ARCAL

REGIONAL STRATEGIC PROFILE FOR LATIN AMERICA AND THE CARIBBEAN 2016–2021

EXECUTIVE SUMMARY






ARCAL

IAEA

BACKGROUND

The International Atomic Energy Agency (IAEA) and the Co-operation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL) have worked closely together to prepare a new strategic programme framework to identify and prioritize the region's most pressing problems and needs that could be addressed using nuclear technologies in the period up to 2021.

The new Regional Strategic Profile for Latin America and the Caribbean (RSP) was drawn up on the basis of a sectoral diagnosis using a strengths, weaknesses, opportunities and threats (SWOT) analysis, which helped not only to identify the most acute regional needs and problems, but also to characterize them in terms of their respective baselines, prioritize them, and identify the objectives and goals to be achieved and the indicators by which to measure them.

The 39 needs/problems identified were classified into six thematic areas representing the priority areas within the scope of the new RSP: food security, human health, environment, energy, radiation safety and radiation technologies.

At the end of the process, a working document was prepared containing strategic guidance to facilitate the planning of technical cooperation cycles covered under the new RSP. This working document will be updated periodically as progress is made toward achieving the objectives and goals that have been set.

It is anticipated that the new RSP, in addition to serving as a programmatic reference of major importance for the preparation of project and programme proposals both for ARCAL and the IAEA, will help to attract strategic partners, from within the region and outside it, to pursue projects having a larger scope, benefit and impact.

In this document, 'region' and 'regional' refer to those countries that are States Parties to the ARCAL Agreement.

THEMATIC AREAS

FOOD SECURITY

The Latin America and Caribbean region has some of the largest reserves of land with agricultural potential in the world (700 million hectares), which, together with the region's great biological diversity, makes it a mainstay of global food security. It is expected that by 2050, the region will be meeting more than 60% of the global demand for food. Supporting the agricultural sector's role as a major food supplier requires overcoming critical challenges as regards both increasing production efficiency and preventing the degradation of natural resources. Hence the urgent need to develop technologies to support increased and sustainable food production from agriculture, stock-breeding and fishing in the region.

Nuclear technologies have demonstrated their effectiveness and can contribute to improving efficiency in fertilization, water use, biological nitrogen fixation, crop and livestock improvement, pest and disease control, and quality control for food products. For this reason, it is anticipated that the implementation of the RSP in the area of food security will help to optimize the efficiency of production systems in the region through projects tied to the six needs/problems identified for this area.

A1. Improvement of practices for the management of agricultural soil and water resources with the appropriate use of agrochemicals, fertilizers, water and microorganisms for biological nitrogen fixation.

A2. Use of technologies for the improvement of animals and plants of recognized economic importance and to support initiatives to improve the yield/production and commercial potential of plants and animals reflecting the region's biodiversity.

A3. Incidence of transboundary diseases in animals, including those with zoonotic repercussions.

A4. Availability of foods of animal and vegetable origin (including products derived from aquaculture) that meet quality and safety standards.

A5. Damage caused by pests to animal and plant products.

A6. To support initiatives for the development of aquaculture in the region.

HEALTH

In Latin America and the Caribbean, a region with a population of some 580 million inhabitants, roughly 76% of deaths are caused by non-communicable diseases, with cardiovascular diseases being the leading cause of death, followed by malignant neoplasms. By 2030, the number of new cases of malignant neoplasms each year is expected to double, bringing to 1 million the number of deaths annually. It has been estimated that 50–60% of cancer-related deaths could be prevented by applying the available knowledge and technologies. To achieve this would require implementing multiple, complex measures, in addition to timely detection and effective treatment.

Nuclear technology has been shown to be a powerful tool in the diagnosis and treatment of these diseases. Nuclear medicine and radiotherapy have

evolved significantly in recent decades in most Latin American countries, with advances being made in technological assets, the availability of various radiopharmaceuticals required for diagnosis and treatment, and human resources development.

The technical cooperation programme, through ARCAL and IAEA projects, has contributed to these objectives. At the same time, there are still many challenges to be addressed and the RSP could serve as an effective instrument for funnelling technical cooperation resources toward the main areas identified as having high priority. Thus, based on a strategic analysis, it has been determined that the efforts of ARCAL for the period 2016–2021 should be directed at strengthening national cancer control programmes as a strategy for solving the other needs and problems that have been identified and prioritized in the area of human health:

S1. To improve efficiency and quality in the use of new technologies for the diagnosis and treatment of diseases.

S2. Lack of appropriate technology management systems for planning, incorporation and maintenance of biomedical equipment.

S3. Insufficient nuclear medicine and radiotherapy technicians to meet the growing need arising from the establishment of new centres in the region.

S4. Insufficient human resources in medical physics in imaging services (nuclear medicine and radiology).

S5. Shortage of comprehensive, functional and operational national cancer control plans (NCCP)

S6. Growing childhood obesity in the region and its correlation with the incidence rate of non-communicable diseases, caused in part by malnutrition in early infancy.

ENVIRONMENT

Latin America and the Caribbean possess enormous wealth in terms of natural resources, cover 15% of the Earth's surface, account for a third of the world's renewable water resources, and are home to 40% of all plant and animal species and the most diverse flora on the planet.

Within the last decade, the region has experienced economic growth which is expected to continue in the near future, accompanied by an improvement in some of the key macro social indicators. In the last 30 years, the population of the region has doubled, over half of it now being concentrated in urban areas, with the attendant concentration of vehicles, industry and other sources of pollution.

