

Studies on Animal Health Delivery Systems in Pastoral Areas in Manyara, Tanzania

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Abstract: A study to identify animal health delivery systems to show how marginalized pastoral communities are accessing animal health services was conducted in Babati, Hanang and Mbulu Districts of Manyara Region. It was shown that livestock was the principal economic activity for pastoralists in Mbulu, Babati and Hanang and that pastoralists are located in relatively remote areas. Animal diseases, in particular parasitic infections, viral/bacterial epizootics and scarcity of water and pasture are among the major constraints that these pastoralists face. Despite of such problems, reliable animal health delivery system lacks in these areas and handling of almost all animal husbandry services, treatment and control of diseases is exclusively carried out by farmers that are quite skilful home grown animal para-veterinarians. Efforts to improve animal health and productivity and thus economy and livelihood of these pastoral farmers will succeed through their involvement in solving the problems. It was observed that there is a high illiteracy rate among the pastoralists; hence education for all is essential for success of any developmental project to be implemented in the pastoral areas. In summary the information available in the present study validates the need for planning of an effective and sustainable animal health delivery system in the pastoral farming systems in Manyara region and Tanzania as a whole.

INTRODUCTION

In sub-Saharan Africa, animal diseases, overgrazing and limited animal health services are considered to be among the major impediment of the efforts that are geared towards improving animal health and production. Since most of livestock keeping is carried out in the rural areas - where there is limited infrastructure, in particular - veterinary services, roads and telephones, the involvement of community based animal health workers (CAHW) to provide veterinary services has been adopted in many countries in Africa (.Barret and Okali, 1998; Nalitoleta *et al.*, 2001; Leyland and Catle , 2002; Alloport *et al.*, 2005). Control programs for tsetse fly in Kenya Uganda, Zambia and Zimbabwe and rinderpest in the southern Sudan, Somalia and Ethiopia, were timely, efficient and cost-effective through

involvement of CAHW (Jones. *et al.*,1998). Similarly, in Tanzania, the involvement of CAHW in selected districts has led to reduced morbidity and calf mortality, improved animal disease surveillance in a much wider area, timely reporting of cases and improved availability of essential veterinary drugs close to the pastoral farmers (Nallitolela *et al.*, 2001; Allport *et al.*, 2005). Farm Africa had successfully implement such system in Babati district, where similar results were attained in both pastoral and agro-pastoral groups.

It is through such initial success of utilizing CAHW in some parts of East Africa and Tanzania to improve animal health services in underserved areas that extension of similar work was planned to be carried out in the underserved pastoral villages in Babati, Mbulu and Hanang districts. These villages lack modern veterinary services, essential infrastructure such as roads and animal health staff. In order to determine the impact of introduction CAHW in the animal health care delivery system in the selected villages, a study on the existing animal health delivery system in these villages was conducted.

MATERIALS AND METHODS

Study area

The study was conducted in ten villages, two in Babati, three in Mbulu and five in Hanang districts. These villages, apart from Masakta in Hanang district, were selected because the majority of its residents are pastoralists. In Babati district Mwada and Vilima Vitatu supports most of the livestock and is a semi-arid plain that is at an altitude of 3000ft and located between eastern shore of Lake Manyara in the bottom of East African rift valley. Due to low precipitation (400-700 mm p.a.) the area is occupied mainly by pastoral Barbaig/Datoga tribes that migrate seasonally to and fro into this area due to limited water and pasture during dry season. In some years the area is frequently inundated with water from both Lake Babati and Manyara and as a result, some of areas cannot be accessed. The area of grazing land in this area has been decreasing year after due to encroachment of big crop farmers that grow drought resistant crops such as sesame and cotton. Other areas have also been converted into game reserve cum hunting blocks for tourist purposes. In Mbulu district, three villages in Yaeda Chini (Mongo wa mono, Yaeda chini and Eshkesh) were selected. This is a flat extensive plain that lies at the bottom of Yaeda hollow space along the east African rift-valley. The area has similar climatic conditions like that of Mwada/Vilima vitatu. The plains are flooded during rainy season and are utterly dry during dry season except in some limited areas where pools of water remain. While the plains are open, the escarpment that surrounds Yaeda crater is covered by bush and trees and is habitat for variety of game animals and tsetse fly. The main pastoral farmers are of the Barbaig tribe while few are Iraqw. The area is also occupied by a few Hadzabe aborigines that are still hunters and gathers of fruits and roots. The inhabitants of this area have of the recent been in dispute with an Arab investor who has been allocated a large area for the purpose of possibly game hunting and other tourist purposes. Simbey and Glangala villages lie in a Bush land that is a haven for tsetse fly. Despite of plenty of pasture water shortage in the dry season and trypanosomosis are major impediments for the efforts that are geared towards improvement of livestock production. Gehandu village which is located in the southern west of the Hanang

