CGIAR

Rethinking Food Markets and Value Chains for Inclusion and Sustainability

Disease management and value chain up-grading: tick control in Uganda's dairy value chain

CIMMYT, IFPRI and Makerere University

The issue of Ticks and Tick-Borne Diseases (TTBDs)

- TTBDs are increasingly becoming a challenge to the fast-growing sector
  - Uganda's warm and humid environments favor ticks' survival
  - Extensive grazing systems complicate tick management
  - Shift towards improved breeds which are high yielding but susceptible to TTBDs
  - Failures in chemical control: documented resistance of ticks to existing acaricides

- Implications of TTBDs and acaricide failures for the dairy value chains
  - Productivity loss (ECF diseases, anaplasmosis. , etc.)
  - Loss of income (acaricide & disease treatments)
  - Desperate farmers have resorted to unsanctioned practices, such as mixing acaricides with pesticides, posing risks to human, animal, and environmental health

Chemical control with acaricides

- Acaricides are the most common method for TTBD control due to their fast action against tick populations

- A major risk: *resistance of ticks to acaricides*

- Factors associated with resistance: genetic, **operational**, and biological factors
  - Tick resistance to drugs is inevitable over time due to genetic factors, but proper use of acaricides is key to delaying and managing it

Acaricide: a technical technology

- Effective use requires an understanding of the drugs, their modes of action, tick biology
  - Use of proper application techniques
  - Correct dosage
  - Frequency and timing of treatments
  - Monitoring of resistance
  - Evidence-based recommendations (lab tests)
  - Proper rotation practices
    - Changing from one acaricide type/class to another class with a different mode of action
    - Five classes registered in Uganda: synthetic pyrethroids, amidines, co-formulations of organophosphates and synthetic pyrethroids, organophosphates, and ivermectins

Figure 15: Showing the different classes of acaricides on the Ugandan market. Under each class are the registered brands on the market

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A technical technology left to farmers

Before liberalization

- Government-led tick management
  - Use of communal dips
  - Dip scouts managed the dips, including selection of the chemical used, managing a rotation schedule, and zonation to coordinate the chemical used in a given zone
- Pros and cons
  - Expensive for the government but resistance management

Post- liberalization

- Farmer-led tick management
  - Government role restricted to regulation
  - Private sector responsible for drug supply
  - Public extension services to support farmers
- Pros and cons
  - Inadequate support to farmers
  - Incentive misalignment and externalities problem
  - Coordination challenges

Our scoping work on this topic

- To understand the challenge of TTBDs
  - Prevalence of TTBDs, prevalence of use of illicit methods, and factors associated with chemical failures
  - Document the effects at the farm level of TTBDs and acaricide failures
  - Asses the role of input markets, specifically drug stores

- Data collection among various actors in the southwestern milk shed
  - Household surveys with 926 farmers
  - Exit interviews with 411 farmers at retail
  - Census with 318 vet drug sellers
  - Mystery shoppers exercise among 249 shops

Some takeaways from our work

Extensive systems that complicate tick control

	Mean	SD	Median	
Free range grazing in the preceding dry season	0.65			
Rotational grazing in the preceding dry season	0.35			
Free range grazing in the preceding wet season	0.66			
Rotational grazing in the preceding dry season	0.34			
Farmer uses feed supplement	0.65			
Available grazing area in acres	70		61	50
Herd size	68		69	49
Proportion of improved breeds in the total herd	0.93			

