Government of the Republic of Moldova

IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Country Programme Framework

2021–2026

This Country Programme Framework for the Republic of Moldova (2021– 2026) has been signed on behalf of the Government of the Republic of Moldova and the International Atomic Energy Agency

On behalf of the Government

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Chisinau, December 18, 20

Place and Date

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List of Abbreviations

CPF	Country Programme Framework
IAEA	International Atomic Energy Agency
TC	Technical Cooperation
TCP	Technical Cooperation Programme
UNDAF	United Nations Development Assistance Framework
PET/CT	positron emission tomography–computed tomography
SPECT	single-photon emission computed tomography
NARNRA	National Agency for Regulation of Nuclear and Radiological Activities
IARC	International Agency for Research on Cancer
LMICs	low- and middle-income countries
SDG	Sustainable Development Goal
NLO	National Liaison Officer

EXECUTIVE SUMMARY

The Country Programme Framework (CPF) 2021-2026 serves as the frame of reference for technical cooperation between the Republic of Moldova and the IAEA during the period 2021–2026. The CPF aims to address key national priorities where nuclear science and technology have a comparative advantage over other technologies and produce a tangible socio-economic benefit.

The proposed programme under the CPF which builds upon the achievements of past technical cooperation is aligned with the Sustainable Development Strategy Moldova - 2030, the United Nations Partnership Framework for Sustainable Development 2018-2020 and the Sustainable Development Goals (SDGs). Additionally, a number of relevant sectoral and international development strategies and agreements have been taken into consideration in the preparation of the CPF, such as the European Association Agreement.

The proposed technical cooperation programme under the current CPF thus focuses on strengthening the capacity of institutions in Moldova that participate in the implementation of the proposed programme to become more technically and financially self-reliant and to provide high-quality services in the following areas:

- nuclear medicine and radiotherapy for improving access to quality cancer diagnosis, treatment and care for all people in the country;
- water resource management for improving the knowledge and understanding of national groundwater resources for the Government's informed decision-making on the use and sustainability of the water resources for present and future generations;
- sustainable agriculture in a climate-changing environment for improved food security in the country and increased exports to other markets, such as the European Union;
- nuclear and radiation safety, including radioactive waste management, for the protection of occupationally exposed workers, the general public and the environment.

The proposed programme under the CPF will contribute to the achievement of Sustainable Development Goals (SDGs) 2, 3, 6, 8, 12 and 15.

To ensure the sustainability of the expected results of the proposed programme under the CPF, a number of reviews will be conducted to monitor progress and challenges with the opportunity to introduce corrective actions, as appropriate. A mid-term will be conducted in 2023 and the final review will be conducted in 2025, when the results of the technical cooperation programme will be evaluated in the framework of the formulation of the succeeding CPF. Where appropriate, sustainability strategies will be devised.

1. INTRODUCTION

This CPF serves as the frame of reference for technical cooperation between the Republic of Moldova and the IAEA during the period 2021–2026.

The proposed technical cooperation programme under the CPF builds on the achievements of past technical cooperation between Moldova and the IAEA and aims at addressing key national priorities where nuclear science and technology have a comparative advantage over conventional technologies and produce a tangible socio-economic benefit. The proposed CPF thus focuses on further strengthening the capacity of institutions in Moldova for the utilization of nuclear science and technologies within the ultimate goal of achieving self-reliance and promoting the sustainability of the achieved results.

The CPF is aligned with the National Development Strategy Moldova – 2030, the UN Partnership Framework for Sustainable Development 2018-2022 and the Sustainable Development Goals (SDGs) and the planned outcomes of the CPF are aligned with relevant outcomes and objectives of these strategies.

The preparation of the CPF was coordinated by the National Agency of Nuclear and Radiological Activities, as the institution hosting the office of the National Liaison Officer. The CPF was developed in close engagement and consultations with a broad range of stakeholders in the country and at the IAEA at all levels to ensure strong commitment by the Government and the institutions that will implement the proposed technical cooperation programme. These stakeholders include: Ministry of Health, Labour and Social Protection; General Inspectorate for Emergency Situations of Ministry of Internal Affairs; Ministry of Agriculture, Regional Development and Environment**;** Institute of Geology and Seismology; State Hydrogeology Expedition; Institute of Soil Sciences; the National Sanitary Veterinary and Food Safety Authority; and the Institute for Diagnosis and Animal Health, and the Institute of Chemistry Moldova.

The CPF Coordinator ensured a balanced representation of both men and women in the group of stakeholders involved in the development of the CPF. The central aim was that the concerns of both men and women are well considered in the proposed technical cooperation programme and to maximize sustainable benefits for the whole population, particularly the most vulnerable.

The key objectives of the proposed technical cooperation programme under the CPF are to enhance national capacities to:

- improve the quality of nuclear medicine, X-ray diagnostics and radiotherapy in the country;
- study and gain a better understanding and knowledge of underground water reserves;
- develop sustainable agricultural practices in a climate-changing environment and improve crop and animal productivity;
- improve radioactive waste management;
- strengthen the legal framework for the safe, secure and peaceful uses of nuclear technology; and
- develop and maintain a regulatory nuclear and radiation safety infrastructure, including the development and approval of the National Basic Safety Standards document which will implement the IAEA GSR Part 3.

In addition to the national technical cooperation programme, Moldova will participate in regional and interregional technical cooperation projects in the listed areas and other areas such as nutrition, food safety.

In order to ensure sustainability of the support provided through the technical cooperation programme under the CPF, reviews on progress under this CPF will be undertaken throughout the lifetime of this CPF and will be conducted before the end of each TC programme cycle, including a thorough mid-term review in 2023. The reviews will focus on progress achieved, challenges observed in programme implementation and lessons learned.

These findings will indicate TC sustainability strategies in areas where the provided TC assistance has already built a critical mass of human and institutional capacities allowing Moldovan institutions to achieve technical and financial self-reliance. The ultimate goal of IAEA TC is to help countries achieve self-reliance in the application of nuclear science and technology for socio-economic results. However, IAEA will continue to be active as a source of quality assurance (e.g. for certification of laboratories or dosimetry calibration), a focal point for information exchange and a catalyst for regional and international co-operation.

The results of the reviews will be also used to improve the formulation of new project proposals linked to the CPF in order to ensure the achievement of the planned outcomes and enhance sustainability of the results and Moldova's self-reliance in these areas. The final review will be conducted in 2025, when the results of the technical cooperation programme will be evaluated in the framework of the formulation of the succeeding CPF.

2. SITUATION ANALYSIS

The Republic of Moldova is a landlocked country in Eastern Europe. It is the poorest country in Europe by GDP per capita. The European Union is Moldova's biggest trade partner. Around 64% of Moldovan exports are destined to the EU market. Moldova is a partner country of the Eastern Partnership within the European Neighbourhood Policy. Moldova signed the Association Agreement and the Deep and Comprehensive Free Trade Agreement with the European Union in 2014. The parties committed to cooperate and converge economic policy, legislation, and regulation across a broad range of areas, including equal rights for workers, the exchange of information and staff in the area of justice, the modernisation of Moldova's energy infrastructure, and access to the European Investment Bank. The agreement commits Moldova to economic, judicial and financial reforms to converge its policies and legislation to those of the European Union. Key priorities of the Association Agenda include agriculture and rural development with the objective to increase the competitiveness of agricultural production, especially in selected sectors with high export value, and to improve sustainable use of land and water resources; environment and climate action with the objective to advance the adoption of the main legal framework on Air Protection, Chemical Substances Management and Industrial Emissions and implement the laws on Strategic Environmental Assessment and Waste Management; and energy security and energy efficiency.
Moldova has committed to implement the 2030 Agenda for a better life by 2030. 106 targets were integrated into national policy documents. Most of the already aligned targets are in the environment sector. The proposed programme under the CPF will contribute to the attainment of several SDGs, particularly SDG 2, SDG 3, SDG 6, SDG 8, SDG 12 and SDG 15. However, in its ambition to achieve SDGs, the country is facing a myriad of challenges. These include demographic decline, the emigration, especially of young and skilled people, reduced life expectancy, an ageing population, inequalities and risks of food and energy poverty, high vulnerability of the health system, the country's dependence on external energy sources, the reduced use of innovation and research limiting the competitiveness and the capacity of the country to respond to problems, limited institutional capacities in the area of environment protection. Additionally, the monitoring and evaluation system of the SDGs implementation is impacted by the lack of data for about one fourth of the nationalized SDGs or insufficient disaggregated data for over 30% of the indicators.

Moldova is a party to the Paris Agreement and has become the fourth country to submit 2020 Nationally Determined Contribution under the Paris Agreement. Moldova is highly vulnerable to climate change and is exposed to disasters due to hydrometeorological phenomena and natural hazards. Drought and floods are among top hydro-meteorological hazards caused by extreme weather and climate events. Climate scenarios indicate that the country is strongly trending towards becoming more arid. This will intensify droughts.

