



## Key achievements in Pakistan

- 2019: Internationally accredited testing laboratory at the Nuclear Institute for Agriculture and Biology in Faisalabad starts providing food safety services to improve the quality of fish and shrimp.
- 2018: Pakistan's first 'theranostics' laboratory becomes fully operational at the Institute of Nuclear Medicine and Oncology in Lahore.
- 2017: Pakistan's Veterinary Drug Residue Laboratories receive ISO/IEC 17025 accreditation for antibiotics and hormones testing from the Pakistan National Accreditation Council.

## Atoms for peace and development

Widely known as the world's 'Atoms for Peace and Development' organization within the United Nations family, the IAEA is the international centre for cooperation in the nuclear field. The Agency works with its Member States and multiple partners worldwide to promote the safe, secure and peaceful use of nuclear technologies.

The IAEA's technical cooperation (TC) programme helps countries to use nuclear science and technology to address key development priorities in areas including health, agriculture, water, the environment and industry. The programme also helps countries to identify and meet future energy needs. It supports greater radiation safety and nuclear security, and provides legislative assistance.



The Nuclear Institute for Agriculture and Biology in Faisalabad was established with IAEA assistance to conduct analytical services for drug residues in animals. The lab received ISO/IEC 17025 accreditation for testing and equipment calibration. (Photo: Muhammad Imran/NIAB)

## Recent project successes

### Food safety

Pakistan's agricultural sector contributes 12 per cent of the country's gross domestic product. However, concerns about contaminants in food exports have made it difficult for Pakistan to access international markets.

In response to a request by the country, the IAEA built Pakistan's ability to identify, monitor and address the presence of antibiotic and hormonal drug residues in livestock by establishing the country's first veterinary drug residue laboratory at the Nuclear Institute for Agriculture and Biology (NIAB) in Faisalabad. Equipment, including a cell cradle bioreactor, was procured for disease diagnosis and cell culture analysis.

With over 200 consignments analysed in 2019, the accredited veterinary drug residue laboratory provides integrated, cost-effective, analytical support to the quarantine departments of the Ministry of National Food Security and Research by analysing animal meat destined for export. Similar testing services are available to the private sector, providing many positive economic benefits.

With IAEA support, 129 chemists, food technologists, veterinarians and nutritionists were also trained from different research organizations in advanced analytical techniques for food safety measures.

### Human health

Pakistan's first 'theranostics' laboratory, which combines targeted radionuclide therapy with diagnostic tests, became fully operational in 2018 at Institute of Nuclear Medicine and Oncology in Lahore. The laboratory provides cancer services which use targeted radiopharmaceuticals.

IAEA support included the commissioning of a Gallium-68 generator for the production of radiopharmaceuticals – a landmark achievement for the Institute. The laboratory was fully equipped and training was provided to ten doctors and scientists.

Since its inauguration in 2018, 176 patients have received diagnostic scans for neuroendocrine tumors and 134 for prostate cancers.

## Crop breeding

With support from the IAEA and the Food and Agriculture Organization of the United Nations, Pakistan is developing new crop varieties using nuclear techniques.

The IAEA supported the training of scientists and assisted the country to upgrade the equipment of the Plant Genomics and Molecular Breeding Laboratory at the National Institute for Biotechnology and Genetic Engineering in Faisalabad. In addition, capacities were strengthened in the use of target induced local lesion in genomes (TILLING), a technique used in molecular biology to identify mutations in a specific gene.

New, higher yielding varieties of wheat with resistance to rust disease, and more productive strains of cotton with an improved tolerance to leaf curl disease were developed and distributed to farmers. Two varieties of sesame, released in 2016 and 2017, have double the traditional yield. A new variety of mandarin, released in 2017, has increased yields by more than 30 per cent. Farmers who planted the newly developed castor bean in 2017, bred for early maturity and high oil content, are now making over US\$600 more per hectare.

## Active national projects

- Strengthening and Enhancing Capabilities of Pakistan's National Institutions to Support a Safe, Reliable and Sustainable Nuclear Power Programme (PAK2007)
- Developing Isotope-Aided Techniques in Agriculture for Resource Conservation and Climate Change Adaptation and Mitigation (PAK5051)
- Improving Livestock Productivity Using Nuclear and Related Techniques by Exploiting Indigenous Feed Resources while Reducing Enteric Greenhouse Gas Emissions (PAK5052)
- Strengthening Cancer Diagnosis and Treatment Facilities through Positron Emission Tomography Based Molecular Imaging and Radiotherapy Techniques and Image Guided Radiation Therapy (PAK6024)
- Strengthening Theranostics through Emerging Radiolabeled Therapeutic Peptide Radiopharmaceuticals (PAK6025)
- Strengthening National Capabilities to Mitigate Vitamin A Deficiency in Vulnerable Populations Using Stable Isotope Techniques (PAK6026)

Pakistan also participates in 45 regional and 12 interregional projects, mostly in the area of food and agriculture.

## IAEA support to Pakistan, 2009–2018



**1064** trained  
(including 155 women)

**425** international experts provided

**425** attended specialist meetings  
(including 43 women)

## Priority areas of support

- Supporting the food and agriculture sectors
- Improving human health
- Strengthening water resource management
- Ensuring nuclear safety
- Supporting radioactive waste management
- Facilitating the development of nuclear power
- Promoting industrial applications of nuclear technology
- Combatting climate change and supporting environmental protection
- Ensuring nuclear security and safeguards
- Supporting the physical protection of nuclear facilities

## Pakistan's contribution to South-South and triangular cooperation, 2009–2018

**337** expert and lecturer assignments provided by Pakistan

**44** training course participants

**21** fellows or scientific visitors hosted

Based on data available as of April 2020

## Cancer control imPACT Review conducted: December 2013

## Strategic documents supported

- Country Programme Framework 2020–2025, signed in September 2019

[www.iaea.org/technicalcooperation](http://www.iaea.org/technicalcooperation)

The IAEA collaborates with National Liaison Officers and Permanent Missions to deliver its TC programme.