Large herds of improved breeds in free-range grazing systems

High prevalence of TTBDs & associated costs to farmers

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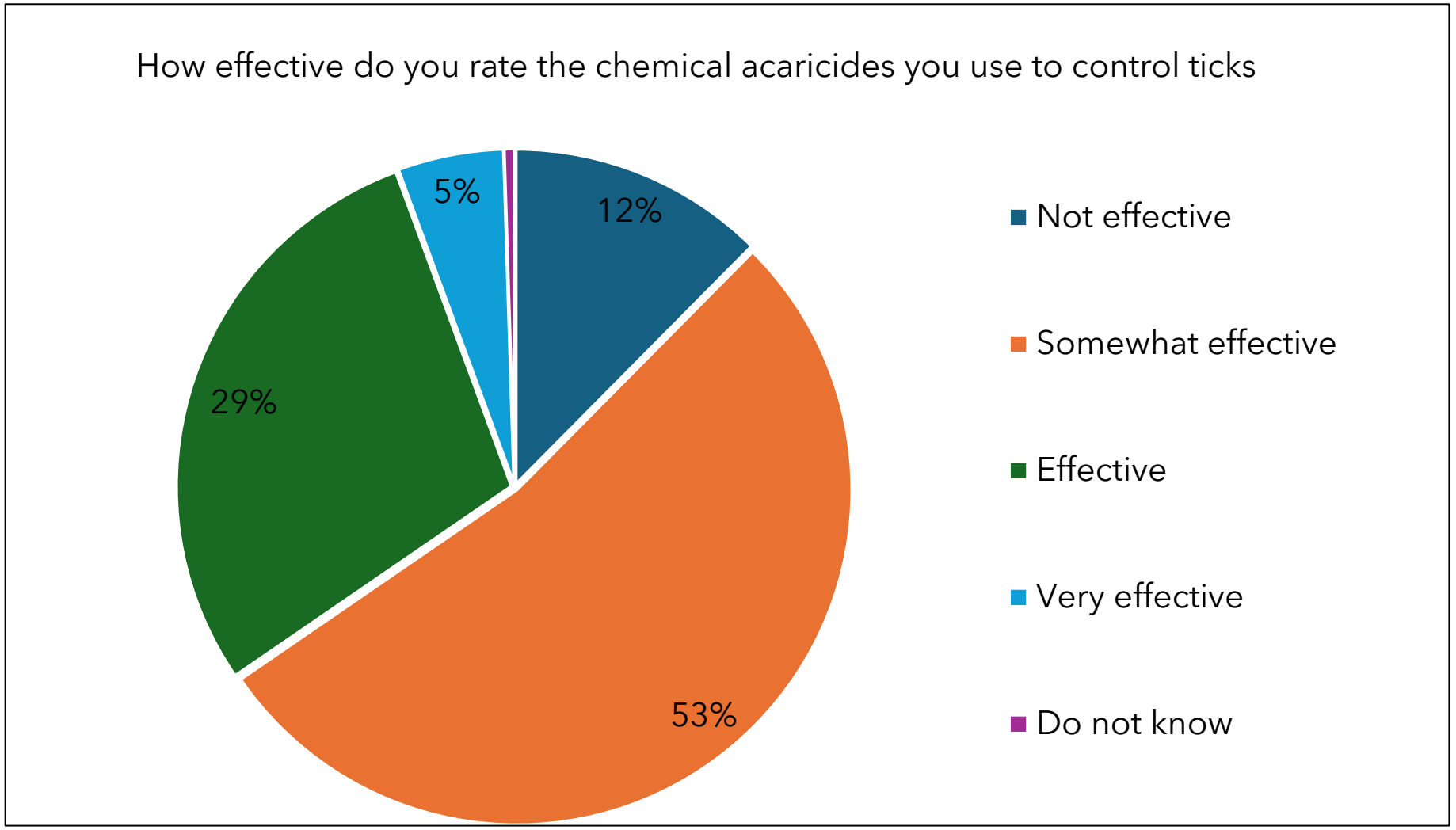
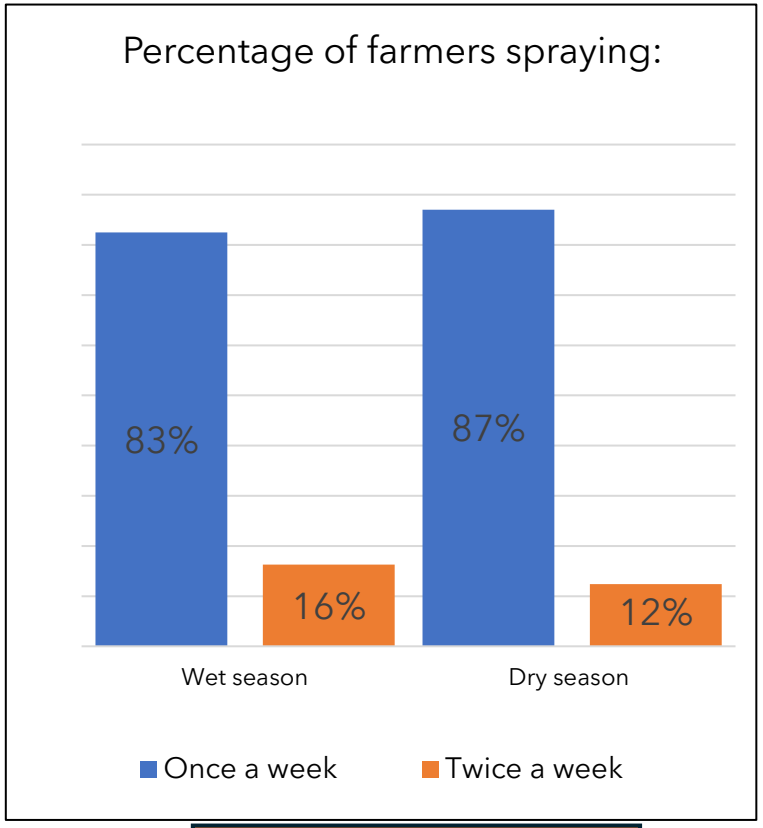
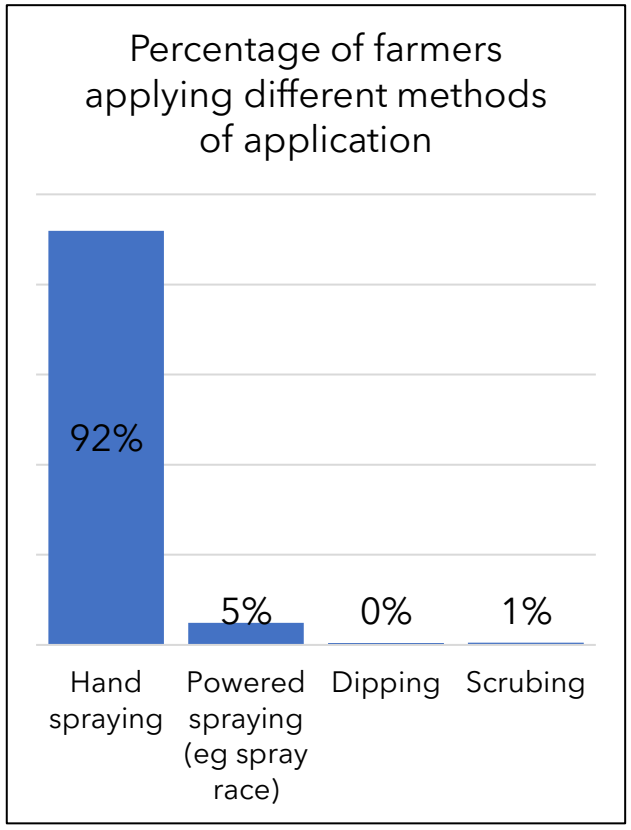
	Mean	SD	Median
Farmer experienced a TBD (ECF is the most common) in the last 12 months	0.76		
Proportion of herd affected by a TBD in the last 12 months	0.24	0.33	0.15
A farmer lost an animal to a TBD	0.52		
Farmer lost 1-9 animals to a TBD	0.39		
Farmer lost more than 9 animals to TBD	0.12		
Number of animals that died from a TBD	3	3	1
Annual costs in UGS spent in TTBDs management (acaricides, treatments)	3,081,367 (USD 832)		
Animal has suffered adverse effects due to acaricide use	0.27		
A person in the family has suffered adverse effects due to acaricide use	0.17		

