

Animal health strategy and vision for Tanzania



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Animal health strategy and vision for Tanzania

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I. Introduction to animal health services in Tanzania

More than 85% of Tanzanians live in rural areas, out of which about 37% keep livestock. The livestock population is estimated at 23 million cattle, 7 million sheep, 16 million goats, 2 million pigs, and 59 million poultry. An estimated 88% out of the total livestock population is kept in smallholder traditional systems.

Animal diseases (transboundary and zoonotic) significantly hinder the development of the livestock sector and they also expose producers to high livelihood risks and uncertainties. Diseases have direct (mortality and morbidity) and indirect effects; they interfere with the quality and value of animal source food products or services that are consumed on-farm, and those sold or returned to the natural environment. The indirect negative economic impacts from animal diseases are measured as a function of altered socio-economic or natural systems e.g. herd and farm, territory and community, region and nation or value chain (production system).

Furthermore, animal diseases cause losses in households' incomes, loss in added value, disorganisation of the livestock value chain, the degradation in national GDP during export embargoes, drops in monetary values (prices) of livestock products in markets and the closures of markets during the control of epizootic episodes.

In order to optimize utilization of available financial and human resources for surveillance (for early detection of emerging zoonotic disease) and to ensure control, prevention, and even elimination of priority animal diseases; the delivery of animal health services and related infrastructures was examined in terms of capacity, activity and impact on herd health. The welfare of households involved in livestock keeping was also examined to provide a better picture of the context of the animal health analysis.

We used the Livestock Sector Investment Policy Toolkit (LSIPT) as a decision-making tool based on opinions of experts and evidence-based data for disease listing and multi-level criteria for assessing the impact of animal diseases in the country.

2. Diseases as a constraint to livestock production

Majority of the country's rangelands (over 60% of the total land area suitable for livestock farming) are inhabited by pastoralists and agro-pastoralists who face threats from insects, diseases, predators, drought, floods and other natural disasters.

Livestock diseases are a significant constraint to livestock production, productivity and safe utilization of animal products. In 2015 alone, the Ministry of Agriculture, Livestock and Fisheries (MALF) recorded 329 animal disease outbreaks involving 32 animal disease conditions and 24,231 clinical cases; causing 5,864 deaths and destruction of 167 animals across the country. Their control and or prevention are a recurring and costly burden to individual livestock keepers, institutional herd owners and the local and national government.

Animal diseases cause serious socio-economic consequences that include production losses, loss of livelihoods, and they exaggerate poverty. They are also associated with food insecurity; restricted marketing opportunities, disincentives to investments, and public-health risks. The most vulnerable groups, for whom animal diseases are particularly devastating, are poor livestock farmers and agro-pastoral farming communities. Transboundary animal diseases (TADs) and zoonoses are some of the major constraints to livestock production in pastoral and agro-pastoral areas in Tanzania and are by large the most important constraint to herd health and trade in animals and their products.

The common TADs include foot-and-mouth disease (FMD), peste des petits ruminants (PPR), contagious bovine pleuropneumonia (CBPP), lumpy skin disease (LSD), contagious caprine pleuropneumonia (CCPP), African swine fever (ASF) and Newcastle disease etc. The control and prevention of TADs is beyond farmers' capacity and impacts heavily on the livestock sector in terms of production, products processing and livestock commodities trade.

Neglected zoonotic diseases (NZDs) also present a major threat to human and animal health. They are endemic and widespread in pastoral and agro-pastoral areas. These diseases are also a threat to food safety because in many areas where people live in close proximity to livestock and where households rely on animals for food security, income and social capital. NZDs may not only cause deaths, but can also lower animal production, lead to losses in milk production and trade. The most common NZDs include zoonotic gastrointestinal diseases; brucellosis (a bacterial parasite that infects human and many livestock species); zoonotic tuberculosis (bovine-TB); anthrax; rabies; leptospirosis; cysticercosis; echinococcosis; toxoplasmosis; zoonotic trypanosomiasis and hepatitis E etc.

