



**GOVERNMENT OF
THE REPUBLIC OF PERU**



**INTERNATIONAL ATOMIC
ENERGY AGENCY**

COUNTRY PROGRAMME FRAMEWORK

2018 – 2023

On behalf of the Government:

Dr Susana Petrick

**President
Peruvian Institute of Nuclear Energy**

VIENNA 20 Sept 2018

Place and date

**On behalf of the International Atomic Energy
Agency:**

Mr Dazhu Yang

**Deputy Director General
Head of the Department of Technical
Cooperation**

Vienna, 2018-09-20

Place and date

Introduction

Peru is a democratic State which, in 2002, agreed by consensus on a set of 31 policies for the country's sustainable development. This set of State policies is based on four major national objectives, namely:

- Strengthening of democracy and the rule of law;
- Development, with equality and social justice;
- Promotion of national competitiveness;
- Affirmation of an efficient, transparent and decentralized State.

For each State policy, goals, indicators and regulatory proposals to be achieved by 2021 (year of the national bicentenary) have been set forth in the country's first strategic development plan, known as the *Peru 2021 Bicentennial Plan*.

The drafting of the *Peru 2021 Bicentennial Plan*, which was completed in 2010, was based on a diagnosis and analysis of all aspects of national life. It aligns the country with, and commits it to, the **Sustainable Development Goals** formulated by the United Nations in 2015. It is fully in line with the design of the **Country Programme Framework with the International Atomic Energy Agency for the period 2018–2023**, in terms of both the objectives and time frame.

The *Bicentennial Plan* sets a baseline against which to confirm positive data, such as poverty reduction by 18 points since the year 2000 and improved distribution of wealth. This allowed Peru, for the first time in 2008, to go from being one of the countries with the highest levels of inequality to becoming considered as an upper-middle income country, moving up several places in the Human Development Index (HDI) of the United Nations Development Programme (UNDP).

The country has seen sustained economic growth in recent years, owing to the export of primary products. This is at risk, however, unless diversification is achieved by promoting industrialization to give products greater added value and ensure the strengthening of the domestic market.

With a population forecast of 33 million for the start of the second decade of the millennium, GDP needs to double and a growth rate of at least 6% needs to be reached, with investment rates of around 25%, thus reducing poverty to below 10% of the total population.

In this connection, the biggest change that Peru will have to address in the coming years is decentralization, with a view to reducing infant mortality and malnutrition and ensuring equal opportunities and high levels of human development.

DEVELOPMENT PRIORITIES AND OBJECTIVES

The State policies provide a guidance framework for defining the national objectives, goals and activities included in the *Peru 2021 Bicentennial Plan*. Of the 31 State policies formulated, the proposed Country Programme Framework will contribute to at least the following 10:

- Poverty reduction;
- Equal opportunities without discrimination;
- Universal access to health services and social security;
- Promotion of food safety and nutrition;
- Competitiveness, productivity and economic regularization;
- Sustainable development and environmental management;
- Development of science and technology;
- Reciprocal expansion of markets;
- Agricultural and rural development;

The first objective is the eradication of poverty and extreme poverty. The second objective is aimed at ensuring sufficient food and access to basic services such as water, sanitation, electricity and communications. These objectives can only be achieved in a sustainable manner within the framework of a competitive economy that allows access to formal employment with high productivity. The third objective is to achieve a level of industrialization similar to that in countries with abundant natural resources, such as Canada or Australia.

Another national objective is to achieve the sustainable exploitation of natural resources in such a way as to give the people a good quality of life. To this end, natural resources — which are Peru's main source of wealth — should be exploited, while protecting the environment and developing the technology needed for an export-oriented agro-industry, based on organic farming, reforestation of the Andean and Amazon regions and protection of the germ plasm of indigenous species. Marine and continental aquaculture should also be developed with a view to ensuring food security and the conservation of species for future generations.

In relation to the State policies, national strategies were determined for achieving these objectives through activities defined in a plan for each sector, known as the *Multi-year Strategic Sectoral Plan*.

The development of sustainable, highly productive agriculture is one of the objectives in the plan for agriculture and irrigation; this is certain to bring about the eradication of drug trafficking and illegal mining — scourges that are currently putting the habitats and health of native populations at serious risk and support human trafficking.

The strategic objectives of the health sector, which are aimed at improving public health and providing universal access to health services, focus on activities that will lower maternal and neonatal mortality, control communicable diseases and reduce the incidence of non-communicable diseases such as diabetes and cancer. To this end, strategies have been planned which, in line with the approach of Peru's Country Programme Framework with the IAEA, seek to ensure the continuity and sustainability of the outcomes of the Cancer Prevention and Control Programme. The results of the *National Plan for Comprehensive Action and Improved Access to Oncology Services in Peru (Hope Plan)* will serve as an indicator, and the objective will be to reduce cancer mortality rates. Cancer currently affects 115 in every 100 000 people, making it the second biggest cause of death in the country.

These State policies and strategic objectives — or at least those related to the areas mentioned above — can be achieved through the application of nuclear techniques and the use of Peru's existing nuclear and radiation facilities. At the present juncture of generational change, it has also become a priority to ensure the sustainable use of nuclear technology through activities to preserve knowledge, build the capacities of the next generation and transfer technology and good practices to bring about a culture of radiological and nuclear safety.

