



International Livestock Research Institute

Livestock and human health

ILRI corporate report highlights 2015–2016

Livestock and human health

Development and effective delivery of vaccines reduces livestock mortality and illness, enhances public health and improves the livelihoods of millions of smallholder farmers

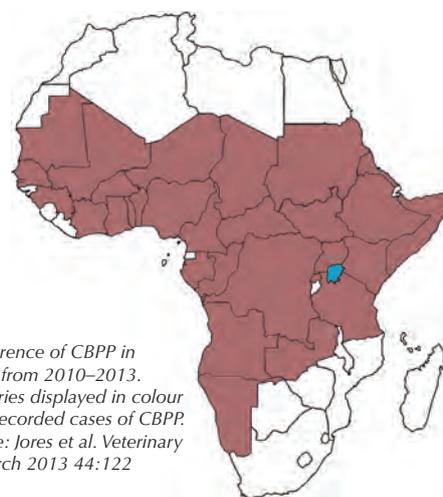
One Health approaches—based on the interdependence of human, animal and environmental health—help tackle zoonoses and antimicrobial resistance

Understanding women's role in livestock production is key in providing herd health solutions

Science into practice

Breakthrough vaccines offer hope to farmers whose animals risk infection from devastating diseases

Livestock diseases cost African farmers billions of dollars a year; contagious bovine pleuropneumonia (CBPP) alone causes annual losses estimated at USD 2 billion. Working to overcome the shortcoming of existing vaccines—in terms of cost, accessibility, difficulty of production and efficacy—and applying advanced bioinformatics allowed ILRI and partner scientists for the first time to screen possible candidate vaccine antigens for CBPP. This breakthrough research—together with an improved experimental system that replicates natural infection—markedly increases the likelihood of developing a more efficient vaccine. Findings by scientists have also accelerated development of multi-species single-dose immunization for cattle, sheep, goats and camels to the virus causing Rift Valley fever, a zoonotic pathogen i.e. transmittable to humans. Trials to confirm the effectiveness of the vaccine in livestock are expected to begin in 2017/18. As the work exploits vaccine technology suitable for use in livestock and humans, this research has paved the way for clinical studies in humans, a model that could be applied to tackle other zoonotic diseases.



Occurrence of CBPP in Africa from 2010–2013. Countries displayed in colour have recorded cases of CBPP. Source: Jores et al. *Veterinary Research* 2013 44:122

ILRI study prompts taskforce recommendations on food safety

A first 'cost of illness' study on food-borne diseases of pork sold in Vietnam attracted considerable interest from policymakers. The findings, which could inform public health actions potentially saving up to USD 6 million annually in health costs, prompted recommendations by a multi-stakeholder taskforce on how to make food safer and improve smallholder farmer livelihoods.

Preventative action ensures pigs are free of tapeworm

Better inexpensive husbandry practices were shown to be effective in reducing the transmission of *Taenia* spp., a tapeworm infection causing cysticercosis in people. Such tailored strategies, along with increased frequency and enhanced quality of routine meat inspection to prevent the infection entering the food chain, are expected to reduce the impact on human health. Research also highlighted the role of multiple socio-economic, behavioural and environmental factors in *Taenia* spp. transmission patterns in western Kenya, e.g. education levels and access to clean drinking water.

Analysis with state-of-art technologies reveals nearly 50% of camels test positive for Middle East respiratory syndrome coronavirus antibodies

Several pieces of research on camel populations in Laikipia county, central Kenya, have revealed high levels of Middle East respiratory syndrome coronavirus (MERS-CoV) antibodies—a virus that could cause acute respiratory illness in people. These findings build on 2014 research that tested camel samples collected decades ago and stored in the ILRI biorepository. Comparisons between the samples—underlining the importance of the biorepository—demonstrate that

MERS-CoV has been circulating in camel populations for many years. This work has been undertaken in partnership with the national veterinary authorities, and scientists are now well-placed to determine whether MERS-CoV of Laikipia camels is genetically similar to MERS-CoV in other parts of the Horn of Africa, as well as to the human pathogenic strain in the Middle East. These findings are expected to better inform animal and human health policy deliberations of national and international decision-makers.

