



Federal Ministry
of Food
and Agriculture

PHD PROGRAM OF BMEL

AMRAFRIKA: Strengthening monitoring systems for antimicrobial use and resistance in cattle farms using participatory, one-health and data management systems in South-Kivu Province, D.R. Congo (AMRAFRIKA)

Country/countries	Germany, Democratic Republic of the Congo
funding agency	Federal Ministry of Food and Agriculture - BMEL
project management	Federal Office for Agriculture and Food – BLE
project coordinator	Leibniz Institute for Agricultural Engineering and Bioeconomy, e.V. (ATB)- Potsdam, Germany Dr. Olivier Kashongwe Project team: Dr Tina Kabelitz, Prof. Thomas Amon, Prof. Barbara Amon, Mr. Lukas Minogue
project partner(s)	Institut Supérieur des Techniques Médicales de Bukavu, (ISTM) –Bukavu, D.R. Congo Dr. Louissette Wimba, Dr. Zack Kambale, Dr. Marcel Mapoli, Prof. Christophe Kasigwa
project budget	182,825.52 Euro

project duration	3 years (October 2023 - September 2026)
key words	Antimicrobial resistance, cattle, one health, surveillance system, South-Kivu
background	<p>The South-Kivu province has the third highest population of the country after Kinshasa (+11M) and North Kivu (+6M) and its capital city Bukavu with more than 1 million people has high population density (+19833 persons/km²) (Wikipedia). The city has benefiting long from the government's efforts to improve of security in recent years before the resurgence of armed groups in the last year. Located at the shores of Lake Kivu, the city is supplied with animal source foods from the increasing local production and from importations from neighbouring countries (Maass et al., 2012). The high population density coupled with its relatively high consumption of animal source food are attractive factors for producers (Udomkun et al., 2018, Ngaruka et al. 2021). The major producing hubs for milk and dairy products are located in the provinces of Plaine de Ruzizi, Kavumu and Mulume Munene, and the neighbouring Province of North Kivu. Cattle rearing for milk and meat production is an important source of livelihood for rural populations in the South Kivu.</p> <p>Production is mainly (>70%) from local cattle of Ankole and N'dama breeds in herds ±40 animals, kept in extensive system and making use of communal land resources for grazing (Mugumaarhahama et al. 2021). The average daily production per herd of 16.2 kg milk from about nine lactating cows is commercialized in the form of fermented milk or white cheese ('Mashanza') (Mwamini et al., 2019). Milk is also a highly perishable product, being an ideal medium for growth of microorganisms. This is particularly relevant in the South-Kivu region because of environmental conditions (high temperatures) and the lack of a continuous cold chain. Farmers therefore, put in place preventive measures including hygiene routines as well as preventive and curative prophylaxis for which heavy antimicrobial use is often required (Mugumaarhahama et al. 2021). This raises public health concerns on the safety of milk and meat products in a region where the standard protocols on antibiotics use in cattle farms are not observed or known to farmers (Yoshua et al. 2019).</p>
objective	The main aim of this 'AMRAfrika' project is to develop an antimicrobial use and resistance assessment model in cattle production systems combining upstream participatory approaches in data gathering with current digital data management systems and online analyses and modelling techniques to support decision-making. The project will approach AMR risk assessment in a holistic way to provide timely relevant decision support evidence on cattle disease occurrence and AMR risks at the nexus between environment-plant-livestock-human (One-health). This will enable stakeholders to take early decisions on potential threats to human and environmental health by zoonotic pathogens and antimicrobial residues/ resistances. Hence, the project

	<p>contributes to the goal of this call by improving monitoring and evaluation systems to occurrence and spread of diseases and specifically by the innovativeness of the method in the African context. The project also initiates bilateral and multilateral cooperation with an Institution of higher learning in Africa, specifically in D.R. Congo. Therefore, AMRAfrika project will contribute to the scientific development of researchers from D.R. Congo in AMR surveillance in cattle production systems through the collaboration with ATB.</p>
<p>short description</p>	<p>The AMRAfrika project aims to develop an assessment model for antimicrobial use (AMU) and resistance (AMR) in cattle production systems that integrates participatory data collection approaches with current digital data management systems, online analyses and modelling techniques to support decision-making. The AMR risk assessment will be conducted in a holistic manner to provide timely, relevant decision support evidence on cattle disease occurrence and AMR risks at the nexus between environment-plant-livestock-human (One-health). The project will enable stakeholders to take early good decisions to prevent threats to human and environmental health by zoonotic pathogens and antimicrobial residues/resistances. Therefore, the project contributes to improve monitoring and evaluation systems for the occurrence and spread of diseases and specifically by the innovativeness of the method in the African context.</p> <p>The AMRAfrika project has five main work packages (WP) in which its activities are articulated. Firstly, we will use a participatory approach to design of data collection tools with major stakeholders. We will select criteria for monitoring and surveillance for cattle infectious diseases and AMR in South Kivu Province as a baseline for the country. Secondly, we will record AMU, cattle infections and measure AMR. This will include retrospective recording of AMU (1 year recall at most) in the farms and establishing a prospective recording routing of AMU, infections and AMR in cattle production systems. Thirdly, we will develop a data recording system (platform) for antimicrobial use and resistance in Cattle production that include data acquisition and management. For this, we will set up a data management platform incorporating three main functions: administration; collection and storage; cleaning and quality assurance. The fourth area will involve modelling of AMR patterns of target pathogens and designing an online application programmer interface (API). We will analyse data collected in other work packages to understand the trends of AMU and AMR, pathogen occurrence. We will use modelling to predict recurrence and likelihood of treatment successes. The results and predictions will be availed to users through an online platform where, to some extent, the needed results can be requested. The last area of focus will be the project management and coordination, led by the ATB where high quality project management and coordination will be provided. This will include activities and tasks such as organization of meetings, exchange of partners, report writing, communication, dissemination, and risk management.</p>