Food processors are affected when zoonotic diseases impair the supply of adequate quality raw inputs; poor inputs also reduce profitability due to the cost of mitigating the effects of disease and when there is an erosion of the value of the final products in the marketplace. In addition, communities are affected when zoonotic diseases affect human health or the environment, or if losses to producers and processors have a significant impact on the wider economy.

Other important animal diseases in Tanzania include tick-borne diseases such as East Coast fever (ECF or Theileriosis), anaplasmosis, babesiosis and cowdriosis. Tsetse flies infest about 30,931,957 hectares (32.83%) of

Tanzania mainland, whereby 16,431,622.63 hectares (17.44% are high-risk infested areas, and 14,500,335 hectares (15.39%) are medium- and low-risk infested areas. Thus, most livestock kept in traditional systems is in areas with a high tsetse challenge and are at risk of trypanosomosis infestation. In poultry, common diseases and conditions include; Marek's disease, salmonellosis, mycoplasma, fowlpox, infectious bursal disease (IBD) or gumboro, colibacillosis, coccidiosis, infectious coryza, cholera, helminthosis and various ectoparasites.

3. Current policy on animal health

The National Livestock Policy (NLP) recognizes that livestock diseases are among the main constraints limiting the development of Tanzania's livestock industry. It says 'There is a high prevalence of livestock diseases in the country such as TADs, vector borne, zoonoses and emerging diseases that presents big challenges for developing the livestock industry. Furthermore, the policy calls for provision of veterinary services that comply with the World Organisation for Animal Health (OIE) standards and guidelines for international animal disease control and trade.

According to the NLP, the main aim of Tanzania's animal health services is to control, eradicate and prevent the introduction of animal diseases; whereby, the control of TADs and diseases of economic importance is the responsibility of the government, and the control of non-TADs is the responsibility of the private sector and other stakeholders. The private sector is also expected to supply veterinary medicines and other inputs.

Although, the control of NZDs is not a public good, the policy assures that the government in collaboration with other stakeholders will strengthen infrastructure and facilities for veterinary public health and food safety services. The government will also, in collaboration with other stakeholders, promote the provision of veterinary public health and food safety services.

4. The LSIPT as a toolkit to prioritize diseases and veterinary services delivery

The Livestock Sector Investment and Policy Toolkit (LSIPT) toolkit is a multi-criteria decision-making tool used to analyze the performance of the livestock sector using the opinions of experts and real performance data as evidences. All animal disease records were obtained from MALF records and listed; the LSPT toolkit was then used to prioritize animal diseases, evaluate the disease impacts on the basis of a preset criteria (scores). The aggregated scores and weights of criteria for each disease were then determined using the relative role (weight) of each criterion.

The main objectives of the prioritization work is to optimize allocation of financial and human resources for surveillance, prevention, control and elimination of selected infectious diseases and to target surveillance for early detection of any emerging disease. Species targeted are food-producing animals, mainly cattle (beef, dairy), small ruminants (sheep and goats), chicken and swine.

Four excel tools¹ were used to get priority diseases, assess their qualitative and quantitative socio-economic impacts of diseases and to generate an inventory of established veterinary infrastructures in the country.

- a. the Excel tool M4_SM2_A4_TOOL_1_Disease Selection.xlsm was used to score and select the five most important or priority diseases.
- b. The Excel tool M4_SM2_A4_TOOL_2_Impact_disease.xlsm was used to score impact of animal diseases on households (HHD) assets /capital, on livestock markets and scoring impact of animal diseases on livestock systems using the specific dimension hampering intensification.
- c. The Excel tool M4_SM2_A4_TOOL_3_Prog_health.xlsm was used to make an inventory of control and preventive interventions in animal health, and an inventory of OIE standards implemented in the country.
- d. The Excel tool M4_SM2_A4_TOOL_3B_Infrastruct_Health.xlsm was used to establish the functionality status of the different animal health delivery infrastructures.

