

## Awareness, Knowledge and Practice of Pastoralists and Agro-Pastoralists towards Livestock Diseases Affecting Domestic Animals in Arusha, Manyara and Morogoro Regions, Tanzania

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### Abstract

The study was carried out to assess pastoralists and agro-pastoralists awareness, knowledge and practice in various livestock diseases affecting domestic animals in Arusha Manyara and Morogoro regions in Tanzania. Closed- and open-ended questionnaires, focus group discussions and in-depth interview techniques were employed. Diseases, drought, lack of dipping tanks, insufficient of livestock experts and drugs are the main constraints in the livestock keeping community in the study area. Nineteen diseases have been reported to affect their animals at one time or the other. East Coast fever (ECF, 79.7%), Contagious Caprine Pleuropneumonia (CCPP, 60.8%) and Trypanosomosis (50%) have been reported by more than 50% of pastoralists that they affect their animals. ECF and CCPP seem to be the leading diseases with great impact to the pastoralists by causing high mortality rates. Rift valley fever (RVF) and anthrax have been reported by majority to be diseases which appear in form of outbreak in their area. Diseases reported here are said to be controlled primarily by treating with various drugs and Oxytetracycline being a common drug of choice for most unknown diseases. Other control methods include vaccination and deworming, dipping and spray of animals using acaricides. Livestock experts have been reported to play little role in controlling common livestock diseases as majority of livestock keepers tends to treat their animals. Veterinary experts seem to be important during outbreak of diseases or for unknown diseases killing many animals. Eating of dead and improperly cooked meat together with un-boiled milk was found to be common in the pastoral community. This could lead to the spread (if any) of zoonotic diseases easily. Livestock keeping community is aware of most of common diseases circulating in their area but the way they practice to control leads to failure of control of those diseases at individual and national level. Devising a mechanism to educate them so that they know how to handle some common and reporting outbreak diseases such as use of trained community animal health workers (CAHWs) will help control livestock diseases in Tanzania.

**Keywords:** community animal health workers, livelihood constraints, ECF, CCPP, CBPP, trypanosomosis, control measures

### 1.0 Introduction

The highly increasing livestock demand for livestock products in the developing countries has globally made livestock sector to highly dynamic. This is largely driven by increasing human population, income growth and urbanization (Thornton, 2010) with greater interest to livestock products.

Tanzania is endowed with abundant area a total 88.6 million hectares of land resource out of which 60 million hectares are suitable for livestock grazing, able to carry up to 20 million Livestock Units. However, due to tsetse infestation and other constraints, only 40% of the rangelands are utilized for grazing cattle (21 280 875), goats (15 154 121) and sheep (5 715 549). Other major livestock species kept in the country include pigs (1 584 411) and chickens (43 745 505) (MLDF, 2012a). Majority (more than 90%) of the livestock population in the country is of indigenous types, kept in the traditional sector, having a characteristically low productivity yet resistant to diseases. This is the main reason as to why people continue to maintain local breeds despite of low contribution to their income. Tick borne diseases are the main problem for livestock keeping community in Tanzania and keepers are aware of that and are trying to control by using acaricides (Swai *et al.*, 2005).

Zoonotic diseases affecting livestock keeping communities in Tanzania as reported by Shirima *et al.* (2003) were rabies, anthrax, tuberculosis, brucellosis, Foot and Mouth disease (FMD), Cysticercosis, plaque and tapeworms. In addition, livestock keepers reported that rabies, anthrax, tuberculosis and brucellosis poses great loss due to morbidity and mortality in human and animals. However, awareness to these diseases was found to be very minimal subjecting them to great risk of getting them. Studies carried out in Central Tanzania by Mboera and Kitanyi (1992) in small ruminants showed that parasitic infections (53.1%) were the leading cause of losses followed by bacterial infections (23.6%). Due to low education and income, the control of livestock diseases in Tanzania by livestock keepers is still unsatisfactory. Many livestock families are not aware of diseases affecting their animals specifically and tend to treat them blindly using Oxytetracycline. Thus, this study aimed at

understanding the extent of awareness and knowledge of livestock keeping community towards diseases prevailing in their community and the way they overcome them. With the re-emerging and emerging zoonotic diseases ([Shirima et al., 2003](#)), livestock keeping community have to know the diseases which are circulating in their area so that they can easily report new diseases to the livestock and public health authorities for action.

