REGIONAL COOPERATIVE AGREEMENT

for Research, Development and Training
Related to Nuclear Science and Technology for Asia and the Pacific

ANNUAL REPORT 2024

RCA

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Acknowledgements

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RCA Chair's Statement

Lili XIAO
Senior Project Official
RCA National Representative; IAEA TC NLO of China
China Atomic Energy Authority

Dear Valued Parties,

In my role as the Current Chair of the Regional Cooperative Agreement for Research, Development, and Training Related to Nuclear Science and Technology for Asia and the Pacific (RCA), I am thrilled to share the journey and accomplishments of the RCA in 2024. This year, our collective efforts have significantly advanced regional collaboration in nuclear science and technology, leaving a positive mark on promoting the socio-economic development and achieving the UN 2030 Sustainable Development Goals of the Asia - Pacific region.

Major Events

The year 2024 was highlighted by two key events that steered the RCA's progress. The 46th National Representative Meeting (NRM) in Beijing was a turning point where we decided to embrace a more programmatic approach in the formulation of RCA projects for the 2026/2027 Technical Cooperation (TC) cycle. This strategic shift, in line with the IAEA's flagship initiatives such as Rays of Hope, ATOM4FOOD, NUTEC Plastics, ZODIAC, and ATOM4NetZero, aims to enhance the efficiency, effectiveness, and impact of our regional cooperation. It allows us to better address the diverse needs of Government Parties and maximize the benefits of nuclear science and technology across the Asia - Pacific. Subsequently, the 53rd General Coordinating Meeting (GCM) in Vienna further strengthened our governance framework. The decision to form a working group for the Rapid Review and oversee the revision of the Terms of Reference for the RCA Programme Advisory Committee (PAC) was a significant step towards ensuring more effective oversight and coordination within the RCA. The RCA also made its mark on the international stage through various events. The side event during the 68th General Conference and the Special Exhibition at the 2024 IAEA Ministerial Conference were resounding successes, which attracted attention from the high-level officials from the IAEA and from the Government Parties. These events served as platforms for experts and delegates to exchange ideas, fostering a deeper understanding of how nuclear technology can be harnessed to tackle regional challenges in food security, human health, and environmental protection, and more importantly, increasing the visibility of RCA by showcasing the RCA's 52 - year journey and its significant contributions to the field.

Project Implementation

In 2024, the RCA's project implementation was a testament to our joint commitment and coordinating capabilities. We successfully advanced fifteen active TC projects, with the addition of six new projects spanning various sectors, each bringing its own set of achievements and best practices. In the agricultural sector, the RAS5088 project on enhancing crop productivity and quality through mutation by speed breeding was a remarkable success. It not only strengthened global research networks but also expanded the Mutation Breeding Network to include partners from Europe, Africa, and Latin America. This expansion led to increased international collaboration in joint research and resource mobilization. Over 121 young researchers, including 61 women, received training on Mutation by Speed Breeding, equipping them with the skills to develop improved crop varieties. The project also saw the development and distribution of numerous mutated crop varieties in this region. In the human health sector, projects like RAS6098 (standardizing radiotherapy in palliative care) and RAS6100 (strengthening the clinical application of hypofractionated radiotherapy) made significant progress. RAS6098 organized multiple RTCs, training a total of 118 medical professionals, including 62 women, on comprehensive palliative radiotherapy management. The project also took steps towards developing clinical practice guidelines, which are crucial for ensuring consistent and high - quality care for cancer patients. RAS6100, on the other hand, focused on strengthening the clinical application of hypofractionated radiotherapy. Through a series of meetings, RTCs, and expert missions, the project collected baseline data, developed practical information packages, and implemented quality assurance/quality control programs. The RAS9092 project in the radiation safety sector was another success story. It enhanced the capacity of participating countries to manage radiological emergencies at Category II and III facilities. Many countries strengthened their regulatory frameworks, improved emergency planning, and invested in human resource development. Essential equipment, such as personal radiation detectors, was procured and distributed, further enhancing emergency preparedness and response capabilities across the region.

Nevertheless, we have to admit that RCA project implementation also faced several challenges. The shift towards a programmatic approach in TC project design required seamless collaboration between NRs and regional experts. Quantifying the impact of RTCs on national - level changes was a complex task, as it involved evaluating not only the knowledge and skills acquired by participants but also the long - term effects on national - level practices and policies. Strengthening resource mobilization, enhancing synergies between RCA projects and national TC projects, and building strategic partnerships were areas that required more focus to ensure the long - term sustainability and growth of our initiatives.

Main Activities

In 2024, a wide range of activities that are integral to our mandate have been organized under the RCA framework.

Training and Capacity - Building.

A total of 666 professionals, with 270 women, participated in our training and capacity - building activities. The RTCs, sponsorships, technical workshops, and coordination and expert meetings covered diverse topics. In the industry - related projects, RTCs such as "Gamma Dosimetry Application" and "Electron Beam Dosimetry" under the RAS1028 project trained professionals in quality assurance and quality control in dosimetry applications. These skills are crucial for ensuring the safety and effectiveness of radiation processing facilities. The sponsorships provided opportunities for professionals to attend international conferences and training programs, exposing them to the latest global trends and technologies in nuclear science and technology. Technical workshops, like the one on non - destructive testing (NDT) techniques for quality control in civil engineering under the RAS1029 project, brought together experts and practitioners to share the latest techniques and best practices.

Research and Network - Building.

The Mutation Breeding Network's global expansion was a significant achievement. It enabled experts and researchers from different regions to collaborate, share knowledge, and pool resources. The Asia and Pacific Radiation Oncology Network (ASPRONET) continued to thrive, with Pakistan taking over the hosting responsibility in 2024. This network facilitated knowledge exchange and the sharing of best practices in cancer management, contributing to the improvement of radiotherapy services across the region. Additionally, a study on isotopic techniques and the recursive digital filter method was published in the Journal of Hydro - Environmental Research, advancing the field of isotope hydrology and providing valuable insights for water resource management.

Outlook for 2025

Looking ahead to 2025, we have an ambitious agenda. We plan to hold around 37 regional events across 14 projects, including the 47th NRM in Fiji and the 54th GCM in Vienna. These events will be crucial for further discussions, collaboration, and decision - making. Strengthening governance by appointing a new PAC Chair and members is a top priority. Completing social and economic impact assessments on isotope hydrology and nuclear medicine and launching the assessment publications will be significant milestones. These assessments will provide valuable insights into the long - term benefits of our programs and help us make more informed decisions. We will also focus on finalizing RCA project designs for the 2026/2027 cycle and preparing for the 2028/2029 cycle, ensuring that our projects remain relevant and effective in addressing the evolving needs of the Asia - Pacific region.

Acknowledgment

It was a great honour for China, through CAEA, to transition as Chair from Australia, through ANSTO, during 2024. I would like to express my heartfelt gratitude to all the RCA Government Parties (GPs). Your financial contributions, in-kind support, and the active engagement of your representatives have been the cornerstone of our success. I am also deeply appreciative of the IAEA's continuous support. The alignment with IAEA's flagship initiatives has given our work a broader perspective and greater international significance. Finally, I would like to thank the RCA Regional Office (RCARO) and its dedicated team. Your hard work in organizing events, supporting projects, and promoting the RCA's activities has been essential.

Executive Summary

The Regional Cooperative Agreement for Research, Development, and Training related to Nuclear Science and Technology for Asia and the Pacific (RCA) is an intergovernmental framework, established under the auspices of the International Atomic Energy Agency (IAEA) in 1972. Over the years, the RCA has played an important role in fostering regional collaboration and advancing the peaceful applications of nuclear science and technology, significantly contributing to the socio-economic development and sustainability of the Asia-Pacific region. The RCA has also benefited from the IAEA's Technical Cooperation (TC) programme, which has supported advancements in nuclear science and technology across the region.

2024 marked another year of significant achievements for the RCA, strengthening regional cooperation and partnerships to promote the peaceful use of nuclear science and technology. These efforts continue to advance the social and economic development of the Asia-Pacific region.

In 2024, the RCA Government Parties (GPs) convened the 46th National Representative Meeting (NRM) [1] in May in Beijing, People's Republic of China (PRC), chaired by the Government of China through the China Atomic Energy Authority (CAEA). During this meeting, Ms Lili Xiao was unanimously elected as the new RCA Chair. The meeting thanked the outgoing Chair, Ms Natascha Spark from the Australian Nuclear Science and Technology Organization (ANSTO) for her dedication and commitment to the RCA during Australia's Chair year. The NRM also welcomed Mr Kim Dae Ki as the newly appointed Director of RCARO. Discussion focused on governance, implementation, and key initiatives of the RCA programme. The agreements and recommendations made during this meeting marked a significant milestone, particularly, the decision to adopt a more strategic, thematic and programmatic approach in the TC cycle. This strategic shift aims to enhance the effectiveness, efficiency, and impact of regional collaboration across the Asia and Pacific region, ensuring that diverse needs of Government Parties are addressed and that the benefits of nuclear science and technology are maximized for greater regional impact.

In addition to these advancements, the RCA GPs also took significant steps to strengthen the RCA governance in 2024. During the 53rd General Coordinating Meeting (GCM) held in September in Vienna, Austria, the GPs agreed to form a working group to follow up on the Rapid Review, including overseeing the revision of the Terms of Reference (ToR) for the RCA Programme Advisory Committee (PAC). This decision reflects a commitment to enhancing the governance framework and ensuring more efficiency, effectiveness and inclusiveness within the RCA. The working group held its first meeting in Vienna in November 2024, where members convened in person to discuss the Rapid Review. Follow-up virtual meetings were planned, with recommendations expected to be presented at the 47th NRM. At the 53rd GCM, the NRs also reached agreement to include non-RCA Pacific Island countries as observers into the 47th NRM.

[1] Report of the 46th NRM, 14-17 May 2024.

As part of the 68th General Conference, the RCA GPs, with the support of the RCA Regional Office (RCARO), hosted a side event titled "RCA: Advancing Sustainable Development in the Asia-Pacific Region". The event brought together delegates and experts to explore strategies for enhancing regional cooperation in nuclear science and technology. It provided a dynamic platform for stakeholders to exchange ideas and discuss the RCA's contributions to socio-economic development in the region.

In addition, with support from the RCARO, the RCA organized a Special Exhibition at the 2024 IAEA Ministerial Conference, themed "Bringing Prosperity to the Asia-Pacific: RCA." The exhibition showcased the RCA's achievements over its 52 years of operation and attracted a distinguished audience, including the Director General of the IAEA, the RCA Chair, National Representatives, senior officials from RCA GPs, and IAEA representatives.

Highlighting the socio-economic impact of the RCA in the region is essential. To assess the social and economic impact assessment of the RCA programme, an impact assessment was initiated on air quality monitoring and food irradiation and authenticity projects, supported through the TC programme from 2000 to 2023. The assessment was extensive process, requiring significant coordination and engagement with multiple stakeholders. By the end of 2024, a draft report on the impact of air quality monitoring was completed and reviewed by the RCA GPs, with preparation underway for final design and publication. Meanwhile, work progress continued on the food safety impact assessment report, which remained under preparation in 2024. The findings of these assessments are set to be disseminated in 2025 to RCA GPs, relevant stakeholders, and the public.