The Sustainable Development Strategy Moldova – 2030 includes the 17 sustainable development goals adjusted to national characteristics, with clear targets for 2030, promoting the sustainable development of the Republic of Moldova. The strategy sets long-term sectoral development priorities, focusing on improving the quality of citizens' lives. It aims to focus the public policies of the Republic of Moldova on the problems, interests and aspirations of the people. The document will also contribute to the strategic allocation of budgetary and institutional resources, according to the objectives set for the four basic pillars:

1. Sustainable and inclusive economy;
2. Strong human and social capital;
3. Fair and efficient institutions;
4. Healthy environment.

For the development of these areas, 10 sustainable development objectives (SDO's) at national level have been set up to be achieved by 2030. The following six objectives are relevant for the proposed technical cooperation programme:

1. Increasing incomes from sustainable sources and reducing economic inequalities;
2. Increasing access of people to physical infrastructure, public utilities and living conditions;
3. Improving working conditions and reducing informal employment;
4. Ensuring the fundamental right to the best physical and mental health;
5. Enhancing a solid and inclusive social protection system;
9. Promoting a peaceful, safe and inclusive society;
10. Ensuring the fundamental right to a healthy and safe environment.

In 2018, Moldova signed the United Nations Partnership Framework for Sustainable Development 2018-2022 of which the IAEA is a co-signatory. The ultimate objective of the PFSD is to enlarge people's choices and opportunities, and to promote prosperity, resilience and sustainable development in Moldova.

The IAEA contributes to outcomes 3 and 4 of the framework:

> Outcome 3 – the people of Moldova, in particular the most vulnerable, benefit from enhanced environmental governance, energy security, sustainable management of natural resources, and climate and disaster resilient development;
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> Outcome 4 – the people of Moldova, in particular the most vulnerable, demand and benefit from gender-sensitive and human rights-based, inclusive, effective and equality education, health and social policies and services.

This CPF has been developed based on the Sustainable Development Strategy Moldova -2030, the United Nations Partnership Framework for Sustainable Development 2018-2020 and the Sustainable Development Goals (SDGs) and the achievements of past technical cooperation with the country. Additionally, relevant sectoral and international strategies and agreements have been taken into consideration, such as the EU Association Agreement.

The Republic of Moldova became a Member State of the IAEA in 1997 and has since then participated in the IAEA TC programme. Key achievements include the strengthening of nuclear medicine services in Moldova, the improvement of the environmental conditions of the territories affected by the Chernobyl accident, and the strengthening of nuclear and radiation safety and security in the country. In the area of nuclear and radiation safety, technical cooperation activities focused on strengthening Moldova's governmental, legal and regulatory infrastructure for the use of nuclear technology; and improving national capacities for planning, commissioning, operation and decommissioning of radiological facilities, for radioactive waste management, and for nuclear/radiological knowledge management. In the area of nuclear medicine, support was provided through the provision of hybrid imaging equipment (SPECT/CT and PET/CT) and the development of human resource capacities.

Nuclear and Radiation Safety and Security

Legal Framework

The national legal framework for radiation protection, safety and security is contained in several pieces of legislation, as identified in Annex 3.

The reform of the legal framework including the regulatory infrastructure of Moldova for nuclear and radiation safety, started on 11 May 2006 through the adoption of Law No. 111-XV which was replaced on 8 June 2012 by Law no. 132 on the safe deployment of nuclear and radiological activities.

Moldova intends to prepare a new legislation and to avail itself of IAEA legislative assistance activities provided through the relevant regional TC projects (for 2020-21, TC Project RER0046). In particular, Moldova intends to seek a review by the IAEA of a new draft Law in order to bring it in line with the IAEA Safety Standards, security guidance and relevant international legal instruments adopted under the Agency's auspices. Moldova also intends to request a combined competence awareness mission and a national workshop, as well as a scientific visit by OLA of legislative drafter(s) and/or key decision-makers and parliamentarians to discuss the draft law. Finally, it intends to seek further training of national officials in nuclear law to enhance national capabilities in developing nuclear legislation by submitting applications to the annual IAEA Nuclear law Institute (NLI).

Based on the provisions of Law no. 132, the National Agency for Regulation of Nuclear and Radiological Activities (NARNRA) performs all regulatory functions including the development of the legal framework, the state account of nuclear and radioactive materials, and authorization, inspection and enforcement.

The Ministry of Health operates State owned hospitals and clinics and at the same time it (through the National Agency of Public Health (NAPH)) inspects and issues sanitary authorizations both for them and for private facilities. Additionally, NAPH provides services to the authorized persons in the areas of individual and working places monitoring and after that inspects these facilities for compliance with the requirements.

Based on the law No. 132, a wide range of regulations in the field of authorization, state control, accounting of nuclear and radiological materials, management of radioactive waste were approved.

According to the Law 227/2019 it is proposed to establish the "National Agency for the Regulation of Nuclear, Radiological and Chemical Activities" by reorganizing the National Agency for the Regulation of Nuclear and Radiological Activities.

The current regulations, in particular the “Fundamental Radiation Protection Norms Requirements and Rules (FRPN-2000)”, No. 06.5.3.34” which was published in 2001 and developed in compliance with the Safety Series No. 115, introduced best practices regarding basic radiation protection for occupational, public and medical exposures, radiation safety requirements, radioactive waste management, yearly inventory, accounting and categorization of radioactive sources and radiological installations.

The national occupational radiation protection arrangements are established in the national legislative framework: Fundamental Radiation Protection Norms Requirements and Rules (FRPN-2000), No. 06.5.3.34 - 27.02.2001 (Safety Series No.115); Law on the safe deployment of nuclear and radiological activities No. 132 - 08.06.12, according to which the protection and safety of the staff (specialists of category A and B are based on the following principles of the International Commission of Radioprotection:

- foundation of practical activity - none of the practical activity type is admitted conditioned by radiation if the benefit obtained as a result of its utilisation does not exceed the prejudice produced or it can be produced;

- optimisation of protection – radiation doses of risk are maintained at reasonable admitted levels, taking into account economic and social factors. To decrease inequitable non uniformity of radiation or of the risk to limit individual doses size of the number exposed persons and the probability to be exposed in case of a necessary exposure, the doses must be so low, as the exposure is reasonable grounded;

- personal limits of the risk - the exposure of some persons as a result of a certain activity with the source is conditioned by dose limits or the control doses in case of a potential exposure.

Regarding individual monitoring and radiation assessment, employers and licensees are responsible for organisation of exposure assessment of each worker based on individual monitoring-concluding

contracts for this purpose with accredited services of radiation monitoring on adopted programs of quality assurance.

Individual monitoring for external and/or internal exposure, as well as a zone monitoring and monitoring of the working place of external exposure is performed for each worker that works permanently or provisionally in the controlled area.

The Dose Exposure Limits are established for occupational (a) limits for exposure of each worker; b) limits for persons and students aged between 16-18 who need to use radiation sources for purposes of study) and c) limits for public exposure.

In 2018, an Integrated Regulatory Review Service (IRRS) was conducted to assess the regulatory safety framework of Moldova. Recommendations from the IRRS mission include:

- The Government should revise or update national policy and strategy for safety to clearly define and implement the roles and responsibilities of the NARNRA and the National Agency of Public Health.
- The Government should strengthen regulatory independence in decision making and regulatory control over activities involving radiation risks.
- The NARNRA should integrate the management system and implement the safety legislation for all facilities and activities comprehensively.

One of the key legislative documents to be developed and approved in the next few years is the National Basic Safety Standards document which is expected to take into consideration the IAEA GSR Part 3. IAEA support is thus sought to review the developed document.

Afterwards, a set of regulations shall be developed laying down the basic requirements for education, training, qualification and competence of all the personnel with responsibilities in radiation protection and safety. The establishment of a national strategy on education and training in radiation protection and safety will ensure that a national education and training programme will be developed to build the necessary competence.

In line with these efforts, Moldova will keep information on its national radiation safety infrastructure up-to-dated in the IAEA Radiation Safety Information Management System (RASIMS) as a means of recording the achievements as well as assessing the effectiveness of actions and progress made. The information will be updated by the relevant national counterparts and endorsed by the national RASIMS coordinator.

The Government of the Republic of Moldova has made a political commitment to the Code of Conduct on the Safety and Security of Radioactive Sources and its supplementary Guidance on the Import and Export of Radioactive Sources and thus endeavours to follow the guidance in the Code and its Guidance.

RADIOACTIVE WASTE MANAGEMENT

In 2017, the Parliament approved the National Strategy for Radioactive Waste Management for 2017-2026.

The strategy sets out the paramount direction for radiological and nuclear activities in the field of radioactive waste management; the methods and mechanisms for the provision of responsible and safe radioactive waste management; and the commitments of Moldova at the international level. The strategy envisages activities such as establishing the infrastructure for decommissioning of inadequate radon type facility as well as planning decommissioning activities. The strategy is based on the provisions of international treaties, in particular the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

In Moldova, radioactive waste management is carried out without taking into account the radiological peculiarities of the radioactive waste, the type of emitted radiations and the period of halving the predominant radionuclides, moreover, the solutions for disposal of the radioactive waste with activities of large and medium radioactivity and with a half-life period of over 5 years are not formulated.

