

MANAGEMENT OF TECHNICAL COOPERATION FOR DEVELOPMENT



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The technical cooperation programme is the IAEA's primary mechanism to support socioeconomic development in Member States and the achievement of the Sustainable Development Goals. The programme delivers support in key development areas including health and nutrition, food and agriculture, water and the environment, industrial applications, and nuclear knowledge development and management. The programme helps Member States to identify and meet future energy needs, and assists in improving radiation safety and nuclear security worldwide, including through legislative assistance.

Hua Liu

Deputy Director General
and Head of the Department of Technical Cooperation

Management of Technical Cooperation for Development

150
countries and territories received support through the technical cooperation programme

including **35**
least developed countries

partnership agreements signed:
1 memorandum of understanding;
12 Practical Arrangements

13

Country Programme Frameworks signed

16

imPACT review missions

10



Resources mobilized to support major initiatives:

RAYs OF HOPE:
€20 million

ZODIAC:
€1.7 million

OTHERS:
€9 million

legislative activities

65



1241

fellows
442 women

632

scientific visitors
229 women

2699

expert and lecturer assignments
851 women

196

**regional and
interregional
training courses**

3944
**training course
participants**
1627 women

560

meetings

5253 meeting
participants
2114 women

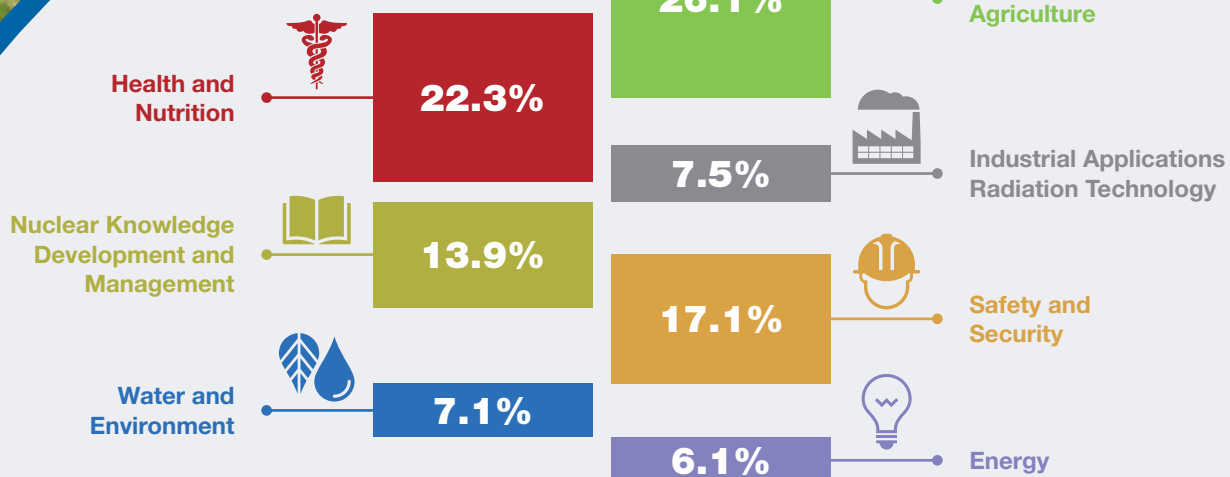
1104

active projects

150 projects
closed

600 projects in
closure at the end
of 2023

Actuals by technical field for 2023



Actuals: the equivalent of disbursements in line with the terminology in use since the implementation of the Agency-wide Information System for Programme Support.



TECHNICAL COOPERATION

OBJECTIVES

To manage, develop and implement a needs-based, responsive technical cooperation programme in an effective and efficient manner, and thus to strengthen the technical capacities of Member States in the peaceful application and safe use of nuclear technologies for sustainable development.