The "Introductory Workshop for New National RCA Representatives on RCA Programme and its Policy" was held by the RCARO in July in Seoul, Republic of Korea. The workshop aimed to provide information on IAEA/RCA frameworks and programmes to newly appointed National RCA Representatives from the past three years. A total of 35 participants attended the workshop.

In alignment with the RCA regional programme framework for 2024-2029, the RCA GPs successfully advanced the implementation of fifteen (15) active TC projects in 2024[2], including the launch of six (6) new projects, across various sectors such as agriculture, human health, and hydrology. In 2024, a total of 666 professionals, including almost 270 women[3], from RCA GPs participated in regional training courses, sponsorships, technical workshops and meetings, and initiatives were carried out on phased array ultrasonic testing, mutation breeding, and isotopic techniques. Two (2) projects were successfully concluded in 2024: RAS5088, and RAS9092.

Six (6) RCA project concept notes were submitted to and endorsed by IAEA for project design development. A project design team was formed for each proposal through a call for nominations sent to the NRs. By the end of 2024, all six project designs were finalized in the IAEA PCMF as planned and prepared for the next step: technical review by IAEA technical departments.

[2] Annex 1: List of RCA On-going Projects in 2024
[3] Annex 2: List of RCA Regional Events in 2024

Messages from RCA Support Team

Deng Ge
Director
Division for Asia and the Pacific
Department of Technical Cooperation International Atomic Energy Agency

2024 was another year of remarkable achievements for RCA. We witnessed a significant shift toward a more programmatic approach in technical cooperation project formulation, aligning with key IAEA flagship initiatives such as Rays of Hope, Atoms4Food, NUTEC Plastics, ZODIAC, and Atoms4 Net Zero. This strategic transition will further enhance the impact and effectiveness of RCA's initiatives.

A key milestone was the launch of the RCA social and economic impact assessment, aimed at evaluating the application of nuclear and isotope techniques in air quality monitoring, food safety, groundwater management, and nuclear medicine. This initiative provides valuable insights into the long-term benefits of RCA programmes over the past two decades.

Congratulations to all involved in the successful implementation of the RCA policy discussions, promotional forums, and both regional and national activities throughout 2024. These collective efforts have significantly strengthened the expertise of professionals while increasing RCA's visibility across the region.

Dae Ki KIM
Director
RCA Regional Office

In 2024, RCARO expanded its activities to enhance the visibility and impact of the RCA. The RCA Side Event at the IAEA General Conference and the Special Exhibition at the IAEA Ministerial Conference successfully showcased the RCA's achievements and its role in sustainable development in the Asia-Pacific region.

To meet the needs of the Government Parties, RCARO organized a workshop for new National Representatives completed the research project on access to radiotherapy, and conducted a survey on future priorities. Partnership was also strengthened through cooperation with the US DOE on eBeam technology.

RCARO also continued to foster the next generation through capacity-building and scholarship programmes, while providing support to the RCA Chair and policy discussions. We sincerely appreciate the cooperation of the IAEA and the Government Parties, and look forward to further advancing RCA's contributions to regional socio-economic development.

List of Acronym

ANSTO	Australian Nuclear Science and Technology Organization
APCNDT	Asia Pacific Conference for Non-Destructive Testing
ASEAN	Association of Southeast Asian Nations
ASEANTOM	ASEAN Network of Regulatory Bodies on Atomic Energy
ASPAMARD	Asia-Pacific Marine Radioactivity Database
BMS	Breeding Management System
COVID-19	Coronavirus Disease 2019
CSI	Chief Scientific Investigator
CT	Computed Tomography
DIR RCARO	Director of the RCA Regional Office
EB	Electron Beam
EPR	Electronic Patient Record
FP	Focal Person
GCM	General Conference Meeting
GP	Government Party
IAEA	International Atomic Energy Agency
IRMS	Isotope Ratio Mass Spectrometers
IRPA	International Radiation Protection Association
KAERI	Korea Atomic Energy Research Institute
KIRAMS	Korea Institute of Radiological & Medical Sciences
LCC	Lead Country Coordinator
MARIS	Marine Radioactivity Information System
MTS	Medium Term Strategy
MTSC	Medium-Term Strategy Coordination
NDT	Non-Destructive Testing
NPC	National Project Coordinator
NR	National RCA Representative
NRM	Regional Meeting of the National RCA Representatives
PPAR	Project Progress Assessment Report
RCA	Regional Cooperative Agreement
RCA PAC	RCA Programme Advisory Committee
RCARO	RCA Regional Office
RPF	Regional Program Framework
SAC	Standing Advisory Committee
SDGs	Sustainable Development Goals
STF	Special Task Force
TC	Technical Cooperation
TCDC	Technical Cooperation among Developing Countries
TO	Technical Officer
UNOSSC	United Nations Office for South-South Cooperation
WG	Working Group

Implementation of RCA Programme in 2024

RCA Programme Activities

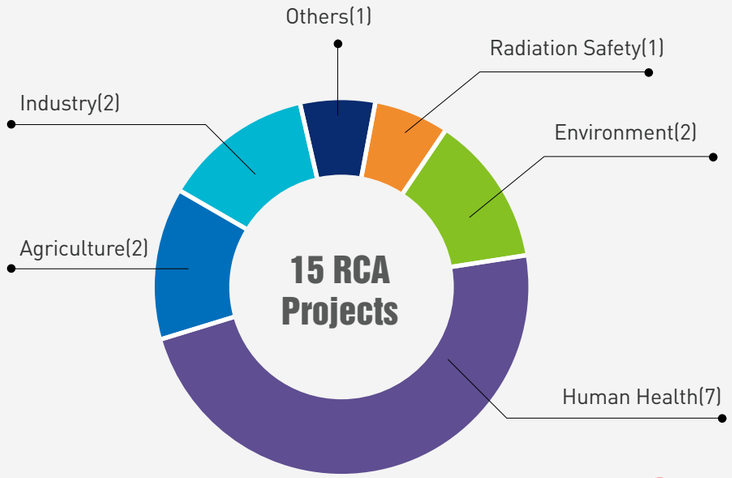
15 RCA Projects

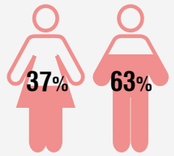
8 Training Courses
200 Participated

24 Meetings
449 Participated

54 Expert Assignments for
897 days

RCA Projects by Thematic Areas





89 RCA Activities **766** Participants **284** Women Participants

RCA Programme Fund

1.84 Million Euro
Budget Allocated

466,667 Euro
Extrabudgetary Contributed

713,523 Euro
In-kind Contribution Contributed

Implementation of RCA Programme Since 1972

186
RCA Projects

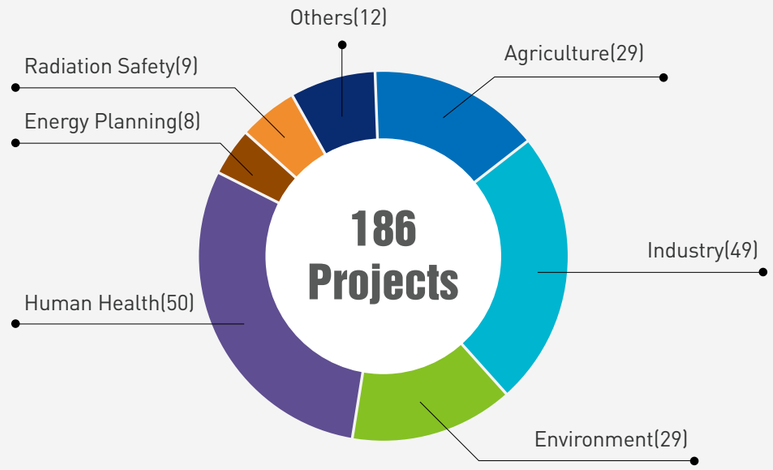
601
Meetings & Workshops

681 Training Courses

10,552
Trained Professionals

4,679
Experts and Lecturers

>>> **Total Budget:**
93.9 Million US$



What's RCA

The Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology for Asia and the Pacific (RCA) is an intergovernmental agreement for the South Asia, East Asia, Southeast Asia and the Pacific region, operating under the auspices of the IAEA. There are twenty-two (22) RCA Government Parties in the RCA. RCA GPs undertake, in cooperation with each other and with the IAEA, the RCA Programme to promote and coordinate cooperative research, development and training projects in nuclear science and technology that can improve the living conditions of the people and contribute to preserving the nature in the region. The GPs are represented by the National RCA Representatives (NRs) and have two policy meetings namely the Meeting of National RCA Representatives (NRM) and the General Conference Meeting (GCM) annually to address policy issues, development priorities, overall management of the RCA Programme and other relevant issues.

RCA Programme

Since its establishment, the RCA has served to promote regional cooperation and disseminate the peaceful uses of nuclear science and technology, contributing to the socio-economic well-being of the Asia-Pacific region. RCA has implemented a total of 186 projects, held 601 meetings and workshops and trained over 10,552 professionals through more than 681 training courses with a total budget of USD 93.9 Million invested during the last five decades.

With the aim to contribute to achieving the UN Sustainable Development Goals for Asia and the Pacific, the RCA Programme has been implemented in the areas of RCA Strategic Priorities including Agriculture, Environment, Human Health, Industry, and Radiation Safety and Energy Planning. Covering various subjects related to isotope and radiation applications, the RCA Programme consists of projects and activities to address the development needs of the GPs through diversified approaches such as regional training courses, expert missions, consultations and meetings to enhance the capability for utilising nuclear technology. Research Projects also involve coordinated research networks of national research institutions of the RCA to conduct research on themes or problems that are relevant to or can be resolved with nuclear science and technology. Other Cooperative Activities offer flexible means to complement the RCA Programme or respond to ad hoc needs in a timely manner.

In commemoration of the 30th Anniversary of the RCA and to increase the ownership of the RCA GPs, the RCA Regional Office was established in 2002, in Daejeon, Republic of Korea, supported by the Korean Government. To fulfil its mandate to increase the visibility and viability of the RCA, RCARO has undertaken various cooperative activities for the RCA. Over the past two decades, RCARO has implemented partnership projects, RCA Research Projects, and RCA promotional activities in a way that would secure extra funding from regional/international donors for the RCA Technical Cooperation Programme, and advocate the peaceful uses of nuclear science and technology to address the needs of the RCA GPs.