Additionally, some waste contains radionuclides of the alpha type with a very long half-life period (of over thousand, million and billion years - Ra-226, Pu-238 and Pu-239, natural uranium, uranium with a different degree of enrichment of uranium-235, Th-232). The alpha type radionuclides are characterized by extreme radiotoxicity and pose a very serious danger to the environment and to the health of the population. According to international standards of radiological safety for the radioactive waste management, this type of radioactive waste needs to be isolated from the environment and disposed in geological structures, thus, avoiding their accumulation at the storage points or temporary storage facilities and preventing their theft or accidental dispersion into the environment.

In 2000 IAEA experts, during a review mission, classified the situation at the Radioactive Waste Management Company “Special Facilities 5101, 5102” ("Special Objects") as critical due to the migration of a part of the radionuclides stored underground into the groundwater, radioactively contaminating the soil to a certain depth. Given the fact that the company is situated in close proximity to Bubuieci Village and is located in the area of Chisinau City, this situation cannot be accepted and tolerated now or in the future. Therefore, urgent measures must be undertaken to halt the migration of radionuclides from the underground storage through decommissioning, decontamination and remediation of the affected territory. Moreover, following the radiological accident in Chisinau on 21 September 2015, 120 m^3 of soil was contaminated with Cs-137. The management of this low and medium radioactive waste has become a stringent problem.

The delay of these actions may lead to the expansion of radioactive pollution of the soil and groundwater with all the adverse effects on the health of the population and socio-economic damage caused by the radioactive contamination of the environment.

According to the statistics of the National Register of Ionizing Radiation Sources, managed by the NARNRA, in the Republic of Moldova there are over 6,000 radioactive sources operated by about 200 economic agents (without counting the radioactive sources in use in different institutions on the left bank of the Nistru River) - potential radioactive waste generators. A large part of these sources contains radionuclides with a half-life of about 30 years, while others - over thousands and millions of years.

The overall objective on short and mid-term is to reduce the impact on the population of exposure to ionizing radiation, derived from the current radioactive waste management, by stopping the process of radioactive contamination of the environment, by sorting and minimizing the amount of the radioactive waste and undertaking remedial actions of the radioactively contaminated territories.

From 2018 to 2019, the following actions were carried out in order to start implementing the National Strategy:

- a draft regulation on the requirements for ensuring radiological and nuclear safety in the collection, treatment, conditioning and storage of solid radioactive waste was developed by NARNRA (2018);
- dossiers submitted by the "Special Objects" were examined and a re-evaluation inspection was carried out by NARNRA in May 2018 (Evaluation Act No. 816/1), with the issuance of the following permissive documents:

- Radiological authorization for the type of activity - treatment of disused radioactive sources (disassembly of smoke detectors);

- Safety certificate for the point of processing and treatment of disused radioactive sources;

- Safety certificate for packaging for temporary storage of disused radioactive sources.

- 359 orphan sources found in the country were collected and transported to the radioactive waste storage facility under the premises of „Special Objects 5101, 5102" (2018);
- 9 staff members of NARNRA and the General Inspectorate of Emergency Situations (IGSU) were trained in the field of radioactive waste management (2018);
- NARNRA ensured the evaluation and authorization of the transfer and transportation of disused radioactive sources from various radiological facilities by issuing 12 transfer documents – permits (2019);
- actions were taken to establish targets for disused radioactive sources (radioactive waste) and measures were taken to identify and assess the radiological safety, including in the left side of the Nistru River. Thus, 256 radioactive sources were detected, identified and transfered for final storage, of which 248 from the left side of the Nistru River. Additional 90 radioactive sources outside the state control (orphan sources), were detected and identified and the tranfer process for storage is underway (2019);
- technical documentation and the feasibility study regarding the decommissioning of the "RADON" type disposal facility (closed) with the formulation of the project proposals were evaluated by NARNRA (2019);
- a practical demonstration of national capabilities in environmental radiological monitoring was organized in the context of the first national response system in case of a radiological or nuclear accident (2019);
- NARNRA conducted two national trainings for operators within the cooperation with the IAEA (2019);
- a detailed Plan for the Decommissioning of the RADON type disposal facility and for the remediation of the contaminated territory was elaborated by the Hungarian company ENERCON and submitted for review and evaluation to the beneficiary ("Special Objects 5101, 5102") (2019-2020);
- a Quality Management System for "Special Objects 5101, 5102" was started to be developed (Quality Manual, according to ISO 9001, was approved) and the development of the supporting documents was initiated; in parallel the training of the responsible staff in the Radioactive Waste Management field was carried out (2019);
- a pre-feasibility study for the final disposal system of radioactive waste was initiated by the IAEA and contracted with the German company BGE TEHNOLOGY (2019); and
- a new fence (part of the physical protection system) was built around the "surveilled" area that covers almost the entire perimeter of "Special Objects 5101, 5102" (2019).

Further to these achievements, the IAEA support is sought for achieving the following key objectives during the CPF period:

1) To implement standards and procedures for the safe management of radioactive waste used internationally by developing and implementing national normative acts in the field;
2) To ensure a better level of radiological and nuclear security, including the physical one, for the radiation protection of the personnel that is occupationally exposed and for the population at present and in the future;
3) To develop the research programs related to the radioactive waste management up to the final disposal and methods to reduce the impact on the health of the population and the environment of the long-life radionuclides and to study patterns for the migration of radionuclides in the environment;
4) To maintain sustainability of the physical protection of facilities that deal with radioactive waste and physical protection of the high and medium activity radioactive waste (including during transport, storage, detection, identification and collection of the orphan radioactive sources);
5) To maintain and develop the human resources involved in activities related to the radioactive waste management;
6) To maintain and improve the technical infrastructure associated with the safe radioactive waste management;
7) To ensure funding of the radioactive waste management processes in accordance with the "Polluter pays" principle;
8) To keep the public informed about the radioactive waste management activities, taking into consideration the sensitivity of the information on physical protection of the radiological facilities dedicated to the radioactive waste management and other information protected by law, as well as to ensure the public's participation in the decision-making process;
9) To manage the database (National Register of the Radioactive Waste) with information on the entire inventory of radioactive waste.

The *planned outcome* under the thematic area of nuclear and radiation safety would thus be:

- Strengthened nuclear and radiation safety for the protection of occupationally exposed workers, the public and the environment in the Republic of Moldova

The planned outcome will contribute to the attainment of SDG 8 – Decent Work and Economic Growth and SDG 12 – Responsbile Production and Consumption.

HEALTH AND NUTRITION

Cancer management

The Republic of Moldova has a disease burden characterized by a high prevalence of non-communicable diseases (NCDs) which currently account for 90% of all deaths, with cardiovascular diseases (59%), being in the first place, followed by cancer (15%) (WHO 2020). Rising morbidity and mortality linked to cancer have become a major source of government concern. According to the GLOBOCAN 2018 data, the current number of deaths from cancer is 8 508 and the incidence of new cases for both sexes is 15 284 and is expected to increase by 22.3% by 2040. Currently, cancer in Moldova is the second leading cause of death.

In 2018, for females, the leading cancers were breast (22.5%), colorectum (12.7%), cervix uteri (8.7%), corpus uteri (6.6%) and lung (5.3%). For males, the five leading cancers were lung (16.6%), colorectum (15.6%), prostate (10.4%), liver (6.8%) and stomach (6.1%) (GLOBOCAN 2018). Due to the rising incidence and mortality the need for improved cancer care is critical.

The National Cancer Control Programme 2016-2025 and National Development Strategy Moldova – 2030 aim to reduce the incidence of cancer mortality by 10 per cent, increase the rate of early detection by 25 percent and improve the quality of life of patients diagnosed with the disease, until 2030. Interventions focus on increasing patients' access to quality diagnosis, treatment and care and improving work conditions of medical institutions, including the introduction of new technologies. Of the around 10500 new cancer patients registered in the Republic of Moldova annually, almost 50% need radiotherapy as part of their curative or palliative treatment.

The Republic of Moldova is an endemic area with a cancer of unknown primary (CUP) incidence of various thyroid pathologies that occurs at different ages and genders of the population. In the Republic of Moldova 10 people out of 100 000 are diagnosed every year with thyroid cancer (334 new cases in 2016/ 448 in 2017) and about 30 new cases of patients with diffuse toxic goiter. Thyroid cancer has a higher frequency in case of women, compared to men, by 6:1. Thyroid cancer affects young people (20-30 years old) at working age which becomes a social problem.

Over the past 15 years, Moldova received the IAEA assistance to build capacity in the use of new technologies and to improve quality assurance in nuclear medicine, radio-diagnostics and radiotherapy. Support in upgrading the nuclear medicine units at the Oncology Institute and the Republican Clinical Hospital were identified as priorities by the Government (item 3.5 Strengthening the Oncology Institute and establishing on its basis the National Reference Center (CNR) in Oncology in the Republic of Moldova - Annex 2 of the Action Plan for the years 2016 - 2020 regarding the implementation of the National Cancer Control Program for the years 2016 – 2025).

Moldova received an imPACT review mission in April 2009 and was provided evidence-based comprehensive cancer control recommendations, including on radiation medicine and the radiation safety regulatory infrastructure. Following the imPACT mission recommendation to the Government of Moldova and to the Head of the Public Health Department of the Ministry of Health, Moldova enhanced the cancer control in the country, particularly through establishing a comprehensive National Cancer Control Programme (NCCP), including the essential components of cancer prevention, screening and early detection, treatment, palliative care and cancer registry.