**93.7
million**

TCF target



**91.3
million**

TCF
contributions
received



97.5%

TCF rate of
attainment



**30.7
million**

extrabudgetary
contributions
received

KEY OUTPUTS

The Technical Cooperation Programme in 2023

In 2023, 150 countries and territories took part in the technical cooperation (TC) programme through over 1100 projects that helped them to address priorities in health and nutrition, food and agriculture, water and the environment, industrial applications, and nuclear knowledge development and management. The programme also provided Member States with assistance in climate change monitoring and adaptation and clean energy, and in training and encouraging the next generation of nuclear scientists and researchers. The major Agency initiatives ZODIAC, NUTEC Plastics and Rays of Hope support the delivery of development activities, in particular TC activities that require major funding for equipment, by mobilizing funds, conducting awareness-raising and bringing together partners. The initiatives, in particular Rays of Hope, have also helped countries to address financial challenges

relating to the physical infrastructure needed to house Agency support. This assistance has been provided, for instance, through the development of bankable documents and support for drafting funding proposals.

In November 2023, the Board of Governors approved the TC programme for 2024–2025, comprising 458 new TC projects. The ongoing effort to focus on comprehensive, impactful projects is reflected in the more streamlined project portfolio for the new TC cycle.

To strengthen national delivery of the TC programme, a regular group fellowship was established for National Liaison Assistants (NLAs). In 2023, two cohorts of NLAs were trained at Agency Headquarters.

Programme Delivery and Financial Highlights

The TC programme provides support in the form of capacity building, knowledge sharing, partnership building, support for networking and procurement. The TCF implementation rate for 2023 was 85.5%, with support provided, inter alia, for 1241 fellowships, 632 scientific visits, 560 meetings and 196 training courses. In total, the Agency supported participation in the TC programme in 11 070 instances, with women representing 40% of all participants.

The TCF rate of attainment reached 97.5% by the end of December 2023, representing some €91.3 million. Extrabudgetary funds of €30.7 million were mobilized to support activities related to the major initiatives and unfunded components of the TC programme, not including an amount of €0.2 million in in-kind contributions.

Achievements in Africa

With the support of the Agency, a curriculum for the first Master of Science in Nutrition and Nuclear Techniques was introduced at the International University of Rabat, Morocco, and at North-West University, South Africa. Ten candidates from French-speaking countries began their MSc studies in October 2023 in Rabat, and five candidates from English-speaking countries were selected to start the programme in South Africa in early 2024. E-learning modules for a master's programme in radiopharmacy were also finalized with Agency support and are ready for use in several African universities.

In Abidjan, Côte d'Ivoire, the installation and testing of an alpha spectrometry laboratory was completed, while in Senegal, releases of sterile male mosquitoes were intensified in 2023. New varieties of rice and sorghum with higher yields and adaptability to drought conditions were developed for use in Africa. In Ghana and Rwanda, the average yield of cassava in project demonstration plots and participating farms was increased from around 20 tonnes to over 70 tonnes per hectare with Agency support.

In Mozambique, the Agency supported the launch of a brachytherapy unit at Maputo Central Hospital, and in Côte d'Ivoire, installation and acceptance tests were completed for the new nuclear medicine facility in Abidjan. A linear accelerator (linac) was installed at Tripoli University Hospital, Libya, in October 2023, and in Ethiopia, installation and acceptance testing for the new nuclear medicine facility at Black Lion Hospital was completed. In addition, Botswana opened its first public radiotherapy centre at the Sir Ketumile Masire Teaching Hospital in July 2023 with Agency support. Procurement of a cyclotron for Benin was initiated, and the training of nuclear medicine professionals in Algiers began in partnership with the Government of Algeria. Two linacs were procured for Kenya with Agency support, for installation in early 2024. The Government of Lesotho allocated €10 million to the construction of a radiotherapy facility, and civil works began at the site in Maseru. Agency support for the training of critical staff is ongoing and a CT scanner is being procured through government cost-sharing.

Achievements in Asia and the Pacific

Three PhD students from the Islamic Republic of Iran, Mongolia and the Philippines, supported by the Agency, completed two years of study in radiation emergency medicine at Japan's Hiroshima University under the Phoenix Leader Education Program for Renaissance from Radiation Disaster, and six candidates selected by the Agency enrolled in a master's programme in nuclear engineering and management at China's Tsinghua University.