## **1.1 Materials and Methods**

### **1.1.1 Study area**

The study was conducted in pastoral (Arusha and Manyara) and agro-pastoral (Morogoro) communities in Tanzania (02°17' to 06°57' S and 35°32' to 37°34' E) with an altitude ranging from 482 to 1368 m above sea level. The rain season in these areas are divided into two: one from October to December (short season) and the other one from March to May (long season). The average annual precipitation in this area ranges from 500 to 1000 mm with vegetation mainly of shrubs, and acacia bushes. Livestock species kept are primarily cattle, goats and sheep. Other animals kept include chickens, dogs, cats, donkeys and pigs.

### **1.1.2 Study design**

A cross-sectional study design was used in this study to collect quantitative information. The quantitative information was collected from 74 respondents (Table 1) who were selected randomly and qualitative information was collected using 9 focal groups (Table 3).

### **1.1.3 Data collection**

Questionnaire survey (closed- and open-ended), focus group discussions (FGD) and in-depth interviews (IDI) were conducted to explore information on diseases affecting individual pastoralists and agro-pastoralists, diseases with great impact to livestock keepers and outbreak diseases affecting their animals. Questionnaire and FGD were administered to livestock keepers while the IDI was conducted to key informants such as District Veterinary officers (DVOs) and Livestock Extension officers. These techniques were used together information on prevailing livestock diseases, outbreak diseases and diseases with great impact in the community. Focal groups were asked on their daily activities, main constraints, control methods for livestock diseases and usefulness of livestock experts. In both cases Kiswahili was used as media of communication and in some area a translation was made by one member in their local language and or from local language to Kiswahili to make sure that we communicate smoothly. Responses of participants were jotted down in a notebook by the interviewer without interfering with the discussion.

### **1.1.4 Statistical analysis**

Data were entered, organized, coded and collated in Microsoft excel (Microsoft office 2010) and then imported to Statistical Package for Social Science (SPSS) version 17.0. In SPSS descriptive analysis (means, frequencies) was carried out. Weft Qualitative Data Analysis (Weft QDA) was used to analyze focus group discussion transcripts.

## **1.2 Results**

Questionnaire survey used 74 respondents from 17 villages of Arusha (9), Manyara (4) and Morogoro (4) regions in Tanzania out of which 15 respondents were purely pastoralists and 59 were agro-pastoralists. Their age ranged from 21 to 79 years (Figure 1). Out of the 74 respondents, 61 were men and 53 were household heads (HH). The 9 focal groups involved between 5 to 26 people depending on the locality, most of whom were men who were ethnically Maasai with few Mbulu, Barbaig and other tribes.

### **1.2.1 Livelihood constraints**

The main constraints of pastoralists and agro-pastoralists in the study area are diseases, drought, inadequate pasture, water and dipping tanks, insufficient of livestock experts and drugs (Table 3). A list of diseases has been reported in the study area by individual respondents in their household to affect their animals with some having greatest impact. East Coast fever (ECF) has been reported by majority livestock keepers to affect their animals and imposes great losses due to deaths especially of young animals. They are immunizing animals, but because the vaccine is very expensive (one dose costs 10 US dollars) they fail to vaccinate many animals. Contagious Bovine Pleuropneumonia (CBPP) and Contagious Caprine Pleuropneumonia (CCPP) are other two diseases that have been reported to bring big problems in the study area. CBPP is a disease that causes high morbidity and mortality losses to cattle in the pastoralists while CCPP causes similar losses in goats and sheep. Vaccines are available in the country and due to great impact of the disease to individual livestock keepers and hindrance to the national and international trades; vaccination has been made to be public good in Tanzania. Other diseases that have been reported by respondents in the livestock keeping community to affect their animals are summarized in Table 2.