This Country Programme Framework for 2018–2023 has been drawn up by the Peruvian Institute of Nuclear Energy (IPEN) following consultations with national entities to identify areas in which IAEA technical cooperation can play a fundamental role in achieving the sectoral development objectives designated as priorities by the State in the *Peru 2021 Bicentennial Plan*. As well as being related to the use of nuclear science and technology, these objectives are clearly in line with the following *Sustainable Development Goals*: 1) no poverty; 2) zero hunger; 3) good health and well-being; 6) clean water and sanitation; 9) industry, innovation and infrastructure; 13) water [sic] action; 14) life below water; 15) life on land; and 17) partnerships for the goals.

Chapter 2. National Development Priorities and Activities Relevant to the IAEA Technical Cooperation Programme

For this Country Programme Framework 2018–2023, Peru is considering national development activities related to the Agency's technical cooperation programme, which provides support to Member States in the use of nuclear techniques in areas where they offer advantages over other methods for achieving significant development.

In the agriculture and irrigation sector, based on the prospective analysis carried out when drafting the Multi-year Strategic Sectoral Plan, ten trends were identified, each with diagnostic indicators supported by national and regional statistics. Projections were also made for 2021 and 2030.

The first trend relates to climate variations, the indicators of which are variability in temperature and precipitation, resulting in more frequent and more intense climate phenomena such as El Niño. It is known that climate variations and phenomena will cause the loss of large glacial expanses, which currently serve as water reservoirs. [There is also] a notable increase in the sedimentation of dams and riverbeds and a rise in the mass movements that cause landslides through heavy rainfall in high areas and mountainsides where there is no stabilizing vegetation. The trend of warmer climate will also create new niches for introduction of non-native invasive pest species that can seriously affect food production and commercialization and will exacerbate damage caused by endemic pests.

It is therefore important, over the next five years, to build capacity and experience in the use of nuclear techniques to study and apply models of the phenomena mentioned above, especially with regard to studying environmental climate-change impacts, e.g., pollution trends, sedimentation using radioactive and stable isotopes, and to analyse and determine the rate at which and glacier fluxmasses are diminishing. Capacity should also be built locally to better understand and predict the impact of climate change on the response of the Peruvian coastal upwelling ecosystem to climate change, which will have a direct effect on fisheries and productivity of Peruvian coastal waters, representing (almost 20% of the world's landings of industrial fish) with direct consequence to seafood security. The second trend identified as a threat to agricultural production, and therefore to food security, is the rise in soil degradation through overexploitation on account of greater competition in food production, an increase in the indiscriminate use of agrochemicals and water shortages. This trend is very concerning as, according to OECD/FAO estimates, over 25% of agricultural land worldwide is currently degraded and over 30% in Peru will be degraded by 2050. Monitoring soil degradation is essential in order to take timely action to restore the soil in areas used for agriculture and thus avoid accelerated desertification. Also threatening food security is the presence of endemic and new invasive pest species that affect crop production and livestock by reducing yields. Surveillance systems for early detection of pest problems and emergency response capacity using environment friendly measures such as the sterile insect technology, is essential to effectively prevent pest outbreaks.

The third trend is the inefficient and unsustainable use of water resources, which diminishes the reserves through increased demand in agriculture, industry and mining. This trend is exacerbated by the contamination of surface water and groundwater by run-off from mining tailings sites and informal and illegal mining operations. A lack of information for making management decisions has, in some cases, led to saline water infiltrating overexploited aquifers, resulting in soil salinization and low productivity of the land. All of these issues require the use of appropriate technology for monitoring and applying models of consumption patterns of water, which is a valuable and scarce resource.

Capacity building in the use of isotope hydrology techniques in order to study aquifer dynamics is another priority for 2018–2022 as it is key to the rational use of aquifers on the western slope, where the coastal agricultural valleys are irrigated by glacier-fed rivers, and to the determination of underground aquifer recharge rates.

The fourth trend is producers' limited access to high-quality seeds that are productive enough to meet growing national and international demand. This trend goes hand in hand with the drop in productivity caused by diseases and pests, which are occurring more frequently as a result of climate variations. In recent years, the La Molina National Agricultural University Cereals Programme has achieved success in cultivating quinoa with improved productivity through gamma radiation-induced mutations and in counteracting the devastating effects of fungi such as mildew when the grains are sown in warmer climates. These models should be followed for other crops that are critical to the food security of populations living in the poorest areas such as the southern sierra, and for improving agricultural production for export purposes. Studies on obtaining new varieties of other species, such as native potatoes, could improve productivity in the field or, in the case of rice, produce seeds that are adapted to saline soils or limited water.

In a similar vein, coffee is a crop that requires special attention in view of its strategic importance as a replacement crop in regions that have traditionally produced coca. The various organic varieties of coffee and cocoa fetch high prices on the international market, making them strong competitors against coca production, which stems from drug trafficking. Since these important crops are at risk of diseases such as coffee rust, however, programmes to develop plants that are disease resistant but still high quality need to be implemented urgently.