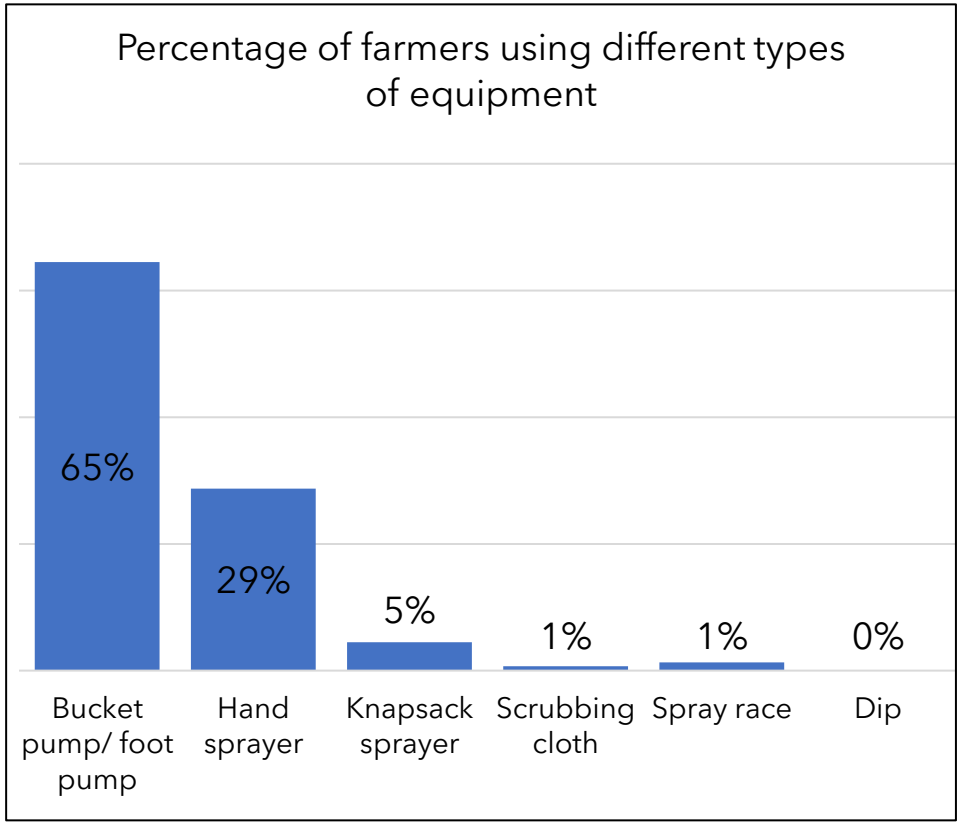
65% of farmers reported their current acaricides as not effective or somewhat effective