Inadequate water and pasture in 2008/09 is another constraint that have been reported during focus group discussions to kill many animals and has caused pastoralists to become agro-pastoralists in northern part of Tanzania as coping mechanism (Table 3). Majority of their animals died and those who remained with few became agro-pastoralists. Because diseases (especially outbreaks) which comes without a notification and drought, most pastoralists find safe for them being agro-pastoralists.

### 1.2.2 Possible transmission routes of livestock diseases to human

Fifty six of the respondents think that livestock diseases can go to human via consumption of animal products. And these diseases include RVF, tuberculosis, anthrax, brucellosis and bird flu (Avian influenza). Despite this understanding the study has found that 64% of the respondents eat improperly cooked meat and boiled milk and they say they are used to that as they have been doing that for long time without problem.

### 1.2.3 Control measures for livestock diseases

Their main control measures which have been reported in this study are treatments, vaccinations, deworming and dipping (includes smearing and spraying) the animals using acaricides. Two (22.2%) focal groups reported to use dipping tanks and six groups (66.7%) to use spray pumps to control vector borne diseases. Pastoralists seems to know the importance of controlling vector borne diseases as they cause great loss to their animals. That's why in areas where there no dipping tanks, pastoralists have been spraying their animals and in some area they are building tanks themselves. This study revealed that pastoralists are treating their animals themselves instead of using livestock experts. Their first line of drug for treatment in most cases especially cases which are not known to them has been reported to be Oxytetracycline (OTC).

## 1.3 Discussion

This study reports the awareness, knowledge and practices of livestock keeping community towards livestock diseases in Arusha, Manyara and Morogoro regions in Tanzania. ECF has been reported to be the most threatening disease to pastoralists, a finding which different from the one reported by Shima *et al.* (2003) where Foot and mouth disease (FMD) was reported to be the major problem in Masaai pastoralist communities of Tanzania. Despite of the efforts that are made to prevent and control ECF in Tanzania, the disease remains to be the leading for loses encountered by livestock keepers (Kambarage, 1995). Immunization of cattle for ECF is done in different parts of Tanzania (Dolan, 1991) but its efficacy is still questionable. In May 2010, a vaccine against ECF was registered in Tanzania formally which is said to prevent up to 98% of deaths of cattle from the disease, but mass vaccination has proved very difficult to achieve (McDermott *et al.*, 2010; Lucumay and Lynen, 2010). ECF can kills up 1 million cattle a year and nearly half of calf deaths in Eastern, Central and Southern Africa and the methods used to control the disease up to date are inadequate ([http://192.156.137.110/ILRIPubAware/Uploaded%20Files/20041029114520.04BR\\_IMP\\_ProtectingPastoralCattleAgainstLethalDisease.pdf](http://192.156.137.110/ILRIPubAware/Uploaded%20Files/20041029114520.04BR_IMP_ProtectingPastoralCattleAgainstLethalDisease.pdf)) particularly for pastoralists, on whom the disease has the biggest impacts as reported in this study.

CBPP and CCPP on the other hand have been reported to bring greater loses with financial implications to livestock owners in the study area. [Tambi \*et al.\* \(2006\)](#) estimated these loses per country for cattle to be US\$2.5 million euros, while direct and indirect production losses plus disease control costs to be 3.7 million euros per country. In Tanzania direct loses a result of animal mortality, and vaccination campaign and disease surveillance costs for CBPP have been assessed at over US\$11 million (Msami *et al.*, 2001). CCPP is a disastrous disease for livestock keepers in small ruminants due to massive deaths it causes ([Shiferaw \*et al.\*, 2006](#)). These diseases are very threat not only to the livestock keeping community in Tanzania but also the whole community keeping cattle and small ruminants in Africa (FAO, 1997).