Applications of nuclear and nuclear related techniques in animal production and health, include the following:

- i) Animal health: Development and upgrade of the capacities in the use of nuclear and nuclear related technologies for detection and differentiation of animal diseases. This component should cover the use of serological and molecular tools for disease detection, support in advanced methods for pathogen differentiation, as well as support in implementation and maintenance of international standards in the relevant field (primarily ISO 17025). Targets are priority transboundary animal diseases of the member states as well as those with zoonotic impact;
- ii) Animal reproduction: Support in the programmes for establishment or upgrade of nuclear and nuclear related technologies for improvement of animal reproduction (priority on artificial insemination of animals), and;
- iii) Animal nutrition: The use of nuclear and nuclear related technologies for improvement of the digestibility and utilization of the animal feedstuffs. The priority is focused on the improvement of the digestibility and metabolic utilization of locally available feedstuffs, with lower natural digestibility (high fibre diets).

In the health sector, three objectives were identified in the Multi-year Strategic Sectoral Plan for 2016–2021, including:

- Improvement of public health;
- Extension of insurance coverage to protect public health.

One of the strategic actions identified in this context was to reduce the incidence of non-communicable diseases, including various types of cancer with a higher average incidence, such as cervical, stomach, breast, skin and prostate cancer. Another strategic action is the control of morbidity and reduction of mortality rates. Taking as a baseline the fact that, between 2012 and 2015, over 140 000 people were diagnosed and treated free of charge through the *Hope Plan*, which PAHO and WHO identified as a model for the region, specific human health activities can be planned.

The development of new radioisotopes and new Tc-99m production methods that ensure the decentralized distribution of radiopharmaceuticals for diagnosis or treatment allow for the early diagnosis and timely treatment of people living far from the capital at regional institutes of neoplastic

diseases (IREN), which already exist for the north macroregion in Trujillo, the south macroregion in Arequipa and the central macroregion in Huancayo.

In the case of vector-borne diseases such as dengue, chikungunya and Zika, the prevention, control and monitoring activities undertaken by the National Centre of Disease Epidemiology, Prevention and Control should keep the incidence of these diseases low, despite the effect that climate change may have on the rapid propagation of epidemics due to the increased expanse of areas where vectors such as *Aedes aegypti* exist. To this end, programmes to reduce mosquito populations using the sterile insect technique must be continued, as the mosquito's high level of adaptability renders other forms of attack and control ineffective.

The continuation of, or better still, the increase in, activities carried out with IAEA support by institutions such as the Peruvian Institute of Nuclear Energy (IPEN), the tissue bank at the National Institute for Child Health (INSN), the National Institute of Neoplastic Diseases (INEN), the National Institute of Health (INS) and other Peruvian institutions that help to tackle these problems and create new development opportunities through the sustainable and clean use of natural resources, will be key to national development between now and 2022. Activities in the environment sector to manage and remediate environmental pollution caused by extraction activities (principally formal mining), and to eradicate informal and illegal mining and illegal logging in the Amazon region will also be key, as will industrial production activities and comprehensive coastal marine management for the exploitation of fishing resources.

Chapter 3. Relevant international development assistance

Taking into account the highly positive results and the experience acquired by Peru in implementing the Agency's technical cooperation programme, through national, regional and interregional projects, as well as the excellent results achieved under ARCAL, the country has prioritized international assistance in the following areas for the Country Programme Framework 2018–2023.

- Activities to mitigate the effects of climate change, in particular the global temperature increase, in order to foster improvements in three main crops, namely coffee, potato and cereals such as rice and quinoa. The desired improvements in these crops should lead to developing varieties that are more tolerant to drought, soil salinity, higher temperatures and resistant to pests and disease. These effects can be avoided or mitigated by improving tolerance to abiotic and biotic stresses of locally adopted varieties through gamma irradiation-induced mutations.
- Climate change is predicted to have a major impact on fisheries productivity, since the Peruvian coastal upwelling ecosystem has already demonstrated large interannual ecosystem variability with the El Niño-Southern Oscillation (ENSO) cycle. Studies on the prediction of the impact on fisheries and mitigation activities should be fostered, which include the protection from harmful algae blooms (HABs) and ocean acidification.
- Studies on activities to prevent constant soil degradation owing to overgrazing, water shortages, excessive use of fertilizers and agrochemicals, discontinuation of agricultural activities and erosion caused by climate change, an increase in environmental contaminants and greater exposure to solar UV radiation. Because of all of the above, the land is less fit for agriculture. This trend should be given attention, considering the importance of using the land to address growing variables related to demand for food and competition for land use to produce biofuel. It is therefore essential to strengthen the programme for sustainable water and soil management through improved irrigation and agricultural technology adoption, for the recharge and rational use of water resources.