Sub-optimal acaricide application procedures



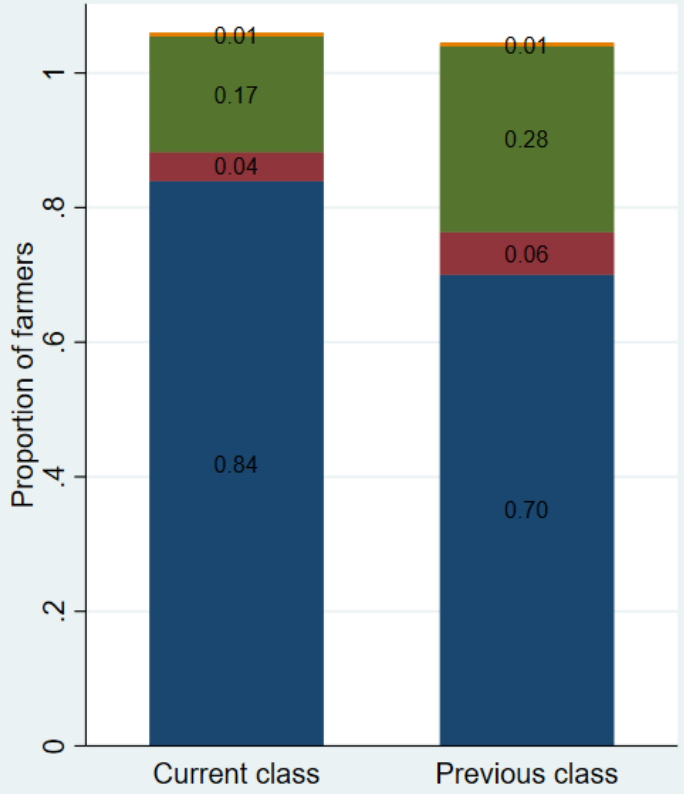


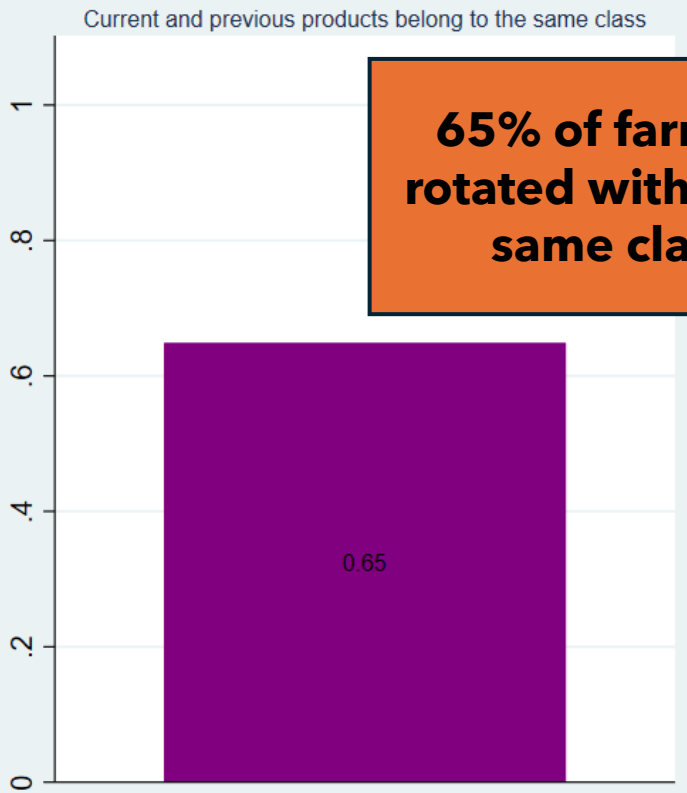


High frequency of treatments

Low use of effective equipment e.g spray race or dips

Improper acaricide rotation practices





65% of farmers rotated within the same class

Class of the current and previously used acaricide
Amidines
Pyrethroids
Co-formulation
Lactones