Vision

The RCA shall be recognized as an effective partner in providing nuclear technologies that enhance socioeconomic well-being and contribute to sustainable development in the region

Mission

- To identify and implement nuclear technologies for regional needs
- To encourage sustainability of nuclear technology capacities in RCA GPs
- To coordinate cooperative research in nuclear science and technology
- To promote the benefits of nuclear technologies and identify funding mechanisms
- To develop regional networks for the exchange of technologies, training and equipment

2024 RCA Programme

Thematic Sector	Project Number	Project Title	Lead Country	Implementation Period
Others (Management and Implementation)	RAS0092	Enhancing the Strategic Management of the Programme under the Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology for Asia and the Pacific (RCA)	ROK	2024-2027
Industry	RAS1028	Improving the Quality Management Practices in Radiation Processing Facilities for Better Performance and Applications (RCA)	MAL	2022-2025
	RAS1029	Enhancing Regional Capabilities in Advanced Non-Destructive Testing Techniques for Improved Safety and Inspection Performance in Industries (RCA)	MAL	2023-2026
Agriculture	RAS5088	Enhancing Crop Productivity and Quality through Mutation by Speed Breeding (RCA)	CPR	2021-2024
	RAS5091	Assessing and Mitigating Agro-Contaminants to Improve Water Quality and Soil Productivity in Catchments Using Integrated Isotopic Approaches (RCA)	AUL	2022-2025
Human Health	RAS6098	Standardizing Radiotherapy in Palliative Care (RCA)	JPN	2022-2025
	RAS6100	Strengthening Clinical Application of Hypofractionated Radiotherapy (RCA)	ROK	2022-2025
	RAS6101	Improving the Quality and Safety of Radiation Medicine through Medical Physicist Education and Training (RCA)	CPR	2022-2025
	RAS6105	Improving Cancer Management through Theranostics by Using Radioisotope Based Diagnostic and Therapeutic Techniques (RCA)	PKT	2024-2027
	RAS6108	Strengthening Cancer Care by Training Radiation Oncology Health Professionals in Consistent and Accurate Data Collection through Oncology Information Systems (RCA)	AUL	2024-2026
	RAS6109	Improving the Quality and Safety of Diagnostic and Interventional Radiology Services to Benefit Health Care by Enhancing the Status, Knowledge and Skills of Medical Physicists (RCA)	AUL	2024-2027
	RAS6110	Improving the Radiotherapy Capacity of Newcomer Government Parties (RCA)	JPN	2024-2027
Environment	RAS7040	Improving Water Resources Management Practices by Enhancing the Regional Collaboration in Environmental Isotope Analysis and Applications (RCA)	VIE	2022-2025
	RAS7043	Evaluating the Efficacy of Artificial Recharge to Groundwater in Water Scarce Regions using Isotope Techniques (RCA)	IND	2024-2027
Radiation Safety	RAS9092	Strengthening the Capacity to Respond to Radiological Emergencies of Category II and III Facilities (RCA)	ROK	2020-2023

REGIONAL COOPERATIVE AGREEMENT

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SECTION 1

OVERVIEW OF THE RCA PROGRAMME IN 2024

Section 1 provides a comprehensive overview of the RCA Programme in 2024, detailing its policy meetings, management and implementations, financial and in-kind contributions, and a summary of RCARO activities, offering valuable insights into the programmes' scope and achievements throughout the year.

SECTION 1

OVERVIEW OF THE RCA PROGRAMME IN 2024

REGIONAL COOPERATIVE AGREEMENT

I. Management and Implementation of the RCA Projects

1.1. Summary of the RCA Programme in 2024

In 2024, the RCA GPs successfully implemented more than thirty-five (35) planned events and activities across fifteen (15) ongoing projects, including the launch of six (6) new projects approved for the 2024/2025 cycle. The implementation utilized both in-person events hosted by RCA GPs and hybrid approaches to maximize participation and engagement. By the end of 2024, a total of 666 professionals, including 270 women, from RCA GPs participated in eight (8) regional training courses; three (3) sponsorships to participate in the IAEA's First Coordination Meeting of the Global Water Analysis Laboratory Network, to attend the IAEA's Training Course on Isotope-enabled Water Balance Modelling Using the JAMS/J2000 Modelling System, and to participate in the International Conference on Hybrid Imaging (IPET) 2024; seven (7) technical workshops and seventeen (17) coordination and expert meetings[6]. To support the RTCs, technical workshops and meetings, thirty-nine (39) experts (6 women), were recruited. Additionally, seventeen (17) experts undertook TC expert missions to support the national trainings, assessments, and expert group meetings. Thirty-seven (37) experts, including thirteen (13) women, were hired for home-based research and analysis assignments, with 25 of them coming from the region.

[6] Annex 2: List of RCA Regional Events in 2024

I. Management and Implementation of the RCA Projects

Activities	Number of times	Total participants	Lecturers/experts		Women participants
			Regional bases	Non-regional base	
Regional Training Course	8	200	8	8	86
Sponsorship	3	17	0	0	6
Technical workshop	7	112	10	3	43
Meeting	17	337	15	2	135
Total	35	666	33	13	270

Activities	Number of days	Number of experts	Regional bases	Non-regional base	Women
Expert mission	84	17	13	4	1
Home based assignment	813	37	25	12	13

Key achievements also included:

- A bank of questions for Phased Array Ultrasonic Testing (PAUT) Level 2 & 3, aligned with ISO 9712 and ISO/TS 25107 standards, and question banks on RT-D, also adhering to ISO 9712 and ISO/TS 25107 standards, were developed. These resources will be instrumental for testing institutions looking to adopt and implement PAUT certification at the national level.
- The Mutation Breeding Network, initially launched under the RCA, was expanded globally in 2024, bringing together experts and researchers from Asia and the Pacific to collaborate with specialists from other regions.
- The Asia and Pacific Radiation Oncology Network (ASPRONET) was sustained to facilitate knowledge exchange and best practices in cancer management. The hosting responsibility of this network rotates annually, with Pakistan taking over from New Zealand after 2024.
- A study on isotopic techniques and the recursive digital filter method was published in the Journal of Hydro-Environmental Research.
- A draft report on the social and economic impact assessment of air quality monitoring was completed and reviewed by the RCA GPs, with preparation underway for final design and publication. Meanwhile, work progressed on the food safety impact assessment report, which remained under preparation in 2024. The findings of these assessments are set to be disseminated in 2025 to RCA GPs, relevant stakeholders, and the public.
- Two projects were successfully completed in 2024: RAS5088, and RAS9092. Additionally, results summaries and success stories for RAS5088, RAS6096, and RAS7037 were compiled, with plans to publish and communicate RCA's achievements in 2025.

In 2024, six (6) RCA project concept notes were submitted to and endorsed by IAEA for project design development. These include two projects in human health, two in agriculture, one in marine environment, and one in water and wastewater treatment. To support the development of each proposal, a dedicated

I. Management and Implementation of the RCA Projects

project design teams were formed, bringing together experts nominated by participating countries. A virtual meeting with the IAEA TC Programme Coordination Team was organized for all project formulation teams to provide briefings on the process, requirements, results-based project design, and quality assurance criteria. Additionally, meetings with the IAEA thematic area Technical Officers (TOs) were held to discuss the programmatic approach for each project design. To refine their proposals, dedicated meetings were conducted with the RCA FP, NRs, country leads, PAC members and TOs. By the end of 2024, all six project designs were finalized in PCMF as planned and prepared for the next step: technical review by IAEA technical departments.

1.2. Summary of Financial and In-Kind Contributions

In 2024, the RCA programme utilized 1,714,639 Euros (66.65%) from the total combined allocation of the TC fund and extrabudgetary fund, which amounted to 2,572,491 Euros.

The total allocation of the TC fund for RCA in 2024 was 1,842,089 Euros, with an expenditure of 1,418,645 Euros, representing 77% of the allocated funds.

The total allocation of the extrabudgetary fund, based on 2024 work plan, amounted to 730,402 Euros with an expenditure of 295,994 Euros, representing 41% of the planned budget.

In 2024, EB fund contributions were received from the RCA GPs as follows. It is important to highlight that the extrabudgetary fund represents the total allocated budget for the projects over the entire implementation period, rather than just portion designated for 2024

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Country	Amount in Euros	Project
Australia	147,307.34	**RAS0092**: Enhancing the Strategic Management of the Programme under the Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology for Asia and the Pacific (RCA)
Japan	167,209.97	
ROK/RCARO	63,560	
Australia	37,015.14	**RAS6108**: Strengthening Cancer Care by Training Radiation Oncology Health Professionals in Consistent and Accurate Data Collection through Oncology Information Systems (RCA)
Australia	37,015.14	**RAS6109**: Improving the Quality and Safety of Diagnostic and Interventional Radiology Services to Benefit Health Care by Enhancing the Status, Knowledge, and Skills of Medical Physicists (RCA)
Malaysia	10,000	**RAS1028**: Improving the Quality Management Practices in Radiation Processing Facilities for Better Performance and Applications (RCA)
Philippines	4,560	**RAS0092**: Enhancing the Strategic Management of the Programme under the Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology for Asia and the Pacific (RCA)
Total	**466,667.59**	

I. Management and Implementation of the RCA Projects

In-kind contribution

In-kind contributions have been recognised since the RCA Agreement commenced in 1972. In line with TC practice, In-kind contributions are understood as cost-free goods and/or services provided by a Party (Donor) for the benefit of one or other Parties (Recipients) in implementing a specific project. The RCA GPs have agreed that for reporting purposes, the financial contribution of each RCA GP to the RCA programme be calculated based on an adopted and non-discriminatory measure of the In-kind contribution and presented in the RCA Annual Reports. The total amount of In-kind contributions made by the RCA GPs was calculated as € 713,523 in 2024.

1.3.Progress Monitoring and Reporting

Progress monitoring of the RCA programme is overseen by the NRs. Annual achievements, challenges, and lessons learned are documented in the Project Progress Assessment Report (PPAR), while final achievements are recorded in the Project Achievement Report (PAR). In 2024, the RCA Projects' progresses of 2023 were reviewed and discussed by the NRs during the 46th NRM.

At the project level, the project teams met both in person and virtually for coordination meetings to discuss and review progress, challenges, lessons learned, as well as plan future actions, and celebrate the collective achievements. In total, six (6) mid-term coordination meetings; three (3) final coordination meetings; and six (6) first coordination meetings were organized in 2024.

1.4. Challenges in Implementation

In 2024, the key challenge was the implementation of the NRs' decision to shift the TC project design towards a strategic, thematic and programmatic approach. Successfully aligning with this new approach requires a collaborative effort between the NRs and regional experts as well as the RCA FP and IAEA TOs, working together toward a common goal.

Another key challenge was quantifying and assessing the impact of regional training courses (RTCs) on national-level changes. More comprehensive assessments are needed from national project implementation teams to measure these effects.

While the NRs achieved the 2024 resource mobilization goal of 400,000 Euros, additional funds and partnerships will be required to sustain the current level of TC project implementation.

1.5. Summary of the RCA Regional Office (RCARO) Activities

RCARO has implemented various cooperative activities to fulfil its mandate to increase the visibility and viability of the RCA and mobilize new resources for the RCA TC Programme. In an effort to promote the RCA, RCARO hosted the RCA Side Event during the 68th IAEA General Conference Meeting in September and the RCA's Special Exhibition during the IAEA's Ministerial Conference in November.

To address the needs of the GPs, RCARO held an introductory workshop for the new RCA NRs in July to enhance their understanding on the RCA Programme and its policy, inviting fourteen (14) RCA NRs and RCA experts. RCARO also continued supporting the cooperative research through Research Project on

I. Management and Implementation of the RCA Projects

Closing the Gap in the Access to Radiotherapy in RCA (RCA RP03). With the completion of the RP03 in 2024, RCARO conducted a survey of the needs of the GPs for new project until December.

In pursuit of expanding partnerships for the RCA, RCARO implemented a partnership project with the US DOE and conducted technical workshops and expert missions to support the adoption of eBeam technology and its applications in various areas such as food and agriculture, human health and environment treatment.

Moreover, RCARO conducted various capacity-building activities and trained more than 1,600 professionals in the application of nuclear science and technology since its establishment. The RCARO Scholarship Programme supports Master's and PhD students in cooperation with leading Korean institutes: KAIST, KINGS, and UST. RCARO also continued providing secretariat support for the RCA in preparations of the policy meetings.