- The characterization of aquifers, sources and bodies of groundwater and surface water is one of the most urgent activities, because water resources are scarce owing to the gradual accumulation of greenhouse gases, as demonstrated dramatically in Peru through glacier retreat. In this connection, any glaciers in Peru that are lower than 5500 metres above sea level are expected to have disappeared by 2025. The continual process of deglaciation will lead to greater water circulation in waterways. In the next 25 to 50 years, this will begin to decrease progressively, exacerbating low-water periods and consequently reducing water availability for human consumption, industrial activities and hydroelectric power generation. Joint activities are currently being undertaken by the Peruvian Institute of Nuclear Energy (IPEN), the Geophysical Institute of Peru (IGP) and La Molina National Agricultural University (UNALM) to apply nuclear techniques for the monitoring of soil degradation, desertification, salinization, sedimentation and underground aquifer recharge.
- Activities to protect agricultural production and food security from endemic pests and from introductions of non-indigenous invasive pests through the use of effective and environment friendly pest control technologies including the sterile insect technique.
- Establishment and strengthening of gamma irradiation technology as an effective tool for the preservation of agricultural products for domestic consumption and export. The value added to consumer products through correct handling and treatment could range from a gradual change in food handling to a radical change in production technology using irradiation. This can be used not only to increase the shelf life of products, but also to apply a sanitary and phytosanitary treatment to meet the needs of target markets.
- The development of best stockbreeding practices for cattle, sheep and domestic camelids such as alpacas and vicuñas, along with the selective breeding of animals with better disease resistance and high-quality fibre should be taken into consideration when using technology in the livestock sector, as should the increase in aquacultural production, in particular with a view to protecting Amazonian species. Support in the three areas (as mentioned above) is critical: i) animal health, ii) animal reproduction and animal nutrition.
- In the field of human health, a priority is the application of technology to address the problems of low-income populations, in particular women living in rural or poor urban areas who present with advanced-stage neoplasm, making cancer the second leading cause of death in Peru owing to the limited public access to diagnosis and early treatment.
- In order to establish a national system of decentralized health services and strengthen epidemiological surveillance, the Government of Peru, through its Ministry of Health (MINSA), is prioritizing the decentralization of cancer care, with a view to coordinating and integrating work to diagnose and treat cancer, by strengthening the infrastructure of nuclear medicine, radiotherapy and radiodiagnosis facilities.
- This can only be achieved with the development of new radioisotopes or more effective methods to distribute radiopharmaceuticals that use Tc-99m as a marker. There are already two regional institutes of neoplastic diseases in Peru: one for the north macroregion and the other for the south macroregion. These are examples of synergy between the regional and central governments, under the technical governance of the National Institute of Neoplastic Diseases (INEN).
- The low number of trained medical physicists working in cancer treatment remains a problem. For this reason, the training of medical physicists and nuclear medicine doctors must be improved.

- By increasing the production of radioisotopes and radiopharmaceuticals, training medical professionals and using new technologies such as cyclotrons, IPEN is facilitating the decentralization of nuclear medicine services; it is also aiming to reduce the cost of timely cancer diagnosis and relapse detection in low-income populations through development and innovation projects.
- Peru's acquisition of state-of-the-art equipment is another reason why the capacities of radiotherapists, medical technicians and medical physicists need to be built up. IPEN is working together with national universities to produce properly qualified specialists. Support is needed from IAEA experts in the areas of validation, radioactive waste management and radiation protection training.
- In the area of communicable diseases, increased capacities are needed in integrated vector management, using the sterile insect technique to control *Aedes* mosquitoes, which are vectors of pathogens such as Zika, dengue and chikungunya. Joint efforts have been taken in this regard with the National Institute of Health and universities.
- There have been successes in the treatment of burns and skin lesions using materials produced at the tissue bank (skin) at the National Institute for Child Health. Doctors working in hospitals outside of the Lima region also need to be informed and trained, however, as the number of cases of burnt children and adults has increased as a result of a rise in violence.
- There is a need to improve the regulatory infrastructure, the radiation protection of patients and occupationally exposed workers, the management and safe disposal of radioactive waste, radiological emergency preparedness and response, the safe transport of radioactive material and the relevant education and training systems. This includes aspects related to national standards and regulations.

Owing to the great potential and importance of using radioisotopes in hydrology, soil degradation studies, industrial processes and, most importantly, human health, their production in Peru, especially in the RP-10 research reactor, needs to be strengthened. Like in other countries, however, it has become a matter of urgency to train the next generation of technical and professional staff in nuclear engineering specializations, in order to develop such products and ensure the operation of the RP-10 reactor. Thanks to technical cooperation with the IAEA and interaction with other countries inside and outside of the region, IPEN is developing a plan to train staff in the areas where they are most needed.

Nuclear knowledge development and management

Following recent difficulties in replacing its technical staff, IPEN urgently needs to train human resources in the operation and maintenance of nuclear research reactors and the use of radiotracer techniques, irradiators and other industrial applications.

The training of human resources is a priority for ensuring the continuity of current activities, in particular the operation and maintenance of nuclear and radiation facilities, and for introducing new technologies.

Chapter 4. Overview of past and present agency technical cooperation activities in peru

Peru has received over \$30 million in technical cooperation, 60% of which corresponds to laboratory materials and equipment, and 40% to expert missions and fellowships.

Various expert missions have taken part in national events such as training courses, workshops and technical meetings.

Similarly, Peruvian fellows have taken part in regional and international courses, workshops and scientific visits. Approximately 50 scientists from Peru have done internships at IAEA laboratories.

The country also receives substantial resources through the supply of laboratory materials and equipment, which have made it possible to upgrade facilities that carry out research projects in key areas for national development.

Peru is currently participating in international cooperation projects, which will ensure that the resources coming in to the country will continue to increase, thus enabling nuclear techniques to contribute further to national development.

Peru is a formal member of RALACA (Red Analitica de Latino America y el Caribe), the regional network laboratories for food safety analysis. With IAEA support through regional and interregional TC projects, Peru together with other RALACA countries has strengthened herits technical capacities of laboratories for food safety analysis and control.

