3 Contribution of Local Chicken to Socio-economies Among Rural Households

4.3.1 Number of FRLC kept by the respondents

The average numbers of FRLC in the study area were 26.41, 22.94 and 19.04 Free Range Local Chicken, in 2007, 2008 and 2009 respectively. The results show that there was a decrease in number of FRLC in the study area in the three years. At household level (Table 4), the number of respondents with less than 10 FRLC in 2007 was reported to be 7.2 %, while in 2008 and 2009, 19.9 % and 32.0 % of the respondents were reported to be keeping less than 10 Free Range Local Chicken (FRLC), respectively. In the focus group discussion conducted in Vikenge, Kimambila, Tangeni, Lubungo, Mafuru, Sangasanga and Changarawe villages, reported reason for the decrease in the number of FRLC was diseases such as ND which was reported to be the most dangerous disease in the study area.

Table 4: Number of FRLC from 2007-2009

Number of FRLC	2007 (N=181)		2008 (N=181)		2009 (N=181)	
	Frequency	%	Frequency	%	Frequency	%
<10	13	7.2	36	19.9	58	32.0
10-30	126	69.6	111	61.3	101	55.8
31-60	33	18.2	29	16.0	18	9.9
61-90	7	3.9	3	1.7	3	1.7
91-120	1	0.6	1	0.6	1	0.6
>120	1	0.6	1	0.6	0	0.6

4.3.2 Common diseases affecting chicken in the study area

The traditional method of keeping FRLC in developing countries especially in Tanzania make farmers earn little benefit. The economic benefits resulting from FRLC contribute to the rise of livestock sector and of national economy but one of the costly exercise farmers are trying to avoid in the study area is vaccination. The results show that ND contributed to 80.7 % of deaths, followed by vitamin A deficiencies which contributed to about 11 % for both adult chicken and chicks (Table 5).

**Table 5: Common diseases affecting chicken and chicks in the study area
(N=181)**

Type of diseases	Frequency	%
ND	146	80.7
Vitamin A deficiency	20	11
Vitamin A deficiency & ND	15	8.3

During focus group discussions, some of the farmers reported to have stopped vaccinating their chicken after the phasing out of the project on cost grounds. However, low level of education was also another issue that created resistance of farmers not to vaccinate their FRLC. A study on poverty alleviation through free-range poultry improvement, which was done in Uganda, reported that poor productivity of FRLC was a result of high mortality rate due to ND diseases and predators. Newcastle disease (ND) has been reported to be the main cause of chicken and chick's loss in various areas in Africa (Kusina *et al.*, 2001; Aboe *et al.*, 2006).

4.3.3 Free range local chicken vaccination programme

The Newcastle disease vaccination programme and training of farmers by Sokoine University of Agriculture helped to reduce the number of chicken deaths occurring in the study area. One of the farmers in Sangasanga and Kimambila said that the failure of some farmers to timely vaccinate their animals against diseases contributed to resistance of the disease in the area. In the focus group discussion with farmers in the study area, the common things which were observed include farmers delaying to vaccinate their chicks and chicken, most of these chicks and chicken were vaccinated once or twice a year. However, delays were caused by farmers who neglected the idea of cost sharing programme in the study area (Table 6).

Table 6: Number of vaccination from 2007-2009

Number of Vaccination	2007 (N=108)		2008 (N=150)		2009 (N=73)	
	Frequency	%	Frequency	%	Frequency	%
1	44	40.7	52	34.7	38	52.1
2	27	25.0	46	30.7	18	24.7
3	26	24.1	31	20.7	11	15.1
4	8	7.4	17	11.3	3	4.1
5	1	0.9	1	0.7	1	1.4
6	0	0.0	1	0.7	0	0.0
12	2	1.9	2	1.3	2	2.7

The cost sharing idea led to the pulling out of even those who were willing to participate in the vaccination exercise. Some of these farmers initially had accepted the concept of cost sharing and were ready to contribute, but sometimes, it took too long to collect the money for the cost sharing. According to Alders (2000), resistance is a common phenomenon in most African communities as it was proven

in most societies and institutions that when people are required to share the cost they tend to resist against the programme introduced in the area.

4.3.4 Number of FRLC sold from 2007 to 2009

Free Range Local Chicken (FRLC) contributes to a great part to the household source of income. In 2007 and 2008, the FRLC sold were 781 and 1116 respectively. These figures are better than that of 2009, where only 545 FRLC were sold. This is probably due to low market demand resulting from the world economic crises which occurred at the time. Majority of rural farmers sold FRLC to get money for domestic use such as buying food. Out of 181 respondents (Table 7) who kept FRLC in the study area, only 35.36 % sold FRLC in 2009.

Table 7: Number of FRLC sold from 2007 to 2009 in the study area

Number of FRLC sold	2007 (N=181)		2008 (N=181)		2009 (N=181)	
	Frequency	%	Frequency	%	Frequency	%
<10	65	67.7	90	69.2	48	71.6
10-20	27	28.1	33	25.4	13	19.4
21-30	3	3.1	1	0.8	5	7.5
31-40	0	0.0	3	2.3	1	1.5
41-50	1	1.0	2	1.5	0	0.0
51+	0	0.0	1	0.8	0	0.0

The respondents who sold less than 10 FRLC accounted for 71.6 % followed by 19.4 % whose sales ranged between 10 to 20 FRLC (Table 7). According to Alders *et al.* (2000), the limited sales of FRLC could be due to their slow growth rates and poor egg production, high mortalities and susceptibility to diseases.

4.3.5 Income obtained from selling FRLC

FRLC is an important source of income which contributes to household's wellbeing in the study area. The results show that, in the year 2007, the FRLC contributed to about Tsh 5 857 500, while in 2008 and 2009 the enterprise contributed Tsh 7 812 000 and Tsh 4 360 000 to the household incomes. At household level, 56.3 % of farmers got an annual income of less than Tsh 50 000 in 2009 compared to the farmers who got income ranging from Tsh 50 000 to above Tsh 100 000 as all accounted for 21.9 % (Table 8).

