

## **Antimicrobial resistance in the poultry value chain in Uganda: a post COVID-19 lockdown farm mapping visit of production systems in Wakiso and Soroti, Uganda.**

Dickson Ndoboli<sup>1\*</sup>, Irene Mbatidde<sup>1\*</sup>, Dreck Ayebare<sup>1\*</sup>, Bernd-Alois Tenhagen<sup>2</sup>, Michel Dione<sup>3</sup>, Kristina Roesel<sup>4</sup>, Arshnee Moodley<sup>4</sup>

<sup>1</sup>*International Livestock Research Institute, Kampala, Uganda*

<sup>2</sup>*German Federal Institute for Risk Assessment, Berlin, Germany*

<sup>3</sup>*International Livestock Research Institute, Dakar, Senegal*

<sup>4</sup>*International Livestock Research Institute, Nairobi, Kenya*

\*Authors contributed equally to this work

### **Background:**

Antimicrobial resistance (AMR) is one of 10 global health threats. The effects of AMR on public health are estimated to increase to 10 million human deaths annually and output of livestock production is expected to decrease 8.5% by 2050. Uganda has adopted a National Action Plan to address AMR with a number of action areas including research and innovation.

Within the [Boosting Uganda's Investment in Livestock Development \(BUILD\)](#) project, the AMR thematic area focuses on the drivers of antimicrobial use, prevalence, and transmission dynamics of antimicrobial resistant pathogens in two different poultry farming systems. This four-year project is being implemented in Wakiso and Soroti in Uganda. In Wakiso, bordering Kampala to the West, poultry production is intensive. Soroti, approximately 300 km north east of Kampala, is a rural area with small scale poultry farms. As part of the project, we planned to visit 400 farms for a cross-sectional study across the two districts.

The COVID-19 pandemic severely hampered initiation of the project, with field work scheduled to start in April 2020. Various restrictions including lockdowns were implemented, which like in other countries had substantial effects on the economy including the poultry sector. Moreover, there is no database or comprehensive list of farms to determine the number of farms in an area including farmers' names and addresses. Without this information, to enable recruitment for our cross-sectional study we conducted farm mapping visits in the two districts. The visits aimed to:

1) catalogue the poultry farms in each study area, 2) capture the types of farming/husbandry systems, and 3) get a brief overview of production challenges on farms that may affect antimicrobial use. This data was used to inform the inclusion criteria of farms, the sampling strategy and sample size calculation for a prevalence and risk factor study that was finally conducted in 2021.

### **Methodology:**

The farm mapping exercises in the two districts were conducted in February and April 2021. In each district, 1.5-3 weeks were spent visiting different farms. A questionnaire was developed and uploaded to *ODK Collect*®. It captured data on farm demographics, production systems, farm management practices, location, and current production challenges. Interviews were conducted using a Tablet computer and the data extracted into Microsoft Excel.

### **Findings:**

A total of 272 farms were visited: 126 in Wakiso and 146 in Soroti. In Soroti, 98% of farms reared indigenous chicken breeds while in Wakiso, 43% of farms reared Kuroiler; a hybrid species, 37% broilers, and 33% reared layers. The predominant poultry rearing system in Soroti was free range (95%) with 34% of farms rearing other avian species including ducks, turkeys, and pigeons. In Wakiso 98% of farms were intensive (500-5000 birds) and 2% were semi intensive (50-200) birds. Furthermore, 72% of the farms reared other livestock species such as cattle, sheep, and goats,

Many farms in both Wakiso and Soroti had stopped operations due to challenges with lockdown because of restricted movements preventing purchasing of parent stocks that affected restocking at farms. The farm input prices (e.g. feed) had increased due to restricted imports. Increased disease prevalence on farms as veterinary service delivery was reduced for example widespread Newcastle disease in Soroti and a drop in prices of poultry products were some of the reasons given for farmers abandoning the poultry business.

A number of challenges were encountered and they include; i) difficulty in accessing farms due to poor road conditions, ii) lack of biosecurity measures on the farms which increases the risk of transmission of pathogens from one farm to another, iii) district veterinarians have little knowledge on farms in their jurisdiction.

**Conclusion:**

The production systems and types of birds reared in the two districts are different which will need to be considered in our sampling strategy. The lack of biosecurity and the outbreaks of Newcastle disease, especially in Soroti's free range system, highlight some potential areas of intervention to improve poultry production and to reduce antimicrobial use. COVID-19 and the lockdown had adverse effects on poultry farming.

**Acknowledgements**

This work was funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) through the project "Boosting Uganda's Investments in Livestock Development" (BUILD). Additional support was received from the CGIAR Research Program Agriculture for Nutrition and Health through the CGIAR Antimicrobial Resistance Hub. We also acknowledge the CGIAR Fund Donors (<https://www.cgiar.org/funders>).