A close collaboration with the IAEA led to the installation of a computed tomography (CT) machine at the Republican Clinical Hospital in 2013 which helped reopen its nuclear medicine unit, enabling more precise and complex examination of a variety of cancers.

The IAEA also supported the Oncology Institute, hosting the only radiotherapy department in Moldova, during the last 20 years in developing its cancer care services by providing radiotherapy equipment and training to its radiotherapy staff. The IAEA helped inter alia with the installation of a single-photon emission computed tomography (SPECT) machine in 2011, resulting in increased access to modern nuclear diagnostic investigation. The SPECT equipment was recently upgraded to be a tri-modality PET-SPECT-CT, enabling to strengthen and expand the use of this unit to benefit a larger number of patients.

The IAEA also supported the installation of the first modern radiotherapy equipment — a linear accelerator. The linear accelerator has improved the country radiotherapy services and helped expand their access.

However, the sources of two existing Co-60 machines were changed last time in 2006 while they should be changed every 5 years. One of the sources is due to be replaced in 2020 and the second machine will be replaced by a Linac; both are to be procured under the IAEA technical cooperation programme.

Moreover, all other equipment in the Radiotherapy Department, including the only operated linear accelerator, are at the end of their useful life and will soon become obsolete. At the same time, it should be mentioned that the IAEA has recently procured a CT scanner, immobilisation devices, QA

equipment and is in the process of upgrading the treatment planning system and record and verify system.

There is only 3D- C on formal radiotherapy in the country (which should be maintained as it is the most appropriate technique for many cancers), but in the treatment of many types of cancer more precise techniques such as Intensity Modulated Radiation Therapy (IMRT), Image Guided Radiation Therapy (IGRT) and Stereotactic Radiosurgery (SRS) are in use. In developed countries, Intensity Modulated Radiotherapy is a standard of radiation treatment for head and neck cancers, tumours of the central nervous system, prostate cancer, rectal cancer, pediatric malignancies, etc. The optimal Radiotherapy Utilization Rate (RUR) is calculated by determining the incidence of each indication for radiotherapy.

The Oncology Institute was partly equipped in 2018 and 2019 (the IAEA procured a large amount of equipment). However, despite that, without continuous action and investment, radiotherapy treatment might not be available in the Republic of Moldova within the following years. It needs to be underlined that the Oncology Institute is the only centre providing radiotherapy services in Moldova.

In addition, the Oncology Institute has been looking for new solutions in nuclear medicine for early diagnosis and treatment of cancer, especially in the diagnosis and treatment of thyroid cancer and other thyroid diseases using radioactive iodine.

In the period of 2021-2026, the IAEA support is thus sought to strengthen capacities of the Oncology Institute to enhance the quality of nuclear medicine and radiotherapy services for early diagnosis and safe and effective treatment, especially for the diagnosis and treatment of thyroid cancer and other thyroid diseases. For the radiotherapy department at the Oncology Institute brachytherapy services and training of medical physicists, radiation oncologists and RTTs should be improved.

IAEA support will be focused on providing the necessary expertise through experts' services/missions; training of personnel of the Oncology Institute, including through fellowships and scientific visits for Quality Assurance and Quality Control; procurement, delivery and installation of new equipment, including a Linac with IMRT technique, dosimetry equipment for quality control, a set of specific immobilisation devices, a new Linac with dynamic MLC and volumetric arc-therapy, a teragam device (with Co-60), and 3D HDR brachytherapy. Staff of the Oncology Institute will also participate in regional training courses, workshops and meetings related to radiotherapy and nuclear medicine.

It is planned to set up a Steering Committee with the help of the IAEA experts for planning and implementation of the proposed programme, including the assessment of the bunker for the new equipment, training of staff of the Oncology Institute and the procurement of equipment.

The National Agency for Regulation of Nuclear and Radiological Activities will be responsible for providing necessary authorizations.

Both men and women are involved in planning and implementation of related projects and will benefit from the related projects. Taking into consideration the high incidence of thyroid disorders in the country, the practical implementation of the programme will ensure early diagnosis, treatment and subsequent monitoring of patients by reduced time to diagnosis and treatment as a result of increased efficacy with equivalent total ablation of combination treatment (surgery, tumour growth time (TGT)); reduced costs per treated case; increased survival rate of patients after radioimmunotherapy (RIT) by more than 10 years with the possibility of returning to RIT treatment in case of relapse which also is not possible through other methods of treatment. It is also important to include targeted radionuclide therapies to expand the number of radiopharmaceuticals approved and in use, not only for thyroid cancer but neuroendocrine tumours and prostate cancer.

Nutrition

Childhood obesity is a growing concern in Europe, including in Moldova, but awareness of excessive body fat in school children and its long-term health impacts is limited. Moldova has been involved in the regional TC project on Childhood obesity, RER6034 (2016-2019) and was participating in all training

events and received supplies to perform body composition assessments in school children. Thus, Moldova is interested in continuing its participation in regional and interregional technical cooperation projects in the area of nutrition to broaden the country knowledge on the application of nuclear techniques for nutritional issues.

The *planned outcome* of the proposed technical cooperation programme is thus:

- To improve access to quality cancer diagnosis, treatment and care for all men and women in the Republic of Moldova

The planned outcome will contribute to the attainment of SDG 3 – Good Health.

WATER AND THE ENVIRONMENT

Water resources are an important subject for the Republic of Moldova. According to statistical data, 70% of the population of the Republic of Moldova uses underground water for drinking purposes, and the rural population, which constitutes 54% of the whole population, uses exclusively underground water resources.

However, the groundwater resources are negatively impacted by the construction of big reservoirs for electricity production on the Nistru river and the increased utilisation of groundwater for economic activities due to the aridization as a result of climate change. Moldova is considered the most climate vulnerable country in Europe based on a range of economic and social indicators, including low adaptation capacity.

The National Program on the implementation of the Protocol on Water and Health in the Republic of Moldova for 2016–2025 sets out 12 objectives, which include inter alia:

- ensuring by 2025 the distribution of safe drinking water in 100% of institutions for children and a reduction of up to 20% of inappropriate samples of drinking water in basic chemical parameters and up to 5% in microbiological parameters;
- reducing by 20% a number of outbreaks of infectious diseases and the incidence of water-related diseases by 2025; and
- ensuring access to sustainable drinking water supply systems in 100% of institutions for children and for 75% of the total population by 2025.

The above objectives are related to one of the 10 objectives of the National Development Strategy Moldova - 2030, namely: Ensuring the fundamental right to the best physical and mental health.

To achieve these goals, the Action Plan provides 77 actions to improve the situation, such as strengthening the legal framework, monitoring the system for water quality, developing the infrastructure for water supply and sanitation systems, building water treatment plants to improve drinking water supplied to consumers, creating regional operators of water supply and sanitation (WSS) systems, improving water quality monitoring, informing the public about water and health problems, and establishing a Clearing House for public information.

Recognizing the underground water resources as one of the key factors for national security and sustainable development of the country, the Republic of Moldova has committed itself to develop a national strategy for using underground water resources. The first step of that process should be to study underground water reserves using nuclear-derived techniques.

The Ministry of Agriculture, Regional Development and the Environment and the Ministry of Health, Labour and Social Protection, which have developed and coordinated the setting and implementation of targets with all interested authorities, will be responsible for implementing the Protocol on Water and Health.

In the past, the IAEA helped Moldova enhance its capacities in applying nuclear and nuclear-derived technologies in water resources management to assess its groundwater resources. A national TC

project contributed to the assessment of scarce groundwater resources in the arid areas of Moldova, leading to sustainable freshwater supply for human consumption and agricultural use.

Under the current CPF, the IAEA support is sought to enhance Moldova's capacities in the use of isotope hydrology to assess its groundwater resources.

The *planned outcome* of the proposed programme is thus

- Enhanced knowledge of national water resources for drawing up a national long-term policy and strategy for the use of underground water resources and developing measures to maintain the sustainability of water resources of the country for present and future generations

The planned outcome will contribute to the attainment of SDG 6 – Clean Water and Sanitation.

FOOD & AGRICULTURE

Animal health and production

Agriculture is the primary pillar of the Moldavian economy, benefitting from a mild climate and black, fertile soils. The sector accounts for more than 10% of the Gross Domestic Product and nearly half of the country exports. Nevertheless, the rural poverty rate of nearly 15% is nearly 5 times greater than that of urban areas. Improvement of agricultural profitability would thus contribute to SDO 1 of the National Development Strategy Moldova – 2020 'Increasing incomes from sustainable sources and reducing economic inequalities".

Livestock currently accounts for about one-third of agricultural production. Livestock production is very sensitive to climate change which impacts the production of fodder. Domestic livestock production is currently sufficient to supply only 40% of internal demand, thus forcing the country to rely on imports. Nuclear techniques have the potential to address the goals of the country in terms of livestock production. There are three general areas of interest in the animal production and health, namely:

i. Animal health: Development and upgrade of 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 as well as those with zoonotic impact;
ii. Animal reproduction: Support in 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: 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).