Farmers lack knowledge of different classes of acaricides

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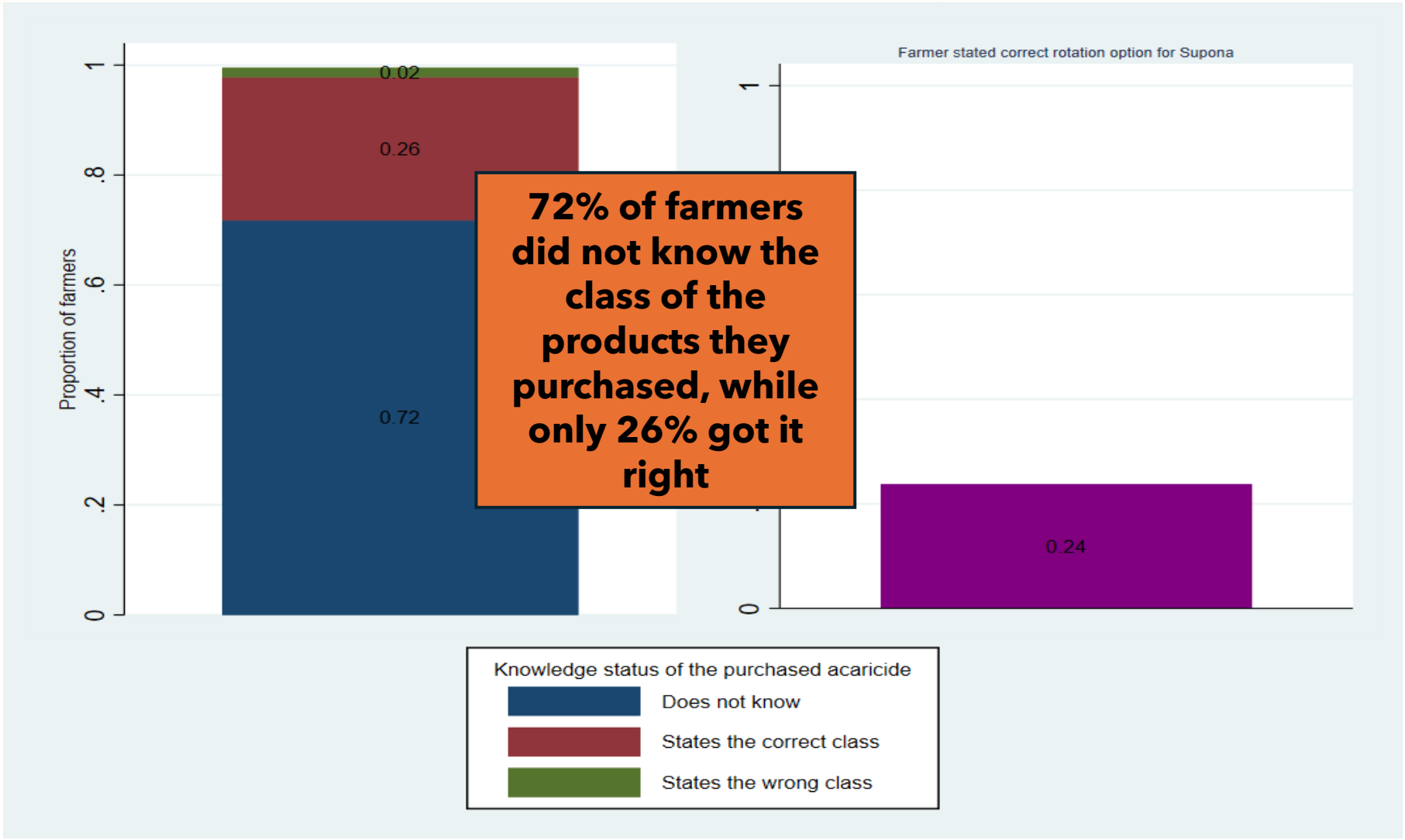
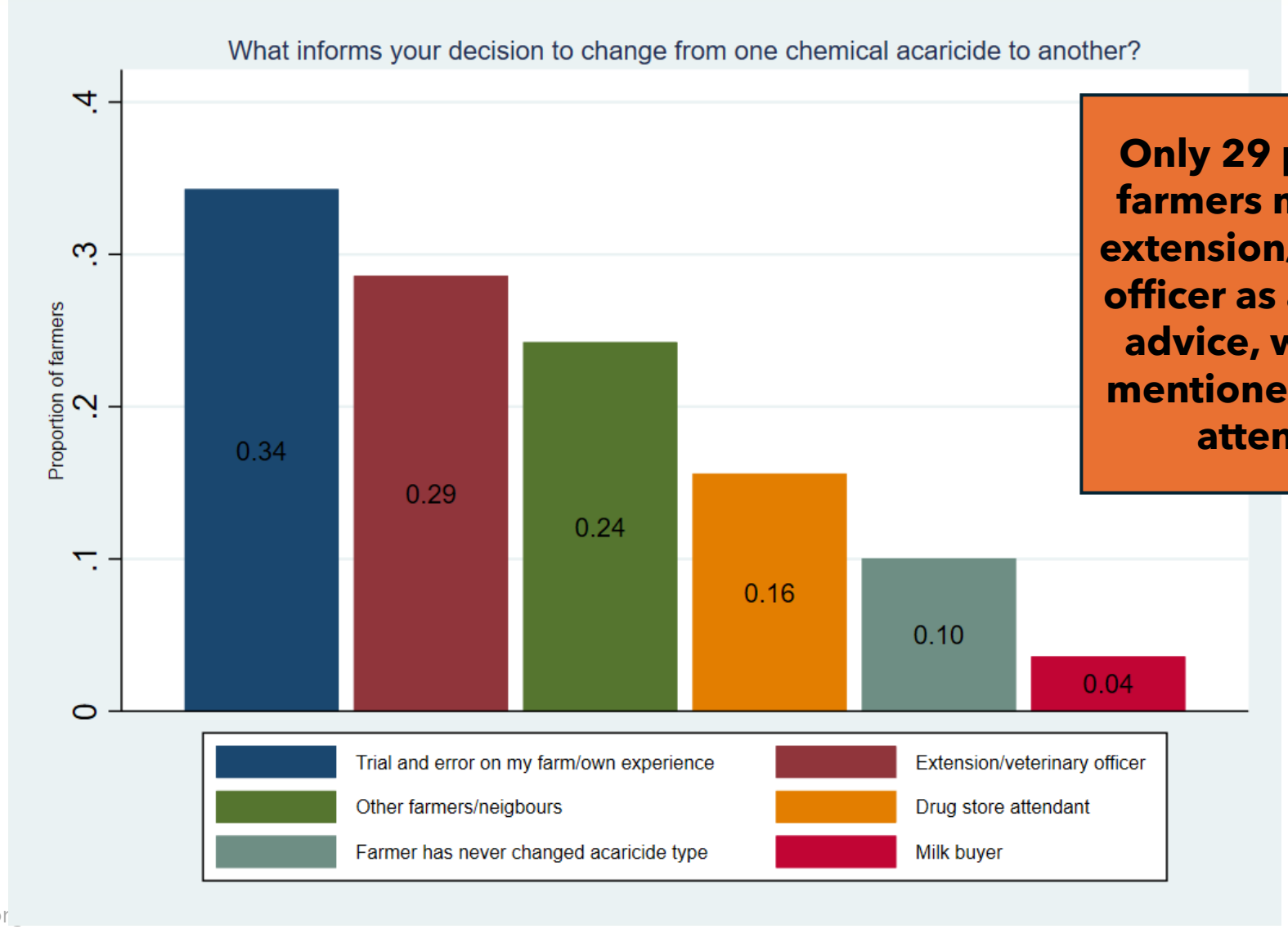