1. The authors used the LSIP tool kit, <http://www.alive-lsiptoolkit.org>, to undertake the analysis. Unfortunately, the numbers of variables and the size of the printouts make it impossible to present the Excel sheets here.

5. Main animal diseases that constrain livestock production

Rift Valley fever (RVF), an acute hemorrhagic viral disease of cattle, sheep and goats, periodically emerges in Tanzania every 10-20 years. RVF in Tanzania has consistently been reported after prolonged rainfall and flooding following a period of long drought. The main sign of the disease is widespread abortion and deaths of sheep and goats. The last outbreak was in 2006/2007 and it affected mostly the Northern and Central zones of the country and caused significant socio-economic impacts. It affected 11 regions (29 districts) and destroyed households' assets, affected 46,680 cattle, 56,990 goats, and 32,900 sheep. Of these, 15,726 cattle, 19,199 goats and 12,124 sheep aborted. The outbreak killed 16,973 cattle, 20,913 goats and 12,124 sheep; and 309 human contracted the disease and 144 died (case fatality rate was 46.6%).

The livelihoods of affected livestock-dependent communities dwindled as availability and consumption of milk and red meat dramatically reduced. The RVF outbreak also caused longer-term severe human illnesses, disability and suffering, which impaired human labour and affected farmers did not resume their normal economic activities. In response, the government spent USD 3.84 million vaccinating over 5.3 million animals to control the outbreak, with most of the money spent on imported vaccines and mass livestock vaccination campaigns.

Another important TAD is FMD, which is a highly contagious vesicular disease of cloven-hoofed animal species. It is caused by the foot-and-mouth disease virus (FMDV) of the genus *Aphthovirus* and the family Picornaviridae. There are seven distinct serotypes, namely: O, A, C, South African Territories (SAT) 1, SAT 2, SAT 3, and Asia 1. FMD is reported in all production systems in the country; it is endemic in the country and is a commercially important disease. In 2015 alone, it caused several outbreaks in 76 local government authorities (LGAs), recorded 5895 cases, inflicting 61 deaths, mostly calves. Though it causes low mortalities, the economic losses incurred due to FMD are very high. At farm level, most of the economic loss comes through failure of beef animals to put on weight, loss of milk in dairy cows, etc. At national level losses are due to rigorously applied control measures, involving heavy expenditure on diagnostic services, vaccination, compensation to owners, quarantine, disposal of carcasses, etc.

Peste des petits ruminants (PPR) also known as 'goat plague', is widely spread in Tanzania. It is an acute viral disease (from a morbillivirus, in paramyxovirus family) of goats and sheep characterized by fever, mouth sores, diarrhoea, pneumonia, and sometimes death. Though not zoonotic, PPR causes high mortality of goats and sheep with significant socio-economic impacts. PPR was reported for the first time in northern pastoral areas of Tanzania in the last quarter of 2008; it was confirmed and reported to OIE in January 2009. PPR broke out in the southern parts of Tanzania in early 2010, threatening a local population of over 13.5 million goats and over 3.5 million sheep.

Since then, the disease has spread widely due to the uncontrolled movements of animals associated with either trade or search for water and pasture during drought periods. In the year 2015 alone, PPR was reported in 9 regions of Tanzania, affecting 1833 small ruminants, and it killed 400 sheep and goats. The disease impacted many households

with huge animal losses (>10%) reducing flock size and animal values; many remote rural pastoral and agro-pastoral communities also lost their livelihoods before the government, through the MALF managed to vaccinate goats and sheep to prevent further transmission and spread of PPR.