district faces more or less similar tsetsefly problem. Masakta and Galangala are other two villages that were covered in Hanang district and are located in a Maize/wheat-livestock sub-humid area. Here the livestock production system is predominantly agro-pastoral with intensive cultivation. In general most of surveyed villages are in remote places without animal health services, have poor and seasonal roads. The inhabitants are mainly pastoralists that constantly migrate due to fluctuations in animal feed and, water supplies and natural calamities such as animal diseases, floods, hunger and even cattle rustling.

Methodology

The team visited each of the ten villages once and administered semi-structured questionnaires to randomly selected heads of the kraal/*boma* or any other elder person who happen to be around. Although it was preferred that the interviews be conducted right at the owners premises some of questionnaires were conducted by summoning them in a common meeting known place in the village. This was due to unexpected heavy rains that dominated the study period. The great distance from one kraal to another and the poor or no roads in these areas were also among the limiting factors that made the survey work rather difficult. We frequently had to spend a lot of time pushing the vehicle that was constantly stuck in the mud. Some areas were flooded and we had to postpone the work for nearly two months. At Mongo wa Mono in Yaeda, the study was also postponed due incessant uprising of Hadzabe and other pastoral farmers in the area against an Arab investor who was implicated for being allocated taking big area of land that might endanger their livelihood. During the interview, the informants were asked to rank their major sources of income, major livestock problems and major livestock diseases and conditions. The informants were also asked to list people who were engaged in offering animal health services and enumerate the animal health infrastructure such as drug shops, dip-tanks, veterinary clinic and trained personnel including CAHWs. The prevalent animal diseases and their determinants and effects on productivity as well as how they were treated and controlled were assessed. The utilization of indigenous knowledge in the animal health delivery systems was also assessed. Other areas covered were the assessment of animal productivity indices such as calving/kidding rate and calf/kid mortalities, abortion rate, milk production, calving interval and heifer age at first mating. Livestock population and de-stocking rates were other parameters that were studied. A part from questionnaire, direct observations were made to validate the information obtained from informants. This included direct assessment of herd size, grazing conditions and animal management. In addition, cattle blood and faecal samples were collected from a representative farmer who was randomly selected from each village for subsequent checking of presence of disease causative agents such as bacteria and parasites. Animals were also inspected for detection of existence of patent disease conditions and ecto-parasites.

DATA ANALYSIS

The data was entered in a computer and analysed, using Statistix® statistical software. The generated descriptive statistic data was summarised in graphs and tables by employing Graph pad-Prisms® soft ware package. Inferential statistic was

employed to determine if there exists significant difference between or among the data collected from villages/districts for the corresponding variables.

RESULTS

The informants ranked livestock production as principal economic activity and only 22.8% of them practiced limited crop farming. Cattle were singled out as their major livestock followed by goats, chicken and sheep while each family kept few donkeys for transportation. The overall level of illiteracy was very high (66.7%) among the villagers and the rate was highest among the pastoral farmers than the other villagers. The villagers pin pointed animal diseases as the leading problem followed by scarcity of water and pasture during dry season as shown in Figure 1.

