



Supporting Animal Health in a Changing Climate

Climate change, including warmer temperatures and different rain patterns, has affected the migration of animals and the spread of diseases. This has brought diseases into new geographic areas, causing animal disease outbreaks and posing a threat to animal and human health.

Early diagnosis, proper characterization of pathogens — the organisms that cause diseases — and animal vaccinations are essential to controlling and preventing the spread of animal diseases.

Nuclear and nuclear-derived techniques can be used to diagnose diseases and characterize variants rapidly and accurately, protecting livestock and preventing the spread of animal and zoonotic diseases. Using irradiation technology, scientists can also develop and produce suitable vaccines to target these diseases.

Ethiopia has the largest population of

livestock in Africa, including 60 million cattle, according to the World Bank. Due to climate change, however, the livestock population is now being exposed to an increasing number of diseases. This threatens both food security at home and exports to foreign markets. As the livestock sector accounts for 10 per cent of Ethiopian exports, preventing and controlling animal disease outbreaks is key to Ethiopia's economy.


To support the detection of transboundary animal diseases, the IAEA, through the Joint FAO-IAEA Centre of Nuclear Techniques in Food and Agriculture, has supported the development of the Veterinary Diagnostic Laboratory (VETLAB) Network. In Ethiopia, the Animal Health Institute and National Veterinary Institute have expanded their capacities through the VETLAB Network to detect animal disease pathogens using nuclear techniques, including real time reverse transcription-polymerase chain



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reaction (real time RT-PCR). Staff have been trained in the early and rapid diagnosis and control of diseases such as foot-and-mouth disease, peste des petits ruminants and avian influenza, among others.

Once variants of animal diseases are identified, corresponding animal vaccinations can be produced or developed using nuclear techniques to help control the spread of outbreaks. Irradiated vaccines offer a cost-efficient approach and do not contain any chemical or other compounds that are traditionally used in inactivated vaccines.

Ethiopia now produces more than 260 million animal vaccine doses per year. The Ministry of Agriculture distributes the vaccines to farms, including those in rural areas where the farm animals have a higher chance of interaction with wild animals that potentially carry diseases. In cooperation with the IAEA, through the Joint FAO/IAEA Centre, Ethiopia is also in the process of developing a novel gamma-irradiated vaccine against fowl cholera in poultry and lumpy skin disease in cattle.

The Science

Real time RT-PCR is a nuclear-derived technique that allows scientists to detect specific genetic material of disease-causing pathogens. Chemical reagents with fluorescent dyes are frequently used to mark the genetic material of the pathogen. This new method allows scientists to see the results almost immediately while the process is ongoing.



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