African swine fever (ASF) is a highly contagious and deadly haemorrhagic viral disease of domestic pigs (of all breeds and ages) caused by the African swine fever virus (ASFV), a double-stranded DNA virus of the family *Asfarviridae* and genus *Asfivirus*. There is no vaccine to prevent ASF outbreaks. In eastern and southern African countries, the disease occurs through complex transmission cycles involving domestic pigs, soft ticks and wild African pigs, and warthogs (*Phaechochoerus africanus*), which do not develop signs of disease. In Tanzania, the disease is endemic in Mbeya, Rukwa, Morogoro, Arusha and Kilimanjaro regions.

However, new foci in Manyoni, Kigoma, Mwanza and Kagera have reported outbreaks. In Rombo district, a wave of epidemics occurred in 2013 affecting 1085 pig keepers, and attacking 5322 pigs. In this outbreak, mortality losses reached 84% (range, 46-97) and on average the number of pigs lost per household was 4 (range 1-50). Translation of such mortality figures into financial terms produces a loss of Tsh 160.632 million (USD 73,000), indicating that ASF is a devastating disease that can disrupt the pig industry and the local economy.

In the poultry sub-sector, though diseases such as Marek's disease, infectious laryngo-tracheitis, infectious bronchitis and infectious bursal disease (gumboro) occur, Newcastle disease (ND) an acute viral disease affecting domestic and wild birds, is most important. ND causes 50–100% chicken mortality in different affected regions in the country. It is a common but preventable disease that is often controlled by biosecurity/sanitary measures or through mass bird vaccinations to stop its transmissions and reduce chicken mortality. In 2015 alone, there were 17 ND outbreaks reported in 11 LGAs affecting 4080 birds and causing 3019 deaths, respectively. ND is one of the major diseases that impede indigenous chicken production but the disease is controlled, in commercial poultry enterprises frequent vaccinations with modern efficient vaccines. In smallholder farms a thermo-stable vaccine which is locally produced by Vaccine Institute in Tanzania is used.

Contagious bovine pleuropneumonia (CBPP) was first reported in Tanzania in 1916. It was eradicated in 1964 but later re-emerged in 1990 and has since spread widely in the country, threatening the entire national herd. In 2015 alone, CBPP was reported in 45 local government authorities (LGAs) affecting 3795 cattle and 706 died. The impact of CBPP is felt at both national and households' levels affecting both trade and households' livelihood/income. In response, the MALF prepared a national control strategy called 'CBPP Rollback Plan' which was implemented starting in 2003 to control and prevent the spread of the disease. From 2003–2013, the government has spent Tshs. 1,835,166,910.00 (over USD 1,000,000) to procure 15,185,800 doses of CBPP vaccines and to finance mass vaccination campaigns covering 9,696,849 cattle.

Of the important NZDs, brucellosis is the major endemic zoonosis, alongside bovine tuberculosis (bTB) and rabies. The most important causative bacteria for brucellosis in decreasing orders are *Brucella melitensis* (small ruminants), *B. abortus* (cattle), *B. suis* (pigs), and *B. canis* (dogs). Infection may result from direct contact with infected animals and can be transmitted to consumers through raw milk and milk products. Human-to-human transmission of the infection does not occur. Clinically, brucellosis in animals is exhibited by late-term abortion; infertility and reduced milk production as a result of retained placenta and secondary endometritis, and excretion of the organisms in uterine discharges and milk.

Full-term calves may die soon after birth. In fully susceptible herds, abortion rates may vary from 30–80%. Brucellosis in humans is almost always associated with infected domestic and wild animals or their products and poses more risk to farmers, animal handlers, abattoir workers and veterinarians. In humans, brucellosis is often manifested by anorexia, headache, arthralgia and general malaise and, less commonly, insomnia, sexual impotence and constipation. However, there are limited control efforts even through public awareness campaigns or livestock vaccination programs against brucellosis. The national brucellosis control and prevention strategic plan is being formulated to enhance control and prevention through collaboration between veterinary and medical disciplines.