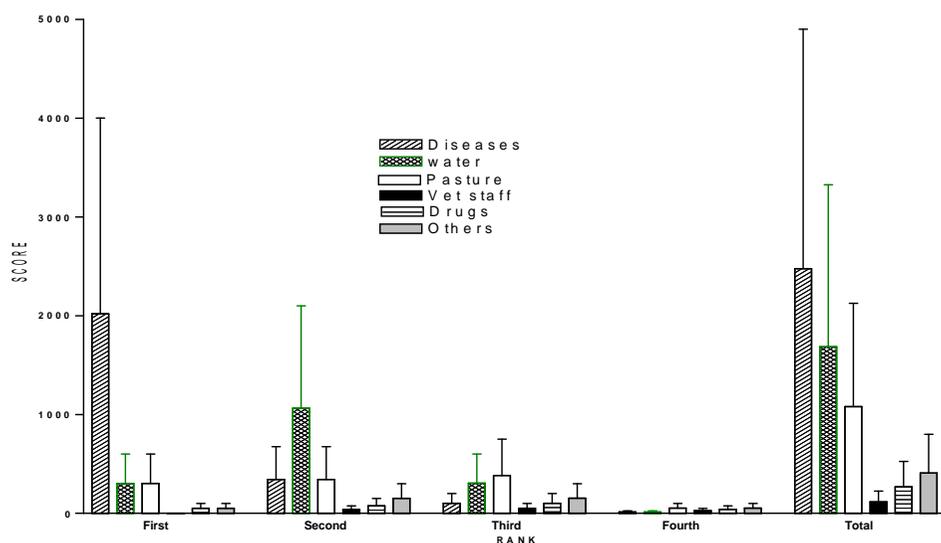


Figure 1: Major livestock problems in Mbulu, Hanang and Babati district villagers with animal diseases ranking the first

Among the major diseases, parasites (trypanosomosis, tick borne diseases and worms) were the the major diseases followed by bacterial and viral epizootics in particular lumpy skin (LSD) and contagious bovine and caprine pleura-pneumonia as shown in Figure 2. Although there was plenty of lush *Bricharia* grass species at Gisambalang village, the high rate of tsetse fly infestation in the area has limited the number of cattle in the area. While in Yaeda chini we noticed some pastoral farmers migrating across the rift valley escarpment to Vilima Vitatu in Babati district after the farmer noticed an outbreak of LSD in his neighbour's herd thus spreading the disease. Diagnosis of the samples that were collected from representative farmers from the study area compared well with those obtained from interviewed farmers. The laboratory findings showed that worm infection in cattle had the highest prevalence followed by tick born diseases. Calves had the highest number of eggs per gram of faeces (EPGF=639.47± S.E=135.4) than matured cattle (EPGF=233.87± S.E=32.7). Foot rot and bloat were other major conditions that affected their livestock during rainy season. High calf (24.97% ± 5.8) and kid

(38.24% ± 6.04) mortality rates that were even 100% in some kraals were reported by farmers. The high mortalities were accompanied by low productivity indices such as long maturing age (3.05 years), milk production (average of 0.97 litres per milking) and short lactation period of 7.8 months.

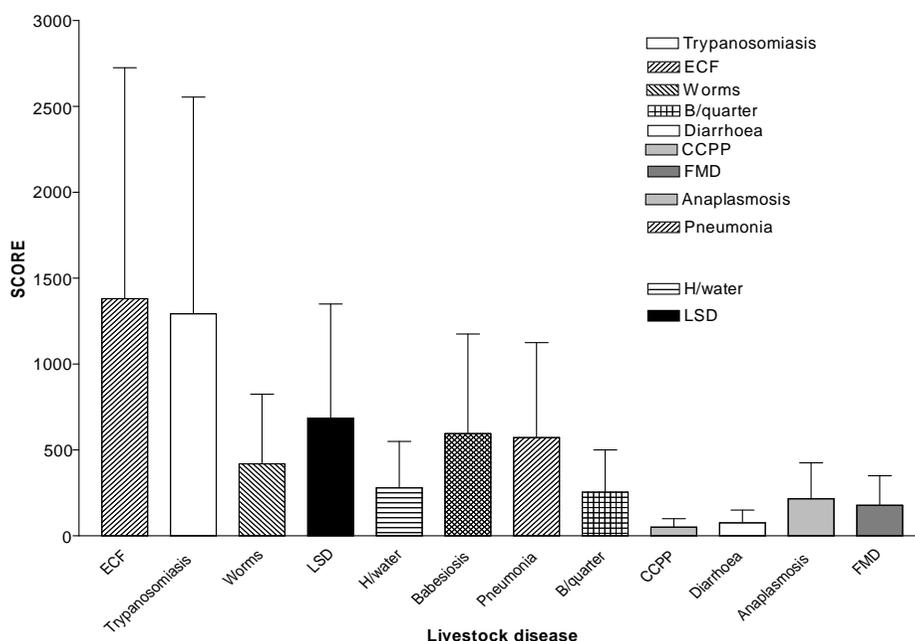


Figure 2: Major livestock diseases in Mbulu, Hanang and Babati district villagers with animal diseases ranking the first

Table1: Key livestock production parameters among pastorals in selected villages in Babati, Hanang and Mbulu district