Trypanosomosis has been reported by majority livestock keeping community with little impact (2.7%) compared to other diseases such as ECF, CCPP, CBPP, myiasis and Peste des Petitis Ruminants (PPR). A survey that was conducted by [Malele \*et al.\*, \(2011\)](#) in the southern, western, northern and north eastern regions of Tanzania to re-define the distribution limit of tsetse infestation and the implication for livestock sector, results indicated that *Glossina morsitans sl* and *G. pallidipes* were the dominant and widely distributed tsetse species, although their boundaries shown to shrank. The distribution was found to more near national parks and game reserve areas justifying the reduced impact of the disease reported in this study. However, due to migratory kind of grazing pastoralists are still sending their animals close to the national parks and game reserve areas as are the areas with good pastures especially during the dry season where pastures become scarce in many areas.

FMD in this study has been reported as of low frequency and impact in the study area, however the disease outbreak in other parts of the country have been reported by the Ministry of Livestock Development and Fisheries (Tanzania) to be a big problem (MLDF, 2012b). The reason for low report here may be due to time when the interview was carried out or the low mortality caused by the disease.

Myiasis (Oestrosis) on the other hand has shown to be a big problem in the study area due to high mortality for sheep and goats. However, no study have been conducted to investigate the problem in detail and therefore studies need to be conducted which will help to solve this problem. The disease is caused by *Oestrus ovis* of the family Oestridae, the parasite affecting the nasal cavities and adjoining sinuses in sheep and goats. The prevalence of *O. ovis* have been reported in different countries and found to range from 5.1% to 91% ([Shoorijeh \*et al.\*, 2011](#), [Gabaj \*et al.\*, 1993](#)). Therefore, strategies for preventing and controlling myiasis should be considered as it may affect the livestock market of small ruminants. The zoonotic implication of Oestrosis ([Mumcuoglu and Eliashar, 2011](#)), put more weight for considering the disease in the strategic plan for

controlling diseases in a country where the disease is said to exist. In Tanzania, there is a need of investigating the disease through slaughter slabs and abattoirs to estimate the magnitude of disease.

Although RVF disease has not been reported by respondents in the study area to have great impact to their livestock, the disease has been reported to occur in the study area in 2006/07 with great socio-economic impact (Mohamed *et al.*, 2007). This may be partly due to time frame since the disease occurred (4 years back) and they only counted existing problems at that moment. The natural outbreaks of disease are sporadic and explosive leaving a very short time for planning and proper management of disease during the outbreak leading to greater socio-economic effects. Thus, it will remain a threat to the livestock keeping community and the national due to its socio-economic implications occurring during the outbreaks as result of morbidity, mortality and through costs of the measures taken by individuals and nation to prevent or control infection and disease (Otte *et al.*, 2004, Dijkman *et al.*, 2009).

The control of tick-borne diseases which have been reported to be big problem through dipping animals will help increase the income of pastoralists as well contribute to the national Gross Domestic Products (GDP). Some pastoralists are building their own dipping tanks; this shows that if the government partially supports pastoralists in building the dipping tanks, many dipping tanks can be built in Tanzania. The government of United Republic of Tanzania reports that there 1 864 working dipping tanks (MLDF, 2012b) which are still insufficient to cover all villages keeping animals. Efforts are there to make sure that at least every village keeping animals have one dipping tanks to help controlling tick- and mosquito-borne diseases which is big problem not only in Tanzania but in many parts of Africa.

On the other hand pastoralists have been reported to treat their animals themselves and they will report to the livestock field officer or the veterinary officer after so many trials without success. This means that, in case of outbreak they will report to livestock experts very late while the disease has caused great loss or has spread to a wider area. Thus, the use of trained community animal health workers (CAHWs) as suggested by Swai and Masaaza (2012) who rolled out the question on the use of CAHWs as an important alternative animal health delivery channel in the country's marginal areas from professional veterinary practitioners, and academicians becomes to be very important. Instead of leaving them treat the way they do, it is better to select few individual in the community who are treating animals and provide them with basic knowledge. This will help them to know clinical signs of common diseases, drug and dose for treatment and how to prevent them from occurring and when to report for unknown diseases such as outbreaks and new diseases for them. They are using high dose in a wrong administration route creating resistance to many livestock diseases, which otherwise could be treated by drugs in the first line of the respective disease. Treating of animals by livestock keepers themselves is due to insufficiency and or absence of veterinary professionals and paraprofessions in the marginal areas of Tanzania (Swai *et al.*, 2005). Also the movement of pastoralists from one area to another looking for good pasture, water and running away from vector borne diseases has contributed to the difficult of providing livestock health services. Free market economy for livestock drugs which allows livestock keepers to access drugs easily in the markets and livestock drug shops has enabled pastoralists to continue treating themselves for centuries now. For them as their animals are living away from the community it becomes expensive to call a livestock expert to treat their animals as they will have to buy the drugs themselves and pay the expert money for buying fuel. Thus why, four focal groups (44.1%) have reported that livestock experts have little use for them (Table 3). The use community-based animal health delivery systems have been reported to make a valuable contribution to improving veterinary services in the more remote and under-served livestock rearing areas of the developing world where it has been practiced (Leyland and Catley, 2002).