Peru and the IAEA Division of Nuclear Security (IAEA/NSNS) have jointly developed an Integrated Nuclear Security Support Plan (INSSP) in 2011 which was officially approved by the Government of Peru in March 2012 and last reviewed in February 2018. The INSSP covers all aspects related to nuclear security: legislative and regulatory framework, threat and risk assessment, physical protection regime, detection, response, and sustainability. Peru's INSSP contains activities from 2018 to 2021 and is currently under implementation.

Chapter 5. Envisioned country programme outline (areas, objectives and expected results)

Near-term programme:

1. Build national capacities to establish a strengthened national nuclear safety and security infrastructure
Stakeholders: IAEA, IPEN, National Police
End users: general public
2. Strengthen radiation-related activities and the work of the cell and tissue bank for diseases such as diabetes, coronary artery diseases, etc.
Stakeholders: IAEA, IPEN, National Institute for Child Health, national hospitals
End users: general public
3. Establishing a national policy and strategy for education and training in radiation, transport and waste safety (implementation of the recommendations of the EduTA mission June 2016).
Stakeholders: IPEN, OTAN
End users: all personnel engaged in activities relevant to radiation protection and safety
4. Production of Tc-99/Mo-99 generators for medical applications
Stakeholders: IAEA, IPEN
End users: national and private hospitals and the general public
5. Use of the sterile insect technique for control of the vector *Aedes aegypti*

Stakeholders: IAEA, IPEN, Ministry of Health (National Institute of Health, General Directorate for Environmental Health and Food Safety (DIGESA), Centre for Disease Control (CDC)) and universities

End users: endemic populations with a high risk of transmission

6. Development and validation of a multiclass analytical method for the simultaneous determination of mycotoxins and pesticide residue in quinoa and grapes by quechers method and ultra-performance liquid chromatography coupled to tandem mass quadrupolar spectrometry

Stakeholders: IAEA, SENASA

End users: Food safety and quality control authorities and food industry

7. Training in nuclear research reactors

Stakeholders: IAEA, IPEN

End users: operators and maintenance staff

8. Training in isotope hydrology

Stakeholders: IPEN, Geophysics Institute of Peru

End users: decision makers in the Ministry of Environment, the National Water Authority and the Ministry of Energy and Mines

9. Training in radiation protection using online education platforms

Stakeholders: IAEA, IPEN, universities

End users: professionals and technicians who use ionizing radiation sources

10. Use of irradiation techniques to produce new varieties of crops such as rice, coffee, barley, quinoa and kiwicha

Stakeholders: IAEA, La Molina National Agricultural University

End users: national and provincial universities and crop producers.

11. Support in the establishment of early detection and rapid response systems for animal diseases, as well as centres for animal reproduction and animal nutrition.

Stakeholders: IAEA, Servicio Nacional de Sanidad Agraria (SENASA)-Dirección de Sanidad Animal;

End users: Ministry of agriculture, Officially designated animal production and health entities (laboratories, field services and universities), as well as the farmers.

12. Training in nuclear and isotopic tools to study the impact of climate change on fisheries and including ocean acidification and harmful algalae blooms.

Stakeholders: IAEA, Peruvian Marine Research Institute

End users: Fishing companies. Aquaculture Industry, the public.

Medium-term programme:

Design, construction and commissioning of radiation facilities such as radiopharmaceutical cyclotron laboratories, irradiation plants, etc.

Training in radiotherapy for children and pregnant women, incorporating new techniques such as digital mammography and tomosynthesis.

A medium-term programmatic support strategy is to strengthen the functions of the regulatory body.

General support activities

Training in radiation protection using online education platforms.

Request for IAEA missions.

Support for establishing a carbon dating laboratory.

The areas of human health, radiation safety, water resources and environmental management, energy, agriculture and industry, and national capacity building have been set as priorities.

Annex 1: Resource estimates and forecasts

National programme 2018–2023

		US \$
1	Estimated government cash contribution for the planning period	800 000
	Estimated government in-kind contribution for the planning period	200 000
	Total estimated resources	1 000 000
2	Preliminary estimates for the agreed programme/projects reflected in the CPF	3 200 000
	Total estimated costs	3 200 000
3	Total estimated resources less total estimated costs	2 200 000
4	Estimated resource requirements	2 200 000

Annex 2: Compilation of Treaties under the Auspices of the IAEA signed by Peru

Multilateral treaties

TITLE	IN FORCE	STATUS
Vienna Convention on Civil Liability for Nuclear Damage	26-11-1980	Accession: 26-08-1980
Convention on the Physical Protection of Nuclear Material	10-02-1995	Accession: 11-01-1995
Amendment to the Convention on the Physical Protection of Nuclear Material	08-05-2016	Ratification: 27-03-2014
Convention on Early Notification of a Nuclear Accident	17-08-1995	Accession: 17-07-1995
Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	17-08-1995	Accession: 17-07-1995
Convention on Nuclear Safety	29-09-1997	Signature: 22-09-1994 Ratification: 01-07-1997
Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	08-05-2016	Signature: 04-06-1998 Ratification: 08-02-2016
Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage		Signature: 04-06-1998
Convention on Supplementary Compensation for Nuclear Damage		Signature: 04-06-1998
Revised Supplementary Agreement Concerning the Provision of Technical Assistance by the IAEA to the Government of Peru	25-03-1980	Signature: 25-03-1980
Regional Co-operation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL)	05-09-2005	Signature: 20-10-1998 Ratification: 28-03-2001