The Moldovan livestock sector and eastern Europe in general face several critical transboundary animal disease threats. Starting with 2017, African swine fever continues to spread in south-eastern Europe, including Moldova. Although in 2018, no lumpy skin disease (LSD) outbreaks were reported in the Balkan region, after its decline reported in 2017 (385) compared to 2016 (7,483), Moldova is still in high danger of emergence of LSD. In 2018 also Peste des petits ruminants endangered the animal health status in Moldova due to its spreading in Bulgaria. The antimicrobial resistance in zoonotic and indicator bacteria from humans, animals and food continues to be a major concern in Europe and also in the Republic of Moldova.

In the Republic of Moldova there are relevant national strategy and sector goals in the field of animal production and health, namely:

- Improving production and productive efficiency of livestock through the application of nuclear and nuclear related technologies;
- Implementing measures to control, monitor and eradicate major animal diseases in the region (such as African swine fever, Avian influenza, lumpy skin disease, West Nile disease, echinococcosis etc.);
- Partnership with the Food and Agriculture Organisation (FAO) and the World Organization for Animal Health (OIE) initiative called Global Strategy for eradication of Peste des petits Ruminants by 2030;
- Contribution to the fight against spreading diseases including antimicrobial resistance work of the World Health Organization, Food and Agriculture Organization and the World Organization for Animal Health.

For animal production, the key counterpart institutes, partners and beneficiaries comprise the technical institutions of the Government of the Republic of Moldova, including livestock services in the Ministry, the Artificial Insemination Centre Maximovca, the Institute of Biotechnologies in Animal Husbandry and Veterinary Medicine, SE Moldsuinhibrid, SE Avicola Moldova, as well as the National Agency on Rural Development (ASCA).

With regard to animal health, important stakeholders and potential project counterparts include Ministry of Agriculture, Regional Development and Environment, specifically the Food Industry-Sanitary Veterinary and Animal Origin Food Safety Agency and the Republican Veterinary Diagnostic Centre, and the Department of Sanitary-Veterinary Supervision-National Agency for Food Safety and the veterinary college at the State Agricultural University of Moldova.

As a result of the above situation analysis, the IAEA support is sought to strengthen the productivity of the national livestock sector to improve food security in the country and increase trade of live ruminants to neighbouring countries by:

- improving national capacities for the application of nuclear derived techniques and molecular epidemiology-based diagnosis for animals;
- strengthening the surveillance of animal diseases and zoonosis in the Republic of Moldova; and
- increasing interregional cooperation among diagnostic laboratories using nuclear techniques for transboundary animal diseases.

Crop production

The Republic of Moldova is highly vulnerable to climate change. Drought and floods are among top hydro-meteorological hazards caused by extreme weather and climate events. In Moldovan climate induced disasters occur more frequently and on a recurring basis causing economic losses valued on average at 4 million US dollars per year. Between 1990 and 2015, Moldova experienced eleven droughts that caused significant yield declines in crops and pastures. A severe drought in 1994 resulted in a 30% decline in GDP and a 26% decline in agricultural output. The catastrophic drought of 2007 impacted 90% of the country's territory, and 80% of the rural population (the majority of whom were women) were affected by reduced harvest. Total losses amounted to 1 billion USD. The 2012 drought severely affected crop production in the Central and Southern regions and caused estimated losses of about 1.25 billion USD. Climate scenarios indicate that the country is strongly trended towards becoming more arid. This will intensify droughts as well as fires.

In order to enhance resilience to the effects of climate change in the production of the country's staple food crops such as cereals (wheat, barley), vegetables and other important crops and enhance food security, the IAEA support is sought to enhance national capacities to develop sustainable agriculture practices in a climate-changing environment and to use mutation breeding for crop improvement.

The challenge is to innovatively increase agricultural productivity with nuclear techniques and improved technologies which ensure environmental sustainability. Mutation breeding activities should place emphasis on developing new crop varieties for staple food crops with enhanced adaptability to negative effects of climate change. In the era of climate change the focus should be on developing improved crop varieties with tolerance to abiotic stresses (cold, heat, salinity, drought tolerance) and biotic stresses (diseases, pests, weeds). In addition, focus should be given on crop improvement regarding nutrition quality to meet food safety standards.

The introduction of sustainable agricultural practices and crop improvement for sustainable food security will contribute to pillar 1 Sustainable and Inclusive Economy and sustainable development objective (SDO) 1 Increasing incomes from sustainable sources and reducing economic inequalities Moldova's National Development Plan – the Sustainable Development Strategy Moldova - 2030. The proposed technical cooperation in the area of sustainable agricultural practices and improved crop production is also aligned with outcome 3 of the United Nations Partnership Framework for Sustainable Development 2018-2022 and with the EU Association Agenda key priority 'agriculture and rural development' with the objective to increase the competitiveness of agricultural production, especially in selected sectors with high export value, and to improve sustainable use of land and water resources.

The *planned outcomes* for the thematic area of food and agriculture are thus:

- Improved livestock health and productivity and increased trade of live ruminants to neighbouring countries by 2026
- Enhanced adaptability of selected staple food crops to abiotic and biotic stresses resulting from climate change and increased crop productivity by 2026

The planned outcomes will contribute to SDG 2 – Zero Hunger, and SDG 15 – Life on Land.

3. RESULT MATRIX

Nuclear and Radiation Safety and Security

Radioactive Waste Management Outcome	Baseline	Indicator	Means of Verification	Assumptions/risks
Strengthened nuclear and radiation safety for the protection of occupationally exposed workers, the public and the environment in the Republic of Moldova	National Basic Safety Standards document in development	-National Basic Safety Standards document approved by 2025 and used for implementation of the IAEA GSR Part 3 -Basic regulations for education, training, qualification and competence -National strategy on E&T	National Basic Safety Standards, Government documentation	Adequate resources allocated in a timely manner Continuous Government support No major change in technical and managerial staff *Risk:* Budget limitation
	Migration of radionuclides from underground storage of the Radioactive Waste Management Company "Special Facilities 5101, 5102" ("Special Objects") to underground water and soil to a certain depth close to Bubuieci Village in the area of Chisinau City	- Special Objects ready for decommissioning and surrounding area decontaminated by 2026 - New storage facility for radioactive waste with competent staff and necessary infrastructure for radioactive waste management, in particular waste that contains radionuclides of the alpha type with a very long half-life period in place by 2026	Training certificates Project reports Functional new storage facility	
	-Pending radiological authorization for decommissioning - Related documents including safety case currently being developed	Radiological authorization for decommissioning issued by the end of 2026	Authorization documentation	
		Radiation protection regulations developed and	Government documentation, hospital	

	-No radiation protection regulations - Limited human resource capacities in radiation protection	approved and adequate human resource capacities built by 2026	reports, project reports, training certificates		
Indicative Outputs	**Indicative Timeframe** (Future TC cycle)	**Relevant national counterpart(s)/ institution(s)**	**Approximate Cost in €** (A)	**Resources* currently available in €** (B)	**Resources to be identified/mobilised in €** (A-B=C)
National infrastructure and human resource capacities in decommissioning "Special Objects" and for decontaminating and remediating the affected territory enhanced	2022-2026	Ministry of Internal Affairs, General Inspectorate of Emergency Situations	290,000	50,000	240,000
Safety Case for decommissioning activities and facilities developed	2021-2023	Ministry of Internal Affairs, General Inspectorate of Emergency Situations	75,000	750,000	-
Radiological, nuclear and physical security at "Special Objects" ensured and underground storage of "Special Objects" ready for decommissioning	2021-2026	Ministry of Internal Affairs, General Inspectorate of Emergency Situations	1,450,000	290,000	1,160,000
Place and conditions for the final radioactive waste disposal identified and established	2021-2025	Ministry of Internal Affairs, General Inspectorate of Emergency Situations	170,000	34,000	136,000
National Basic Safety Standards document developed and reviewed	2021-2025	National Agency for Regulation of Nuclear and Radiological Activities	30,000	30,000	-
National capacities in radiation protection built to protect occupationally exposed workers and patients from the negative effects of ionizing radiation	2021-2026	National Agency for Regulation of Nuclear and Radiological Activities	80,000	50,000	30,000

Nuclear and Radiation Safety and Security Subtotals		
Approximate Cost in € (A)	**Resources* currently**	**Resources to be identified/mobilised in €** (A-B)

		available in € (B)	
2,095,000	529,000	€1,566,000	

Health and Nutrition

Health and Nutrition Outcome	Baseline	Indicator	Means of Verification	Assumptions/risks

Increased access to quality nuclear medicine and radiotherapy services for all men and women in the Republic of Moldova	1,050 patients treated by radiotherapy and nuclear medicine at the Oncology Institute in 2021	Number of patients undergoing high quality treatment per year by radiotherapy and nuclear medicine Target: 3,500 patients by the end of 2026	National Cancer Registration of the Republic of Moldova	Continuous Government support Trained staff remains on board Risk: Budget limitation
	Equipment of the Oncology Institute, the only Institute hosting a radiotherapy department, in the country, is or will soon become obsolete and needs replacement and upgrading to tackle the growing cancer incidences in the country	Number of newly procured and repaired (maintained) existing equipment operational by 2026	Mission reports, project reports, hospital reports	
	Lack of capacities of staff of the Oncology Institute to use new state-of-the-art radiotherapy and nuclear medicine technologies	Staff of Oncology Institute (medical physicists, oncologists, radiotherapists, RTT and technical support staff) with the necessary competences to use the procured equipment safely and effectively by 2026	Hospital reports, training certificates	