#### **1.4 Conclusion**

This study has revealed the main constraints of livestock community to be diseases, drought, inadequate pasture, water and dipping tanks. The study suggests the following;

- There some diseases which have not been reported in this study yet important such as rabies, brucellosis and tuberculosis. Thus serological survey for important diseases for the national should be adopted so that to capture any emergence of diseases which are threat to the national.
- Also more studies for myiases in livestock need to carry out to know the magnitude of disease in Tanzania as it is not known.
- Establishment of infrastructure such as dipping tanks, water wells and dams which will allow pastoralists to settle in one area as animal movements in Tanzania has caused a lot of fighting between pastoralists and farmers.
- Livestock keepers on the other hand are advised to keep manageable number of animals and improve them by practicing good breeding systems and pasture cultivation.
- The use of CAWHs should be emphasized by the government to reduce blind treatment carried out by livestock keepers. Also provision of education on zoonotic diseases prevailing in the country is very important to prevent the spread of diseases to human.

### 1.5 Acknowledgement

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**Table 1:** The number of respondent for questionnaire survey by villages

<b>Vilage</b>	<b>Ward</b>	<b>District</b>	<b>Region</b>	<b>No. of Respondents</b>
Esilalei	Makuyuni	Monduli	Arusha	4
Makuyuni	Makuyuni	Monduli	Arusha	4
Mto wa Mbu	Mto wa Mbu	Monduli	Arusha	4
Pinyinyi	Pinyinyi	Ngorongoro	Arusha	4
Monic	Pinyinyi	Ngorongoro	Arusha	4
Engaresero	Pinyinyi	Ngorongoro	Arusha	4
Eworendere	Namanga	Longido	Arusha	4
Sinya	Sinya	Longido	Arusha	4
Tingatinga	Sinya	Longido	Arusha	4
Hysam	Dareda	Babati	Manyara	4
Endadosh	Qash	Babati	Manyara	4
Signo	Sgno	Babati	Manyara	4
Terrat	Terrat	Simanjiro	Manyara	4
Changalawe	Mzumbe	Mvomero	Morogoro	6
Mangae	Melela	Mvomero	Morogoro	7
Mgudeni	Mvomero	Mvomero	Morogoro	4
Mkata B	Doma	Mvomero	Morogoro	5
<b>Total</b>				<b>74</b>