Tick-borne diseases (TBDs) are transmitted by ticks and the major tick-borne diseases are East Coast fever (ECF) or Theileriosis, anaplasmosis, babesiosis and cowdriosis (heart water). All these diseases are also widespread in the country. However, in 10-years (2003–2013), TZS 14,822,310,976 (USD 6.7 million) was spent to construct 439 and rehabilitate 835 livestock dip-tanks to control ticks in the county.

6. Impact of animal diseases: Quantitative analysis

6.1 Diseases that affect assets of smallholder households

Animal diseases hinder the development of the livestock sector. They expose producers' households to high production and life risks and uncertainty. Diseases have direct effects (mortality and morbidity) and indirect effects. Animal diseases (in decreasing order of importance) affecting households' assets for cattle are CBPP, RVF, ECF/ vaccine-preventable diseases (VPDs), brucellosis and FMD; for sheep and goats: RVF, CCPP, PPR, brucellosis and Orf disease (in decreasing order of importance) while for pigs it is ASF, TGE, Erysipelas, brucellosis then porcine helminthoses. For poultry (local chicken), high impact diseases affecting households' assets are ND, salmonellosis, fowl pox, inflammatory bowel disease and coccidiosis.

Despite the presence of these and other animal diseases in Tanzania, the discussion below is centred on the qualitative impact assessment of the six priority diseases.

Rift Valley fever: Using scores to assess disease impact, the three production zones in Tanzania were disproportionately affected by the disease with comparable impacts between them. The disease threat was higher in the Central and Highland zones and less so in the Lake and Coastal zone. The impact appears more severe among the small and large-scale traditional livestock keepers, but less so in ranches in terms of financial, human, natural, social and physical losses. At household level, RVF effected natural capital, followed by human and financial losses from the physical loss of animals due to deaths and social capital, in that order. Natural capital assets provide people with a wide range of free goods and services, thus changes in the performance of natural capital assets impacted human well-being and the economy.

Newcastle disease is widespread in the country, causing higher mortalities in indigenous chicken than commercial breeds. From the impact score sheets, indigenous chicken in the Central zone succumb more frequently to ND than those in Lake and Coastal and Highland areas. This corresponds to the traditional practice of raising better disease-adapted (tolerant chicken ecotypes) and nutritionally superior birds in the Lake and Coastal zone and frequent access to protective vaccination services from other livestock projects in the highlands. In commercial poultry enterprises (broilers, layers) in all zones, ND is well controlled by frequent vaccinations with efficient commercial vaccines to avoid mortalities at all growth stages.

Contagious bovine pleuropneumonia: From the scoresheets, although all production zones are affected, CBPP's major impacts at household level are high physical loss (deaths) of animals and finances in both the Central and Lake and Coastal zones than in Highland zones. In the Lake and northern zones, the main risk factors for CBPP outbreaks are communal grazing and open sharing of watering points. The spread of disease is fuelled by frequent migration of livestock by agro-pastoral and pastoral communities to the coastal and southern highland zones in search of pasture, water and markets.

The impact of CBPP noted from the worksheets is attributed to agro-pastoralists and pastoralists lack of awareness of preventive measures including that CBPP is prevented by mass cattle vaccination campaigns. Findings also showed that CBPP vaccine supply as envisioned in the CBPP rollback strategy was inadequate, and it was unavailable to most livestock keepers.

Peste des petit ruminants (PPR): The scoring exercise showed that PPR's impact is perceptibly higher in the highland (northern and southern) areas and somehow appreciable in coastal areas (south of Tanzania). Infection and transmission in the southern corridor and southern highland areas of Tanzania is attributed to the north-south migration of small ruminant flocks from northern pastoral communities. Also, limited capacity for disease surveillance, reporting and control due to low vaccination coverage (in terms of animals, and villages) suggests the continued prevalence of PPR in the production systems.