Table 8: Gross income due to selling of FRLC from 2007 to 2009 in study area

Income in Tsh	2007 (N=93)		2008 (N=126)		2009 (N=64)	
	Frequency	%	Frequency	%	Frequency	%
< 50000	47	50.5	78	61.9	36	56.3
50000 – 100000	26	28.0	23	18.3	14	21.9
>100000	20	21.5	25	19.8	14	21.9

There is a decrease in the level of income among the farmers year by year caused by the decrease in the number of chicken because most of the farmers do not vaccinate their chicken regularly. As Swatson *et al.* (2001) suggest, farmers should regularly vaccinate their chicken in order to increase the number which would have an effect on the level of income. A similar study was done by Alabi and Osifo (2004) in Nigeria who found that farmers who used to vaccinated their chicken regularly had a drastic increase in number of chicken which resulted into an increase in income. Also Gueye (2000) reports that, rural poultry fetch higher prices and envisages that with better marketing/advertising, the demand for the free-range local chicken could increase in the village and urban areas.

4.4 Productivity of Maize and Rice

In the study area, out of 181 farmers, 176 of them cultivated maize; and out of this 44.8 % of them harvested from 250 to 500 kg of maize, while about 30 % of the respondents harvested below 250 kg of maize in 2008. It was also observed that only 22.1 % of all the farmers harvested more than 500 kg in 2008 (Table 9).

Table 9: Maize and rice yield (kg) in 2008

Yield (kg)	Maize (N=176)		Rice (N=111)	
	Frequency	%	Frequency	%
< 250	55	30.4	81	73.0
250 – 500	81	44.8	29	26.1
>500	40	22.1	1	0.9

One bag is equivalent to 100 kg

None of the respondents reported to earn an income from maize through selling maize harvested during the last production season. The same was true with rice production as farmer's harvested little for just household consumption only. As FAO (2000) reports, most of the small scale farmers in Africa cultivate crops in small scale which is sufficient only for their domestic use.

4.5 Social Relations Within and Among the Households

4.5.1 Ownership of FRLC by gender in the households

About 56 % of women owned FRLC, while men accounted for 18.8 % followed by 14.9 % of both adult men and women (Table 10). Children of both sexes owned and cared for FRLC. This reflects the real situation in most of the rural areas in Tanzania, that majority of the women own and care for FRLC. The plausible reason

is that women consider FRLC as a bio asset as a source of income, social capital and nutrition (FAO, 2000). Men have control over larger animals, which enable them to acquire and reproduce their power and access to the means of production and consumption that flow from that fact.

Table 10: Ownership of FRLC by gender in the households (N=181)

Care FRLC	Frequency	%
Female	102	56.4
Male	34	18.8
Male child	5	2.8
Female child	1	0.6
All children	2	1.1
All household Members	10	5.5
Both adult men and women	27	14.9

As Alabi and Osifo (2004) pointed out, women are more involved in family production than is the case with men; and this has made the farmers to develop superior caring techniques as opposed to the latter. The superiority is probably due to the reason that women spend more time at home caring for family poultry than does the men; besides poultry activities do not require masculinity. The implication is that, women may efficiently generate more income from family poultry than can the men, on the other hand; the high mortalities reported for Newcastle Disease (ND) might be a major factor that discourages men from investing much of their time and scarce resources in expanding flock size (Sprdbrow and Foster, 2000).

4.5.2 Decision in selling FRLC and eggs

Most of the respondents kept FRLC for local consumption rather than for commercial/business purposes. However, the FRLC have a good market in the study

area and outside. For the majority, the selling of FRLC takes place only when there are problems within the household. In the study area, women were the ones who owned and cared for the FRLC, but during the selling they have to discuss the matter with their counterparts (Table 12).

Table 11: Decision to sell FRLC and eggs in the household

Decision	FRLC (N=173)		Eggs (N=138)	
	Frequency	%	Frequency	%
Female	52	30.1	73	52.9
Male	61	35.3	26	18.8
Male child	6	3.5	2	1.4
All children	2	1.2	2	1.4
All household Members	47	27.2	28	20.3
Both adult men and women	5	2.9	7	5.0

It was noted (Table 12) in the study that 30.1 % and 52.9 % of females had decision making power over the selling of FRLC and eggs, respectively as compared to 35.5 % and 18.8 % of males, respectively. Only 27.2 % and 20.3 % of decisions for selling FRLC and eggs respectively were made by both household members

This partly gives the impression that although women are responsible for ownership and caring for FRLC in the household, they are not the last decision makers on whether or not to sell the FRLC. For that matter the relations among household members exist in transferring information and making decision together and coming up with desired results. In contrast, the study done in Mozambique found out that women were having very little say in the selling of FRLC, instead men were the ones with the powers to on whether or not to sell the FRLC but generally if FRLC

were under the control of a woman, they have some autonomy in their use. One woman stressed that: 'if the chickens are mine, I don't need to get down on bended knee in order to use them'. She is referring to the act of kneeling down before the husband to request for permission (Alders, 1999).

4.5.3 Keeping money obtained from selling FRLC and eggs

Household relation is influenced by several factors including the use of household resources, money inclusive. The keeping revenue obtained from the selling of the FRLC and its products was observed to be clearly determined among the household members. The findings indicated that more than half of the respondents 60.1 % indicated that money obtained from the selling of FRLC were kept by females, while only 19.1 % indicated that it was the males who kept the money. Further, the study noted that about 67.3 % of females kept the money obtained from selling eggs as compared to 15 % of males. However, the money obtained from selling both the FRLC and eggs was kept by all household members in the household by 15 % and 12 %, respectively, as shown in Table 12. The fact that majority of the females kept the money obtained from FRLC and eggs reflect the ownership patterns of the FRLC and large animals. As Pedersen and Kristensen (2004) reports, freedom of keeping money from FRLC and eggs influences management practices and good husbandry of FRLC.