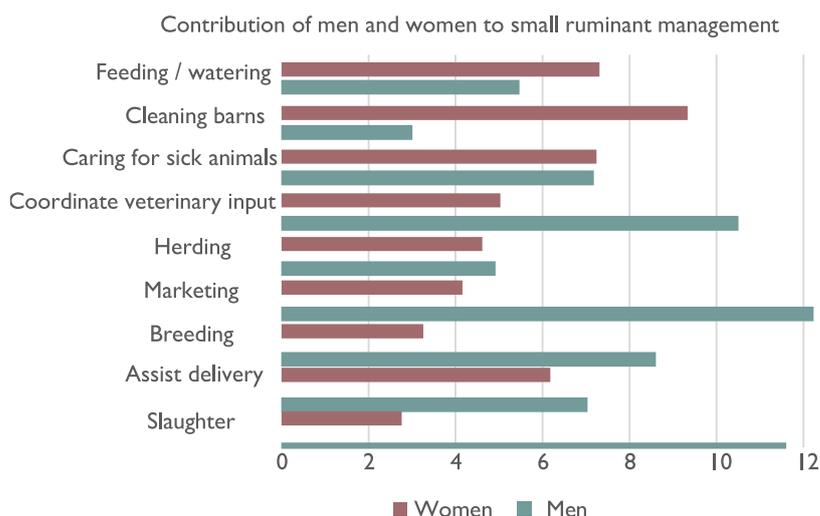
Evidence-based decision-making

Channelling livestock research findings into global public health and environment fora

Bringing livestock science to targeted large-scale audiences is a key approach to inform and guide influential researchers, aid workers and policymakers. Senior ILRI scientists participated in the 2015 Lancet Commission report on Health and Climate Change, and were thus able to ensure appropriate and pro-poor coverage of livestock health and related food safety issues. Mapping out the impacts of climate change and the necessary policy responses to ensure the highest attainable standards of health worldwide, the commission presented 10 recommendations for governments worldwide to take action in the next five years. With the University of Liverpool, ILRI participated in a major impact report by the World Health Organization (WHO) providing the first global cost estimates of food-borne diseases. It ensured that understanding of issues affecting poor consumers of animal-source foods were considered as part of the findings. While further research is needed, particularly to fill data gaps at national and sub-national levels, the WHO is actively involved in capacity building through national food-borne disease burden studies, and encouraging the use of these findings in setting evidence informed policies.

Gender approach helps initiate control programs for overlooked diseases

Women in a number of zones in Ethiopia contributed to the implementation of preventative measures for diseases of key importance to smallholder farmers. Disproportionately dependent on income from small ruminants and more frequently falling ill due to their proximity to the animals, women farmers directed scientists towards control programs for respiratory, reproductive, parasitic and neurological diseases in livestock. Given their knowledge of diseases and roles in small ruminant management, the study highlighted the untapped potential of women in the provision of animal health services.



African swine fever control strategy approved by 16 African countries

Scientists at the Biosciences eastern and central Africa (BeCA)–ILRI Hub played a leading role in the research component of the Africa control strategy for African swine fever. Developed by a taskforce comprising staff from BeCA–ILRI Hub, the Food and Agriculture Organization of the United Nations and the African Union InterAfrican Bureau for Animal Resources, the strategy was validated in November 2015 by 16 African countries and 20 research and development partners. For the first time, this will allow the implementation of a coordinated continent-wide approach to the struggle against African swine fever and further safeguard a USD-150-billion-plus a year global industry.

Capacity development

Thousands of value chain actors and research fellows benefit from on-the-ground training and high-level support in five African countries

Developing One Health multi-disciplinary capacities is essential and ILRI provides both high-level support to research fellows (nearly 60 assisted from June 2015–2016) and downstream support to a range of field actors. For instance, nearly 1500 farmers, butchers, meat inspectors and food vendors received training on food hygiene in five African countries, including on diagnosis and containment of African swine fever in Uganda where follow up indicated participants had taken measures to prevent further outbreaks.

Key research

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Key partners for the work reported here

Biotechnology and Biological Sciences Research Council, UK • Centre Suisse de Recherches Scientifiques en Cote d'Ivoire • Commonwealth Scientific and Industrial Research Organisation, Australia • Federal Institute for Risk Assessment, Germany • Food and Agriculture Organization of the United Nations • Friedrich-Loeffler-Institut • Global Alliance for Livestock Veterinary Medicines • Hanoi School of Public Health • Hester Biosciences Ltd • Institute of Tropical Medicine Antwerp • Jenner Institute • Kenya Ministry of Agriculture, Livestock and Fisheries • Kenya Medical Research Institute • Kenya Zoonotic Disease Unit • London School of Hygiene and Tropical Medicine • Makerere University • National agricultural research systems in Ethiopia, Mali, Tanzania and Uganda • National Animal Health Diagnostic and Investigation Centre, Ethiopia • Pirbright Institute • Public Health Foundation of India • Royal Veterinary College, UK • Technical University of Denmark • Texas A&M AgriLife • Uganda Ministry of Agriculture, Animal Industries and Fisheries • United States Department of Agriculture–Agricultural Research Service • Universidad Nacional de San Martín • University of Copenhagen • University of Bonn • University of Bern • University of Edinburgh • University of Liverpool • University of Maryland • University of Nairobi • University of Oxford • University of Toronto • University of Veterinary Medicine, Hanover • University of Washington

CGIAR research programs

Agriculture for Nutrition and Health • Climate Change, Agriculture and Food Security • Livestock and Fish • Policies, Institutions, and Markets

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