Farmers are not supported when making decisions on acaricides to use



Only 29 percent of farmers mentioned extension/veterinary officer as a source of advice, while 16% mentioned vet store attendants

Farmers do not interact with some of the existing information materials

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	Percentage of farmers
Farmer has seen the NDA leaflet before	37%
Source of the leaflet	
Drug store	82%
Extension officer	4%
Veterinary Officer	14%
On a billboard	1%
Attention to drug labels	
I do not pay attention to the labels	47%
I only pay little attention to the labels	28%
I pay more attention to the labels	25%

Figure 15: Showing the different classes of acaricides on the Ugandan market. Under each class are the registered brands on the market

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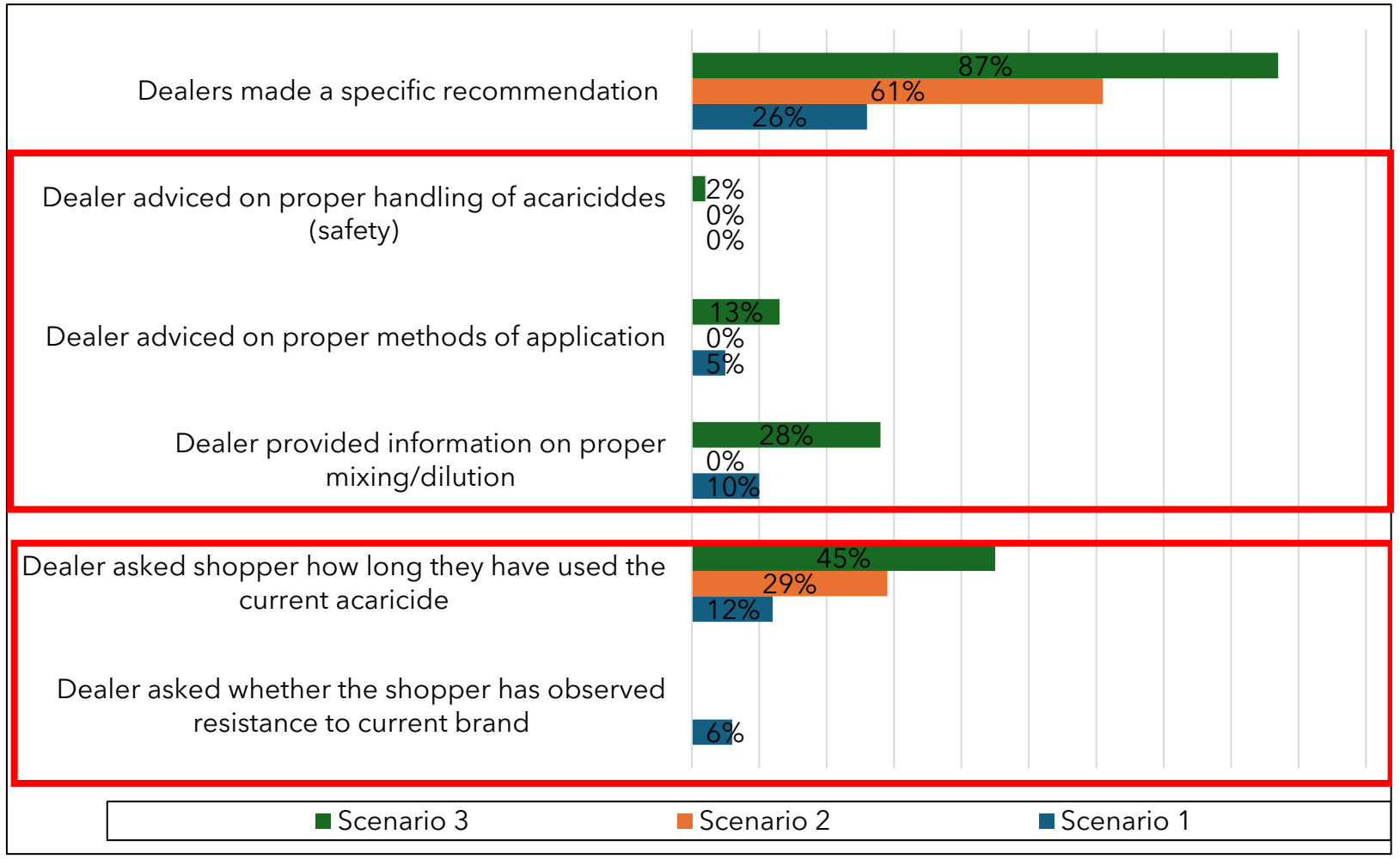
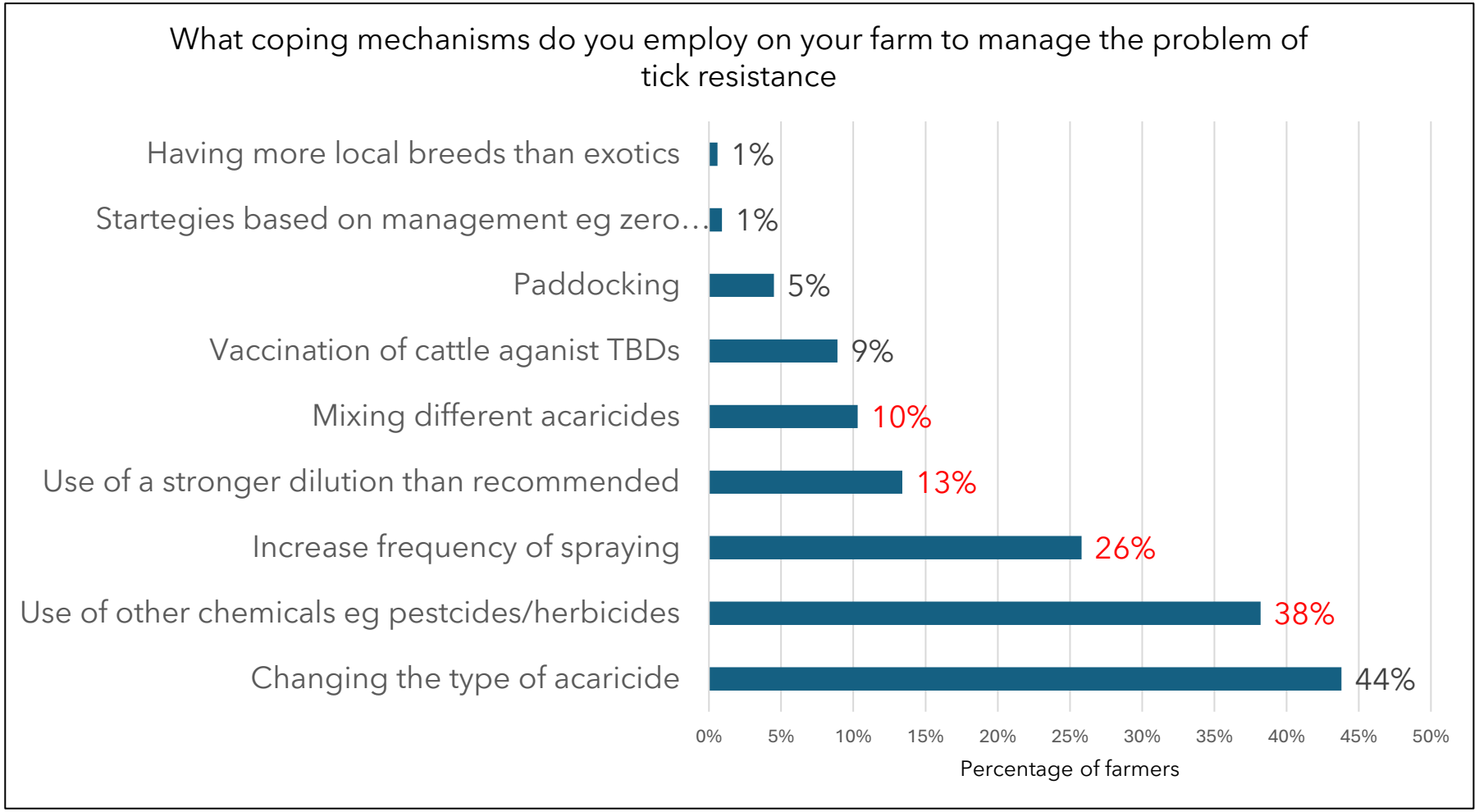
Dealers do not support farmers in their drug choices: results from the mystery shopper's experiment