Safeguards agreements

Reg. No.	TITLE	IN FORCE	Status
1357	Agreement between the Republic of Peru and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty for the Prohibition of Nuclear Weapons in Latin America and the Treaty on the Non-Proliferation of Nuclear Weapons	01-08-1979	Signature: 02-03-1978
1731	Protocol Additional to the Agreement between the Republic of Peru and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty for the Prohibition of Nuclear Weapons in Latin America and the Treaty on the Non-Proliferation of Nuclear Weapons	23-07-2001	Signature: 22-03-2000

Other non-binding international instruments

TITLE	STATUS
Code of Conduct on the Safety and Security of Radioactive Sources, and the supplementary Guidance on the Import and Export of Radioactive Sources.	Peru acceded in 2004
Code of Conduct on the Radiation Safety and Security of Research Reactors [sic]	Peru acceded in 2004

Annex 3: Active projects under way in Peru

Interregional, national, regional and ARCAL projects - Peru				
Item	No.	NAME	COUNTERPART	EMAIL
INTERREGIONAL PROJECTS				
1	INT0096	Establishing and Enhancing National Legal Frameworks for the Safe, Secure and Peaceful Use of Nuclear Energy and Ionizing Radiation	Mónica Medina Gonzales (Ministry of Energy and Mines)	momedina@mem.gob.pe
2	INT2019	Deploying Technology and Management of Sustainable Uranium Extraction Projects	Jacinto Valencia Herrera (Peruvian Institute of Nuclear Energy)	jvalencia@ipen.gob.pe
3	INT5153	Assessing the Impact of Climate Change and its Effects on Soil and Water Resources in Polar and Mountainous Regions	Gerardo Maghella Seminario (Peruvian Institute of Nuclear Energy)	gmaghella@ipen.gob.pe
4	INT5155	Sharing Knowledge on the Sterile Insect and Related Techniques for the Integrated Area-Wide Management of Insect Pests and Human Disease Vectors	To be decided (Palmira Ventosilla López - Cayetano Heredia Peruvian University)	
5	INT6057	Establishing a Joint IAEA/ICTP International Post-Graduate Medical Physics Education Programme	To be decided	
6	INT6062	Strengthening Capacity for Cervical Cancer Control through Improvement of Diagnosis and Treatment	Gustavo Sarria Bardales (National Institute of Neoplastic Diseases)	gsarria97@gmail.com
7	INT7019	Supporting a Global Ocean Acidification Observing Network towards Increased Involvement of Developing States	Michelle Graco (Peruvian Marine Research Institute)	mgraco@imarpe.gob.pe
8	INT9174	Connecting Networks for Enhanced Communication and Training	To be decided	
9	INT9180	Sustaining the Safe Transport of Radioactive Material by Promoting the Harmonization of Transport Regulations and Building Regulatory Capacity and Outreach to the Transport Community to Address Global Issues Including Denial of Shipment	Walter Cruz Choquehuanca (Peruvian Institute of Nuclear Energy)	wcruz@ipen.gob.pe

NATIONAL PROJECTS				
Item				
1	PER0026	Building General Capacity for Nuclear Technology Applications	Alberto Montano Chuqui (Peruvian Institute of Nuclear Energy)	amontano@ipen.gob.pe
2	PER1015	Improving the Safety and Utilization of the RP-10 Reactor	Germán Cáceres Vivanco (Peruvian Institute of Nuclear Energy)	gcaceres@ipen.gob.pe
3	PER1016	Strengthening Radiation Processing, and Cell and Tissue Banking Activities	Emma Castro Gamero (Peruvian Institute of Nuclear Energy) René Herrera Taquia (National Institute for Child Health)	ecastro@ipen.gob.pe rherrera@insnsb.gob.pe
4	PER4023	Modernizing and Improving the Utilization of the RP-10 Reactor	Germán Cáceres Vivanco (Peruvian Institute of Nuclear Energy)	gcaceres@ipen.gob.pe
5	PER5032	Conducting Genetic Characterization of Alpacas for Resistance to Diseases	Juan Agapito Panta (Peruvian Institute of Nuclear Energy)	jagapito@ipen.gob.pe
6	PER6017	Improving National Capabilities to Treat Patients with Burns, Lesions and Polytraumatized Conditions Through the Application of Radiation-Processed Cells, Scaffolds and Tissues	Emma Castro Gamero (Peruvian Institute of Nuclear Energy) René Herrera Taquia (National Institute for Child Health)	ecastro@ipen.gob.pe rherrera@insnsb.gob.pe
7	PER6018	Strengthening National Capacities for Diagnosis and Treatment of Cancer Patients	Iván Belzusarri Padilla (National Institute of Neoplastic Diseases)	ivanbelzusarri@gmail.com
8	PER6019	Strengthening Radiopharmaceuticals Production with Molybdenum-99/Technetium-99m Generator for Use in the Public Health Sector	Guilmer Agurto Chávez (Peruvian Institute of Nuclear Energy)	gagurto@ipen.gob.pe
9	PER9024	Measuring Occupational Radon Levels in Three Regions and Creating Radon Maps for Policy Makers	Susana Gonzales Villalobos (Peruvian Institute of Nuclear Energy)	sgonzales@ipen.gob.pe
10	PER9025	Strengthening National Infrastructure for Radiation Safety and Security	José Castro Palomino (Peruvian Institute of Nuclear Energy)	jcastro@ipen.gob.pe
REGIONAL PROJECTS				
Item				
1	RLA0054	Strengthening the Planning, Design and Review of the Programme to Support the Implementation of Strategic Activities for Nuclear Technology and its Applications	Alberto Montano Chuqui (Peruvian Institute of Nuclear Energy)	amontano@ipen.gob.pe
2	RLA0055	Establishing National Legal Frameworks in Member States	Mónica Medina Gonzales (Ministry of Energy and Mines)	momedina@ipen.gob.pe
3	RLA0057	Enhancing Nuclear Education, Training, Outreach and Knowledge Management	Susana Petrick Casagrande (Peruvian Institute of Nuclear Energy)	spetrick@ipen.gob.pe
4	RLA0058	Using Nuclear Techniques to Support Conservation and Preservation of Cultural Heritage Objects	Paula Olivera de Lezcano (Peruvian Institute of Nuclear Energy)	polivera@ipen.gob.pe