Table 12: Keeping money obtained from selling FRLC and eggs in the household

Keep Money	FRLC (N=173)		Eggs (N=147)	
	Frequency	%	Frequency	%
Female	104	60.1	99	67.3
Male	33	19.1	22	15.0
Male child	2	1.2	3	2.0
Female child	2	1.2	1	0.7
All children	2	1.2	.0	0.0
Both adult males and females	4	2.3	5	3.4
All household Members	26	15.0	17	11.6

4.5.4 Relations among households

In any society, the relationship among households is created by members of the community or neighbours. In the study area, the relations among households were assessed through asking questions about the relation of neighbours to the households who kept and regularly vaccinated FRLC against ND. On this aspect, there were reported incidents of conflict which include destruction of gardens leading to hostilities among the households. Other claim was the disposal of carcass to neighbour's farms; this was reported by 39.8 % of the respondents. About 60 % of the respondents disposed carcasses to neighbour's farms purposely (Table 13).

Table 13: Reason for neighbours throwing ND infected carcasses near compounds (N=181)

Reason	Frequency	%
They don't know the effect of throwing carcasses	72	39.8
Because neighbors vaccinated against ND	45	24.9
To decrease number of neighbors chicken	31	17.1
FRLC destroy neighbors farms	26	14.4
Neighbors want to test function of ND vaccination	7	3.9

The implication of these two main claims is that, the traditional methods of keeping FRLC create negative relations among the households.

4.5.5 Actions taken by respondents as a result of throwing ND infected carcass to neighbour's farms

The findings indicated that about 58 % of the farmers reported to have resolved the conflict with neighbours through negotiations whereas 29.3 % of the farmers reported to have taken no action. The implication of these reactions means that, the farmers themselves do not understand or take into consideration the negative impact of ND to their FRLC. As discussed earlier, the majority of farmers kept FRLC as a hobby and not for economic purposes. Furthermore, the results show that 10.5 % of the farmers settle such problems through action against their neighbours, while 2.2 % of farmers apply witchcraft against neighbours who throw ND infected carcass onto neighbours farms (Table 14). The mode through which farmers' react to the conflicts implies the maintenance and trust onto the existing communal and/ or traditional ways of conflict resolution techniques that are aimed at developing lasting solutions with consensus building among themselves.

Table 14: Actions taken by respondents as a result of throwing ND infected carcass to neighbours farms (N=181)

Action	Frequency	%
Negotiate with him/her	105	58
Take no action	53	29.3
Take legal action	19	10.5
Apply witchcraft	4	2.2

4.6 Performance of ND Vaccination against Local Herbs

Farmers may have positive or negative attitudes toward certain technologies or innovations, and these can influence farmers' acceptance on the given technologies. The findings indicate that 83 % of the respondents declared that, ND vaccination worked better than the local herbs whereas 8.6 % supported that both ND vaccination and the local herbs worked better and only 6.9 % were comfortable with the local herbs only (Table 15). The results implied that majority of the farmers accepted the performance of ND vaccination as compared to that of local herbs in the study area. The results are contrary to the one reported by Mushi *et al.* (2000), which show that 80 % of the households used traditional *Setswana decoctions* to treat infected chickens in South Africa, whilst only a few villagers attempted to vaccinate FRLC against ND disease in this study.

Table 15: Performance of Vaccination and Local herb (N=175)

Performance	Frequency	%
ND Vaccination	145	83.0
ND Vaccination and Local herbs	15	8.6
Local herbs	12	6.9
None of them	3	1.7

4.7 Farmers' Perceptions towards ND Vaccination Exercise

In the study area, farmers showed positive perception toward ND vaccination exercise. The findings indicate that a significant majority of farmers 99.4 % reported to have positive perception as opposed to only 0.6 % who had negative perception toward ND. The negative perception was due to the fact that these respondents are the main suppliers of traditional herbs thus they discourage the use of ND vaccination to maintain the market of their products (Table 16). This means that, the

introduction of ND vaccination as a new innovation to farmers, cemented the way towards improvement of FRLC and new ways of fighting against ND in the study area. Though this has taken place, there is still a need to have a close follow-up in order to encourage and motivate farmers to continue improving their traditional way of keeping FRLC. This would allow the keeping of FRLC to be business oriented and it would earn farmers more income for household needs.

Table 16: Perception of respondents against ND vaccination (N=164)

Perception	Frequency	%
Positive perception	163	99.4
Negative perception	1	0.6

4.8. Policies Adopted by Communities for the Sustainability of the ND

Vaccination Exercise

Developed and developing countries put forward the concept of sustainability in all areas as their first priority in any development projects. In their initiatives to support development projects in developing countries, different stakeholders always come up with a watchword of sustainability. The ND vaccination project in Mvomero District started in 2005, whereas among the strategies put forward was to ensure the project becomes sustainable in the long run and even after the project phase out. Different approaches were used to ensure sustainability of the ND vaccination exercise in the study area. During the interview with farmers, some approaches or policies were reported as being set to ensure sustainability in the area; among them was the introduction of groups for FRLC keepers in the area, building of good quality houses for chicken as well as cost sharing during ND vaccination exercise.

4.8.1 FRLC group formation

In the introduction of FRLC groups in the study area, only 43.6 % of farmers formed FRLC groups, as opposed to 56.4 % of farmers who did not have any groups (Table 17). This means that the strategy developed for sustainability through group formation was still needed in the study area. During focus group discussion, farmers proved to have no enough knowledge and skills on how to form the groups, what are the advantages and how the group could be a strategy of sustaining the ND vaccination exercise thus strengthening FRLC industry for their wellbeing. A similar study done by Alders *et al.* (2000), it was revealed that farmers in developing countries lack education and training on how to form groups to ensure sustainability of the projects

Table 17: Groups developed to sustain ND vaccination exercise (N=181)

FRLC Group	Frequency	%
Yes	79	43.6
No	102	56.4

4.8.2 FRLC housing and shelter

Table 18 shows that 58.6 % of the farmers reported that, FRLC had their special houses while 27.6 % used the same houses with human beings and the remaining 2.2 %, 5.0 % and 6.6 % of farmers reported that their FRLC slept on trees, on roofs and in the kitchens, respectively. During the survey, it was observed that the conditions of the houses used for FRLC were more or less the same in the seven studied villages. Most of the FRLC houses were made of mud, mud bricks and wood as well as no chicken ban was partitioned into places for laying eggs and for chicks. This kind of poor housing was one of the contributions to the decline of FRLC production

in the study area. During FGD, it was revealed that the high cost of constructing a standard FRLC ban had made farmers fail to construct standard FRLC ban. The construction of ban should be in such a way that, they are easy to clean, they are well ventilated and cheap. According to Host (2000), farmers construct good FRLC ban because of the experience they get from their fore-parents, advise from the projects and the need to protect their FRLC from hazards.