African swine fever (ASF): The scoring work revealed physical and financial losses as the main impacts of ASF. However, natural losses are also significant thus impairing sow-rearing and porkers fattening activities.

The disease is more common in the southern highlands (Ruvuma, Mbeya, Iringa and Njombe regions and it has spread to Rukwa (Sumbawanga district) region through the use of swill for feeds and illegal movement of animals. Outbreaks are also not uncommon in the northern highlands (Manyara, Kilimanjaro, Tanga and Arusha regions) and occasional outbreaks are also reported in the Coastal zone especially Dar-es-salaam (Temeke district) and Morogoro regions (Kilombero district). The lack of zoosanitary measures and illegal movement of animals despite quarantines that are put in place is precipitating transmission and complicating control and prevention of ASF.

Brucellosis: In Tanzania, the impact of brucellosis is bigger in pastoral systems and human-wildlife interface areas than in dairy farming systems. Experts' scores have shown that incidence of human and animal brucellosis are highest in the northern, central and northwest areas of the Lake Zone than elsewhere. These are essentially pastoral and agro-pastoral production areas with numerous traditional cattle, goats and sheep. The disease has qualitatively showed a significantly higher spatial distribution within areas having larger number of sheep and goats than swine and cattle and is most prevalent in the described livestock production zones.

6.2 Diseases that affect livestock markets and value chains

Diseases interfere with the quality and value of food products of animal origin or services that are consumed on-farm, sold or returned to the natural environment. Diseases affecting cattle markets and value chains (in decreasing order of importance) are FMD, brucellosis, CBPP, RVF and the least is ECF/VPDs. For sheep and goats (in decreasing order of importance) are brucellosis, RVF, PPR, CCPP then Orf disease while in pigs, it is ASF, brucellosis, erysipelas, Transmissible Gastro Enteritis (TGE) and least is helminthosis. In poultry, salmonellosis, ND, IBD followed by fowl pox and least is coccidiosis. The indirect economic impact can be measured as a function of the social, economic or natural system that is altered: herd and farm, territory and community (village), region and nation or value chain (production system).

These diseases cause losses in household incomes, loss in added value and the disorganisation of the livestock value chains, the degradation in GDP during export embargoes, and the drop in monetary values (prices) of products on the markets, and closure of some market places during control of epizootics.

6.3 Diseases that affect intensification of livestock farming systems

Larger herds with greater stocking density will increase the risk for communicable and non-communicable diseases. Intensification of livestock farming will be hampered by such diseases (in declining order of importance) as for cattle,

FMD, RVF, CBPP, brucellosis and ECF/VPDs; for sheep and goats, PPR, CCPP, RVF, brucellosis and Orf disease; while for pigs ASF, TGE, brucellosis, erysipelas and helminthoses; and for poultry, salmonellosis, ND, Fowl Pox, IBD then coccidiosis.

Also, there non-communicable diseases resulting from, for example, intensification with grain feeding which poses risks for milk fever, and hypomagnesaemia and trace-element deficiencies. Others include acidosis, a condition with high point prevalence in pasture-based grain-fed dairy systems where cows are fed grain supplements. To prevent it, the neutral detergent fibre (NDF) in pasture-based diets may need to be higher than 30% of the diet to maintain rumen stability. Laminitis and acidosis are different conditions with a similar pathogenesis, specifically if using highly fermentable diets.

7. Analysis of the capacity and activities of the veterinary services

It is a national priority to reduce the risks of especially the transboundary animal diseases and zoonoses. The national government through the MALF and development partners have continually invested funds and other resources to contain, control and prevent outbreaks of emerging animal disease threats in the country. However, the ministry's capacity (financial, technical) to undertake effective surveillance on the several animal diseases and exerting prompt control response is limited.

