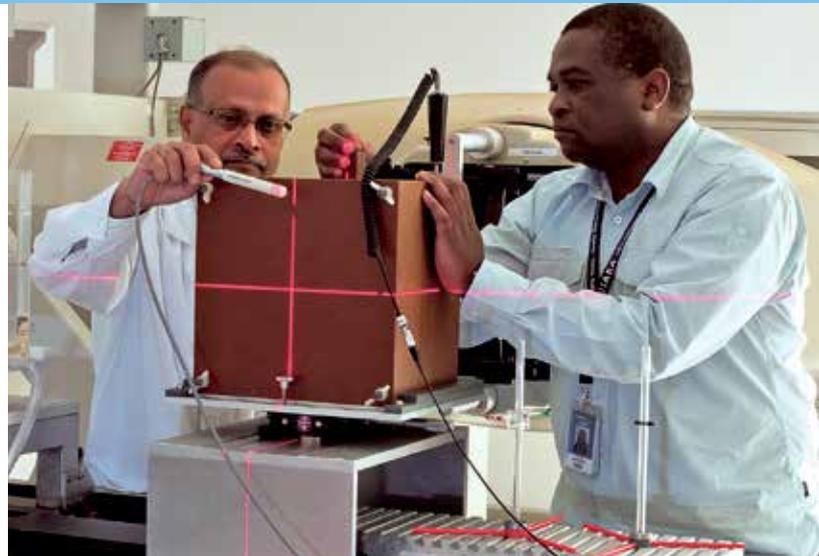


# SCIENCE SUPPORTING DEVELOPMENT



## IAEA Laboratories in Seibersdorf Supporting Member States



The experts from the IAEA Dosimetry Laboratory train professionals and conduct calibration of instruments and audits of the dose in radiotherapy and radiation protection thus ensuring that millions of patients are correctly diagnosed and effectively treated.

The Nuclear Sciences and Applications Laboratories in Seibersdorf provide IAEA Member States research, analytical and training support to improve food security, foster agricultural development, improve human health, establish national capacity in environmental monitoring and assessment, and to support the effective use of nuclear analytical instruments. Scientists and skilled technicians assist Member States in the development and adaptation of new and existing technologies — involving isotopes, radiation and complementary techniques — to suit local requirements and environmental conditions, as well as to provide relevant training and analytical and dosimetry services.

One of the IAEA's key missions is to transfer knowledge and expertise in the peaceful uses of nuclear technologies to Member States. Coordinated research activities and technical cooperation projects are two of the IAEA's main means of undertaking technology transfer. The Laboratories' **applied research and development** services ensure that the transfer can be tailor-made to the specific needs of each Member State.

**Training and capacity building** are also crucial components of technology transfer. While most activities are carried out locally in Member States or in regional laboratories, numerous train- the-trainer workshops,

courses and seminars are held at the Nuclear Sciences and Applications Laboratories, involving **several hundred trainees annually**, with the overall goal of building sustainable capacity in Member States.

**The Laboratories' technical and analytical support** includes providing low-cost essential reference materials, dosimetry calibrations and auditing services to Member States. They are provided through evaluation, standardization and the selection of appropriate equipment and processes for each specific project or need, taking into account local infrastructure and conditions.

### Nuclear Sciences and Applications Laboratories Help Address Global Challenges

On a dedicated campus, scientists and specialists are actively helping nations improve health care, strengthen food and water security, combat disease, and protect vulnerable environments. For instance, the Laboratories help ensure that millions of patients can be correctly diagnosed and effectively treated to recover quicker through precisely calibrated radiotherapy equipment and dosimetry training. Accelerators help preserve priceless artefacts and develop new, versatile materials. Through tailored training delivered



Scientists at the Nuclear Spectrometry and Applications Laboratory help national laboratories build their capacity to use accelerators to perform a wide spectrum of analysis, including on priceless artefacts. The laboratory also supports Member States with training in nuclear instrumentation.

by the IAEA's experts, national laboratories gain the expertise and infrastructure to track sources of pollution to reduce environmental degradation. IAEA-developed low-cost and portable analysis equipment detects animal diseases in the field swiftly, thus protecting lives and livelihoods, and helped in the global eradication of rinderpest. Food is analysed to detect fraudulent products that undermine export revenues and to ensure hygiene. Insect pest populations that threaten humans and animals, and those that destroy valuable crops are suppressed while reducing pesticide use. Laboratory-bred plant varieties can thrive in dry and inhospitable growing conditions, and improved farming methods help small stakeholder farmers increase yields, improve crop and soil resilience and reduce pollution.

### Adapting Laboratories for the Future: Evolving Trends in Science and Technology

With the evolving needs and interests in Member States, the Laboratories need to adapt as well to be able to continue to provide 'fit-for-purpose' services in the next 15-20 years. In addition to changing trends in nuclear science and technology, the scientists are facing emerging issues such as climate change and transboundary animal diseases, as well as growing challenges such as cancer and quality assurance in the use of nuclear sciences and applications. For example, as Member States invest greater effort into combatting the cancer epidemic in the developing world, there is increasing demand for services provided by IAEA's Nuclear Sciences and Applications Laboratories. This is particularly the case with quality assurance issues related to medical physics and dosimetry services.