1.6. Planned Regional Events in 2025

Looking ahead to 2025, approximately 37 regional events are planned across 14 projects, including the 47th NRM in Fiji from 19th to 23rd May and the 54th GCM in Vienna, Austria on 12th September.

Additionally, efforts will focus on strengthening RCA governance to enhance its effectiveness, efficiency, and inclusivity, while continuing joint initiatives to promote inclusion.

The social and economic impact assessments on isotope hydrology and nuclear medicine will be completed, and the four publications of the assessment will be officially launched to disseminate the results.

Further priorities include finalizing RCA project designs for the 2026/2027 cycle and preparing for the 2028/2029 cycle.

SECTION 2

IMPLEMENTATION STATUS OF THE TECHNICAL PROJECT IN 2024

Section 2 is structured into two main sections: 2.1 Completed Project in 2024 and 2.2 Ongoing Projects in 2024, encompassing six thematic sectors including agriculture, environment, human health, industry, radiation safety, and others. Within each project, information is presented, starting with the status of achievement based on the Logical Framework Matrix (LFM), followed by project activities, and highlights from the year 2024.

SECTION 2

IMPLEMENTATION STATUS OF THE TECHNICAL PROJECT IN 2024

REGIONAL COOPERATIVE AGREEMENT

II. Implementation Status of the Technical Project

In 2024, the RCA GPs successfully advanced the implementation of fifteen (15) active TC projects, including the launch of six (6) new projects, across various sectors such as industry, agriculture, human health, and hydrology. Two projects were successfully completed in 2024: RAS5088, and RAS9092.

2.1. Completed Projects in 2024

The achievements of the two closed projects are highlighted as follows:

2.1.1. Agriculture

• **The RAS5088 project** has significantly advanced mutation breeding and speed breeding, leading to improved crop productivity, resilience, and farmer incomes across multiple countries. These efforts have strengthened global research networks, fostered international collaborations, and enhanced food security, contributing directly to the Sustainable Development Goals (SDGs).

Strengthening Partnerships. Fifteen (15) senior scientists from Asia and the Pacific participated in the Second Workshop on the Plant Mutation Breeding Network for Asia-Pacific. The workshop led to the establishment of MBN+ (Mutation Breeding Network Plus), expanding collaboration beyond Asia-Pacific to include Europe, Africa, and Latin America. The MBN+ aims to strengthen global capacity in mutation breeding and biotechnologies to support the Sustainable Development Goals (SDGs); enhance international collaboration in joint research and resource mobilization and foster a robust research network for knowledge-sharing, learning, and application of advanced breeding techniques.

Capacity-Building Success Stories. 121 young researchers (61 women, 60 men) from Government Parties (GPs) have strengthened their skills and technique through the IAEA's trainings on Mutation by Speed Breeding (MbyS). Additionally, mutated crop varieties developed through the project were

II. Implementation Status of the Technical Project

distributed to both women and men farmers in GPs. Notably, mutated rice variety was successfully cultivated by a woman farmer in Lao PDR as part of the participatory varietal selection process within the farmer field school setting, highlighting the project's impact on gender empowerment and agricultural innovation.

RTCs and workshops facilitated international collaboration. For example, scientists from Lao PDR secured research funding from the Mekong Korean Cooperation Fund (MKCF) for a joint mutation breeding programme between the National Agriculture and Forestry Research Institute (NAFRI) of Lao PDR and the Agricultural Genetics Institute (AGI) of Vietnam. Additionally, institutions from Indonesia, Malaysia, Thailand, China, and Vietnam have supported this effort by irradiating rice and mungbean seeds.

Training courses and research funding under Mutation by Speed Breeding (MbyS) have enhanced global research capacity:

The IAEA provided a growth chamber and key facilities to Mongolia, enabling the country to establish speed breeding techniques for wheat breeding, particularly for disease resistance.

Using skills gained from RTC, Malaysia is organizing RTC under RAS5098 project on Mutation Breeding for Abiotic Stress Tolerance from 7th to 11th October 2024 for Pacific Island participants.

Two regional training courses held in Indonesia inspired young researchers from the Philippines to enhance the Field Rapid Generation Advance (FRGA) system under PHI5036. The improved system shortened the days to heading by 2–3 weeks, allowing up to three breeding cycles per year. As a result, 13 promising rice mutant lines are undergoing multi-location trials.

Impact of Mutant Varieties and their Applications in participating countries. Through a combination of mutation breeding and speed breeding, participating countries have developed crop varieties with improved quality, yield, and stress tolerance. These advancements have had significant socio-economic impacts:

Australia. The Clearfield barley variety "Scope" (a direct mutant) led to the fast-tracked release of new Clearfield barley varieties: Maximus CL (2021), Commandus CL (2024), and Zena CL (2024). These varieties now account for 50% of Australia's total barley production, estimated at 13.5 million tonnes in 2023, with a market value of $2.4 billion. The same mutation breeding protocol was used to release four wheat mutant varieties.

China. Hangmai802, a wheat mutant bred using space mutagenesis and double haploidy, was released in 2021 with high yield and salt tolerance. It has the potential to increase grain production by 50 million tonnes and may be cultivated across 70,000 hectares in the coming years, benefiting thousands of farmers.

India. The blackgram mutant varieties TJU-339 and TJU-130 have 19–23% higher yield potential than traditional varieties. These varieties yield 1,100–1,200 kg/ha, compared to 500–600 kg/ha for local varieties. Farmers benefit from $530 per hectare in increased earnings due to improved yields and reduced pesticide use, as both varieties are resistant to yellow mosaic disease. In 2024, these varieties were cultivated across 1,000 hectares, with demand expected to grow.

Lao PDR. The mutant rice variety "Saphart 1" yields 5.0–5.9 tons per hectare, significantly higher than traditional varieties (3.0–4.5 tons/ha). 25 tons of seeds have been produced, covering 416 hectares across 8 provinces. The premium-quality seeds command a 43% higher market price than standard paddy.

Myanmar. The sugarcane mutant "Myabayin", developed through in-vitro mutagenesis, is now widely adopted by private sugar mill industries. It has 80% higher yields, and in 2024, the cultivated

II. Implementation Status of the Technical Project

area expanded to 10,000 hectares. Sugarcane prices have increased from $75 per tonne (2023–2024) to $100 per tonne (2024–2025), adapting to rising domestic sugar prices. Myanmar's annual sugar production is expected to increase by at least 50%, raising farmers' incomes by $11.5 million.

Pakistan. High-yield and virus-resistant varieties of mungbean and soybean were successfully developed under the project. One such variety, named Abbas Mung, was developed using gamma ray mutagenesis. This mungbean variety has shiny, medium-sized seeds with improved taste and is resistant to MYMD and ULCV diseases. Abbas Mung yields 19% more than existing varieties. The mungbean variety released by NIAB now occupies 50% of the total mungbean cultivation area. Its high yield potential can provide farmers with an additional income of approximately USD 250 per hectare, contributing an estimated USD 50 million to the national economy.

Thailand. The mungbean mutant variety "Chai Nat 3", developed from 400 Gy gamma irradiation, was released in 2022. It is high-yielding, rich in starch, and has large seeds, covering 78,400 hectares (70% of Thailand's total mungbean area). Farmers using certified seeds achieve at least 10% higher yields, increasing income by $180 per hectare.

Viet Nam. Through the project, Viet Nam successfully developed and deployed five new mutant varieties of soybeans and peanuts. The new DT2010 soybean variety has replaced the previously popular DT84, now covering an area of 20,000 hectares and benefiting approximately 400,000 farmers. In total, the new varieties are cultivated on 30,000 hectares, significantly improving yields and economic outcomes for local farmers. The country also strengthened its scientific capacity by applying methods such as marker-assisted selection and gene editing to develop crop lines with enhanced resistance to diseases, drought, and salinity.

Status of Achievements based on LFM.

Objective: To improve food security in the Asia and Pacific region through faster release of mutant varieties with improved crop productivity and quality.		
Outcome: Established mutation by speed breeding (MbyS) approach in the RCA GPs for faster development of promising new mutant lines through speed breeding technologies.		
Output	**Indicator and Target**	**Status of Achievements until 2024**
Output 1: Project management structure established.	**Indicator**: Project activities and budget are implemented and utilized as planned. **Baseline**: Not mandatory **Target**: All activities and budgets implemented on time.	**Achieved.** The Final Review Meeting, held from November 18 to 22 in Vientiane, Lao P.D.R., confirmed that all planned activities were successfully completed. The project utilized a total of 554,459.42 Euros, comprising 480,338 Euros from TCF, and EB fund contribution of 74,121 Euros from China. This exceeded the original planned TCF of 425,250 Euros.
Output 2: Personnel trained in Mutation by Speed Breeding (MbyS) protocols in GPs institutions.	**Indicator**: 6 researchers per GP to be trained on MbyS by end of the project. **Baseline**: No researchers in the region trained on MbyS protocols. **Target**: 102 researchers have been trained on MbyS.	**Achieved.** A total of six regional training courses were conducted during the implementation of the project, benefiting 121 researchers, including 61 women, from participating countries. These courses covered key topics essential for modern crop improvement, including: (1) a virtual regional training course on Digital Breeding Management Systems and Field Experimental Data Analysis held from 22 November to 3 December 2021; (2) a virtual Regional Training Course on Double Haploidy for MbyS toward Crop Improvement held on 15-16 March 2022; (3) a Virtual RTC on Application of Genomics, Genotyping held on 10-14 October 2022; (4) a Regional Training Course on Application of Double Haploidy for Mutation by Speed Breeding (MbyS) toward Crop Improvement held on 5-9 December 2022 in Jakarta, Indonesia; (5) Regional Training Course on Mutation by Speed Breeding (MbyS) for Abiotic Stress Tolerance held on 7-18 August 2023 in Jakarta, Indonesia; (6) Regional Workshop on Accelerating Climate-Resilient Crop Improvement: Optimizing Speed Breeding for Plant Mutation Breeding Applications held on 15-19 April 2024 in Hanoi, Viet Nam; and (7) Regional training course on Genomics, Genotyping, Phenotyping, and Genetic Handling of Mutants held on 28 October to 8 November 2024 in Faisalabad of Pakistan.
Output 3: Mutation by Speed Breeding (MbyS) protocols established in GPs.	**Indicator**: At least 4 protocols based on local facilities and adopted to local environments to be developed by the efforts of all participating GPs by the end of project. **Baseline**: No protocol on MbyS. **Target**: At least 4 protocols of MbyS developed in the region.	**Achieved.** The protocols for mutation through double haploidy, rapid cycling, marker-assisted selection, etc., have been established or optimized in GPs, and the final documents have been prepared, ensuring standardized methodologies for future applications.
Output 4: Promising mutant lines from Mutation by Speed Breeding (MbyS) protocols by GPs.	**Indicator**: At least 5 mutant lines developed by MbyS approach by the end of project. **Baseline**: No mutant lines bred by MbyS. **Target**: 5 promising mutant lines produced by MbyS.	**Achieved.** The participating GPs reported significant advancements in crop improvement through mutation and speed-breeding protocols. A total of 2,170 stable mutants, 131 promising mutant lines, and 40 mutant varieties currently undergoing dissemination have been developed across various crops as part of this project.