In collaboration with MALF and development partners, the directorate of veterinary services (DVS) is striving, through initiatives such as the African Union-InterAfrican Bureau for Animal Resources (AU-IBAR) Standard Methods and Procedures in Animal Health (SMP-AH) project and the regional Acaricides Subsidy Program for the Control of Ticks, to implement various programs to control and prevent FMD, CBPP, PPR, CCPP, ND, ASDP and TBD's with various results. Epidemiological surveillance and emergency response must be improved together with the laboratory diagnostic network. Programs to eliminate diseases such as ND, FMD, CBPP, CCPP and PPR should also be implemented.

To accomplish the above goals, the DVS requires adequate funds and other resources and greater collaboration with national, regional, and international agencies to ensure the directorate focuses on controlling and ultimately eliminating the priority vaccine preventable TADs and ZDs.

8. Challenges in animal health delivery

- a. High mortality and production losses due to widespread diseases and pests.
- b. Insufficient capacity for surveillance, diagnostics and vaccinations to control TADs and zoonoses.
- c. Insufficient and dysfunctional infrastructure for disease control e.g. veterinary laboratories, dips, clinics, and facilities.
- d. Limited collaborations in animal health services delivery between public and private sector actors

9. Future prospects

- Strengthened animal disease prevention, preparedness and response capabilities in Tanzania through various adequately-funded programs and initiatives, with animal health services delivery systems and institutions that can effectively control and eliminate animal diseases at households and country levels to minimize the potential impacts of pests and diseases while facilitating livestock and animal by-products trade.
- Livestock keeping communities, private veterinary sector and national animal health institutions that are continually managing economically efficient and environmentally sustainable livestock enterprises with low/tolerable animal disease prevalence.
- A livestock sector that sufficiently produces and supplies local and export markets with adequate livestock and livestock by-products and contributes to the growth of the national economy.
- Increased private sector involvement and investments in Tanzania's national animal health services delivery in all areas and levels through successful partnerships between government, private sector and the livestock industry actors including in systems and processes to address non-regulatory animal health matters.
- Clear roles and responsibilities for private sector and government involvement in the livestock sector to ensure passing of enabling legislation to provide both legitimacy and accountability to the private sector.

10. Strategies for better delivery of animal health services in next five years

- Improve Tanzania's favourable animal health status to support increased productivity of livestock enterprises at household level, the country's animal-dependent industries and trade and market access for animals and related products.
- Develop key national animal health policies, and minimise the risks of emerging animal diseases.
- Implement the national livestock identification system for cattle, sheep and goats.
- Set up livestock industry quality assurance programs covering red meat, milk and white-meat, livestock skins and hides.
- Adopt national animal health performance standards.
- Adopt regulations for quarantine and inspection services including exports certification and inspection services for live animals.

II. Conclusion

In general, improved disease control will continue to be an important requirement for the development and commercial transformation of the livestock sector in Tanzania. Also, a poor animal health delivery system remains one of the main factors limiting livestock sector development.

The current low capacity for proper disease surveillance, diagnosis and vaccination coverage to prevent and control prevailing TADs and zoonotic diseases and pests has led to varying degrees of animal morbidity, mortality and allied production losses in all the three production zones in the country. Also, insufficient numbers, the sub-optimal utilization of functional and the large numbers of dysfunctional infrastructures for disease control and prevention has reduced the DVS's ability in mitigating the major impacts of animal diseases. Inadequate resources including funds, skilled personnel, and logistics have also weakened the ability of national veterinary services to contribute to reducing the impact of reported TADs, ZDs and VPDs. Detecting, controlling and preventing these diseases requires a highly-coordinated public surveillance and response systems at all levels in all areas of the country.

Improved animal health will contribute to on-farm profitability, ensure food quality and safety; and enhance the international competitiveness of Tanzania's livestock and livestock products. In order to catalyze the commercial development of the livestock sector, the health status of the national herd needs to be improved. The DVS must strengthen the country's animal disease surveillance and reporting system including empowering livestock communities to detect and report disease incidents to facilitate prompt responses to outbreaks.

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