The trend towards the intensive use of water resources, increased use of agrochemicals, unsuitable production practices and insufficient processing of agricultural, urban and industrial waste have led to contamination of water, soil, plants, food, flora, fauna and air.

Sustainable resource use and environmental management require, among other things, techniques for the chemical characterization of various types of samples; this can be done efficiently using nuclear techniques, which explains why they are in high demand among entities involved in environmental management. These techniques could be used to address the following needs/problems identified in the RSP in the environmental area.

M1. Inadequate management of the region's water resources.

M2. Insufficient evaluation of the impact of pollution from pesticides, persistent organic compounds, heavy metals and other pollutants of anthropogenic and natural origin in water and soil.

M3. Limited knowledge of the main processes affecting coastal areas.

M4. High degree of atmospheric pollution with trace elements.

M5. Inadequate risk assessment of the environmental and social impact of hydraulic structures.

ENERGY

The Latin America and Caribbean region has over 25 years of experience in the use of nuclear technology for power generation. Installed capacity, in six reactors in three countries, was 4.3 GW in 2012 and will grow to 6.2 GW once two new reactors currently under construction are put into operation. It is estimated that an additional 7 GW of nuclear power capacity will be added to the region's energy mix by 2035. The challenges associated with the construction of new nuclear power plants have been made more difficult by the need to take into account the analysis and evaluation of the extension of the useful life of existing reactors. These factors highlight the need for a comprehensive evaluation of the nuclear option within energy systems with a view to identifying the role it could play in the development of Latin America and the Caribbean.

In addition, there is in seven countries in the region a total of 17 research reactors, the majority of which are ageing and underused. At the same time, the demand for radioisotope products is growing and is not being met by the existing installations, which is why there are plans to build two new reactors. The main challenges to be addressed through cooperation in the area of energy are identified in the RSP and formulated as six needs/ problems:

E1. To improve education and objective and extensive information on nuclear energy.

E2. Absence of integrated appropriate long-term energy development studies in most of the region.

E3. Improved knowledge about the region's uranium potential.

E4. Absence of an established network for the exchange of information and coordination of strategies, from research reactor operators to the radioisotope end-user.

E5. Lack of experience in the region in processes to extend the operating lifetime of nuclear power plants.

E6. Shortage of highly qualified staff to manage and operate research reactors.

RADIATION SAFETY

Acceptance in society of the risks associated with radiation is dependent on the net benefit from its multiple applications. Compliance with radiation safety requirements, in accordance with international standards, is an essential requirement for the application of nuclear technologies and ultimately for the implementation of the main priorities set out in the RSP. Substantial progress has been made in the last 15 years as regards the establishment of regulatory programmes and infrastructure in the Latin America region, which has benefited significantly from the efforts by, and the technical cooperation between, the Agency and its Member States.

However, action is required to consolidate the results achieved at the level of international good practices in the field of safety. With this approach, among the needs identified and prioritized in the RSP, the radiation protection of patients and the responsibilities of Governments and regulatory authorities have been defined as priorities, which will help to address the other closely-related needs and problems.

R1. Insufficient application and implementation among end-users of principles and requirements concerning radiation protection set out in international safety recommendations for the control of medical exposure in computed tomography, radiotherapy, interventional procedures and digital radiology.

R2. Lack of safeguards in countries of the region to ensure that governments maintain a sustainable national regulatory system for radiation protection and safe transport of radioactive material.

R3. Management systems in regulatory authorities that are not sufficient for compliance with all legislative responsibilities in the countries and recommendations of IAEA standards.

R4. Insufficient coverage of occupationally exposed workers by the radiation protection services in the countries (individual internal and external monitoring and workplace monitoring). Inadequate implementation of quality systems in technical services and the lack of availability of unified and centralized national records of occupational dose in all countries.

R5. Lack of national strategies and policies for the safe and sustainable management of radioactive waste and improvement of the operational control over waste and disused sources.

R6. Limited capacities in countries for planning, notification and response with regard to radiological emergencies, including for the provision of

medical care to those affected, systematic analysis of accidents and dissemination of information.

R7. Limitations for calibration regarding levels of radiation protection, radiotherapy and radiodiagnostics by secondary standards dosimetry laboratories in the region.

R8. Insufficient application of management systems among end-users, including the promotion and implementation of a safety culture.

R9. Absence of national strategies for education and training in radiation safety.

R10. Insufficient information and consultation with interested parties and the public concerning possible radiation risks associated with facilities and activities, and processes and decisions of the regulatory body.

RADIATION TECHNOLOGIES

Radiation technologies have found numerous applications in a variety of fields where they can help to improve the quality of life; these include medicine, agriculture, preservation of cultural assets, industry, environment, materials modification, process diagnostics, quality control, sterilization of products and materials, radioisotope production and waste processing, among many others. As the applications of, experience with and confidence in nuclear techniques gradually increase, the use of radiation technologies is on the verge of becoming an important factor in the region's economies. To this end, six needs/problems have been identified in the RSP in the area of radiation technology:

T1. The need to identify, outline and publicize the specific and strategic opportunities and challenges in the region concerning the promotion and use of radiation technologies in priority applications.

T2. The need to increase the competitiveness of regional industries and reduce the environmental impact.

T3. The need to harmonize quality management procedures for the application of radiation technologies in the region.

T4. To improve the quality of industrial goods and services, safety of operation and protection of human life in the region.

T5. To improve the use of the natural, renewable, non-toxic resources of the Latin America and Caribbean region for sustainable development.

T6. To preserve the rich and vast cultural heritage of Latin America and the Caribbean.

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14-29851