



## Key achievements in Lebanon

- 2018: The American University of Beirut Medical Centre is designated as an ARASIA Regional Resource Centre for Nuclear Medicine.
- 2014: Lebanese Atomic Energy Commission and the Central Bank of Lebanon begins to use nuclear techniques to control the quality of its banknotes and coins.
- 2009: The Lebanese Atomic Energy Commission introduces a postgraduate Diploma in Radiation Protection and the Safe Use of Radiation Sources.

## 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 Ion Beam Analysis Laboratory at the Lebanese Atomic Energy Commission was established and upgraded through staff training and procurement with IAEA support. (Photo: M. Roumie/LAEC)

## Recent project successes

### Water and the environment

An isotope hydrology laboratory was established at the Lebanese Atomic Energy Commission (LAEC), enabling the use of nuclear techniques to study the management of water resources.

The laboratory conducts various kinds of isotopic techniques including tritium and C-14 analysis, which are used to address challenges related to water shortages, including overexploitation of resources, management of water quality, and the collection of information on the recharge and renewal rates of groundwater reservoirs.

Gaining a better understanding of groundwater availability using nuclear techniques is critical for Lebanon's water resource management framework. It helps support economic and social welfare without compromising the sustainability of water systems.

### Emergency preparedness and response

A national early warning system was established with IAEA assistance to support Lebanon's efforts to monitor radiation in the air.

This helped build Lebanon's radiation protection infrastructure and analytical capabilities for environmental radionuclide monitoring by establishing remote monitoring stations and a network of monitoring centres. The technical needs of the Radiation Early Warning System were identified through an expert mission. Specialist skills were enhanced with fellowships at Syrian and German institutions.

The new capacity allows Lebanese authorities to further strengthen their radiation safety infrastructure and increase emergency response and preparedness.

### Industrial applications

In 2014, the Central Bank of Lebanon and the LAEC signed a memorandum of understanding to develop quality control tests using nuclear techniques to prevent counterfeit and forged banknotes and coins circulating throughout the system.

The IAEA helped build LAEC's expertise in the 'Time of Flight-Secondary Ion Mass Spectrometry' method, which gathers analytical information on various

elements in printed banknotes, as well as industrial and household paint, pharmaceuticals and polymers.

Further support was given in the use of broad-spectrum chemical and structural analyses for biomedicine, biomaterials, and polymers to control the process and quality of the production of plastic, paint, glass and other surface coatings, which produced measurable economic impacts. Analyses included Atomic Absorption Spectrometry to analyse chemical composition; Differential Scanning Calorimetry to test chemical reactions such as fusion and crystallization events, glass transition temperatures and oxidation.

With help of these nuclear techniques, Lebanon is now gaining greater insight into consumer goods, geological formation, ancient artefacts, archaeology samples and commercial paints.

### Active national projects

- Establishing an Instrumental Neutron Activation Analysis Laboratory – Phase I (LEB1012)
- Strengthening Capacity for Exposure Assessment of Residues and Contaminants in the National Diet (LEB5016)
- Developing a Nuclear Medicine Laboratory at the American University of Beirut Medical Centre (LEB6001)
- Enhancing Analytical Capabilities for the Valorization of the National Cultural Heritage (LEB1009)
- Establishing an Isotopic Ratio Mass Spectrometry Laboratory Dedicated to Authentication and Provenance for Supporting the National Fraud Repression Scheme (LEB1010)
- Upgrading the Surface Chemical Characterization Laboratory to Support Research and Development in Small Local Paper, Plastic and Paint Industries (LEB1011)

Lebanon also participates in 43 regional and 8 interregional projects, mostly in the area of industrial applications.

### Previous IAEA support to Lebanon

IAEA support has enabled the Lebanese Atomic Energy Commission laboratories to provide advanced analytical and high precision services to the public and private sector in strategic areas and to play a central role in supporting sustainable development where nuclear techniques are used. Lebanon is continuing to gain specialised expertise in the use of advanced analytical tools, and in high precision analytical techniques that support the analysis of biological and chemical materials in the region.

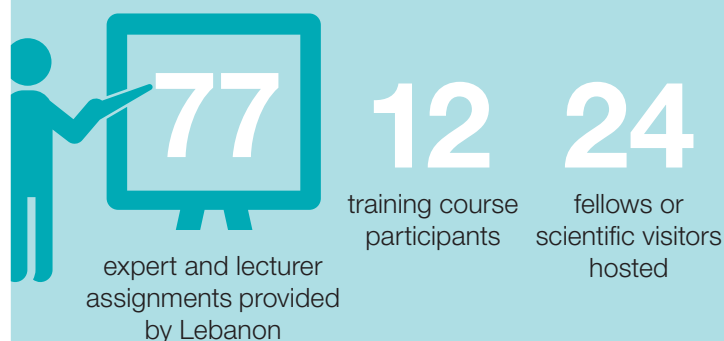
### IAEA support to Lebanon, 2009–2019



### Priority areas of support

- Improving legislation and regulation
- Strengthening radiological, and nuclear safety and security infrastructure
- Increasing the level of nuclear security
- Enhancing national analytical capabilities
- Supporting nuclear research capacities
- Improving human health infrastructure

### Lebanon's contribution to South-South and triangular cooperation, 2009–2019



Based on data available as of April 2020

### Cancer control imPACT Review conducted: November 2013

### Strategic documents supported

- Practical Arrangement with the American University of Beirut Medical Center (2018–2021)

In 2020, a joint review and scoping mission of current cancer services was conducted by the IAEA, World Health Organization and the International Agency for Research on Cancer.

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

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