With Agency facilitation, secondary school teachers underwent training under the accredited professional training programme conducted by the Australian Nuclear Science and Technology Organisation. The teachers also exchanged good practices at a regional seminar in Oman, highlighting effective practices in integrating nuclear science and technology in secondary education. The website for the Asian Network for Education in Nuclear Technology, a network supported by the Agency, now hosts secondary education materials and



◀ The first patient being treated at the new nuclear medicine facility at Black Lion Hospital, Ethiopia. (Photograph courtesy of Tamirat Sheleme/Elsmed Group)

the International Nuclear Science and Technology Academy (INSTA), also supported by the Agency, launched the INSTA Executive Education Programme for Educators, aimed at further enhancing the relevant knowledge and skills of university lecturers.

In addition, the Agency supported the establishment of the International Nuclear Science Olympiad. Clear rules and procedures, a curriculum and sample problems were agreed in preparation for the first Olympiad.

The Co-operative Agreement for Arab States in Asia for Research, Development and Training related to

Nuclear Science and Technology (ARASIA), with Agency support, formed resource mobilization and outreach and communication committees. The operational ARASIA Fund, which is managed by the Agency, enables resource mobilization for the ARASIA TC programme.

The Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (RCA), with Agency support, launched four socioeconomic studies on nuclear medicine, food safety, air quality and isotope hydrology in 2023.

Achievements in Europe and Central Asia

In 2023, technical cooperation efforts in Europe and Central Asia focused strongly on supporting all Member States requesting assistance to develop nuclear power infrastructure and to support capacity building on the technology and applications of small modular reactors (SMRs) (and microreactors) as a contribution to climate change mitigation. The Agency held 23 events on developing nuclear infrastructure and 16 events on SMRs, the events supported through two interregional TC projects that are part of broad Agency mechanisms and initiatives in nuclear infrastructure development and SMR deployment.

Collaboration with the Agency's newest Member State in the region, Turkmenistan, was strengthened. The country's first national TC programme is under way.

Novel mechanisms enabling the delivery of equipment to Ukraine were established to ensure implementation of the national TC portfolio. National training courses outside Ukraine, virtual expert missions and individual training at the Agency and other host countries were organized.

In 2023, Belarus put into operation the second unit of its NPP. This achievement completes 15 years of Agency assistance to initiate a nuclear power programme in Belarus.

Participants at a nuclear science and technology education workshop in Oman showcase diverse learning facilitation tools, such as interactive presentations, educational games and assessment strategies, demonstrating their effective use in introducing nuclear science to classrooms. (Photograph courtesy of Ivan Lim)



The Director General meeting the Kazakh Minister of Energy, Almasadam Satkaliyev, to sign Kazakhstan's CPF for 2023–2028, ensuring closer interaction in areas related to the development of nuclear power infrastructure, nuclear and radiation safety, food security and nuclear medicine.



The Agency provided the country with support to build the capacity of the operating organization to further develop its integrated management system, and assisted the regulatory body in enhancing supervision of the NPP's safety structures and components, safety culture and oversight procedures.

With the support of the Agency, the layout for the PET-CT facility in Montenegro was finalized.

Lastly, the new *Regional Profile for Europe and Central Asia for 2022–2027* was published in English and Russian.

Achievements in Latin America and the Caribbean

The Agency supported the establishment of the Caribbean Radiation Safety and Security Network in 2023. The new network will strengthen and harmonize regulatory frameworks for nuclear safety and security, waste and transport safety, and emergency preparedness and response, and will support the exchange of regulatory experience and practices among regulatory bodies in Agency and Caribbean Community Member States.

The first mobile electron beam linac for the treatment of industrial effluent in Latin America was installed in Brazil in 2023 with Agency support. In Ecuador, an irradiation centre was inaugurated at the National Polytechnic School, with new infrastructure and the repowering of the existing irradiator. The Regional Network of Research Reactors and Related Institutions in Latin American and the Caribbean was launched at the 67th regular session of the General Conference. In addition, Practical Arrangements with the University of the West Indies were extended to strengthen collaboration in education and training on nuclear applications.

Efforts were intensified to build capacities to address the banana disease Fusarium wilt, including through experience sharing with other countries such as Australia and China. Two regional training courses on nuclear-induced mutations and screening methods were followed by a study visit to learn how Australia is managing this disease.