Indicative Outputs	Indicative Timeframe (Future TC cycle)	Relevant national counterpart(s)/ institution(s)	Approximate Cost in € (A)	Resources* currently available in € (B)	Resources to be identified/mobilised in € (A-B=C)
Quality and effectiveness of radiotherapy services at the Oncology Institute of Moldova improved	2021-2024	Ministry of Health, Labour and Social Protection	2,900,000	195,000	2 705 000
Advanced radiotherapy techniques introduced	2023-2026	Ministry of Health, Labour and Social Protection	5,000,000	0	5,000,000
Nuclear medicine services at the Oncology Institute for early diagnosis and safe treatment improved	2023-2024	Ministry of Health, Labour and Social Protection	1,700,000	0	1,700 000

Health and Nutrition Subtotals		
Approximate Cost in € (A)	Resources* currently available in € (B)	Resources to be identified/mobilised in € (A-B)
9 600,000	195,000	9 405,000

Water and the environment

Water and the environment Outcome[s]	Baseline	Indicators	Means of Verification	Assumptions/risks
Enhanced knowledge of national groundwater resources in Moldova for drawing up a national long-term policy and strategy for the use of underground water resources and developing measures to maintain the sustainability of water resources of the country for present and future generations	Lack of accurate and reliable data on Moldova's groundwater resources No technical and human resources capacities, protocols and validated procedure for water resources assessment in place in the Republic of Moldova	Database for groundwater resources established by 2025 Operational and human resource capacities of the Institute of Chemistry built in isotope hydrology for the assessment of Moldova's groundwater resources by 2025 Stable isotope equipment operational by the end 2021 Protocols and validated procedure for groundwater assessment through stable isotopes in place by the end 2024	National report for the groundwater monitoring Training certificates Project reports	Adequate resources allocated in a timely manner Continuous Government support No major change in technical and managerial staff Risk: Budget limitation

Indicative Outputs	Indicative Timeframe (Future TC cycle)	Relevant national counterpart(s)/ institution(s)	Approximate Cost in € (A)	Resources* currently available in € (B)	Resources to be identified/mobilised in € (A-B)
Operational and human resource capacity of the Institute of Chemistry improved in isotope hydrology for groundwater resources management	2021-2025	Institute of Chemistry Moldova	160,950	8,050	152,900
Protocols and validated procedure for groundwater assessment through stable isotopes developed	2021-2024	Institute of Chemistry Moldova	22,000	1,100	20,900
Isotope chemistry of selected aquifers characterized	2021-2023	Institute of Chemistry Moldova	103,600	5,200	98,400

Water and the environment Subtotals		
Approximate Cost in € (A)	Resources* currently available in € (B)	Resources to be identified/mobilised in € (A-B)
286,550	14,350	272,200

Food and agriculture					
Food and agriculture Outcome[s]	**Baseline**	**Indicator**	**Means of Verification**		**Assumptions/risks**
Improved animal health and productivity Increased trade of live ruminants to EU and non-EU countries	Based on current EU legislation, Romania is considered as infected in relation with bluetongue disease Lack of equipment and HR capabilities in molecular epidemiology-based diagnostic to monitor animal health Lack of an integrated regional surveillance and monitoring system of animal diseases and zoonosis 0.11% of GNI was in 2017 the total national budget dedicated by Moldova to development assistance	Infection status of Moldova in relation to animal diseases and zoonosis (e.g. bluetongue disease, peste des petits ruminants, lumpy skin disease etc.) 50% of NRLs with the capacity to apply molecular epidemiology-based diagnostics by 2026 Integrated regional surveillance and monitoring system established and interregional cooperation in nuclear techniques-based laboratory diagnostic for transboundary animal diseases increased by 2026	Official statistics regarding the export of live animals available from the Ministry of Agriculture and National Statistics Institute Equipment inventory Training certificates Regional surveillance and monitoring system in operation		Budget limitations Assumption: Adequate financial and staff resources allocated in a timely manner Risk: Budget limitation Lack of dedicated and specialised staff
Indicative Outputs	**Indicative Timeframe** (Future TC cycle)	**Relevant national counterpart(s)/ institution(s)**	**Approximate Cost in €** (A)	**Estimated resources* available in €** (B)	**Resources to be identified/mobilised in €** (A-B=C)

-Capacity for experimental infection of animals built in Moldova -Enhanced accuracy for the central veterinary authority in implementation of sentinel surveillance programme for bluetongue disease -Improved decision making for the central veterinary authority regarding the control of relevant animal or zoonotic diseases	2024-2026	Ministry of Agriculture, Regional Development and Environment National Sanitary Veterinary and Food Safety Authority Institute for Diagnosis and Animal Health	€400,000	0	€400 000
Institutional and human capacities built to detect, monitor and control animal diseases, including zoonosis, based on application of nuclear derived techniques and molecular epidemiology analysis	2024-2026	National Sanitary Veterinary and Food Safety Authority Institute for Diagnosis and Animal Health Relevant national institutions IAEA/FAO	€200,000	0	€200 000
			Food and agriculture Subtotals		
			Approximate Cost in € (A)	**Estimated resources* available in €** (B)	**Resources to be identified/mobilised in €** (A-B)
			600 000	**0**	**600 000**

Food and Agriculture

Crop production	Baseline	Indicators	Means of Verification	Assumptions/risks

Food and Agriculture

Enhanced adaptability of selected staple food crops to abiotic and biotic stresses resulting from climate change and increased crop productivity	Poor productivity of staple crops (wheat, barley, vegetables - potato, pumpkin, onion) due to the negative effects of climate change such as drought, pests, etc. The total production volume decreases by 1.7% comparing to the previous year and by 16.7% comparing to 2010	Number of crop mutants developed with resistance to drought and pests developed by 2026 Increased crop productivity by at least 5% of selected staple crops by 2026	Project reports, national statistics, log record	Adequate resources allocated in a timely manner Continuous Government support No major change in technical and managerial staff Risk: Budget limitation

Indicative Outputs	**Indicative Timeframe** (Future TC cycle)		**Approximate Cost in €** (A)	**Resources* currently available in €** (B)	**Resources to be identified/mobilised in €** (A-B)
Technical infrastructure and human resource capacities built in plant mutation breeding for crop improvement	2022-2026	Ministry of Agriculture, Regional Development and Environment	120,000	0	120,000
Biodiversity and genetic resources for crop improvement enhanced	2024-2026	Ministry of Agriculture, Regional Development and Environment	95,000	0	95,000
National infrastructure and capacities for biotechnology and related nuclear technologies strengthened	2025-2026	Ministry of Agriculture, Regional Development and Environment	80,000	0	80,000

Food and agriculture Crop production Subtotals		
Approximate Cost in € (A)	**Resources* currently available in €** (B)	**Resources to be identified/mobilised in €** (A-B)
295,000	0	295,000

(*)-The above stated figures are indicative. Signing of the CPF does not commit to funding of the CPF implementation by the Member State or the IAEA, nor does it suggest the expectation of continued levels of Agency funding. The main purpose is to assist planning and prioritization of the country programme framework.

3.1. Resources Summary Table

Thematic Area	Approximate Cost in € (A)	Resources currently available in € (B)	Resources to be identified/mobilised in € (A-B)
Nuclear and Radiation Safety and Security	2,095,000	529,000	1,566,000
Health and Nutrition	9 600,000	195,000	9 405,000
Water and the environment	286,550	14,350	272,200
Food and Agriculture	895,000	0	895,000

Total estimated overall cost for CPF	Total estimated resources available for CPF	Total resources to be identified/mobilised
12,876,550	738,350	12,138,200

Estimated government costs sharing, if additional to above:	€0
Estimated government in-kind contribution, if additional:	€0

4. PROGRAMME IMPLEMENTATION AND SUPPORT

4.1 CPF COORDINATION

The preparation of this CPF was coordinated by the National Agency of Nuclear and Radiological Activities, as the institution hosting the NLO office, with the support from the Programme Management Officer at the Europe Section 1, Division for Europe of the IAEA Department of Technical Cooperation. The PMO coordinated the relevant inputs from the IAEA Technical Departments as well as the IAEA Programme of Action for Cancer Therapy (PACT) and the Division for Programme Support and Planning at the IAEA Department of Technical Cooperation. The NLO identified and nominated focal persons in the relevant Ministries to participate in the preparation process. The CPF was developed in the framework of a series of working group meetings:

1. Ministry of Agriculture, Regional Development and Environment through the National Agency for Regulation of Nuclear and Radiological Activities;
2. Ministry of Health, Labour and Social Protection through Oncology Institute and the Republican Clinical Hospital;
3. Ministry of Education, Culture and Research through Institute of Chemistry;
4. General Inspectorate for Emergency Situations of the Ministry of Internal Affairs, through Radioactive Waste Management Company “Special Facilities 5101, 5102”.
5. National Sanitary Veterinary and Food Safety Authority
6. Institute for Diagnosis and Animal Health
7. Institute of Chemistry Moldova.