Parameter	Mean ± S.E	Range
Abortion rate (%)	8.2 ± 2.1	0 - 50
Calf mortality rate (%)	24.97 ± 5.8	0 - 100
Adult cattle mortality rate (%)	8.22 ± 3.86	0 - 95
Kid mortality rate (%)	38.24 ± 6.04	0 - 100
Milk production per milking (Litres)	0.97 ± .07	0.25 - 2
Lactation period (months)	7.8 ± 0.36	3 - 12
Calving interval (years)	1.2 ± .06	1 - 2
Heifer maturity age (years)	3.05 ± .09	2 - 4
No cattle sold by a farmer (in a year)	4.61 ± 0.63	0 - 20
Cattle prices (70-300 kgs)	187,024 ± 31,466	50,000- 400,000 Tshs

The results for various people that were involved in diagnosing and treating various animal diseases in the study areas are shown in Figure 3. In all villages the pastoral farmers irrespective of age, young and old, females and males proved to be skilled and good diagnosticians who exclusively handled all animal husbandry activities, treatments and control of animal diseases. Many of these pastoral farmers were not familiar with the services of trained veterinarians or other extension workers except in some years when there was national funded vaccination programmes. In few villages services were offered by CAHW and some local healers. Most of these farmers used modern veterinary drugs especially Tetracyclines, anti-trypanosomes and anthelmintics. Data obtained from district livestock offices showed that there were relatively few trained animal health workers in relation to the number of villages. The auxiliary cadre were non-existent and the number of CAHW was almost three times the number of all personnel that were engaged in animal health care services and were on the increase. The few available trained personnel were ill-equipped interns with no transport facilities and other working gears and no operating veterinary clinic existed.

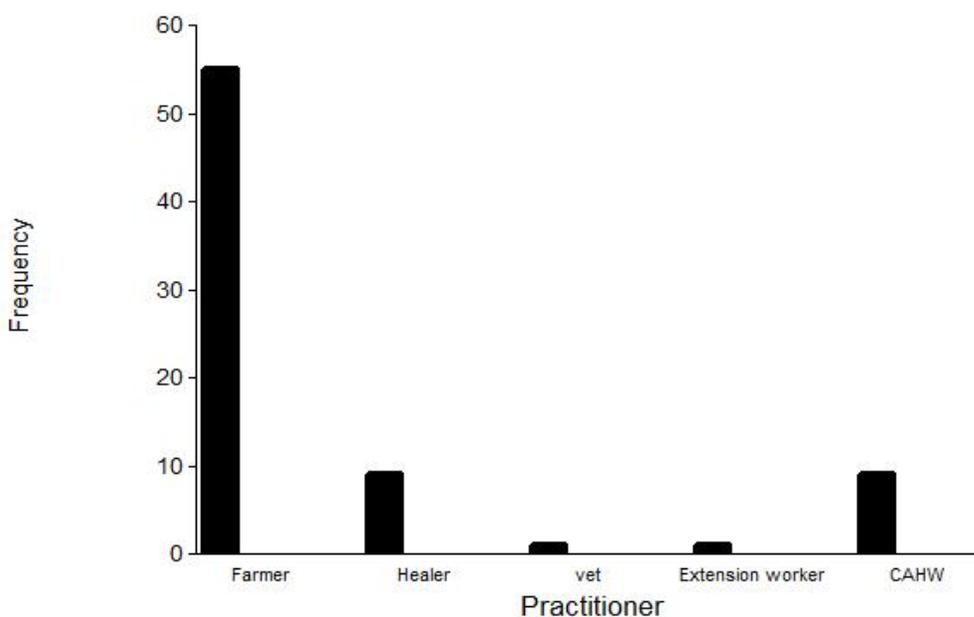


Figure 3: Different people that were involved in attending animal infectious diseases/conditions of livestock in Mbulu, Hanang and Babati districts with the farmers doing most of the treatments

In view the dire need for veterinary services in the pastoral areas, the farmers suggested ways that may improve the health and productivity of their livestock. Effective supply of drug and vaccines was ranked as number one followed by construction of dip tanks and watering facilities for humans and livestock. Furthermore, they needed trained animal health staff to provide extra support to them and their CAHW. Other issues that was seen as a need, were education for

their children and importantly proper program that will give them security over the grazing land that is communally owned and has always been deprived of it by individuals or government for other purposes like crop farming and game reserve.