Construction began on the bunker for a linac and brachytherapy services at San Felipe General Hospital, Honduras, and technical support was provided for the design of a bunker for a similar services in the Dominican Republic. Panama and Uruguay received Agency technical support for the development of new oncological facilities, and in March 2023, radiation oncologists from the region graduated from the third edition of the Agency-supported master's course in advanced radiotherapy in Chile. Eight additional radiation oncologists from the region began studies for the fourth edition of the course in October 2023.

Members of the Regional Network of Research Reactors and Related Institutions in Latin America and the Caribbean at the RP-10 research reactor, Peruvian Institute of Nuclear Energy (IPEN), during the second meeting of the Network in August 2023. (Photograph courtesy of IPEN)



Programme of Action for Cancer Therapy

Activities under the Programme of Action for Cancer Therapy (PACT), in collaboration with WHO and the International Agency for Research on Cancer (IARC), focused on providing Member States with comprehensive, evidence-based evaluations to enhance their national cancer control programmes (NCCPs). Notably, PACT conducted ten imPACT reviews and provided seven countries with support to formulate their NCCPs. Three countries (Jordan, Nigeria and the Sudan) received technical feedback on the final drafts of their NCCPs. Follow-up to imPACT review recommendations was conducted in Iraq, the Syrian Arab Republic and Uruguay, and preparatory activities began for imPACT reviews in The Gambia, Indonesia, Mongolia, Mozambique and Peru.

A bankable document for the consolidation and expansion of Kenya's radiotherapy facilities was completed, and bankable documents for the first public sector facilities in Burundi and the Democratic Republic of the Congo, and for the consolidation and expansion of facilities in Uganda, are nearing completion.

The Agency participated in meetings of the WHO Regional Committees for Africa, the Eastern Mediterranean, Europe, the Americas, South East Asia and the Western Pacific, delivering statements at the ministerial plenary sessions. It also hosted the IAEA-IARC-WHO annual consultation to advance collaboration on cancer control.

Ten African cancer control experts received Agency support to participate in the African Organisation for Research and Training in Cancer (AORTIC) International Conference on Cancer. The Agency was invited to present its work in cancer control at two side events, one hosted by Varian and another hosted by the United Kingdom and the United States of America under the Sustained Dialogue on Peaceful Uses (SDPU). The Agency also attended a further SDPU event in Ghana on enhancing access to nuclear medicine in West Africa.

Engagement with private sector partners for Rays of Hope was strengthened, with the launch of a call for expressions of interest for anchor centres on the United Nations Global Marketplace. A Rays of Hope briefing was conducted for the World Bank.

Supporting and Strengthening Delivery of the Technical Cooperation Programme: The Major Initiatives

Considerable progress has been made to address cancer through the TC programme. Rays of Hope has helped to raise awareness, build partnerships and mobilize funds. In Africa, the Director General laid the foundation stone for the first public sector radiotherapy facility in the Democratic Republic of the Congo in November 2023. In Asia and the Pacific, Practical Arrangements with the Consortium of Universities and Institutions in Japan support teleradiology for the Pacific Islands, led by Tohoku University; and capacity building on theranostics and the use of radiopharmaceuticals. The Agency also signed a Letter of Intent with the Minister of Health of Indonesia to support the national expansion of radiation medicine. In addition, a new triangular partnership between the Agency, the Republic of Korea and Mongolia strengthens nuclear medicine and radiation oncology in Mongolia, benefitting the First and Second State Central Hospitals and the National Cancer Centre. In Latin America and the Caribbean, a third linac for the treatment of cancer patients was inaugurated in October 2023 at Paraguay's National Cancer Institute. Procurement for the provision of more than 30 mammography units for the region, which will help to strengthen the region's capacity to detect breast cancer, was finalized within the framework of the Regional Co-operation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL) and Rays of Hope.