Key recommendations from the project implementation team are highlighted below:

a. Participating GPs should allocate financial resources to support the implementation of project workplans and ensure the continuous optimization and application of Mutation by Speed Breeding (MbyS).

b. The selection of candidates for training courses should align with the objectives and needs of the National Work Team to maximize project impact.

c. Participating GPs are encouraged to facilitate the exchange of mutant germplasm through bilateral agreements, fostering collaboration and resource-sharing.

d. NPCs should regularly provide updated information on both existing and newly developed mutant varieties to the

II. Implementation Status of the Technical Project

FAO/IAEA Mutant Variety Database (MVD). The MVD submission form can be downloaded from the MVD website and submitted directly to the MVD administrator.

e. Countries without in-house irradiation facilities are encouraged to utilize the irradiation services of the FAO/IAEA Plant Breeding and Genetics Laboratory in Seibersdorf, Austria, or collaborate with other participating countries that have such facilities (refer to Annex V for a list of available facilities).

f. All participating GPs should actively use the AOAPM and MBN websites to stay informed about regional advancements in plant mutation research. They are also encouraged to contribute relevant data and updates on mutation breeding from their respective countries to the platform (AOAPM/MBN website).

2.1.2. Safety and Security

• **The RAS9092** project, launched in 2020 for an initial four-year period and later extended until December 2024, was designed to enhance the capacity of RCA participating countries in managing radiological emergencies at Category II and III facilities. The project focuses on strengthening radiation safety measures for both workers and the public by implementing protection strategies aligned with the IAEA safety standards (GSR Part 7).

Despite challenges, including disruptions caused by the COVID-19 pandemic, the project made necessary adjustments to ensure successful implementation. As a result, key objectives were met, and significant outcomes were delivered. In particular, the project played a pivotal role in improving Emergency Preparedness and Response (EPR) capabilities across participating countries. Many countries strengthened regulatory frameworks, improved planning, and invested in human resource development to bolster emergency preparedness. Essential equipment, such as personal radiation detectors, was successfully procured through the IAEA and distributed, further enhancing EPR capabilities. 83% of countries reported advancements in planning and regulatory frameworks. 75% improved efforts to align with IAEA safety standards. 67% enhanced procurement capabilities. A 33% increase was recorded in environmental monitoring efforts.

The project utilized a total extrabudgetary fund of 596,239.47 Euros out of the allocated 686,161 Euros. This funding was made possible through contributions from the Government of the Republic of Korea, which provided 321,955 Euros, and the Government of Norway, which provided 364,206.24 Euros.

Country-Specific Progress and Challenges.

Across participating countries, the RAS9092 project led to significant improvements in emergency preparedness and response (EPR), regulatory frameworks, and training. However, key challenges remain, including resource constraints, stakeholder coordination, regulatory gaps, and the need for continuous training and capacity-building. Addressing these challenges through follow-up initiatives and enhanced regional cooperation will be essential to sustaining and furthering these achievements.

Australia has successfully enhanced compliance with national regulatory requirements in alignment with IAEA GSR Part 7, contributing to improved radiation safety practices. ANSTO applies a holistic, yet graded, approach in implementing the requirements of IAEA GSR Part 7 and has successfully completed hazard assessments and protection strategies for its nuclear installation. Outreach efforts with State and Territory (sub-national) jurisdictions have increased awareness and understanding of radiation protection principles.

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Bangladesh completed the EPRIMS self-assessment and an EPREV preparatory meeting. Significant progress was made through the upgrading of the Safety Analysis Report (SAR) for the 3MW BAEC TRIGA Research Reactor (BTRR) and the development of the National Nuclear and Radiological Emergency Preparedness and Response Plan (NNREPRP). However, challenges remain, particularly the need to complete a hazard assessment and develop a comprehensive protection strategy.

Indonesia carried out webinars, online training, internships, regional workshops, and RTCs, leading to significant progress in national nuclear ERP. New emergency plans were developed at both the facility and site area levels, ensuring alignment with international standards. Challenges remain, including the need to reorganize the EPR structure and enhance senior officials' understanding of IAEA GSR Part 7 requirements.

Republic of Korea conducted a comprehensive review of IAEA GSG-11, Operational Intervention Levels (OILs), and its environmental monitoring system. Key achievements include: (1) improved emergency planning guidelines for Category II and III facilities; (2) adoption of a pre-distribution strategy for potassium iodide (KI); (3) upgraded marine radiological monitoring system. Challenges include amending national laws to align with IAEA GSR Part 2, refining the graded approach for Category II and III facilities, and optimizing emergency exercise schedules for better preparedness.

Lao PDR conducted a virtual training course on radiological security response and organized a workshop with EPR drill exercises. Key achievements include: (1) strengthened human capacity for radiological emergency preparedness; (2) drafting EPR guidelines for relevant organizations.

Malaysia conducted training sessions, workshops, and emergency drills to strengthen EPR capabilities. Authorities successfully complied with the latest Orders, Standard Operating Procedures (SOPs), and EPR plans, ensuring alignment with international standards.

Myanmar focused on: (1) assessing the EPR plan; (2) coordination meetings and knowledge-sharing activities; (3) field exercises training police and customs officers; (4) EPR awareness programs in collaboration with the Myanmar Port Authority; (5) Key achievements include establishing national coordination mechanisms and drafting a nuclear and radiological EPR plan. However, challenges persist, including the need for skilled personnel, regulatory strengthening, and enhanced capacity-building for stakeholders.

Nepal drafted an EPR plan, with the 2024 Directives for Radiological Emergency Preparedness and Response submitted for government approval. Personal Radiation Detectors (PRDs) were distributed to improve response capacity. However, there is a critical need to enhance GSR Part 7 understanding and conduct national training courses for improved preparedness.

Pakistan undertook key initiatives such as: (1) Training programs and offsite emergency drills; (2) establishment of Radiation Emergency Medical Assistance Teams (REMATs); (3) conducting an Emergency Preparedness Review (EPREV); (4) major achievements include the development of a National Radiological Emergency Plan (NREP), facility emergency plans, and training programs for emergency response personnel and medical teams. Remaining challenges include strengthening stakeholder coordination, training public-sector medical professionals in contamination treatment, and developing strategies for radioactive waste management during emergencies.

II. Implementation Status of the Technical Project

The Philippines engaged in: (1) RTC participation, emergency exercises, and webinars; (2) IAEA Expert Mission support for RADPLAN revision; (3) key achievements include increased awareness of IAEA GSR Part 7 requirements, facility categorization, and improvements to RADPLAN and emergency plans for better alignment with international standards. Challenges remain in human resource limitations, gaps in GSR Part 7 understanding, strengthening emergency plans for Category II and III facilities, and acquiring sufficient monitoring instruments.

Thailand focused on: (1) drafting the National Nuclear and Radiological Emergency Plan; (2) developing regulations for licensees; (3) establishing operational guidelines. Key achievements include: (1) training Radiation Safety Officers and first responders; (2) procuring Personal Radiation Detectors (PRDs); (3) establishing the National Nuclear and Radiological Emergency Administration Center (NuREAC); (4) introducing the EPR Smart Tool and Smart Plans. Challenges include budget constraints, limited EPR staff, and the need to enhance medical emergency preparedness at pre-hospital, hospital, and long-term recovery levels.

Viet Nam focused on: (1) updating emergency response plans for the Dalat Nuclear Research Institute; (2) conducting training courses and practical emergency exercises in Da Lat and Da Nang. Key achievements include: (1) developing national and facility-level emergency plans; (2) improving EPR systems and technical support; (3) enhancing legal frameworks to support stakeholder collaboration. However, challenges persist due to limited manpower and budget constraints.

Status of Achievements based on LFM.

Objective: To ensure radiation safety for workers and the public during nuclear or radiological emergency in the RCA region.

Outcome: Capabilities developed among operators and NRAs in the RCA GPs for establishing adequate emergency preparedness and response procedures for category II and III facilities, using a graded approach.

Output	Indicator and Target	Status of Achievements until 2024
Output 1: Project management structure established.	**Indicator**: An agreed project implementation programme. **Baseline**: This project is the first project on the protection strategies for EPR of Category II and III facilities under the RCA. **Target**: Project teams are to be confirmed by the Q1 of 2020 and meetings in conjunction with technical workshops will be implemented annually.	**Achieved.** From the project's inception in 2020, all participating countries appointed National Project Coordinators and National Project Teams, establishing structured work plans to guide their efforts effectively.
Output 2: Regulators and operators trained in the field of radiation protection strategies for emergencies of category II and III facilities.	**Indicator**: The number of regulators and operators trained in the field of radiation protection strategies for emergencies of the Category II and III facilities. **Baseline**: This project is the first project on the protection strategies for EPR of Category II and III facilities under the RCA. **Target**: 25 personnel involved in EPR trained through two RTCs, four expert missions and national training courses/workshops by 2023.	**Achieved.** A total of 94 personnel, including 42 women, involved in EPR received training through two RTCs, a regional workshop, and a webinar. These capacity-building activities covered key aspects of radiological emergency management: (1) webinar on introduction to the IAEA Safety Standards and Protection Strategies held on 7 September 2021; (2) regional training course on Development and Use of Operational Intervention Levels (OILs) for Reactor Emergencies held on 3-7 October 2022; (3) Regional Training Course on Developing a Protection Strategy for a Nuclear or Radiological Emergency held on 31 October to 3 November 2022; and (4) Regional Workshop on Development of National Radiation Emergency Plan (NREP) (Including Hazard Assessment) held on 25-29 March 2024 in Pattaya, Thailand.
Output 3: A handbook of pilot cases of protection strategies for emergencies of category II and III facilities developed.	**Indicator**: A handbook of pilot cases of protection strategies for emergencies of Category II and III facilities. **Target**: Most of the RCA GPs do not have the appropriate EPR plans for Category II and III facilities required by IAEA safety standards Operational handbook will be developed and finalized by 2023	**Adjusted.** A regional workshop was conducted instead of developing a handbook as advised by the IAEA. During the project's concept and approval stage, the development of a handbook compiling pilot cases of protection strategies was initially considered to support their establishment. However, during implementation, it became evident that various IAEA publications on protection strategies had since become available. To maximize efficiency and directly address the needs of participating countries, the project opted to fully utilize these existing resources. Instead of duplicating efforts, regional workshops on specific themes were conducted to strengthen human and institutional capacities for establishing protection strategies while avoiding redundancy with available IAEA publications.
Output 4: Expert network established.	**Indicator**: Online platform established on the RCARO website. **Baseline**: This project is the first project on the protection strategies for EPR of Category II and III facilities under the RCA. **Target**: Online platform will be established by 2020 and used throughout the project.	**Achieved.** An online platform was established on the RCARO website to facilitate information sharing and networking among participating GPs.

Key recommendations from the project implementation team are highlighted below:

a. While the project has significantly improved EPR capacities, substantial capacity-building needs related to EPR plans and procedures remain. Follow-up activities will be crucial to both sustain and enhance these gains.

b. Despite notable progress in adopting and applying IAEA safety and security standards, challenges persist in several critical areas of EPR. These challenges primarily involve understanding and implementing GSR Part 7 requirements, effective planning, and the development of robust protection strategies.