DISCUSSION

Lack of basic data concerning animal health delivery system in areas occupied by pastoralists in Tanzania and East Africa as a whole is well recognized and even the available data such as human and livestock herd demography is notoriously not to be relied on (USAID report. 1980). In the present study, efforts were made to gather important information with regards to animal health delivery system in the villages where livestock were kept under pastoral system in Mbulu, Hanang and Babati districts in Tanzania. The observed high rate of illiteracy among the pastoral farmers than other Tanzanians, the sole dependency on livestock as major source of income and upholding of their cultural values suggest that these pastoralists who are mainly of Barbaig/Datoga tribe have little changed their customs as well as their means of production since the distant past in mid 1800's (Bauman, 1894; Burton, 1859). This is so in spite of great cultural, educational and other changes that have taken place in other tribes since the onset of colonialism, more than 100 years ago, at a time when they found flourishing intensive pastoral system in Mbulu in Tanzania and East Africa as a whole (Bauman, 1894; Kjekshus, 1977). The continuing transhumance among pastoralist is probably due to existence of unsolvable major problems in particular those which endanger the health of their economic activity. This was revealed in the present study whereby animal diseases that occur throughout the year, scarcity of water and pasture during the dry season were the major reasons behind. Unless such problems are solved one should not expect transhumance among pastoralists to come to an end. With regard to major diseases that were pointed out by pastoral farmers, there is an agreement in the data collected from the farmers, trained staff and our own laboratory findings that parasitic diseases notably trypanosomosis, tick borne diseases and worms were the major diseases that affect their stock. Transmission of these parasitic diseases depends on climatic and environmental factors that favour vector and parasite development and making contact with the definitive host (Nansen, 1992). Therefore rainfall pattern, temperature, soil types, topography, altitude, vegetation and other physical features govern their transmission pattern. The pastoral farmers being adept ethno-vets know all these phenomena and similar studies in Masai pastoralists have shown that an elderly cattle owner carefully inspects the health of animals and assesses the grazing conditions, water and pasture quality and quantity and migrates when either of conditions become unfavourable. Unless there is well planned grazing management that will take into account solving the problem of scarcity of water and grass and diseases will continue to find its heaven in all pastoral areas. Grazing management is very essential in controlling common diseases - in particular worms, rather than depending entirely on drugs as observed in the present study. Worms though, are overshadowed by more dramatic major epizootics, unlike the other pathogens, they are the major causes of production losses such as poor growth and calf mortalities. The observed high calf mortalities with a long maturing age of up-to five years could partly be due to poor nutrition and possibly worm infection. In the present study a high infection rates with worms was observed in young stock less than two years old. Since control of worms goes hand in hand

with grazing management this could serve as springboard towards the regulation of animal stocking density something that may limit unnecessary migrations and episodes of epizootic diseases.

The problem of tsetse fly in the tropical grassland has been known since olden days. Proper chemo-prophylaxis and use of environmental friendly control programmes such as the use of impregnated screens with pyrethroids may reduce the problem of tsetse fly hence trypanosomosis (Fox *et al.*, 1993).

The other livestock problems such as occurrence of epizootics, remoteness, lack of transportation and veterinary staffs observed in many villages in the present study are comparable to those observed in other pastoral areas in the sub-Saharan Africa (Stem, 1998, Allport *et al.*, 2005). The decline of colonial and post independence public sector approach in the animal health care in most part of Africa at the commencement of free market economy and multi-parties without establishment of an alternative system in early 80' has aggravated the situation (Stem, 1998). In the present study farmers and members of their families were observed to be the key animal attendants and the role of trained personnel was negligible or totally absent. In our present study the data from districts showed that there is one trained animal health worker for at least 10 villages that are have vast areas. Such findings mirror the result of the decision taken by the government to tighten its economic belt by retrenching most of auxiliary personnel that were close to the farmers and the closing down of veterinary centres in the villages and District veterinary clinics in early 90's in Tanzania. Such a move severely denied the pastoral farmers key veterinary services. The delusion that such services would have been taken care of by private vets and other para-vets was an oversight since even the few private vets that are operating today in Tanzania are found in big cities.

Apart from diseases per se the observed problems of shortage of grazing land for pastoral Barbaig/Datoga groups are highly related to changes that have occurred in their neighbouring agro pastoral ethnic groups other land reforms that have taken place since the coming of colonialists. Historically, in the middle of the twentieth century crop farming by Iraqwi ethnic group expanded beyond their original settlement in Mama Isara at the expense of Barbaig and Massai pastoralist who were forced to migrate (Lowe, 2004). As evidence virtually all names of villages in Mbulu, Hanang, Karatu and Babati district originated from Barbaig tribe. Apart from expansion of Iraqw crop farming the aliaenation of vast land by Germany settlers in Karatu, oldean and Kiru valley in early 1900's further took off the land that was favourable for cattle grazing (Mc Donald, 1946). However, serious marginalization of the pastoral land in the study area occurred in the in late 1960's when wheat scheme in Basuto in Hanang/Mbulu district was established. Such move led the pastoral famers to migrate to other places in Tanzania in search of land with consequences of missing most of social services such as education, health and extermination of their stock by epizootic diseases (Lema, *et al.*, 2003, Makundi, 2003). No wonder that in the present study the average herd sizes were relatively small vis-à-vis what was observed in the early 1960's. Similar events of alienation of pastoral land occurred in Kenya too. During the Colonial era the Massailand was reduced from 155 400 km² in 1889 to approximately 38 850 km² 1913