The Terrestrial Environment Laboratory provides researchers in developing countries low-cost, essential reference materials for calibration and helps enhance national capabilities to track pollution and thus reduce and prevent environmental degradation.





Portable, low-cost diagnostic tools are developed at the Animal Production and Health Laboratory that help identify animal diseases in the field swiftly, thus protecting lives and livelihoods.

## The IAEA Nuclear Sciences and Applications Laboratories: A Unique Asset in the United Nations System

**The Dosimetry Laboratory**, part of the IAEA's human health programme, oversees the quality assurance aspects of the use of radiation in medicine in Member States. It provides dosimetry calibrations for national standards laboratories and conducts audits of the dose in radiotherapy and radiation protection.

**The Nuclear Science and Instrumentation Laboratory**, part of the IAEA's nuclear science programme, works with laboratories in Member States to enhance their use of nuclear instrumentation and analytical techniques, for example in promoting the use of various types of accelerators for materials testing and historical artefact preservation.

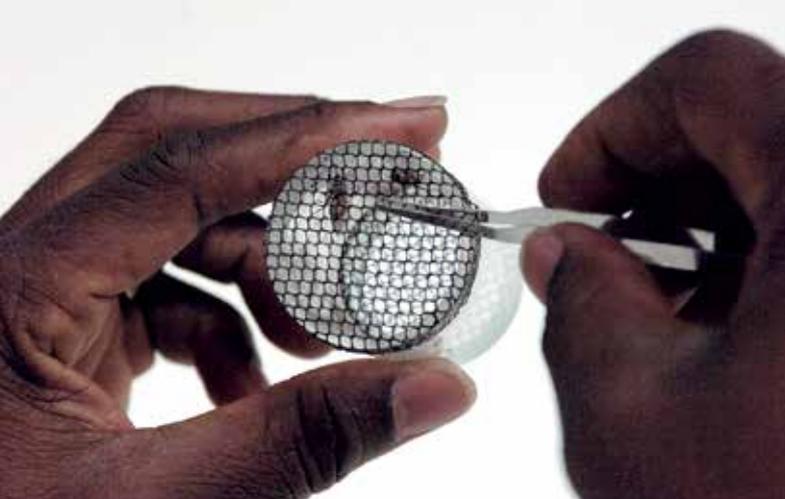
**The Terrestrial Environment Laboratory**, part of the IAEA's environment programme, helps Member States to better understand and protect the terrestrial environment. To achieve this, the laboratory develops environmental assessment strategies and ensures the quality of analytical results by recommending methods, providing reference materials and organizing proficiency tests.

Five of the Laboratories make up the FAO/IAEA Agricultural and Biotechnology Laboratories addressing issues to food security and safety.

**The Animal Production and Health Laboratory** supports Member States in the use of radioisotopes and related technologies to map superior genes for increased animal productivity, and develops and transfers molecular and immunoassay methods for diagnosis and control of transboundary animal diseases.

The Food and Environmental Protection Laboratory provides training in analysing food and in irradiation to ensure safety and hygiene. At this irradiation facility in Jakarta, Indonesia, the treated food helps improve the nutritional status of immune-suppressed patients.





The Insect Pest Control Laboratory develops and offers training in using nuclear techniques to suppress insect pest populations that threaten humans and animals, and destroy valuable crops.



The Plant Breeding and Genetics Laboratory helps Member States develop plant varieties that can thrive in dry and inhospitable environments.

**The Food and Environmental Protection Laboratory** uses nuclear technologies to trace and authenticate food products and to detect and monitor contaminants in foods and the environment, improving Member State laboratory practices in food safety and quality to safeguard health and facilitate international trade.

**The Insect Pest Control Laboratory** develops environmentally friendly methods of pest control for area-wide control of key insect pests, such as fruit flies, tsetse flies, moths and disease transmitting mosquitoes. It is renowned worldwide for its work on the sterile insect technique.

**The Plant Breeding and Genetics Laboratory** focuses on mutation breeding to increase biodiversity for desired traits of crop plants and hence to accelerate the breeding of varieties with higher yield, yield stability, nutrition and improved resistance to environmental stresses such as disease, drought and salinity.

**The Soil and Water Management and Crop Nutrition Laboratory** uses isotopic and radiation methods to measure and monitor soil, water and nutrients in cropping systems as a basis for developing strategies that ensure judicious and efficient use of resources and that minimize environmental degradation.

The Soil and Water Management and Crop Nutrition Laboratory develops improved farming methods and helps build national capacity to support small stakeholder farmers in increasing yields, strengthening crop and soil resilience and reducing pollution. Small stakeholder farmers are the primary source of food in the developing world.



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