Table 18: Place where FRLC sleep at night (N=181)

Place	Frequency	%
Special house	106	58.6
Same house with humans	50	27.6
In the kitchen	12	6.6
On the roof	9	5.0
On the trees	4	2.2

4.8.3. Plan to improve FRLC house

Majority 90.6 % of farmers reported to have a plan to improve FRLC keeping by building better houses and 9.4 % had no any plan to build FRLC houses (Table 19). Good housing helps to protect FRLC against diseases and predators, adverse temperatures, radiation, rain and chilling weather. Njue *et al.* (2001), on a survey on the disease status of FRLC in Kenya, suggest that the designing of housing for the village chicken would go a long way into controlling parasitic diseases and losses associated with predation.

Table 19: Plan to improve FRLC by building improved houses (N=181)

Plan to improve	Frequency	%
Yes	164	90.6
No	17	9.4

4.9 Cost Sharing in ND Vaccination Exercise

This was another strategy that farmers implemented to ensure sustainability of the vaccination exercise. A significant majority of farmers 98.3 % were willing to contribute to the ND vaccination exercise as part of cost sharing and 1.7 % of them were not willing to contribute to the exercise (Table 20). The findings imply that farmers had realized the importance of vaccinating FRLC against ND hence they are ready to contribute to the costs associated with the vaccination exercise.

**Table 20: Readiness of farmers for cost sharing of ND vaccination exercise
(N=181)**

Readiness to contribute	Frequency	%
Yes	178	98.3
No	3.0	1.7

Unfortunately, ND vaccine facilitators in the study area claimed that farmers do not implement the vaccination as it is required. They reported that since cost sharing was introduced, few farmers contributed money to fulfil the vaccination exercise in their respective areas. One of the facilitators in Changarawe village added that, since the programme started she volunteered to buy ND vaccine, yet other farmers failed to pay back her cost.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Chicken-raising is the most widespread stock breeding activity within the household. ND introduces a high risk factor into FRLC-raising; therefore various strategies are established to ensure sustainable production of FRLC and these include vaccination in every three months in each of seven villages and the introduction of cost sharing among the FRLC keepers in the study area. In the long term, success in vaccination against the disease may modify both the conceptions and the current practices on FRLC keeping. Although resistance to a substantial increase in consumption of chicken has been acknowledged, their greater availability implies an increase in their consumption. Greater access to animal protein improves the household diet and the nutritional status of its members. For all households, and especially for the poorest and for women who rely mainly on chicken to fulfill their basic nutritional needs, the increase in the total numbers of chicken raised represents a small improvement in household diet, hygiene, clothing, medications, schooling, social relations and the possibility of getting access to a prized meal and money.

5.2 Recommendations

(a) Continuous training programs should be further organized for poultry farmers and workers in the industry to keep them abreast with the latest technologies in the business and also to provide ways of removing most of the identified constraints.

(b) Extension agency (Ministry of Livestock Development and Fisheries in collaboration with Prime Ministers Office) should be mandated to disseminate

improved technology that would stimulate family poultry production in the study area.

(c) Constant contact between farmers and extension agents should be further encouraged as this is an important factor in the adoption of improved practices by farmers and also farmers should be made to see the potentials inherent in the integration of crop production with poultry farming. Livestock could be reared along with crop production and such wastes could be used in soil fertility maintenance.

(d) The farmers should be educated on the proper feed supplementation so that they can make informed choices on the most suitable feeding management practices.

(e) Capital can be channeled to family poultry production through the provision of micro- credit and formation of cooperative societies; medicine and vaccines should be provided for family poultry production at affordable prices as well as the need to use front line staff to educate farmers and sensitize the public using forums such as those organized by livestock professional bodies to educate the farmers.

REFERENCES

- Aboe, P., Boa-Amponsem, K., Okantah, S., Butler, E., Doward, P., Bryant, M. (2006). Free-range village chicken on the Accra plains, Ghana: Their husbandry and productivity. *Tropical Animal Health and Production* 40(4): 220 - 260.
- Alabi, R.A. and Osifo, A.A. (2004). Constraints to self-sufficiency in Backyard poultry production in Edo State. In: *Proceedings of 9th Annual Conference of Animal Science Association of Nigeria*. 13 - 16 September 2004, Abakaliki, Ebonyi State, Nigeria. pp. 531 - 536.
- Alabi, R. A. and Isah, A. O. (2002). Poultry production constraints: the case of Esan West of Edo Estate, Nigeria. *African Journal of Livestock Extension* 1: 58-61.
- Alders, R.G. (2000). Controlling Newcastle disease in village chickens in Mozambique African Studies Association of Australasia and the Pacific. *African Studies Review and Newsletter* 4(1): 42 - 63.
- Alders, R.G. (2001). Participatory Methodologies and Village Poultry Production. *The possibilities for small holder poultry projects in Eastern and Southern Africa*, Morogoro, Tanzania 6(2): 22 – 38.
- Alders, R.G. and Spradbrow, P.B. (Eds) (2001). SADC Planning Workshop on Newcastle Disease Control in Village Chicken. In: *Proceedings of an*

International Workshop, Maputo, Mozambique, ACIAR Proceedings 103. pp 22 - 44.

Alders, R.G., Fringe, R. and Mata, B.V. (2000). Experiences in the control of Newcastle disease in Mozambique. In: *The Second IAEA/FAO Research Co-ordination Meeting: Improvement of Health and Management of Family Poultry Production in Africa. (Edited by Alders, R.G.)* Maputo, Mozambique. pp 13-45.