4.2 FUTURE REVIEW OF CPF

Future reviews of progress under this CPF will be conducted shortly before the end of each TC programme cycle. The review will focus mainly on the programmatic part and, where relevant, take into consideration lessons learned for better formulation of new project proposals for the following TC programme cycle. The review will consider evolving development priorities at the national level, including consideration of any significant challenges that have affected the programme. The review will be led by the Programme Management Officer for the Republic of Moldova within the Division for Europe at the IAEA Department of Technical Cooperation and the NLO at the National Agency of Nuclear and Radiological Activities.

A mid-term review will be conducted in 2023 and the final review will be conducted in 2025 when the results of the technical cooperation programme will be evaluated in the framework of the formulation of the succeeding CPF.

4.3 PARTNER COORDINATION

The Republic of Moldova became a member of the United Nations in 1992. As a member of the UN, the Republic of Moldova adopted the 2030 Agenda for Sustainable Development with the SDGs at its core.

The partnership between the Republic of Moldova and the UN is guided by the United Nations Partnership Framework for Sustainable Development 2018-2022 which is linked with the National Development Strategy Moldova - 2030 and the SDGs. The ultimate objective of the PFSD of which the IAEA is a co-signatory is to enlarge people's choices and opportunities, and to promote prosperity, resilience and sustainable development in Moldova.

The IAEA contributes to outcomes 3 and 4 of the framework:

> Outcome 3 – the people of Moldova, in particular the most vulnerable, benefit from enhanced environmental governance, energy security, sustainable management of natural resources, and climate and disaster resilient development;
>
> Outcome 4 – the people of Moldova, in particular the most vulnerable, demand and benefit from gender-sensitive and human rights-based, inclusive, effective and equality education, health and social policies and services.

The IAEA is part of the UN Country Team as a non-resident agency and has worked with the United Nations Development Programme (UNDP) and the World Health Organization (WHO) in the implementation of past TC programmes.

Moldova has committed to implement the 2030 Agenda for a better life by 2030. 106 targets were integrated into national policy documents. The proposed programme under the CPF will contribute to the attainment of SDG 3, SDG 6 and SDG 12.

Relations between the European Union and Moldova have intensified in the recent years. Moldova joined the EU's Eastern Partnership in 2009 and the EU-Moldova Association Agreement which entered into force on 1 July 2016. This includes the introduction of a Deep and Comprehensive Free Trade Area (DCFTA). The Association Agreement strengthens Moldova's political and economic ties with the EU. It sets out a reform plan in areas vital for good governance and economic development and strengthens cooperation in several sectors. By signing the agreement, Moldova committed to reforming its domestic policies on the basis of EU laws and practice. To do so, the country benefits from substantial EU support.

The new EU multiannual programming 2017-2020 (Single Support Framework) was adopted on 13 September 2017. It will focus on four priority areas:

1. economic development;
2. governance;
3. connectivity;
4. contacts between people

Beyond these areas, the programming also includes support to civil society, strategic communication, and capacity development/institution building.

The major donor countries and development partners assisting in the development activities of the Republic of Moldova are the Government of Sweden through the Swedish International Development Cooperation Agency (SIDA) and the Swedish Radiation Safety Authority (SSM), and the U.S. Government through the U.S. Nuclear Regulatory Commission (USNRC).
As potential partners/donors can be: German International Corporation Agency (GIZ), Japan International Cooperation Agency (JICA), Council of Europe Development Bank (CEB), Swiss Agency for Development and Cooperation (SDC), the US Agency for International Development (USAID), World Bank, the Government of Estonia and the Government of Romania.
For the implementation of the proposed programme under this CPF, the following have been identified as key partners:

National:

- Ministry of Agriculture, Regional Development and Environment;
- Ministry of Health, Labour and Social Protection;
- Ministry of Education, Culture and Research;
- General Inspectorate for Emergency Situations of the Ministry of Internal Affairs.

Implementing institutions:

- National Agency for Regulation of Nuclear and Radiological Activities;
- Oncology Institute;
- Institute of Chemistry;
- Radioactive Waste management Company “Special Facilities 5101, 5102”.

International:

- United Nations Development Programme (UNDP)
- World Health Organization (WHO)
- United Nations Environment Programme (UNEP)
- European Commission
- Austrian Development Agency

ANNEX 1: PARTNERSHIP MATRIX

Thematic Area	Outcome in Moldova 2030 or sectoral strategy	CPF Outcomes	Links with SDGs	Links with UNDAF	Relevant Partners
Nuclear and Radiation Safety and Security	10) Ensuring the fundamental right to a healthy and safe environment Ongoing assessment of climatic, geomorphological, radiological and seismic weather risks, assessment of the vulnerability of the building stock and critical infrastructure and adjustment of relevant technical and safety standards	Strengthened nuclear and radiation safety for the protection of occupationally exposed workers, the public and the environment in Moldova	SDG 12 – Responsible Consumption and Production SDG 8 – Decent Work and Economic Growth	Outcome 3: Environmental sustainability and resilience The people of Moldova benefit from enhanced environmental governance, energy security, sustainable management of natural resources, and climate and disaster resilient development	National: Ministry of Internal Affairs, General Inspectorate of Emergency Situations International: UNEP EU/EC
Health and Nutrition	5) Ensuring the fundamental right to the best physical and mental health	Improved access to quality cancer diagnosis, treatment and care for all men and women in the Republic of Moldova	SDG 3 – Good Health and Well-Being	Outcome 4. Inclusive and equitable social development The people of Moldova demand and benefit from gender-sensitive and human rights-based, inclusive, effective and equitable quality education, health and social policies and services	National: Ministry of Health, Labour and Social Protection International: WHO

Thematic Area	Outcome in Moldova 2030 or sectoral strategy	CPF Outcomes	Links with SDGs	Links with UNDAF	Relevant Partners
Water and the environment	10) Ensuring the fundamental right to a healthy and safe environment	Enhanced knowledge of national water resources for drawing up a national long-term policy and strategy for the use of underground water resources and developing measures to maintain the sustainability of water resources of the country for present and future generations taking into consideration climate change	SDG 6 – Clean Water and Sanitation	Outcome 3: Environmental sustainability and resilience The people of Moldova benefit from enhanced environmental governance, energy security, sustainable management of natural resources, and climate and disaster resilient development	National: Ministry of Agriculture, Regional Development and Environment Ministry of Education, Culture and Research Ministry of Internal Affairs International: UNDP UNEP UNESCO EC ADA Switzerland
Food and Agriculture	1) Increasing incomes from sustainable sources and reducing economic inequalities	Improved livestock health and productivity and increased trade of live ruminants to neighbouring countries by 2025 Enhanced adaptability of selected staple food crops to abiotic and biotic stresses as a result of climate change and increased crop productivity by 2025	SDG 2 – Zero Hunger SDG 15 – Life on Land	Outcome 3 – the people of Moldova, in particular the most vulnerable, benefit from enhanced environmental governance, energy security, sustainable management of natural resources, and climate and disaster resilient development	FAO, OIE, UNDP, EU/EC

ANNEX 2: LIST OF PARTICIPATING INSTITUTIONS

1. Ministry of Agriculture, Regional Development and Environment through the National Agency for Regulation of Nuclear and Radiological Activities;
2. Ministry of Health, Labour and Social Protection through the Oncology Institute and the Republican Clinical Hospital;
3. Ministry of Education, Culture and Research through Institute of Chemistry;
4. General Inspectorate for Emergency Situations of the Ministry of Internal Affairs, through Radioactive Waste management Company “Special Facilities 5101, 5102”;
5. National Sanitary Veterinary and Food Safety Authority;
6. Institute for Diagnosis and Animal Health;
7. Institute of Chemistry Moldova.

ANNEX 3: LEGAL FRAMEWORK AND IAEA-RELEVANT TREATIES

Legislation

The nuclear legal framework in the Republic of Moldova is mainly contained in the Law on Safe Deployment of Nuclear and Radiological Activities, Law No. 132 from 8 June 2012 other relevant laws including:

- Law No. 68 on 13.04.2017 National Strategy on radioactive waste management with Action Plan 2017-2026;
- Law No. 235-XVI of 20.07.2006 on the basic principles of regulating the entrepreneurial activity;
- Law No. 1163-XIV from 26.07.2000 "On the export, import, re-export and transit of strategic goods";
- Law No. 10-XVI from 03.02.2009 "On State Supervision of Public Health"; Law No. 131 of 08.06.2012 „On state control over business activities"; and
- Law No. 271 of 09.11.1994 „On civil protection".