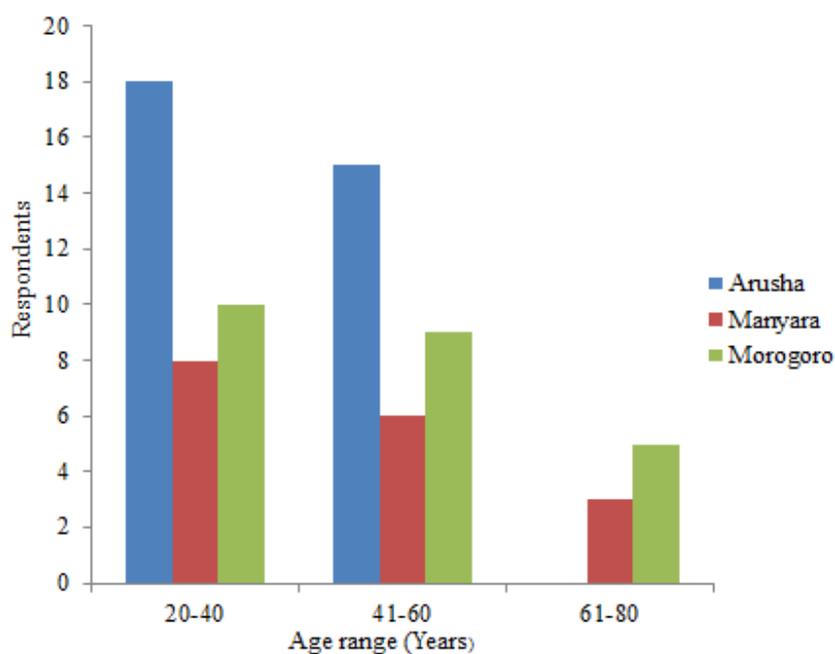
**Table 2:** Proportion of response for common and outbreak diseases in the study area to individual households (N=74) by January to March, 2012

<b>Disease</b>	<b>Farm history</b>	<b>Great impact</b>	<b>Outbreak of diseases</b>
ECF	59 (79.7%)	35 (47.3%)	9 (12.2%)
MCF	9 (12.2%)	3 (4.1%)	1 (1.4%)
Trypanosomosis	37 (50%)	5 (6.8%)	1 (1.4%)
CBPP	34 (45.9%)	18 (24.3%)	10 (13.5%)
CCPP	45 (60.8%)	30 (40.5%)	7 (9.5%)
PPR	10 (13.5%)	9 (12.2%)	0 (0.0%)
RVF	2 (2.7%)	0 (0.0%)	27 (36.5%)
Fasciolosis	8 (10.8%)	3 (4.3%)	0 (0.0%)
Helminthosis	16 (21.6%)	3 (4.3%)	0 (0.0%)
Anaplasmosis	13 (17.6%)	5 (6.8%)	1 (1.4%)
Babesiosis	7 (9.5%)	2 (2.7%)	0 (0.0%)
Anthrax	17 (23.0%)	4 (5.4%)	18 (24.3%)
Myiasis	30 (40.5%)	16 (21.6%)	2 (2.7%)
FMD	24 (32.4%)	2 (2.7%)	5 (6.8%)
LSD	15 (20.3%)	1 (1.4%)	0 (0.0%)
Heart water	2 (2.7%)	0 (0.0%)	1 (1.4%)
Black quarter	4 (5.4%)	1 (1.4%)	5 (6.8%)
Brucellosis	0 (0.0%)	0 (0.0%)	1 (1.4%)
Swine flue	0 (0.0%)	0 (0.0%)	1 (1.4%)

MCF=Malignant catarrhal fever, LSD=Lumpy skin disease

**Table 3:** Focus group discussion responses (N=9 groups) by January to March, 2012

Category	Code	Frequency	% codes
Activities	Livestock keeping	2	22.2
	Agriculture	2	22.2
	Both	1	11.1
Main constraints	Drought	5	55.6
	Diseases	5	55.6
	Lack of dipping tanks	5	55.6
	Insufficient drugs	1	11.1
	Treating themselves	6	66.7
Control diseases	Vaccination&deworming	3	33.3
	Dipping	4	44.4
Dipping methods	Spray pumps	6	66.7
	Dipping tanks	2	22.2
	No methods	1	11.1
Challenges control	Poor turn-up	2	22.2
	No regulation	3	33.3
	Sending few animals	1	11.1
	Satisfied	2	22.2
Usefulness experts	Unsatisfied	1	11.1
	Very little	4	44.4
	Obtaining Info	2	22.2
Obtaining Info	Vet experts	2	22.2
	Government	2	22.2
	Neighbours	1	11.1
Advise	Regular expert visits	2	22.2
	Education-keepers	3	33.3
	Building dipping tanks	1	11.1



**Figure1:** Age range distribution of respondents in the three regions (Arusha, Manyara and Morogoro) of Tanzania