Boki, J.K. (2000). Poultry industry in Tanzania with emphasis on small-scale rural poultry. smallholder poultry project eastern and southern Africa. *Journal of International Development* 14 (2): 23-35.

FAO (2000). *Guidelines, for the Inclusion of Improved Household Poultry Production. Diversification Component of the Special Programme for Food Security.* FAO, Rome. 82 pp.

Farooq, M. N., Gul, N., Chand, R., Durrani, A., Khurshid, J., and Asghar, A. (2002). Production performance of backyard chicken under the care of women in Charsadda, Pakistan. *Livestock Research Rural Development* 14(1): 22-34.

Farooq, M. and Mian, M. A. (2001). Contribution of backyard chicken to household economy produced by non member and member farmers of Women in Development (WID) under Sarhad Rural Support Program (SRSP) in Charsadda, Pakistan. *Journal of Rural Development and Administration* 10 (4): 22-44.

- Gueye, E.F. (2000a). The role of family poultry in poverty alleviation, food security and the promotion of gender equality in rural Africa. *Outlook on Agriculture* 29 (2): 114-136.
- Gueye, E.F. (2000b). Approaches to family poultry development. *World's Poultry Congress* 15 (3): 12 – 17.
- Gueye, E.F. (2000c). Women and family poultry production in rural Africa. *Development in Practice* 10: 72 – 101.
- Hair, J., Black, W., Babin, B., Anderson, R. and Tatham, R. (2006). *Multivariate Data Analysis (Sixth Edition)*. Pearson Education, Inc. New Jersey. 899pp.
- Host, P. (1996). Problems and perspectives of small scale poultry development. *Entwickling and Landlicher raum* 24 (4): 7 – 10.
- ICRISAT (2004). Farmer field schools for the youth in HIV/AIDS affected communities. [<http://www.infobridge.org/asp/documents/3785.pdf>] site visited on 12/5/2010.
- ILO (2000). Participatory Tools for Assessment and Monitoring of Poultry Raising Activities and Animal Disease Control. ILO, Bangkok, Thailand. 34pp.
- Johannes, L. (2006). Models and Statistical Inference: The Controversy between Fisher and Neyman-Pearson. *British Journal for the Philosophy of Science* 57(1): 64-91.

- Johnston, J., Fontanilla, B. and Silvano, F. (2000). The economic impact of vaccinating village fowls: A case of Philippines.
[<http://www.aciar.gov.au/publications/proceedings/39/index.htm>] site visited on 17/4/2010.
- Kampeni, L. F. (2000). Smallholder poultry production in Malawi. In: *Proceeding of the workshop on the possibilities for the Smallholder Poultry Projects in Eastern and Southern Africa*. (Edited by Pedersen, G., Permin, A. and Minga, U.), 3 - 6 July 2000 Morogoro, Tanzania. 22 - 41 pp.
- Kitalyi, A.J. (1996). Socio-Economic aspects of village chicken production in Africa: The role of women, children and NGO's on chicken production. *World's Poultry Congress 1*: 35 - 46.
- Kitalyi, A.J. (1998). *Village Chicken Production Systems in Rural Africa: Household Food Security and Gender Issues*. FAO, Rome. 81pp.
- Kothari, C.R. (2004). *Research Methodology, Methods and Techniques. (Second Edition)*. Wiley Eastern Limited, New Delhi. 401pp.
- Kusina, J. K., Mlhangwa, J., Alders, R. and Spradbrow, P. (2001). A Survey on Village Chicken Losses: Causes and Solutions as Perceived by Farmers. In: *A SADC International Workshop on Newcastle Disease Control in Village Chicken*. (Edited by Kusina, J.K.), Oxford Press, Maputo, Mozambique. pp 114 - 154.

- Krishnaswamy, G. (2006). Livestock Production-twenty first century's food revolution. *Livestock for Rural Development* 16 (1): 5 – 12.
- Minga, U.M., Katule, A.M., Yongolo, M. and Mwanjala, T. (1996) The rural chicken industry in Tanzania: Does it make economic sense? *Journal of Tanzania Veterinary* 16 (2):25 – 28.
- Mlozi, M. R. S., Kakegi, A. V. M., Minga, U. M., Mtambo, A. M. and Olsen, J. E. (2003). Marketing of free range local chicken in Morogoro and Kilosa urban markets in Tanzania. [[http://www.cipav.org.co/Irr/Irr 15/2/cont 152.htm](http://www.cipav.org.co/Irr/Irr%2015/2/cont%20152.htm)] site visited on 2/3/2009.
- Mushi, E. Z., Binta, M.G., Chabo, R.G., Ndebele, R.T and Ramathodi, T. (2000). Diseases and Management of indigenous chickens in Oodi, Kgatleng, Botswana. *Worlds Poultry Science Journal* 56(1): 150-174.
- Mtambo, M.M.A. (2000). Improving the health and productivity of the rural chicken in Africa: Report of Phase 1 of an Enhancement of Research Capacity Programme. [<http://www.husdyr.kvl.dk/html/php/tune99/11-Mtambo.htm>] site visited on 26/2/2010.
- Muhairwa, A.P., Yongolo. M. G. S., Banzu, J. J., Jullu, B., Mdegela, R. H., Mtambo, M. M. A. and Minga, U. M. (2001). Disease trends and prospects of reducing losses in free ranging village chickens in Tanzania. In: *Proceeding of the 10th Conference of the Association of Institutions of Tropical Veterinary Medicines: Livestock, Community and Environment*

(Edited by Kysgaard, N. C. and Monrad, J.), 20-23 August 2001, Copenhagen, Denmark. pp. 123–165.

Mwalusanya, N. A., Katule, A. M., Mutayoba, S. K., Mtambo, M. M. A., Olsen, J. E. and Minga, U. M. (2001). Productivity of local chicken under village management conditions. *Tropical Animal Health and Production* 34(5): 350 - 418.