Scenario 1: Shopper asked for Milibitraz (status quo)
Scenario2: Shopper asked if they could use illicit products
Scenario 3: Shopper complained of resistance to Milibitraz and asked for help

Farmers report using illicit drugs or overuse of acaricides as a coping strategy



Summary and next steps

- TTBDS and associated failures in chemical control are a major challenge in the dairy value chains
  - Huge costs to farmers
  - Potential implications on the quality of milk, meat, hides
  - Risks to environmental health: modes of application, overuse, use of illicit chemicals

- Further research to quantify the costs/risks to the value chains
  - Prevalence of residuals in milk
  - Quantify the risk associated with the existing residuals

Summary and next steps

- Innovations to address the failures in chemical control
  - Vaccination against ticks
  - Farmer support for proper acaricide usage
    - Training, use of lab-based tests (rapid tests) to guide recommendation
    - Different models of supporting farmers: input supply markets, conventional extension services, digital extension, etc
  - Integrated tick management
    - Pasture management (rotation)
    - Zero grazing?
    - Biological control
  - Policy innovations: government to play a bigger role

NARO makes breakthrough in anti-tick vaccine

By Prossy Nandudu

Every time a veterinary doctor visits a livestock farm, the farmer has to part with between sh30,000 and sh150,000.

However, the costs may increase depending on the kind of disease or condition the animal is suffering from and the kind of medication to be administered. This also takes into account the specialisation of the veterinary doctor and the services needed on the farm, Gloria Lwamafa, the proprietor of Karungi Dairy Farm, says.

Lwamafa's views are not any different from those of Dr Patrick Sekimpi, a livestock farmer, who argued that most livestock diseases on the farm are associated with ticks.

"Due to tick infestation, one has to spray cattle twice a week or more. That means more costs for the medicine used while spraying, more labour and more money to purchase acaricides," Sekimpi said.

His remarks are supported by NARO's recent findings that, at the farm level, 80% of the expenses incurred result from the management of cattle diseases associated with tick-borne diseases.

The two commercial livestock farmers expressed their views yesterday in a telephone interview following a report from the National Agriculture Research Organisation (NARO) that there has been a breakthrough in the development of the anti-tick vaccine in Uganda.

The anti-tick vaccines are designed to induce a protective response in vaccinated animal hosts, such as cattle, so that when ticks suck blood from vaccinated cattle, their body functions are impaired, leading to the death of many ticks and decimation of their populations over time.

According to the statement, the anti-tick vaccine was developed by researchers from Uganda in collaboration with the Health and Biotechnology (SaBio) Institute for Game and Wildlife Research Spain, headed by Prof. Jose de la Fuente and Christian Gortázar.

Ugandan scientists, who worked on the vaccine, include Dr Fred Kabi, Dr Paul Kasaija, Dr Swidiq Mugerwa, and Dr Justus Rutayisire.

The statement adds that the vaccine, which has been under development for over 10 years, targets the brown ear tick, locally known as *Engoha*; the African blue tick, locally known as *Entujo* and the tropical bont tick, locally known as *Embarabara*, which are the main threats to cattle in Uganda.

To ensure its viability, the injectable anti-tick vaccine has been evaluated on five farms countrywide, representing five ecological zones in Uganda. Farms that participated in trial include Mbarara ZARDI, Kiburara Prison Farm, Isimba Farm, Maruzi Livestock Station, and Nabuin ZARDI. Further efficacy trials during the 12-month field process at Mbarara, Kiburara, Isimba farms, where cattle sprayed twice at Mbarara completely not sprayed at and Isimba farms, to effectiveness of the vaccine.

ECONOMIC EFFECTS OF TICK

Additional information adds that annually, the costs linked to ticks and pathogens in cattle ra $13.9b and $18.7b.

In Uganda, studies es country loses over $1. ticks and tick-borne di "That is why prom innovations that are sound, such as anti control multi-species is highly justified.

Vaccines are the effective and envir alternative for t statement added.

About the vaccine

The injectable anti-tick vaccine is administered in the muscles of cattle around the neck region, while the oral vaccine is given to cattle through the mouth or mixed in a suitable cattle meal.

"The anti-tick vaccines will reduce tick infestation on the farm, reduce spraying intervals, the labour we use and the cost of the acaricides we use when spraying animals, so it is a welcome move," Dr Patrick Sekimpi, a livestock farmer, said.

Gloria Lwamafa, the proprietor of Karungi Dairy Farm, welcomed the vaccine, with the report adding that the developed vaccines shouldn't cause negative side effects on animals. And if it is true that the vaccine is made in Uganda, we shall spend less on acaricides, which will reduce the costs we have been incurring in veterinary services," Lwamafa said.