IAEA-RELEVANT TREATIES

The participation of the Republic of Moldova in relevant IAEA treaties is set out below:

Agreement between the Republic of Moldova and the IAEA for the application of safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons	in force from 17.05.2006, registered at the UN with no. I-43743
Recognition of Statute of the International Atomic Energy Agency from 24.09.1997); Agreement on the Privileges and Immunities of the International Atomic Energy Agency	in force from 22.12.2008, registered at the UN with no. I-5334
The Vienna Convention on Civil Liability	in force from 07.08.1998, registered at the UN with no. I-16197
Convention on Early Notification of a Nuclear Accident	in force from 07.06.1998, registered at the UN with no. I-24404
Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	in force from 07.06.1998, registered at the UN with no. I-26443
Convention on Nuclear Safety	in force from 07.06.1998, registered at the UN with no. I-33545
Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	in force from 24.05.2010, registered at the UN with no. I-37605
Code of Conduct on the Safety and Security of Radioactive Sources and its supplementary Guidance on the Import and Export of Radioactive Sources	Political commitments to the Code and supplementary Guidance
Convention on the Physical Protection of Nuclear Material	in force from 06.06.1998, registered at the UN with no. I-24631
Amendment to the Convention on the Physical Protection of Nuclear Material	in force from 08.05.2016, registered at the UN with no. 24631
Agreement between the Republic of Moldova and IAEA concluded by exchange of letters with regard to the Amendments to the Small Quantities Protocol, annexed to the Agreement between the Republic of Moldova and IAEA for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons	in force from 08.04.2010

Protocol additional to the Agreement between the Republic of Moldova and the International Atomic Energy Agency for the application of safeguards in connection with the Treaty on the non-proliferation of nuclear weapons	in force from 01.06.2012, registered at the UN with no. A-43743
National Nuclear Law – the Law no 132 on safe deployment of nuclear and radiological activities	Adopted on 08.06.2012

Starting from 2007 the Government has approved the following **Governmental Decrees**:

- on radioactive waste management, 2013;
- on state control and supervision of nuclear and radiological activities and nuclear non-proliferation regime, 2014;
- on authorization of nuclear and radiological activities, 2014;
- on the national registry of ionizing radiation sources, 2014;
- on safe transport of radioactive materials, 2015;
- on physical protection of nuclear and radioactive materials, 2016;
- on radiation protection and safety in radiotherapy 2011;
- on radiation protection and safety in X-ray diagnostic and interventional radiology 2015;
- on radiation protection and safety in nuclear medicine, 2016;
- on ensuring radiological safety in activities with ionizing radiation sources outside the specially designed premises, 2018.

The Republic of Moldova has established a National Strategy in Radioactive Waste Management for 2017-2026.

Future plans:

To approve the legal documents for the implementation of the IAEA GSR Part 3.

ANNEX 4: DETAILS OF PAST TC PROGRAMME

- Moldova joined the IAEA TC programme in 1994.
  23 TC projects have been completed under the auspices of the TC programme. In addition, Moldova, participated in 4 interregional and 120 regional TC projects.
- Key areas and major impact include:
  - **Nuclear and radiation safety and security:** Moldova has strengthened its governmental, legal and regulatory infrastructure for the use of nuclear technology and for the planning, commissioning, operation and decommissioning of radiological facilities in the country. This includes enhanced capacities in nuclear waste management and nuclear knowledge management.
  - **Health:** The IAEA helped Moldova strengthen its nuclear medicine and radiotherapy services and ensure quality treatment to all people in Moldova.
  - **Environment:** The IAEA has helped enhance the environmental conditions of the territories affected by the Chernobyl accident.

Thematic area	Results of past technical cooperation	Key counterpart institutes and partners
Radiation safety and security	The IAEA helped strengthen Moldova's governmental, legal and regulatory infrastructure for radiation safety.	State Department for Standardization, Metrology and Certification; Special Facilities no. 5102, 5101
	IAEA TC support in Moldova contributed to a strengthened national radiation protection infrastructure for improved radiation monitoring of air, soil and water.	National Agency for Regulation of Nuclear and Radiological Activities; Ministry of Internal Affairs; Ministry of Agriculture, Regional Development and Environment
	The IAEA helped strengthen Moldova's capacities in safe and efficient radioactive waste management. A site-specific safety assessment was conducted. Advanced technologies were introduced. A radioactive waste processing and management structure was developed. A gamma radiation early warning system and National Monitoring and Laboratory Control Network covering most of the country were established and are operational. In addition, the establishment of a centralized waste processing and radioactive waste storage facility was initiated. The IAEA helped upgrade the State enterprise waste processing and storage facility "Special Objects 5101, 5102". It has now the capacity to meet existing and future demands for radioactive waste management in accordance with international standards and criteria.	

	The IAEA also helped establish the Metrology Laboratory of Ionizing Values in Moldova for the calibration of instruments for monitoring radiation in the environment. The national calibration laboratory now complies with international requirements. In addition, dosimetry measurements in Moldova are in accordance with the international system of measurement, thus improving the accuracy of monitoring measurements and the confidence of workers and the public in the safe use of nuclear techniques.	
Health	The IAEA helped improve the quality and expand Moldova's diagnostic and treatment capacities for cancer patients in Moldova. Between 2005 and 2006, the IAEA assisted the Moldovan Oncology Institute (MOI), the only hospital for specialized treatment of oncological patients in Moldova (MOI), to improve radiotherapy services through the expansion of brachytherapy treatment to a larger number of patients. As a result of the project, a new high dose rate (HDR) brachytherapy unit has been installed in the radiotherapy department. In addition, local medical and technical staff have been trained in HDR brachytherapy physics, treatment planning, gynecological brachytherapy, and related quality assurance procedures. Between 2007 and 2009, the IAEA helped introduce high-energy photon and electron beam radiotherapy for oncology patients at the Moldovan Oncology Institute (MOI), the only hospital for specialized treatment of oncological patients in Moldova, to improve the effectiveness of radiotherapy services for safe, accurate and effective diagnosis and treatment of cancer. The project was implemented through the provision of expert services, individual and group training for local staff and procurement of a medical accelerator, 3-D treatment planning system and the necessary dosimetry and quality control/assurance equipment. Between 2009 and 2011, the IAEA supported Moldova in setting up a Nuclear Medicine Laboratory at the MOI. The aim was to improve diagnostic capabilities for early detection of non-communicable diseases such as cancer in accordance with modern standards. The project has been implemented through the provision of expert	Moldovan Oncology Institute; National Scientific Applied Centre of Preventive Medicine of the Ministry of Health; The Republican Centre of Medical Imagery and Radiotherapy; National Agency for Regulation of Nuclear and Radiological Activities; Republican Clinical Hospital; Moldovan Oncology Institute.

	services, individual and group training for local staff in nuclear medicine, procurement of a SPECT gamma camera, including its installation and commissioning, and the necessary auxiliary equipment and accessories. The MOI prepared the premises for the gamma camera which has been procured and installed. The existence of a gamma camera has made it possible to survey oncological patients quickly and qualitatively, and to begin special treatment without delay. The knowledge and experience received by the staff through the training at different NM centers was shared with young specialists. Between 2012 and 2013, a nuclear medicine laboratory for early detection of diseases in accordance with the modern standards established at the Republican Clinical Hospital to improve the diagnostic capabilities. The IAEA provided expert services, individual and group training for local staff in nuclear medicine, a SPECT gamma camera and CT, including installation and commissioning, and the necessary auxiliary equipment and accessories. The existence of SPECT/CT Hybrid system in the Republican Clinical Hospital makes it possible to survey patients quickly and qualitatively, and begin special treatment without delay.	
	With IAEA support, a system for radiation safety and protection of patients and operating personnel in medical x-ray diagnostic practice was established in accordance with Basic Safety Standards. The quality control in X-ray devices allows to reduce patient doses from medical X-ray examinations and thus contribute to strengthening radiation safety of the public. In particular the Center of Medical Imagery and Radiotherapy acquired quality assurance capabilities for diagnostic radiology and extended it to six hospitals. That resulted in image quality improvement in those hospitals and awareness increase on radiological protection of patients. Other national TC project helped Moldova develop its nuclear medicine quality assurance/quality control legislation, in parallel with staff training and upgrading of the existing facilities in three nuclear medicine institutions – the Clinical Hospital of the Republic, Medical Diagnostic Centre of the Republic and Scientific Institute for the Protection of the	Republican Medical Centre of Diagnostics, Ministry of Health, Labour and Social Protection Institute of Mother and Child Republican Clinical Hospital National Agency for Regulation of Nuclear and Radiological Activities Moldovan Oncology Institute

	Health of Mothers and Children. As a result, the number of patients treated has significantly increased.	
	At the Republican Clinical Hospital in 2013, close collaboration with the IAEA led to the installation of a computed tomography (CT) machine which resulted in the reopening of its nuclear medicine unit, enabling more precise and complex examination of a variety of cancers.	
Industry	The IAEA helped Moldova conduct a feasibility study with the aim to establish a national radiation processing center for the preservation of agricultural products and the sterilization of medical supplies for commercial use. The project result confirmed that the irradiation preservation of agricultural products and sterilization of medical supplies were realistic and achievable in the country.	Academy of Sciences of Moldova
Water and environment	The IAEA helped Moldova enhance its capacities in applying nuclear and nuclear-derived technologies in water resources management to assess groundwater resources. A national TC project contributed to the assessment of scarce groundwater resources in the arid areas of Moldova, leading to sustainable freshwater supply for human consumption and agricultural use. In energy planning field Moldova is quite active as part of the IAEA RER2017 „Assessing the Role of Low Carbon Energy Technologies for Climate Change Mitigation" with objective to contribute to low carbon and reduced fossil fuel import dependent electricity and heat generation in support of achieving national emission reduction targets.	Ministry of Agriculture, Regional Development and Environment