POLICY BRIEF

IMPROVING TICK-BORNE DISEASES CONTROL IN KENYA: *A STRATEGY TO INCORPORATE MULTIPLE APPROACHES*

TICKS AND TICK-BORNE DISEASES: Livestock's most important enemy

Every second, an animal dies of a tick-borne disease in Kenya. Ticks and the diseases they spread hinder the profitability of livestock farming in the country, as up to 80% of the animals are affected. Yet, livestock keeping contributes close to 10% of the total value of all goods and services produced every year in Kenya[1]. These diseases cause financial losses of more than KES 30 billion per year in the country[2]. All major types of livestock such as cattle, sheep, goats and camels are affected by diseases such as East Coast fever (ECF), babesiosis, anaplasmosis and heartwater[3]. The diseases weaken animal health leading to low yields of milk and meat and decreased incomes. When animals die, farmers suffer losses of milk, meat, manure and income. To reduce animal deaths and improve the quality of life of farmers and provide proteins for mothers and children, ticks and their associated diseases should be controlled. Good quality disease-free animals will sell at premium prices in the market, and produce more greatly increasing farmer incomes. Healthier animals will ultimately reduce poverty, eradicate hunger and improve nutrition and ensure availability of sufficient food for millions of smallholder farmers and pastoralists in Kenya.

1

The current methods being used to control tick diseases in Kenya are ineffective and insufficient

2

Successful disease control should be based on multiple strategies

3

Such integrated control programs will improve animal health and reduce deaths from tick-borne diseases

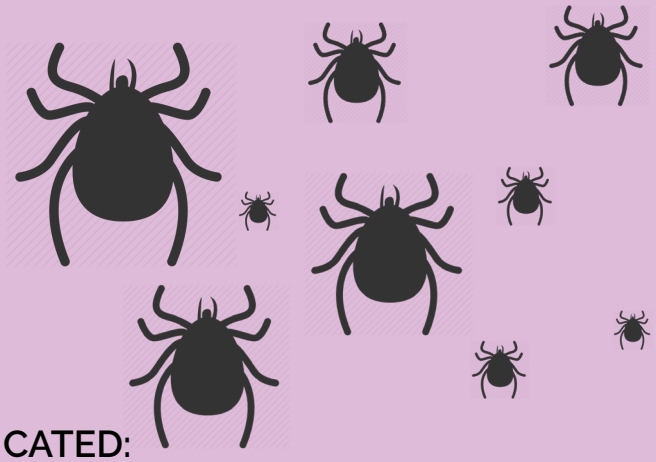
4

Healthier animals will produce more milk and meat, improve nutrition, and increase incomes for farmers

CONTROLLING TICK-BORNE DISEASES: Ineffective and inadequate methods in use

Figure 1. *A sick cow heavily infested with ticks.*

Currently, ticks and tick-borne diseases are controlled by spraying animals with chemicals (acaricides) to kill ticks attached to the animals. However, residues from the chemicals used remain in milk and meat products, making them unsafe and unsuitable for human consumption and for the export market as well. The chemicals also need to be applied often, which is expensive and some types of ticks develop resistance against them over time. The drugs used for treatment are expensive and are only effective if started early, which is often not possible.



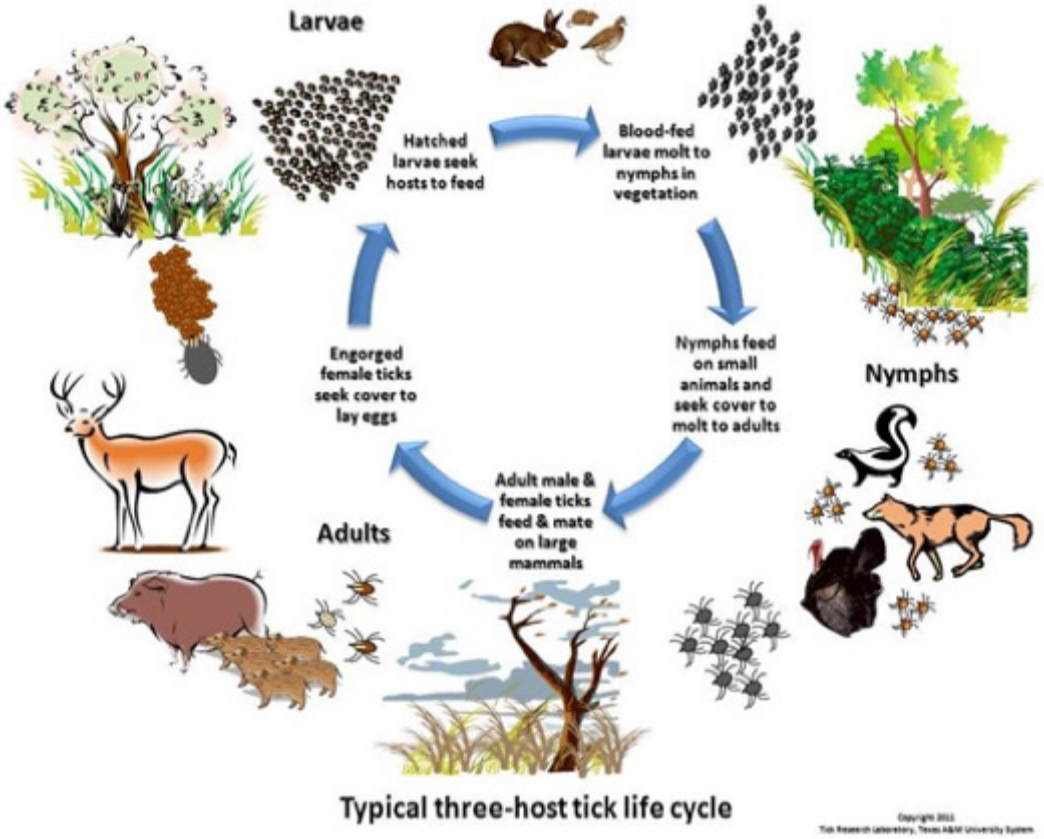
TICK-BORNE DISEASES CAN BE ERADICATED: Others have done it