Msoffe, P. L. M., Minga, U. M., Mtambo, A. M., Gwakisa, P. S., Mdegela, R. H. and Olsen, J.E. (2003). Productivity and natural disease resistance potential of free ranging local chicken ecotypes in Tanzania. *Livestock Research for Rural Development* 14 (3): 176 - 218.

Naila, C., M., Farooq, F.R., Durrani, A. Asghar and Pervez, K. (2001). Prevalence and economic ramification of Newcastle disease in backyard chicken in Charasadda. *Journal for Biological Science* 1: 421 - 424.

Njue, S. W., Kasiiti, J. L., Mbugua, H. C. W. and Gacheru, S. G. (2001) A survey of the Disease status of the village chicken in Kenya. *Journal for Livestock, Community and Environment* 14 (3): 15 - 17.

Oakeley, R.D. (2000). The Socio-economic Environment of Newcastle Disease Control Strategies for Backyard Poultry Systems. In: *Poultry as a tool in poverty eradication and promotion of gender equality. (Edited by Dolberg F. and Petersen P.H.)*, Tunc, Denmark. pp. 22 - 26.

- Ologhobo, A.D. (Ed.) (2004). *Animal Feeds and Feedstuffs: Renewable Natural Resources, and Animal Husbandry*. University of Ibadan Press, Nigeria. 170pp.
- Payne, W.J.A. (1990). *An Introduction to Animal Husbandry in the Tropics*. 4th Edition. Longman Scientific and Technical, Essex, New York. 684pp.
- Pedescen, C. and Kristensen, A. R. (2004). Dynamic modeling of traditional African Chicken Production systems. *Tropical Animal Health and Production Journal* 36(6): 605 - 626.
- Pedersen, C. V. (2002). Local chicken production system in Malawi: Household flock structure, dynamics, management and health. *Tropical Animal and Health and Production* 39(2): 103 – 113.
- Permin, A. and Madsen, M. (2002). Disease occurrence and impact to smallholder poultry. In: *Investing in animal health research to alleviate poverty*. (Edited by Perry B.D., Randolph T.F., McDermott J.J., Sones K.R. and Thornton P.K.), International Livestock Research Institute, Nairobi, Kenya. pp.13 - 24.
- Rahman, M.M., Grasudding, M.R., Islam, J., Allam, C.C. (2002). Evaluation of maternal and humeral immunity against Newcastle disease virus in Chicken. *Animal and Veterinary Advances*. 8 (11): 161 – 163.
- Salcque, A. (2000). Scaling-up: Critical factors in leadership, management, human Resource development and institution building in going from pilot project to

large-scale implementation. In: *Poultry as a tool in poverty eradication and promotion of gender equality*. (Edited by Dolberg F. and Petersen P.H.), DSR Publishers, Denmark. pp. 40–71.

Sonayia, E.B. (2000). *Family Poultry and Food Security: Research Requirements in Science, Technology and Socio-Economics*. Oxford University Press, Montreal, Canada. 168pp.

Swatson, H., Nsahlai, I. and Byebwa, B. (2001). *The status of smallholder poultry production in the Alfred District of KZN (South Africa): Priorities for intervention*. Copenhagen, Denmark. 149pp.

URT (1999). *Tanzania Development Vision 2025: The President's Office Planning Commission*. Government Printers, Dar-es- Salaam, Tanzania. 54pp.

URT (2002). *Tanzania Population and Census of 2003*.

[<http://www.tanzania.go.tz/census/census/district/Mvomero>] site visited on 12/3/2010.

URT (2003). *Rural Development Policy: President's office Regional Administration and Local Government (RALG) Dodoma, Tanzania*. 130pp.

URT (2005). *National Strategy for Growth and Reduction of Poverty*. National Printpack (T) Ltd., Dar-es- Salaam. 71pp.

APPENDICES

Appendix I: Household Interview

Socio-economic Impact of Village Chickens Vaccinated against
Newcastle Disease in Rural Communities of Mvomero District,
Morogoro, Tanzania

Interviewer: _____

Village: _____

Division: _____

Date: _____

I am working as a record collector for a research project that is being carried out by a student from the Sokoine University of Agriculture, Morogoro - Tanzania. I'm interested in getting information about the production, income of chicken and its products, socio-relations within and among the households, people's perception on the ND vaccination exercise and the actions adopted for the sustainability of the exercise. This information will be used to write a report about the socio-economic impact of the vaccinated chickens against ND and will help chicken vaccination programs learn how to help small scale farmers better. The researcher assures the confidentiality for the respondents of this study and safe keeping of the questionnaires.

A. Household Information

1. NAME OF RESPONDENT	2. VILLAGE	3. WARD
4. RESPONDENT'S AGE	5. RESPONDENT'S SEX	6. HH COMPOSITION
(1) Less than 18 Years	(1) Male	Adults: Males.....Females.....
(2) 18-35 Years	(2) Female	Children: Boys.....Girls.....
(3) 36-55 Years		
(4) Above 55 Years		

Marital Status	(1) Married	(2) Divorced	(3) Widowed
	(4) Never married	(5) Single parent	
Education attained	(1) Standard four	(2) Standard 7	(3) Secondary
	(4) College	(5) University	(6) Formal education
	(7) Adult education		

7. What type of crops did you produce last season (2008)?

Food/ Cash crop	Bags/ Kgs/other (c.g. Coconut/Banana)
.....
.....
.....

8. What type and number of livestock has your household had/ have in:			
Livestock Type	2007	2008	2009
FRLC			
Ducks			
Guinea fowl ("Kanga")			
Cattle			
Sheep			
Goat			
Others (Specify).....			

B. General information about FRLC in the village

9. Is that more, less or about the same number of chickens and chicks that you owned last year (2008)?	1. More	
	2. Less	
	3. Same amount	
10. Reason for increase/ decrease in the number of chicken	Increase	Decrease
	1. Regular and timely	1. Newcastle Disease

and/ or chicks	ND Vaccination	2. Other diseases.....
	2. Use of local herbs	3. Predators
	3. Good care (housing, feeding)	4. Theft
	4. Others (specify)...	5. Killing by neighbours
		6. Witchcraft
11. What benefits do you realise by rearing chicken?	1. I get fees for my children	2. I get money to buy food
	3. I get money for medication of my family	4. I get money for buying building materials (mabati, cement...)
	5. I get money to buy clothes for the family	6. I get meat and eggs for my family.
	7. Others (specify).....	