5	RLA0060	Strengthening Regional Capacity Building in the Application of Nuclear Technology in Priority Areas	Susana Gonzales Villalobos (Peruvian Institute of Nuclear Energy)	sgonzales@ipen.gob.pe
6	RLA5066	Increasing the Commercial Application of Electron Beam and X-ray Irradiation Processing of Food	Johnny Vargas Rodríguez (Peruvian Institute of Nuclear Energy)	jvargas@ipen.gob.pe
7	RLA5067	Supporting Capacity Building for Evaluation of Feasibility of a Progressive Control Programme for New World Screwworm	Robin Gamarra Madueño Miguel Quevedo Valle (National Service for Agricultural Health)	rgamarra@senasa.gob.pe
8	RLA5074	Strengthening Regional Capacity in Latin America and the Caribbean for Integrated Vector Management Approaches with a Sterile Insect Technique Component, to Control Aedes Mosquitoes as Vectors of Human Pathogens, particularly Zika Virus	Jesús Antonio Pinto Caballero (National Institute of Health)	jpinto@ins.gob.pe
9	RLA5075	Strengthening the Regional Capacities in the Prevention and Progressive Control of Screwworm in Latin America and the Caribbean	Robin Gamarra Madueño (National Service for Agricultural Health)	rgamarra@senasa.gob.pe
10	RLA5077	Improving Water Use Efficiency Associated with Adaptation Strategies and Climate Change Mitigation in Agriculture	Eduardo Chavarri Velarde (La Molina National Agricultural University)	echavarriv@gmail.com
11	RLA6073	Improving the Quality of Life of Older People Through the Early Diagnosis of Sarcopenia	Ada Rodríguez O'Donell (National Institute of Health)	adarrow2005@yahoo.com.ar
12	RLA6076	Enhancing Production Capacities of Mo-99 and Other Selected Medical Radioisotopes in Research Reactors and Processing Facilities in the Region	Jesús Miranda Alzamora (Peruvian Institute of Nuclear Energy)	jmiranda@ipen.gob.pe
13	RLA6078	Improving Coronary Artery Disease Patient Care with Nuclear Cardiology	Aurelio Mendoza Paulini (National Heart Institute)	Ampau7@yahoo.com
14	RLA9073	Supporting Human Resource Development in Nuclear Security	Alberto Montano Chuqui (Peruvian Institute of Nuclear Energy)	amontano@ipen.gob.pe
15	RLA9076	Strengthening of National Capabilities for Response to Radiation Emergencies	Marco Munive Sánchez (Peruvian Institute of Nuclear Energy)	mmunive@ipen.gob.pe