In November 2023, the Agency attended the Intergovernmental Negotiating Committee on Plastic Pollution in Nairobi to present how NUTEC Plastics addresses plastic pollution at source and in the ocean, and to ensure the Agency's involvement in the negotiations as an observer. The Agency also continues to contribute to the G20 Reports on Actions against Marine Plastic Litter. Experimental proofs of concept for plastic recycling using irradiation were achieved in Indonesia, Malaysia, the Philippines and Thailand, and were initiated in Argentina, Brazil and Mexico. Sixty-three Member States are currently participating in marine plastics monitoring. In Asia and the Pacific, 17 laboratories were equipped with sampling and analysis kits and staff received related training. Monitoring equipment was installed in the Galapagos Islands, Ecuador, to support environmental monitoring and the study of the impact of microplastic pollution in coastal and marine ecosystems.

During 2023, 25 participants from 17 ZODIAC national laboratories in 19 countries and territories in the Asia and the Pacific region received training. In Latin America and the Caribbean, the ZODIAC national laboratories of Chile, Mexico, Panama and Paraguay started receiving equipment detection packages for serology and molecular techniques.

Technical Cooperation and the Global Development Context

The Agency participated in the UN High-level Political Forum on Sustainable Development, with an exhibition and a joint side event with the United Nations Office for South-South Cooperation, the United Nations Development Programme and the Governments of South Africa and Tajikistan, to demonstrate the critical role of South-South and triangular cooperation in ensuring the sustainability of efforts to attain water- and energy-related SDGs. An Agency side event and exhibition was organized at the 5th United Nations Conference on the Least Developed Countries, and the Agency took part as lead discussant at the Multi-stakeholder Forum on Science, Technology and Innovation for the SDGs and participated in the World Health Summit. It also took part extensively at side events on the margins of COP28,

demonstrating the role of nuclear science and technology in mitigating, monitoring and adapting to climate change.

In addition, the Agency attended the Paris Peace Forum, the 10th Roundtable on Financing Water organized by OECD and the African Development Bank, the UN Global Compact Leaders Summit, London Sustainability Week and the Annual Meeting of the World Bank Group and the International Monetary Fund. It played an active role in UN coordination meetings, including those of the Inter-Agency Mechanism for South-South and Triangular Cooperation, the United Nations Economic and Social Council and the Commission for Science and Technology for Development.

Emergency Response

The TC programme is designed for flexibility, which means that it can respond quickly to requests for emergency support. Equipment for the Syrian Arab Republic and Türkiye was procured following the earthquake in February 2023, and Vanuatu was provided with X-ray equipment and other necessary materials after destructive cyclones in March 2023. Libya received assistance following a cyclone and Burkina Faso was supported in addressing an outbreak of dengue fever. Emergency support was provided to the national reference laboratories of Bosnia and Herzegovina, Croatia, Montenegro and Serbia to diagnose and control an

outbreak of African swine fever. The Agency also supported Cyprus in its efforts to suppress the *Aedes aegypti* mosquito, which carries serious tropical diseases like dengue, Zika and chikungunya. In addition, a critical trial using the sterile insect technique to suppress the yellow fever mosquito was successfully initiated in Cyprus, with 100 000 sterile male mosquitoes shipped weekly from the Agency's Seibersdorf laboratories to the island.

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The Director General with the Democratic Republic of the Congo's Minister of Scientific Research, Gilbert Kabanda Kurhenga, and Minister of Higher and University Education, Muhindo Nzangi Butondo, laying the foundation stone for the country's first public sector radiotherapy facility, November 2023.



Technical Cooperation Programme Management

All Office of Internal Oversight Services recommendations issued prior to 2023 have been implemented and closed, and all designs presented for the 2024–2025 TC programme cycle were assessed as being of good quality. Support was provided for a study of the socioeconomic impact of ARCAL projects over the past 15 years, and four e-learning packages

on the methodology of the logical framework approach and project progress assessment reporting were released. A dashboard for the Country Programme Framework (CPF), a strategic planning document, was developed with the aim of facilitating the planning and coordination of the development and update of CPFs.

Legislative Assistance and Treaty Event

Under its legislative assistance programme, the Agency supported Member States by providing comments on draft and enacted national nuclear legislation; holding bilateral meetings with officials and national, subregional and regional workshops; and delivering training on nuclear law.