C: Awareness and Health Status of the FRLC on ND and Avian Flu

12. Do you know any diseases that affect FRLC in this village	
(0) No	(1) Yes
13. If Yes in 12 above, mention them:	
14. From the list in 13 above, which disease mostly affects FRLC in your household?	
15. Of the chicks and chicken, which one are mostly affected and why? ...	
Reason:	
16. Is ND one of the diseases that seriously affect FRLC in this village?	
(0) No	(1) Yes
17. If Yes in 16 above, what were the symptoms of ND that you saw in your FRLC?	
18. Do you think that ND can be controlled in this village?	
(0) No	(1) Yes
19. If Yes in 18 above how can it be done?	

(1) Regular and timely vaccination	(2) Using local herbs	(3) Combination of (1) and (2)
(4) Other means (sp.....)		
20. Have you ever vaccinated your FRLC against ND?		
(0) No		(1) Yes
21. If Yes in 20 above, when did you first vaccinate and how many times?		
(1) 2005	How many times.....	
(2) 2006	How many times.....	
(3) 2007	How many times.....	
(4) 2008	How many times.....	
(5) 2009	How many times.....	
(6) Others (specify).....	How many times.....	
22. Who facilitated the vaccination exercise?		
(1) SUA (ND Project facilitator)	(2) Govt. Extn. Officers	
(3) VEO	(5) Others.....	
(4) NGOs (give name).....		
23. When does ND usually occur in this village?		
24. Have you ever use local herbs in treatment against ND?		
(0) No		(1) Yes
25. When do you think that local herbs can be most useful?		
(1) Before the disease occur	(2) After the disease has started	
(2) All the time	(4) Others (specify)	
26. How regular do you use local herbs?		
(1) Most Often	(2) Quite Often	
(3) Often	(4) Less Often (5) Not using	
27. Between ND vaccination and local herbs which one work best		
(1) ND Vaccination	(2) Local herbs	
(3) All of them	(4) None of them, I just use them.	

28. Have you ever heard about Avian Flu?	
(0) No	(1) Yes
29. Where did you hear from?	
(1) From the Radio	(2) Read in the newspaper
(3) From neighbours	(4) Other mass media channels
(6) From SUA (ND Project)	(5) Others (Specify).....
30. What do you know about Avian Flu?	
(1) It affect FRLC	(2) It affect human beings
(3) It affect both (1) and (2)	(4) It is not harmful at all
(5) Others (specify).....	
31. Do you think that most people in this village are aware of this disease?	
(1) Quite Aware	(2) Aware
(3) Little awareness	(4) Not aware
32. What do you think could be done to control Avian Flu?	
(1) Vaccination	(2) Mass awareness campaign
(3) 1 & 2 combined	(4) Others (specify) ...

D: Contribution of FRLC to the Household Wellbeing

D-1 Income from Chicken and Chicken Products (Eggs)

33. Of the chickens your household raises, how many were sold in?	2005	2006	2007	2008	2009	
34. How often do you sell chicken?						
(1) Per week (give no.....)			(2) Per Month (give number			
(3) Within 6 months (.....)			(4) Others.....			
35. What price do you fetch for each of the following category of chicken	Type	2005	2006	2007	2008	2009
	A Cock					
	Hen					
	Chicks					
36. Of the FRLC that your household has, how many eggs do you collect?						
(1) Per day (give no....) (2) Per week (give number.....) (3) Others.....						
37. How often do you sell eggs?						

(1) Per day (give number.....)	(2) Per week (give number.....)					
(3) Per Months (....)	(4) Other.....					
38. What price do you fetch per egg/ or per tray		2005	2006	2007	2008	2009
	Per egg					
	Per tray					
39. What is the contribution of other sources of income to the household?						
Sources from:	Unit	2005	2006	2007	2008	2009
(1) Selling of maize						
(2) Selling of rice						
(3) Selling of cassava						
(4) Selling of tomatoes						
(5) Selling of goats						
(6) Selling of sheep						
(7) Selling of cattle						
(8) Selling of pigs						
(9) Others (specify).....						
40. What type of problems do you mostly solve using income from FRLC?						
(1) Quick emerging problems (like sickness)	(2) Food					
(3) Buying present for a friend/ neighbour	(4) Both 1,2 and 3					
(5) Others.....						
41. Do you think the number of FRLC could differ before and after ND vaccination?						
(0) No	(1) Yes					
42. If Yes in 41 above, do you think the income from FRLC could increase as well?						
(0) No	(1) Yes					
43. If Yes in 42 above, do you think the income can be helpful in:						

(1) Ensuring food availability	No	Yes
(2) Improve household condition (e.g. iron roofing)	No	Yes
(3) Affordability to social services (e.g. health)	No	Yes
(4) Acquiring assets	No	Yes
(5) Others.....		

D-2 Household Consumption on FRLC

44. Of the Chickens your household own, how many are eaten by the household members?		
(1) Per day (give no.....)	(2) Per Week (give no.....)	
(3) Others (specify).....		
45. Of the eggs collected, how many are consumed by the household members?		
(1) Per day (give no.....)	(2) Per Week (give no.....)	
(3) Others (specify).....		
44. Who mostly consume eggs in the household?		
(1) Girl Child	(2) Boy Child	
(3) Husband	(4) Wife	
(5) Both Adults	(6) All Children	
(7) All members of the HH	(8) Guests	
(9) None	(10) Others.....	
45. What are other uses of chicken and their products		
(1) Give as gift to friends, visitors...	(2) Use as offerings	
(3) When necessary take to witchdoctor	(4) Others.....	

E: Socio-Relations in Rural Communities practicing ND control.