16	RLA9078	Enhancing the National Regulatory Framework and Technological Capabilities for Radioactive Waste Management	Walter Cruz Choquehuanca (Peruvian Institute of Nuclear Energy)	wcruz@ipen.gob.pe
17	RLA9079	Enhancing Governmental and Regulatory Safety Infrastructure to Meet the Requirements of the New IAEA Basic Safety Standards	Julio César Romani Aguirre (Peruvian Institute of Nuclear Energy)	cromani@ipen.gob.pe
18	RLA9084	Strengthening of the Regulatory and Radiation Safety Infrastructure	Marco Munive Sánchez (Peruvian Institute of Nuclear Energy)	mmunive@ipen.gob.pe
19	RLA9085	Strengthening Regional Capabilities for End Users/Technical Support Organizations on Radiation Protection and Emergency Preparedness and Response	Enrique Rojas (Peruvian Institute of Nuclear Energy)	sgonzales@ipen.gob.pe
Item	ARCAL PROJECTS			
1	RLA0059	Strengthening Regional Cooperation (ARCAL LXII [sic])	Susana Petrick Casagrande (Peruvian Institute of Nuclear Energy)	spetrick@ipen.gob.pe
2	RLA0062	Promoting the Sustainability and Networking of National Nuclear Energy Institutions (ARCAL CLXIII)	Susana Petrick Casagrande Susana González Villalobos (Peruvian Institute of Nuclear Energy)	spetrick@ipen.gob.pe sgonzales@ipen.gob.pe
3	RLA1012	Developing a Capacity Building Programme to Ensure Sustainable Operation of Nuclear Research Reactors through Personnel Training (ARCAL CLI)	Jorge Condori Ccari Agustín Zúñiga Gamarra (Peruvian Institute of Nuclear Energy)	jcondori@ipen.gob.pe azuniga@ipen.gob.pe
4	RLA1013	Creating Expertise in the Use of Radiation Technology for Improving Industrial Performance, Developing New Materials and Products, and Reducing the Environmental Impact of the Industry (ARCAL CXLVI)	Julio Santiago Contreras (San Marcos National University) (new counterpart - January 2018)	jsantiagoc@unmsm.edu.pe
5	RLA1014	Advancing Non-Destructive Testing Technologies for the Inspection of Civil and Industrial Structures (ARCAL CLIX)	Jorge Condori Ccari (Peruvian Institute of Nuclear Energy)	jcondori@ipen.gob.pe
6	RLA1015	Harmonizing Integrated Management Systems and Good Irradiation Practice Procedures in Irradiation Facilities (ARCAL CLX)	Ludwig Guiop (Peruvian Institute of Nuclear Energy)	lguiop@ipen.gob.pe

7	RLA1016	Certifying Flow Measurement Methods and Calibration Techniques of Flow Meters Used in the Oil and Gas Industries by Radiotracers (ARCAL CLXI)	Carlos Sebastián Calvo (Ricardo Palma University)	Carlos.SebastianC@urp.pe
8	RLA2016	Supporting Formulation of Plans for Sustainable Energy Development at a Subregional Level - Stage II (ARCAL CLIII)	Juan Ávila López (Peruvian Institute of Nuclear Energy)	javila@ipen.gob.pe
9	RLA5064	Strengthening Soil and Water Conservation Strategies at the Landscape Level by Using Innovative Radio and Stable Isotope and Related Techniques (ARCAL CXL)	Gerardo Maghella Seminario (Peruvian Institute of Nuclear Energy)	gmaghella@ipen.gob.pe
10	RLA5068	Improving Yield and Commercial Potential of Crops of Economic Importance (ARCAL CL)	Luz Gómez Pando (La Molina National Agricultural University)	luzgomez@lamolina.edu.pe
11	RLA5070	Strengthening Fruit Fly Surveillance and Control Measures Using the Sterile Insect Technique in an Area Wide and Integrated Pest Management Approach for the Protection and Expansion of Horticultural Production (ARCAL CXLI)	Jorge Manrique Linares (National Service for Agricultural Health)	jmanrique@senasa.gob.pe
12	RLA5071	Decreasing the Parasite Infestation Rate of Sheep (ARCAL CXLIV)	Armando Hung Chaparro (UPCH) Fernando Arauco (University of the Center)	armando.hung@upch.pe faraucov@hotmail.com
13	RLA5076	Strengthening Surveillance Systems and Monitoring Programmes of Hydraulic Facilities Using Nuclear Techniques to Assess Sedimentation Impacts as Environmental and Social Risks (ARCAL CLV)	Sergio Morera Julca (Geophysics Institute of Peru)	sergiobaymorera@gmail.com
14	RLA5078	Improving Fertilization Practices in Crops through the Use of Efficient Genotypes in the Use of Macronutrients and Plant Growth Promoting Bacteria (ARCAL CLVII)	Sady Javier García Bendezu (La Molina National Agricultural University)	sgarciab@lamolina.edu.pe
15	RLA6072	Supporting Capacity Building of Human Resources for a Comprehensive Approach to Radiation Therapy (ARCAL CXXXIV)	Gustavo Sarria Bardales (National Institute of Neoplastic Diseases)	gsarria97@gmail.com
16	RLA6075	Supporting Diagnosis and Treatment of Tumours in Paediatric Patients (ARCAL CXXXIII)	Gustavo Sarria Bardales (National Institute of Neoplastic Diseases)	gsarria97@gmail.com
17	RLA6077	Taking Strategic Actions to Strengthen Capacities in the Diagnostics and Treatment of Cancer with a Comprehensive Approach (ARCAL CXLVIII)	Victor Palacios Cabrejos (Ministry of Health)	vpalacios@minsa.gob.pe

18	RLA6080	Harmonizing Criteria on Good Manufacturing Practices and Quality Control of Radioisotopes and Radiopharmaceuticals (ARCAL CLII)	Eleazar Aliaga Rojas (Peruvian Institute of Nuclear Energy)	ealiaga@ipen.gob.pe
19	RLA7016	Using Isotopes for Hydrogeological Assessment of Intensively Exploited Aquifers in Latin America (ARCAL CXXVII)	Gerardo Maghella Seminario (Peruvian Institute of Nuclear Energy)	gmaghella@ipen.gob.pe
20	RLA7023	Assessing Atmospheric Aerosol Components in Urban Areas to Improve Air Pollution and Climate Change Management (ARCAL CLIV)	Patricia Bedregal Salas (Peruvian Institute of Nuclear Energy)	pbedregal@ipen.gob.pe