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c. To address these ongoing challenges, follow-up projects have been recommended. These initiatives should focus on enhancing EPR plans and procedures through targeted training programs and workshops that are tailored to meet the specific needs of each country. Given the diverse conditions and priorities across participating nations, a flexible and customized approach will be essential for overcoming existing barriers.

d. Additionally, it is recommended that future efforts include training and guidelines on managing radioactive waste during emergencies. This will further strengthen preparedness and response capabilities across all participating countries.

2.1.3. RCA Research Project

• To support the need of the GPs on cooperative research in the nuclear science and technology, RCARO has implemented the **RCA Research Project (RCARP03)** on closing the gap in radiotherapy access in the RCA Government Parties in 2022-2024. It aims to improve cancer planning and scale up radiotherapy services by providing evidence-based information on the radiotherapy services. According to the work plan, all project activities have been successfully implemented until 2024; 3 research coordination meetings (two of them combined with technical workshops) and 2 research training courses.

In 2024, a research training course on outcome assessment was held virtually from 19 to 20 February inviting over 50 participants including the Chief Scientific Investigators (CSIs) and research team members of the participating countries and relevant experts. Also, a research coordination meeting was held from 6 to 8 May 2024 virtually, inviting 23 participants including the CSIs, Technical Officer and relevant experts. The meeting reviewed the progress/results of the research activities towards project completion in 2024. In conjunction with the meeting, a technical workshop on the outcome assessment was held to provide a more practical and advanced knowledge and guidelines for the research to carry out in 2024, following the workshop held in February 2024. Using the data produced under the project, the participating countries have published two papers in the Lancet Oncology journal; Current and projected gaps in the availability of radiotherapy in the Asia-Pacific region: a country income-group analysis and Radiotherapy services in the Philippines: exploring geographical barriers to improve access to care. As it concluded in 2024, RCARO plans to make a final report of the project in cooperation with the relevant experts in 2025.

II. Implementation Status of the Technical Project

2.2. Ongoing Projects in 2024

2.2.1. Industry

RCA TC programme continues to play a pivotal role in advancing industrial applications of nuclear science and technology across the Asia-Pacific region. Through the implementation of projects, which include technical training programmes, workshops, and expert missions, the RCA enhanced regional capacities in the field of non-destructive testing techniques and applications, thereby strengthening sustainable industrial development. These projects not only improved industrial efficiency and safety but also contributed to sustainable development objectives by fostering synergies and promoting better resource management at the regional level.

• **The RAS1028** project, aimed at enhancing quality management practices in radiation processing

facilities for improved performance and applications, commenced in 2022 and is scheduled to conclude in December 2025. Out of the 5 outputs, 2 have been completed, and 3 are on schedule. This results in a cumulative progress of 40% (2/5). Overall, all outputs of the project are progressing as planned and are on track to fully achieve the target.

In 2024, a mid-term review meeting was held in Suzhou, China, from 4th to 8th March to evaluate progress since the project's inception and to plan the remaining activities through the project's conclusion in 2025. The project also organized two RTCs focused on quality assurance and quality control in dosimetry applications:

- Gamma Dosimetry Application – Held from 24th to 28th June 2024, in Quezon City, Philippines, benefiting 22 professionals, including 10 women.
- Electron Beam Dosimetry – Conducted from 7th to 11th October 2024, in Ho Chi Minh City, Viet Nam, benefiting 18 professionals, including 10 women.

An expert mission was requested by and deployed to Malaysia from 26th to 29th August 2024 to provide specialized training on uncertainty measurements for gamma and electron beam (EB) plant dosimetry systems, further strengthening technical expertise within the project team.

The project utilized 127,989 Euros (79%) from its combined TC and EB budget allocation of 162,916.35 Euros in 2024.

II. Implementation Status of the Technical Project

Status of Achievements based on LFM.

Objective: Improve the level of competitiveness and customer satisfaction of radiation processing facilities in RCA GPs.

Outcome: To improve QM practices conforming to international standards established at irradiation facilities of the participating GPs.

Output	Indicator and Target	Status of Achievements until 2024
Output 1: Project management team operational.	**Indicator**: The number of GPs that have established a project management structure. **Baseline**: 0 **Target**: (1) Number of GPs that have appointed NPCs – 17; (2) Number of GPs that have appointed National Project Teams – 17; (3) Number of GPs that have prepared national work plans – 17; (4) Number of GPs that submit progress reports – 17. (within 3 months of the commencement of the implementation of the project)	**Completed.** 16 GPs reported on the establishment of project team. 16/17 team = 94%
Output 2: Guidelines on conforming to the international standards relevant to the radiation processing facilities established.	**Indicator**: Availability of the manual. **Baseline**: 0. **Target**: The guideline is drafted and finalized by the Second Quarter of the 2022 by Q2/2022.	**On track.** The project successfully completed and delivered 14 guideline documents to all GPs in April 2023. Developing guidelines for compliance with international standards is challenging due to the varying levels of expertise among Government Parties—ranging from beginner to intermediate to expert. During the RTC in Kuala Lumpur (December 2022) and the mid-term review meeting in China (March 2024), GPs agreed to prioritize a foundational understanding of quality management practices. Consequently, following an online meeting between the LCC and TO, it was decided to introduce a standard ISO document as an initial reference and guidance. A total of 14 ISO standard documents were obtained and distributed to all GPs in April 2023.

II. Implementation Status of the Technical Project

Output 3: Personnel trained in establishing integrated/QM practices in radiation processing facilities.	**Indicator**: The number of trained personnel. **Baseline**: 109 (trained personnel from China is not counted). **Target**: (1) 2 personnel x 17 GPs x 4 RTCs = 136 trained personnel by Q2/2024. (2) 10 personnel x 17 GPs in NTC = 170 trained personnel by Q4/2024	**On track.** A total of 229 participants have benefited from Regional Training Courses (RTCs), including 70 professionals have gained expertise through National Training Courses (NTCs).
Output 4: Laboratories capable of carrying out calibrations and measurements required to conform to quality standards.	**Indicator**: Number of GPs with laboratories capable to carry out calibrations and measurements required to conform to quality standards. **Baseline**: 8 **Target**: One laboratory per GPs participated that meet required quality standard by Q4/2024.	**On track.** The project has successfully completed four RTCs, one workshop, one guideline distribution, and one dosimetry intercomparison exercise. Identifying a laboratory capable of performing the necessary calibrations and measurements to meet quality standards within a short timeframe is challenging. Many GPs struggle to comply with stringent standards due to financial constraints, staffing shortages, and the demanding requirements involved.
Output 5: Documentation required to obtain certification of the QMSs from certification bodies of the participating GPs established.	**Indicator**: Number of GPs with required documentation. **Baseline**: 10 **Target**: One QMS document per GPs participated that conform to certification bodies of the participating GPs by Q5/2025.	Due to significant differences in quality management practices among GPs, this output's target has not yet become a priority for all. The focus was agreed on compiling a list of relevant documents that can assist GPs in obtaining a QMS certificate from a recognized certification body.

• **The RAS1029 project**, which began in 2023 and will run through 2026, focuses on strengthening regional capabilities in advanced non-destructive testing (NDT) techniques to enhance safety and inspection performance across industries. GPs have been actively involved in implementing the project's activities, demonstrating strong engagement. The project is progressing according to the implementation work plan, with no delays, and it is expected that the planned outcomes will be achieved as scheduled.

To date, 36 personnel have been trained in advanced NDT (Radiography Testing - Digital (RT-D) and Phased Array Ultrasonic Testing (PAUT) against a target of 51, and 21 personnel have been trained in NDT for civil structures, also with a target of 51. However, no personnel have yet been trained in NDT for composites, with a target of 34. The knowledge and experience gained through participation have been

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successfully disseminated to the national level.

An expert group meeting took place in Christchurch, New Zealand, from 15th to 19th April, to develop a draft document and question bank on Phased Array Ultrasonic Testing (PAUT). The question banks were developed in line with ISO 9712 and ISO/TS 25107 standards. Another expert group meeting was held in Vienna from 14th to 18th October to develop question banks on RT-D, also adhering to ISO 9712 and ISO/TS 25107 standards.

In addition, a consultancy meeting on the preparation of training materials and e-learning modules for non-destructive testing applications in civil engineering was conducted from 13th to 17th May.

In 2024, the project organized a mid-term review meeting in Bangkok, Thailand, from 7th to 11th October to evaluate progress since the project's inception and to plan the remaining activities leading up to its conclusion in 2026.

The project also hosted a regional workshop on Non-Destructive Testing (NDT) techniques for quality control in civil engineering, held in Singapore from 9th to 13th September, benefiting 20 participants, including 2 women.

The project utilized 195,984 Euros, exceeding its allocated TC budget of 169,575 Euros of 2024 due to expanded project activities and additional capacity-building efforts. The additional funds were met by the IAEA TC fund.

Status of Achievements based on LFM.

Objective: To establish regional advancement in NDT to fulfil the requirements set by the global standards for self-reliance and sustainable NDT system of GPs.

Outcome: Regional capabilities in advanced NDT techniques and applications strengthened for sustainable industrial development.

Output	Indicator and Target	Status of Achievements until 2024
Output 1: Project management team established and operational	**Indicator**: Management team in place (NPCs for 21 participating GPs appointed and NPTs constituted) **Target**: 3 project meetings	**On track.** The project implementation team was established in Q1 2023, during which National Project Coordinators (NPCs) were appointed for the 21 participating GPs. Additionally, National Project Teams (NPTs) were formed to support project implementation. Since then, the NPCs and NPTs of the participating GPs have played an active role in contributing to RTCs and meetings under RAS1029. However, in 2024, several changes occurred in the NPCs of Bangladesh, Japan, Pakistan, Sri Lanka, and Thailand due to retirements or job transitions. Furthermore, the NPC from Korea reported potential changes to both the NPC and NPT in 2025. In 2024, new NPC and NPT members have been proposed to the Korean Government and RCARO office, with roles involving the Korean Society for NDT (KSNT) and industry representatives.