- Several states in the USA managed to completely eradicate tick-borne diseases by 1943 by combining multiple methods. They achieved this by restricting animal movements, disease surveillance, isolating sick animals, restricting transport, compulsory dipping authorized by state laws, and inspection for compliance[4].
- South Africa eliminated ECF around the 1940s through isolation and killing of infected animals, intensive disease surveillance, compulsory dipping, paddock rotation and fencing, and segregation of wild animals from livestock. Using the same strategy, the disease was eliminated in Zimbabwe in 1954 and in Swaziland in 1960[4].
- Although the American strategy of compulsory dipping and isolation of infected animals was used in Australia, it did not succeed because farmers refused to comply.

Multiple methods that should be targeted in improved disease control in Kenya

Kenya should learn from the successful eradication of tick-borne diseases in USA and South Africa, and deal with the multiple issues contributing to spread of these diseases.

- Lack of compulsory regular dipping of livestock which has been an effective method of controlling tick-borne diseases
- Many tick types occur in Kenya and new types have been reported recently[5,6]. Knowing where tick-borne diseases occur and what contributes to their spread will allow a more targeted control.
- Wild animals are reservoirs of tick-borne pathogens. Ticks spread diseases from wild animals to livestock. Fencing and segregation of livestock from wild animals will minimize disease spread.
- Recent research evidence indicates extensive dispersal of ticks across host animals and geographical areas[7]. Animals should be restricted from moving about to reduce dispersal of ticks.
- Dense vegetation cover and pastures increase tick numbers and lead to increased movement of livestock and wild animal hosts. Vegetation clearing will reduce tick numbers.



Typical three-host tick life cycle

Getting rid of the enemy

Ticks and tick-borne diseases have been successfully controlled in several countries through targeted integrated tick management (ITM) programs which combine several methods. The Directorates of Livestock at both national and county levels in Kenya should develop and implement such effective approaches. These integrated programs should incorporate multiple factors using the following approaches:

- Remote sensing and GIS used to collect data on where tick-borne diseases occur and what causes them to spread.
- Disease distribution maps generated by the Directorate of Livestock at national level to identify affected regions and guide region-specific management plans.
- Disease hotspots mapped and risk assessment systems developed by the Directorate of Livestock to predict disease outbreaks.
- State to re-introduce regular compulsory dipping/ spraying programs and institute inspection for compliance
- Directorate of Veterinary Services (DVS) to regulate movement of livestock to reduce mobility and dispersal of ticks and minimize spread of tick-borne diseases
- Banning of ineffective chemicals from the market by the Directorate of Veterinary Services (DVS) and enforcing rational use of effective chemicals by County Veterinary extension officers to stop ticks from becoming resistant.
- Regular surveillance of ticks and tick-borne diseases every 10 years to assess changes in their geographical spread.

An integrated disease management program which combines these approaches will stop disease spread, reduce animal deaths, and result in healthier and higher yielding animals. This will ultimately increase household incomes which is used to improve health, education and agriculture. The cost of inaction will continue to rise. Farmers will continue to suffer financial losses, lose their export market base, remain poor and lack vital proteins in form of milk and meat. The country will continue to lose billions of shillings due to high animal deaths, decreased yields and costs incurred from purchase of drugs. The proportion of income contributed to national and county governments by livestock farming will reduce significantly. The economies of counties whose main economic activity is livestock farming will weaken thereby slowing development. All the positive benefits associated with high livestock production will be lost.

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References

1. Kiptarus, J.K. (2005, March). Focus on livestock sector: Supply policy framework strategies, status and links with value addition. Paper presented at a Workshop on Value Assess Food and Export Investment, held at Grand Regency Hotel, Nairobi, Kenya.
2. McLeod, A., and Kristjanson, R., (1999). Economic impact of ticks and associated diseases on cattle in Asia, Australia and Africa. Final report of joint eSYS/International Livestock Research Institute/Australian Centre for International Agricultural Research (eSYS/ILRI/ACIAR) Tick Cost project. International Livestock Research Institute, Nairobi, Kenya.
3. Minjauw, B., and McLeod, A. (2003). Tick-borne diseases and poverty. The impact of ticks and tick-borne diseases on the livelihood of small scale and marginal livestock owners in India, eastern and southern Africa. Animal health program report, Centre for Tropical Veterinary Medicine, University of Edinburg, UK
4. Walker, A. R. (2011). Eradication and control of livestock ticks: biological, economic and social perspectives. Parasitology, 138(8), 945-959.
5. Horak, I. G., Apanaskevich, D. A., & Kariuki, E. K. (2013). A new species of Rhipicephalus (Acari: Ixodidae), a parasite of giraffes in Kenya. Journal of medical entomology, 50(4), 685-690.
6. Multi-gene phylogeny of Rhipicephalus ticks from Kenya provides evidence for a closely-related species complex within the genus that is widely distributed throughout sub-Saharan Africa. Parasitology Research In press
7. Kanduma, E. G., Mwacharo, J. M., Mwaura, S., Njuguna, J. N., Nzuki, I., Kinyanjui, P.W., Githaka, N., Heyne, H., Hanotte, O., Skilton, R.A. and Bishop, R. P. (2016). Multi-locus genotyping reveals absence of genetic structure in field populations of the brown ear tick (Rhipicephalus appendiculatus) in Kenya. Ticks and tick-borne diseases, 7(1), 26-35.

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