(Huntingford, 1953). The Massai land was further alienated due to formation of game reserves and later on game ranching (Campbell, 1981; Galaty, 1980). Any future development of this pastoral sector should take into account the Economic rationality and the goals of these pastoralists and involve them in whatever decision that will be made for them especially on land alienation. Studies have shown that without a thorough understanding of the pastoralists' goals and strategies and without their participation in planning, pastoral development is unlikely to be successful (Grandin, 1981).

The results from the present study support the available information that the few trained veterinary cadre can no longer provide sustainable services to pastoral farmers that are in remote and underserved areas in sub Saharan Africa. The involvement of pastoral communities through utilization of CAHW seems to be one of components that may improve animal health care delivery system in the pastoral systems. Studies have shown that this cadre is justifiable and more cost effective than trained veterinarians in pastoral production systems since the market value of animals are low, they can make correct diagnosis and treat cases successfully using limited time and transport costs (Stem, 1998, Allport *et al.*, 2005). In these circumstances, the farmers are unlikely to pay extra costs to services which would have been offered by veterinarians and may not recognize the extent of their skill and honesty compared to the CAHW whom they live with. Furthermore, the CAHW migrates with their clients and during rainy season it is difficult for the farmers to be reached by trained veterinarians or other paraprofessionals. As suggested by Stem, (1998) the role of veterinarians in this twenty first century should be to that of supervision, health care designer and monitor. Veterinarians should play the role of training the lay, ensure quality and professional ethics and equip and motivate the CAHW and others who work close with farmers necessary tools that are essential for high-quality animal health care delivery system. On the other hand the government will have the regulatory roles and formulate a policy and legal frameworks that will ensure existence of truly sustainable and self-supporting animal health care delivery system in the underserved areas.

As seen elsewhere this CAHW cadre which is emerging in several countries in sub-Saharan Africa (Leyland and Catley, 2002; Allport *et al.*, 2005), will if well trained and supervised, become the nucleus of remarkable force that will strengthen the animal health care delivery system in the present underserved areas.

CONCLUSION

The results from the present study support the available information that livestock was principal economic activity for pastoralists in Mbulu, Babati and Hanang and who are located in relatively remote and underserved areas. Animal disease in particular parasite infections, viral and bacterial epizootics together with scarcity of water and pasture are among the major constraints that these pastoralists face. Despite of such problems, yet reliable animal health delivery system lacks in these areas and handling of most all animal husbandry, treatment and control of diseases is exclusively carried out by farmers that are quite skilful home grown animal “doctors”. Efforts to improve animal health and productivity and thus economy and livelihood of these pastoral farmers will succeed through involving themselves in

solving the aforementioned problems. Due to observed high illiteracy rate among the pastoral farmers, education for all is essential and is the basis for success of any developmental projects that may be implemented in the pastoral areas. In summary, the information available in the present study validates the need for planning for an effective and sustainable animal health delivery system in the pastoralists farming system in Manyara region and Tanzania as a whole.

It is recommended that immediate efforts should be done to control the spread of the prevailing epizootic diseases in particular Lumpy skin disease, Rift valley diseases, CBPP and CCPP by involving farmers, local and central government and other stakeholders

Improvement of animal health and productivity in these underserved areas should take into consideration involvement of the farmers in combating the key problems that they are facing through improvement of drug and vaccine supply, water supply, grazing management, transportation/communication facilities, livestock markets and other infrastructure that are essential for the control of diseases such as dip tanks and impregnated tsetse screens.

The outstanding indigenous knowledge that these pastoral farmers have on animal husbandry, treatment and control of diseases should be preserved, validated and improved through supplementing it with modern veterinary training of selected CAHW representatives and if possible majority of farmers.

Pastoral education - which is essential for human development, should be given priority and revisited in the aftermath of the present incessant transhumance among the pastoral ethnic groups.

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