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Output 2: Personnel trained and competent in advanced NDT inspection.	**Indicator**: No of personnel trained in advanced NDT techniques. **Baseline**: 60 trained personnel on RT-D during 2015-2016 under RAS1020 (without certification). 16 qualified personnel (out of 20 = 80 %) and eligible to RT-D Level 2 certification under RAS1022. 0 qualified and certified Level 3 RT-D personnel (based on past effort analysis). 0 trained, qualified and certified Level 2 TOFD personnel (based on past effort analysis). **Target**: 19 trained personnel and 15 qualified personnel (~ 80 % from the total trained) and eligible to RT-D Level 2 certification (1 RTC) by Q2 2023. 19 trained personnel and 15 qualified personnel (~ 80 % from the total trained) and eligible to RT-D Level 3 certification (1 RTC) by Q2 2025. 19 trained personnel and 15 qualified personnel (~ 80 % from the total trained) and eligible to TOFD Level 2 certification (1 RTC) by Q3 2024. 1 draft document on TOFD to be used as reference for TOFD training (1 EGM) by Q2 2024. – At least 19 national training events on RT-D and TOFD with local trainers involved by Q4 2026 (1 national training event per each Target GP).	**On track.** The first RTC on RTD Level 2 took place in Malaysia in 2023, with 17 participants from 10 GPs. Of these, 14 candidates passed the theoretical and practical exams (82.4%), qualifying them to apply for ISO 9712 RT-D Level 2 certification, pending industrial experience and visual requirements. To support candidates who did not pass, re-examinations were arranged with the Malaysian certification body. While the total trained personnel fell short of the target of 19, the qualification rate exceeded the 80% goal. Efforts are ongoing to ensure these 15 candidates achieve certification and become eligible for the RTC on RT-D Level 3 in July 2025, hosted by Malaysia. For PAUT, no training activities were planned for 2024, leaving the total number of trained personnel at 21. These individuals, who completed the RTC in Korea in 2023, are expected to qualify during the 2025 RTC in Korea. National training events and seminars have played a crucial role in meeting the project's objectives. In 2023, GPs conducted six events focused on RT-D and PAUT, enhancing technical expertise and promoting advanced NDT techniques across the region. In 2024, GPs remained dedicated to organizing national events aligned with the harmonized workplan, achieving a total of 11 events. These efforts contributed to capacity-building, knowledge-sharing, and regional collaboration. China hosted two major events in 2024: the National Seminar on Digital RT in Jiangxi Province in September and the National Conference on PAUT & Advanced Transducers in Hunan Province in July. These events highlighted advancements in digital radiography and phased array ultrasonic testing. Indonesia organized two key events in Q4 2024: a seminar and workshop on RT-D and a similar event on PAUT, strengthening local expertise and knowledge-sharing. Myanmar modernized its radiographic practices through awareness programs for three companies, promoting the transition from conventional to digital radiography. The Philippines held an awareness workshop on RT-D and PAUT in Q4 2024, encouraging industry adoption of advanced techniques. Singapore hosted three national seminars on PAUT and Digital Radiography Testing, demonstrating its commitment to advancing NDT methods. Vietnam contributed with a seminar on RT-D and PAUT, supporting professionals in adopting emerging technologies. In total, 11 national training events were successfully conducted in 2024, bringing the combined total for 2023 and 2024 to 17, just shy of the target of 19. The consistent efforts by GPs over these two years significantly advanced NDT capabilities and regional collaboration.

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Output 3: Personnel trained and competent in NDT for civil structures.	**Indicator**: No of personnel trained and qualified in NDT for civil structures **Baseline**: 40 personnel is expected to be trained during 2020-2021 under RAS1022 (without certification). 0 qualified and certified personnel at any level (based on past effort analysis). **Target**: 38 trained personnel and 30 qualified personnel (2 RTCs – ~ 80 % from the total trained) and eligible to Level 2 for civil structure inspection by Q2 2026. 19 trained personnel in ISO 9712 qualification and certification requirements in NDT for civil structures (1 RW) by Q4 2024. At least 19 national training events on NDT for civil structures with local trainers involved by Q4 2026 (1 national training event per each Target GP).	**On track.** A regional workshop on NDT for civil structures was successfully implemented in 2024, hosted by Singapore. The workshop saw the active participation of 21 individuals from 15 GPs, demonstrating strong regional engagement and interest in advancing NDT techniques for civil engineering applications. Building on the success of this event, activities are planned in 2025 and 2026 to further support the project's goals. With these upcoming events, it is expected that the targeted output of 38 trained personnel and 30 qualified personnel will be achieved. These activities will provide valuable training opportunities, equipping professionals with the necessary skills and knowledge to meet the growing demand for qualified and certified personnel in NDT for civil structures inspection, thereby enhancing industry capabilities across the region. At the national level, GPs have successfully organized several training events and seminars aimed at raising awareness of Non-Destructive Testing (NDT) for civil structures. These events have been instrumental in promoting the importance of advanced NDT techniques and ensuring that industry professionals are equipped with the latest knowledge and best practices. In Indonesia, a national seminar on NDT for Civil Engineering (NDT-CE) was held in Q4 2024, which focused on the critical role of NDT in ensuring the safety and longevity of civil structures. The seminar emphasized the benefits of using NDT methods in civil engineering applications and served as a platform for industry professionals to exchange knowledge and experiences. Mongolia organized two national seminars on NDT-CE in 2024, one in Q2 and another in Q4. These seminars were designed to raise awareness and provide deeper insights into the use of NDT for the inspection and maintenance of civil structures. They also highlighted the importance of adopting modern NDT technologies to improve safety standards in construction and infrastructure maintenance. In Malaysia, a national seminar on NDT was conducted in Q1 2024 with the participation of two experts from Italy and Spain. The seminar was a significant event that not only addressed the importance of NDT in civil engineering but also provided updates on the latest methods and applications used globally. The contributions of the international experts helped participants understand the current trends and innovations in the field, further enhancing the seminar's value. In the Philippines, an awareness seminar on NDT for Civil Engineering was successfully held in Q4 2024. This seminar brought together industry stakeholders to discuss the relevance of NDT in civil engineering and emphasized its growing importance in ensuring the integrity of infrastructure projects across the country. These national events (4 in total) have been crucial in strengthening the knowledge and understanding of NDT for civil structures across the region. With two national training events and seminars reported by GPs in 2023,

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		this brings the total to 6 national events and seminars conducted over the two years (2023 and 2024). These efforts significantly contribute to the targeted output of 19 national events and seminars, highlighting the ongoing commitment to enhancing awareness and expertise in NDT for civil engineering. The successful organization of these events further demonstrates the strong regional engagement and the vital role these national training events play in meeting the project's goals.
Output 4: Capabilities in advanced radiation-based NDT for composite inspection established.	**Indicator**: No of personnel trained in radiation-based NDT for composite inspection. **Baseline**: 0 trained personnel (based on past effort analysis). Target: 38 trained personnel in RT-D and CT for composite inspection (1 RTC and 1 RW) by Q4 2025. At least 19 national training events on advanced radiation-based NDT for composite with local trainers involved by Q4 2026 (1 national training event per each Target GP). **Target**: 38 trained personnel and 30 qualified personnel (2 RTCs – ~ 80 % from the total trained) and eligible to Level 2 for civil structure inspection by Q2 2026. 19 trained personnel in ISO 9712 qualification and certification requirements in NDT for civil structures (1 RW) by Q4 2024. At least 19 national training events on NDT for civil structures with local trainers involved by Q4 2026 (1 national training event per each Target GP).	**On track.** There are no planned activities for this output in 2024. However, a minor revision to the RAS1029 work plan, decided during the RAS1029 Mid-Term Review Meeting in Thailand in 2024, has led to the reduction of this output to a single regional workshop, now scheduled for implementation in 2026. Despite this adjustment, the workshop will have an extended duration, allowing for a more in-depth and comprehensive training program to enhance its effectiveness and maximize its impact. Although no activities on NDT for composites have been implemented under RAS1029, several GPs have reported significant progress at the national level in this field. In Australia, efforts are underway to pursue composite materials certification while also engaging in NDT activities related to additive manufacturing. China has established a national laboratory for NDT of composites, equipped with specialized test blocks designed for nuclear containment applications. In Malaysia, a dedicated facility for NDT of composites has been set up at the Malaysian Nuclear Agency, further strengthening the country's capabilities in this area. Meanwhile, in Pakistan, work on NDT of composites is actively being pursued, reflecting the country's commitment to advancing expertise in this domain. It is expected that GPs will begin organizing national events on NDT for composites to raise awareness and enhance industry adoption. These events will play a crucial role in promoting NDT applications and advancing the implementation of NDT techniques for composite materials across various sectors.

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2.2.2. Agriculture

The RCA TC programme plays a key role in advancing nuclear applications in agriculture across the Asia-Pacific region. Through training, workshops, and expert missions, it has strengthened regional capacities in areas such as soil management, and crop improvement. RAS5088 (concluded at the end of 2024) and RAS5091 were two agriculture projects implemented in 2024.

• **The RAS5091** was launched in 2022 and is scheduled to conclude in 2025. It aims to improve agricultural catchment, water, and soil management practices in the Asia-Pacific region by enhancing the capacity of countries to assess and mitigate agricultural contaminants. The project's initiation was affected by the COVID-19 pandemic, causing early challenges.

In 2024, a virtual mid-term review meeting was held to evaluate progress and plan future activities. The project also organized a regional workshop on soil-water management practices in Bahadurgarh, Haryana, India, from 18–22 March. The workshop focused on strategies to reduce agricultural contaminants and improve water quality. One of its key outcomes was the development of a draft guideline for monitoring agro contaminants.

The project utilized 30,467.27 Euros from the allocated TCF of 30,987.03 Euros in 2024.

Status of Achievements based on LFM.

Objective: To improve agricultural catchment, water, and soil management practices in the Asia-Pacific region by enhancing the capacity of countries to assess and mitigate agricultural contaminants.

Outcome: Enhanced capacity of countries in the Asia-Pacific region to use integrated isotopic techniques to assess and mitigate agricultural contaminants that impact water quality and soil productivity in catchments.

Output	Indicator and Target	Status of Achievements until 2024
Output 1: Project management team operational with an improved understanding of integrated isotopic techniques to assess agro-contaminants in water and soil in the Asia–Pacific region.	**Indicator**: Three project meetings held to establish regional and national project management structures for 20 GPs, preparation of all national workplans, and monitoring and reporting of progress by Q4 2025. **Target**: 20 GPs with NPTs established and linked to RCA.	**On track.** First project coordination meeting held in 2022; 15 national project teams established; 13 national work plans prepared. The virtual mid-term review meeting was held in 2024.
Output 2: Personnel with enhanced technical knowledge and skills for the use of integrated isotopic techniques to assess agro-contaminants available.	**Indicator**: Completion of 4 regional training courses with 3 RPs and 17 TPs, and 5 expert missions, for the use of integrated isotopic approaches by Q4 2024. **Target**: 17 TPs with personnel trained and having acquired skills and knowledge for the use of integrated isotopic approaches; 3 RPs contributing to training.	**On track.** A total of 75 professionals, including 39 women, benefited from multiple capacity-building activities, including: Two online RTCs on (1) Research Design and Sampling Strategy Integrated Isotopic Approaches for Monitoring Sources of Agro-Contaminants in the Environment; (2) RTC on Advanced Data Analysis of Isotopic Approaches for Assessing and Tracing Agro-Contaminants in Catchments, held in Beijing, China, from 23 to 27 October 2023, and a workshop on Soil-Water Management Practices to Reduce Agro-Contaminants and Improve Water Quality, conducted in Bahadurgarh, India, from 18 to 22 March 2024.
Output 3: Mitigation measures for agro contaminants in catchments developed through national studies using integrated isotopic approaches, and translation of science to management improved	**Indicator**: Completion of an online workshop (1 expert mission or HBA required to run this) and 5 expert missions to develop mitigation measures for agro contaminants in 5 GPs by Q4 2024. **Target**: 5 GPs with national studies completed to inform mitigation measures.	**On track.**
Output 4: Data consolidated in a regional database of water and soil isotopic signatures to help identify transboundary hotspots/common issues/practices, and recommendations for enhanced agricultural catchment, water, and soil management practices developed.	**Indicator**: Completion of data entry for the regional database, an online workshop (1 expert mission or HBA required to run this) for use of the database, and agreed recommendations for all GPs by Q4 2025. **Target**: 20 GPs with contributions to the database and agreed recommendations.	**On track.**

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2.2.3. Human Health

The RCA TC programme remains instrumental in strengthening nuclear science and technology applications in health sector. Through technical training programmes, workshops, and expert missions, the RCA has strengthened regional capacities in areas such as the clinical management of palliative care, adaptation of hypofractionated radiotherapy from physics to clinic, and the implementation of theranostic techniques. It also supports efforts to improve the quality and safety of radiation medicine, establish minimum data standards within oncology electronic medical systems (EMS) for quality cancer care, and enhance patient outcomes by strengthening the clinical roles of medical physicists in diagnostic and interventional radiology.