46. Who usually cares for the FRLC?		
(1) Wife	(2) Husband	(3) Male Child
(4) Female Child	(5) All Children	(6) Both Adult Male and Female
(7) All HH member	(8) Others.....	
47. Who makes the final decision about selling of chicken		
(1) Wife	(2) Husband	(3) Male Child

(4) Female Child	(5) All Children	(6) Both Husband and Wife
(7) All HH member	(8) Others.....	
48. Who makes decision about selling of eggs?		
(1) Wife	(2) Husband	(3) Male Child
(4) Female Child	(5) All Children	(6) Both Husband and Wife
(7) All HH member	(8) Others.....	
49. Who usually keeps the money from selling chickens?		
(1) Wife	(2) Husband	(3) Male Child
(4) Female Child	(5) All Children	(6) Both Husband and Wife
(7) All HH member	(8) Others.....	
50. Who usually keeps the money from selling eggs?		
(1) Wife	(2) Husband	(3) Male Child
(4) Female Child	(5) All Children	(6) Both Husband and Wife
(7) All HH member	(8) Others.....	
51. Who usually decides on the use of money obtained from selling chicken and eggs?		
(1) Wife	(2) Husband	(3) Male Child
(4) Female Child	(5) All Children	(6) Both Husband and Wife
(7) All HH member	(8) Others.....	
52. What do you mostly use the money obtained from selling chicken and eggs for?		
(1) School fees	(2) Clothes	(3) Medicine
(4) Food	(5) Both 1, 2, 3 and 4	
	(6) Others.....	
53. Do at times neighbours throw ND infected carcasses near your compound purposely?		
(0) No	(1) Yes	
54. Why do they do so?		
55. If you happen to know the person, how do you resolve the problem?		
(1) Fight	(2) Apply witchcraft	(3) Take to the VEO
(4) Just leave him/ her	(5) Revenge	(6) Others.....

56. Why do you think that neighbours become angry with your chicken?		
(1) Because I vaccinated against ND which led to an increase of the number		
(2) They just want to test if ND vaccination really control the disease		
(3) FRLC at times destroy their farms/ gardens		
(4) They don't want to see me with many chicken		
(5) Because I participated in the ND vaccination exercise		
(6) Others (specify).....		
57. Do you at times face problems when chicken are not cared for as you had expected?		
(0) No	(1) Yes	
58. If Yes in 57 above, who mostly do you quarrel with?		
(1) Wife	(2) Husband	(3) Male Child
(4) Female Child	(5) All Children	
(6) All HH member	(7) Others.....	
59. What other problems do you encounter that lead to conflicts?		
60. What can be done to reduce these conflicts?		

F: Perception of farmers against ND vaccination exercise (Q. 61)

Statements on the perception of the farmers on the ND vaccination exercise	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1. ND vaccinated FRLC cannot die when there an outbreak of the ND					
2. FRLC that are not vaccinated against ND do die easily when there is an outbreak of ND					
3. ND vaccination work					

best to control ND compared to local herbs					
4. Local herbs do work better when FRLC shows all the signs of ND					
5. When vaccinating against ND on the infected FRLC they do die					
6. ND vaccination should be done before an outbreak of the ND for easy control					
7. ND vaccination exercise was conducted by well informed personnel who told me the pre-conditions before vaccination					
8. ND vaccination exercise was for the household benefit thus ensure health of the FRLC by controlling ND					

G: Sustainability of the ND vaccination exercise

62. Where do FRLC sleep at night?		
(1) On the trees	(2) On the roof of house	(3) In the same house that human stay
(4) In their special house.	(5) In the kitchen	(6) Others.....
63. If you have built a house for FRLC, what are the walls made of?		
(1) Poles	(2) Dry grass	(3) Mud bricks

(4) Burnt bricks	(5) Cement blocks	(6) Others.....
64. If you have built a house for FRLC, what is the floor made of?		
(1) Mud	(2) Cement	(3) Others (Specify).....
65. Do you have any plan to improve the production of FRLC by building a better house?		
(0) No	(1) Yes	
66. Are there any groups developed as a result of ND vaccination for the FRLC farmers?		
(0) No	(1) Yes	
67. If Yes in 66 above, who facilitated the formation of the groups?		
(1) HH members	(2) Village leaders	(3) ND project facilitators
(4) Others.....		
68. Are there any guiding rules/ principles developed to guide the group operation?		
(0) No	(1) Yes	
69. If Yes in 68 above, what are they?		
70. How as an individual or group do you ensure that your FRLC are vaccinated against ND regularly?		
71. What ways as a community have you set to ensure that ND is controlled in this village?		
72. Have you ever received any reference material concerning FRLC production, disease and disease control?		
(0) No	(1) Yes	
73. If yes what type of reference materials did you receive?		
(1) Leaflets/ flyers	(2) Books	(3) Chicken magazine
(4) Others.....		
74. Where did you get these reference materials from?		
(1) Friends	(2) Extension Officer	(3) Village Office/ leaders
(4) ND project	(5) Others.....	

75. Were these reference materials helpful in any ways?		
(1) Very helpful	(2) Helpful	(3) Somehow
(4) Not helpful	(5) Never read them	(6) Other.....
76. Are you read to contribute money to cover Newcastle Disease cost?		
	(0) No	(1) Yes
77. If Yes, to 76 above how much per chicken are you willing to pay?		
(i) 20-50 Tshs		
(ii) 50-100 Tshs		
(iii) 200 and above		
(iv) Others (specify.....)		

Appendix 2: Checklist for Focus Group Discussion

1. What type of crops do the community produced in the last season 2008?
2. What type of livestock most of the community member have from 2007 and 2009?
3. Does the people in the community are aware on ND and Avian flu?
4. Does the people timely vaccinate in the community?
5. If yes mention the number of vaccination required per year
6. Mention the effect if somebody does not timely vaccinate his/her chicken.
7. When does ND usually occur in the village?
8. Do the FRLC have any significant contribution in the household?
9. If yes, mention its contribution
10. Who most of the time own and care for FRLC I in the household? Why?
11. Does the number of FRLC differ in number before and after vaccination exercise? Why?
12. Describe the social relation of the household practicing ND vaccination in the community?
14. What strategy does the community put forward for the sustainability of the vaccination exercises?