Armenia, the Bahamas, Barbados, Benin, Brunei Darussalam, Colombia, Dominica, The Gambia, Grenada, Madagascar, Malaysia, Myanmar, Nicaragua, Rwanda, the Philippines, Qatar, Saudi Arabia, Serbia, Sri Lanka, Trinidad and Tobago, Turkmenistan, Uganda and the Bolivarian Republic of Venezuela received assistance in the form of comments and advice on draft and enacted national nuclear legislation.

Bilateral meetings were held with decision makers, policymakers and other senior officials, as well as legislators in 19 Member States. National workshops on nuclear law were also held with Armenia, Benin, Colombia, El Salvador, Malaysia, Mongolia, Myanmar, Nepal, Nicaragua, Paraguay, the Philippines, Turkmenistan, Sri Lanka, the Bolivarian Republic of Venezuela and Zambia.

Two regional and subregional workshops for Europe and Central Asia were held in Bar, Montenegro, in September 2023 and in Dushanbe, Tajikistan (for Russian-speaking Member States), in March 2023.

In October 2023, the 11th session of the Nuclear Law Institute (NLI), supported through the TC programme, was held in Vienna. Participants from 52 Member States acquired a solid understanding of all aspects of nuclear law, with a particular focus on legislative drafting.

The Agency delivered introductory courses on nuclear law at three universities as part of a university partnership initiative. It also trained professors and other faculty staff in nuclear law at the NLI and the OECD/NEA International School of Nuclear Law, and at a training course on nuclear law held at Agency Headquarters in November 2023.



The annual Treaty Event took place during the 67th regular session of the General Conference, providing three Member States (Belarus, Egypt and Zimbabwe) with an opportunity to deposit their instruments of ratification, acceptance, or approval of, or of accession to, the multilateral treaties relating to nuclear safety, nuclear security and civil liability for nuclear damage, deposited with the Director General.



Technical Cooperation in 2023



New & extended partnerships, MOUs and partnership agreements

Consortium of Universities and Institutions in Japan, China National Nuclear Corporation, China Atomic Energy Authority, Japanese Society for Non-Destructive Inspection, Ministry of Health of Mongolia and Korea Institute of Radiological and Medical Sciences, Ministry of Science and ICT of the Republic of Korea, Ministry of Public Health of the State of Qatar, St Jude's Children's Research Hospital, the University of West Indies, GE HealthCare, Siemens Healthineers, Elekta, the OPEC Fund for International Development and the RCA Regional Office



Interregional

23 interregional projects
224 expert and lecturer assignments
36 interregional training courses



NCCP support to

Benin, Botswana, Burundi, Guinea, Guyana, Kenya and Sierra Leone



Latin America and the Caribbean

31 countries receiving support
186 national projects
46 regional projects
238 fellowships and scientific visits
46 regional training courses
985 training course participants
563 expert and lecturer assignments



Nuclear Law

23 Member States received advice on national nuclear legislation
15 national nuclear law workshops held

Project numbers refer to projects active at the end of 2023.



Europe

33 countries
receiving support
176 national projects
36 regional projects
326 fellowships and
scientific visits
25 regional
training courses
828 training
course participants
466 expert and
lecturer assignments



Asia and the Pacific

40 countries
and territories
receiving support
317 national projects
70 regional projects
513 fellowships and
scientific visits
49 regional
training courses
1022 training
course participants
660 expert and
lecturer assignments



Countries with new CPFs

Algeria, Bahrain,
Benin, Burkina Faso,
Cameroon, Democratic
Republic of the Congo,
Greece, Kazakhstan,
Kenya, Lesotho, Malta,
Nigeria, Paraguay,
Thailand, United
Republic of Tanzania,
and Türkiye



Africa

46 countries
receiving support
210 national projects
40 regional projects
796 fellowships and
scientific visits
40 regional
training courses
1109 training course
participants
590 expert and
lecturer assignments



imPACT reviews

Cambodia, Comoros,
Djibouti, El Salvador,
Ethiopia, Fiji, Guinea,
Jordan, Papua New
Guinea and the
Bolivarian Republic
of Venezuela