

Food and Agriculture

Objective

To contribute to the sustainable intensification of agricultural production and the improvement of global food security by addressing the challenges of food production, food protection and food safety through capacity building and technology transfer to Member States. To increase resilience of livelihoods to threats and crises in agriculture by improving assessment and mitigation of threats and crises in agriculture, including impact of climate change and nuclear or radiological accidents on agriculture, as well as food safety risks. To improve efficient agricultural and food systems for sustainable management and conservation of natural resources, and to enhance the conservation and application of plant and animal biodiversity.

Animal and Zoonotic Disease Outbreaks: Diagnosis and Control



FIG. 1. Training is provided to veterinarians and technicians participating in the VETLAB Network of veterinary diagnostic laboratories.

The Veterinary Diagnostic Laboratory (VETLAB) Network continued to grow, expanding to 44 countries in Africa and 19 countries in Asia, with 4 Member State laboratories in Cambodia, the Philippines, Thailand and Viet Nam joining during the year. The Agency, in partnership with the Food and Agriculture Organization of the United Nations (FAO) through the Joint FAO/IAEA Programme of Nuclear Techniques in Food and Agriculture, provided 35 national laboratories with diagnostic toolboxes containing equipment, reagents, consumables, protocols and guidelines for sampling in the field and for early detection of animal and zoonotic diseases under biosecurity conditions (Fig. 1).

In response to outbreaks of Middle East respiratory syndrome (MERS), the Agency, through the Joint FAO/IAEA Programme, provided training in the detection of the MERS pathogen in camels to 19 professionals from seven Member States on the Arabian Peninsula. The trainees learned about safety issues relating to zoonotic diseases in general and nuclear derived techniques for early rapid diagnosis of MERS outbreaks. The Agency also provided training in the detection of the highly pathogenic avian influenza (HPAI) virus to 23 experts from Member States in Europe. An Agency workshop involving 141 participants from 39 Member States focused on coordinating and strengthening 'One Health' initiatives in Africa aimed at addressing emerging and re-emerging zoonotic diseases. The Agency also provided enhanced capacity support, including equipment, standard

operating procedures and training, to Cameroon, the Democratic Republic of the Congo and Togo, enabling them to detect – and contain – HPAI outbreaks in birds at an early stage.

Improving Livestock Performance

In 2017, the Agency, through the Joint FAO/IAEA Division, assisted 23 Member States in their efforts to achieve sustainable growth of the livestock industry through fellowships and training activities. During the year, some 300 professionals received Agency training, including 115 trained in artificial insemination techniques, 143 trained in genetics and animal breeding, and 39 trained in animal nutrition. The Agency also developed a protocol and guidelines, distributed to eight Member States, on the application of stable isotope technology for better management of pastures and improved animal productivity. It also developed a protocol, currently being validated, for the application of radiolabelled amino acids to identify embryo-derived protein as a marker for early diagnosis of pregnancy in cows.

Regional Food Safety Networks

The Agency, through the Joint FAO/IAEA Division, continued to actively support the establishment and strengthening of food safety networks among laboratories and related institutions in 36 countries in Africa, 16 countries in the Asia and the Pacific region, and 21 countries in Latin America and the Caribbean. In 2017, through the Latin American and Caribbean Analytical Network (RALACA), it provided analytical training to 20 fellows. Eight analytical methods for food safety testing were developed, published and applied by the network. The Agency assisted the African Food Safety Network (AFoSaN) in initiating a new knowledge exchange mechanism enabling the exchange of scientists to benchmark analytical techniques and food safety programmes, and to share best practices. Through the Food Safety Asia Network, the Agency provided training in radioreceptor assay techniques to 70 participants in group training activities held in Singapore and Thailand (Fig. 2). A web based platform for knowledge exchange, hosted by Sri Lanka, was further strengthened by the network.



FIG. 2. Participants in an Agency training course on radioreceptor assay of food contaminants carried out through the Food Safety Asia Network.

Eradication of Mediterranean Fruit Fly from the Dominican Republic

The Agency successfully concluded a two year project supporting efforts to eradicate the Mediterranean fruit fly from the Dominican Republic. At the Member State's request, the Agency, in partnership with FAO through the Joint FAO/IAEA Division, provided training and technical guidance in the area-wide application of the sterile insect technique to control an outbreak of Mediterranean fruit fly, a major agricultural pest. Within two years the pest was officially declared eradicated from the country in July, having cost the agricultural sector more than US \$42 million in lost export revenue in 2015. Through the project, the Dominican Republic successfully developed the capabilities for area-wide application of the sterile insect technique and has become a source of training and technology transfer for other countries in the region.

Climate-smart Agriculture

Fallout radionuclides have long been used to estimate soil erosion magnitudes in efforts to implement climate-smart agricultural practices. More than 70 Member States currently use such information to alleviate soil erosion, and hence improve soil quality and make it more resilient to climate variability. In 2017, the Agency, through the Joint FAO/IAEA Division, developed and began validating plutonium-239 and plutonium-240 radioisotopes as tracers for assessing soil erosion (Fig. 3). With their much lower rates of decay (half-lives of more than 6500 years) than currently used radioisotopes (caesium-137, beryllium-7 and lead-210), plutonium-239+240 will facilitate long term assessment of soil erosion and degradation.



FIG. 3. Testing of a new radioisotope tracer to assess soil erosion as part of climate-smart agriculture.