• **RAS6098**, launched in 2022, focuses on standardizing radiotherapy in palliative care to improve the quality of life for cancer patients in the RCA region. During the Mid-Term Review Meeting held in Chiba, Japan in June 2024, discussions on the development of Practice Guidelines led to the decision to conduct a survey in each participating country and develop a Patterns of Care Paper. To further advance this effort, an expert meeting will be held in India in March 2025.

Key activities in 2024 included: (1) a Mid-Term Review Meeting held in Chiba, Japan, from 24 to 28 June; (2) RTC on "Train the Trainers: Guideline for Palliative Radiotherapy", conducted in Jakarta, Indonesia, from 2nd to 6th December.

II. Implementation Status of the Technical Project

The project utilized 89,063.22 Euros (47.29%) from its allocated TC fund of 188,340.28 Euros.

Status of Achievements based on LFM.

Objective: To improve quality of life for cancer patients in the RCA region.		
Outcome: Clinical management of palliative care in the RCA region improved through standardized practice of palliative RT by trained professionals, and clinical practice guidelines for palliative RT suited for situations in RCA GPs developed.		
Output	**Indicator and Target**	**Status of Achievements until 2024**
Output 1: Project management team operational.	**Indicator**: The number of GPs that have established a project management structure. **Baseline**: 0 **Target**: Number of GPs that have appointed NPCs – No of participating GPs that have appointed National Project Teams – No of participating GPs that have prepared national work plans – No of participating GPs within 3 months of the commencement of the implementation of the project Number of GPs that submit progress reports – 15	**Achieved.** The project implementation team was established, and National Project Coordinators (NPCs) were appointed.
Output 2: Radiotherapy professionals trained on comprehensive management of palliative RT.	**Indicator 1**: Number of radiotherapy professionals trained on comprehensive management of palliative radiation therapy in the RTCs (2025). **Baseline** is zero (0). **Indicator 2**: Number of professionals (ROs, MPs, RTTs, and/or nurses) trained in National Training Courses by the completion of the project in 2025. **Baseline** is zero (0). **Target**: 100 800	**On track.** A total of 118 medical professionals, including 62 women, have benefited from three RTCs organized by the project on (1) a Basic Palliative Radiation Therapy for Bones and Brain Metastases; (2) palliative Radiotherapy for Brain Metastases and other Clinical Scenarios; and (3) Train the trainers on guideline for palliative radiotherapy. National Training Courses (NTCs) have been conducted in each participating country, progressing smoothly.
Output 3: Clinical practice guidelines for palliative RT suited for situations in RCA GPs developed.	**Indicator**: Number of practice guidelines for palliative radiotherapy suited for situations in RCA GPs. **Baseline** is zero (0). **Target**: 18 (Number of participating GPs)	**On track.** The project team agreed during the Mid-Term Review Meeting to conduct a survey in each participating country and develop a Patterns of Care Paper. To advance this effort, an expert meeting will be held in India in March 2025 to further refine and finalize the document.

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• **RAS6100**, which began in 2022 and is set to run until 2025, focuses on strengthening the clinical application of hypofractionated radiotherapy (HFRT). It has made good progress in its implementation. In the first year, the project conducted a review of the current status and challenges faced by each participating GPs regarding the clinical application of HFRT. Baseline data for creating a practical information package and Quality Assurance/Quality Control (QA/QC) programs was collected through a survey administered to the National Program Coordinators (NPCs) of each MS.

Over the past three years, the project has held two meetings, two RTCs, and two Expert Missions EMs. These activities have contributed to the preparation of the Practical Information Package and QA/QC programs. During the virtual Mid-Term Review Meeting in July 2024, updates on the clinical application of HFRT were provided. In 2025 (the fourth year), further updates and data analysis on HFRT's clinical application will take place, alongside additional Expert Missions and the completion of the Practical Information Package and QA/QC programs.

Additionally, in 2024, an Expert Mission was requested by and deployed to Malaysia to enhance the existing Lung SBRT service at the National Cancer Institute in Malaysia, which serves as a referral centre for advanced radiotherapy techniques in the Malaysian Ministry of Health's public hospitals.

In 2024, the project utilized 6,983 Euros (20%) from the allocated TC budget of 35,386.42 Euros.

Status of Achievements based on LFM.

Objective: To enhance cancer treatment in the RCA region through the application of hypofractionated radiotherapy.		
Outcome: Comprehensive adaptation of hypofractionated radiotherapy from physics to clinic strengthened for efficient cancer treatment.		
Output	**Indicator and Target**	**Status of Achievements until 2024**
Output 1: Project management team operational.	**Indicator**: Number of GPs that have established a project management structure by 4Q2022 Baseline: 0 **Target 1**: 21 GPs that have appointed National Project Teams **Target 2**: 21 GPs that have prepared national work plans(within 3 months of the commencement of the implementation of the project)	**On track.** Eighteen GPs appointed National Project Teams and prepared National Work Plans (AUL, BGD, KAM, CPR, IND, INS, JPN, ROK, LAO, MAL, MON, MYA, NEP, NZE, PAK, PHI, THA, VIE). The NPC (Dr Timothy Cheo) of SIN have withdrawn from the RAS6100 project. The FIJ did not participated in the RAS6100 project. The NPC of SRL was newly designated in the 2024 (3rd year).
Output 2: Professionals trained in hypofractionated radiotherapy at regional and national level.	**Indicator 1**: Radiation oncologists, medical physicists, and radiation therapists trained on regional training courses and functional as national trainers by 4Q2025 **Indicator 2**: At least one follow-up national training activity by 4Q2025 **Target 1**: 48 Radiation Oncologists, 64 Medical Physicist, 16 Radiation Therapist by 4Q2025 **Target 2**: 21 national training activities by 4Q2025	**On track.** A total of 50 professionals, including 24 women, benefited from two RTCs organized by the project on Basic Science and Clinical Applications of Hypofractionated Radiotherapy; and Mild to Moderate Hypofractionated Radiotherapy (HFRT): Basics to Clinical Application for Curative Treatment of Malignancies.

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Safety and quality of hypofractionated radiotherapy improved.	**Indicator 1**: A package of practical information provided to implement hypofractionated radiotherapy by 4Q2025. **Indicator 2**: Implementation of QA/QC programs in counterpart institutions for hypofractionated radiotherapy by 4Q2025 **Indicator 3**: Collecting, sharing, and distributing information on hypofractionated radiotherapy by using established IT resources by 4Q2025. **Target 1**: Practical Information Package by 4Q2025 **Target 2**: 4 QA/QC programs by 4Q2025 **Target 3**: Information update on the website by 4Q2025	**On track.** In 2022 (the first year), baseline data for a Practical Information Package and QA/QC programmes was collected through a survey conducted with the National Program Coordinators (NPCs) of participating GPs. Additionally, the remaining budget was utilized for the procurement of essential items to support the implementation of Hypofractionated Radiotherapy (HFRT). In 2023 (the second year), the first Expert Mission (EM) was successfully conducted from May 16–19 in Hanoi, Vietnam. In 2024 (the third year), the second Expert Mission took place from December 10–12 in Putrajaya, Malaysia. The Practical Information Package and QA/QC programs are progressing as planned and remain on track for completion.

• **RAS6101**, aimed at improving the quality and safety of radiation medicine through medical physicist education and training, was launched in 2022 and is scheduled to run until 2025. However, the project team has requested an extension until 2026.

In 2024, the project held its Mid-Term Review Meeting in Chiba City, Japan, from 24th to 28th June, to evaluate implementation progress and plan future activities. RTC was also conducted on Medical Physics Academic Programs in Beijing, China, from 5th to 9th August. To further support clinical training in medical physics, two home-based assignments were issued to experts to assist in the coordination and utilization of AMPLE as a training tool for GPs.

In 2024, the project utilized 134,679.15 Euros (98%) from its allocated TC budget of 137,910 Euros.

Status of Achievements based on LFM.

Objective: To improve the quality and safety of radiation medicine in the Asia-Pacific region through medical physics education, training, and certification.

Outcome: Increased number of CQMPs available and recognized in the region.

Output	Indicator and Target	Status of Achievements until 2024
Output 1: Project management structure established.	**Indicator**: Project activities and budget are implemented and utilized as planned. **Baseline**: Not mandatory **Target**: All activities and budgets implemented on time.	**On track.**

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Output 2: Medical physicists trained on quality management and audits.	**Indicator**: 1-2 physicists per GP to be trained on quality management and audit and at least 10 following national training activities held in GPs by end of the project. **Baseline**: No physicists in the region trained on quality management and audit. **Target**: 100 physicists trained on quality management and audit and at least 10 national training activities in the GPs by Q4 2025.	**Achieved.** A total of 105 professionals, including 44 women benefited from RTCs organized by the project on (1) quality management and QA in radiotherapy medical physics; (2) Roles Responsibility, Education &Training of Medical Physicist and Certification for Clinically Qualified Medical Physicist; (3) quality management and quality assurance in medical imaging for medical physicists.
Output 3: Increased structured and supervised clinical training programmes for medical physicists implemented in the region (supported through AMPLE).	**Indicator**: Clinical training programmes in At least 5 more countries based on local facilities and adopted to local environments to be implemented by the efforts of all participating GPs by the end of project. **Baseline**: Available in about 5 countries. **Target**: Available in at least 5 more countries.	**Achieved.** Clinical training has been sustained in participating GPs based on the consensus reached in Krabi, Thailand, in March 2023. To further support this initiative, a RTC on Clinical Training Programs is scheduled to be held in Hanoi, Vietnam, in January 2025.
Output 4: Postgraduate academic medical physics programmes linked to clinical training.	**Indicator**: Number of postgraduate academic programmes. **Baseline**: Postgraduate academic programmes available in about 10 countries. **Target**: 10 more postgraduate programs established.	**On track.** RTC on the Development and Implementation of Academic Programs for Medical Physics Education was organized in Beijing, China from 5th to 9th August 2024. The RTC aimed to equip participants with the essential skills and knowledge required to develop and sustain Postgraduate Medical Physics Academic Programs in alignment with IAEA guidelines, as outlined in the publication Postgraduate Medical Physics Academic Programmes, TCS 56 (Rev. 1).
Output 5: Establishment of certification and relevant mechanisms for CQMPs supported.	**Indicator**: Number of certification programmes for CQMP, CPD programmes established in the region. **Baseline**: Certification programmes for CQMP available in only several countries. No CPD programmes for medical physicists. **Target**: Foster the establishment of Certification mechanisms for CQMP and CPD establishment according to international guidelines. CPD programmes established in the region.	**On track.** In 2022 and 2023, CPD and RTC programmes were successfully established and implemented for medical physicists specializing in radiation oncology and diagnostic radiology. RTC for medical physicists in nuclear medicine is scheduled to take place in Bangkok, Thailand, in 2025. However, the establishment of certification mechanisms for CQMPs remains a significant challenge in most countries. Government support is needed, along with a stronger push from the IAEA to facilitate progress in this critical area.

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• **The RAS6105** project, aimed at improving cancer management through theranostics by utilizing radioisotope-based diagnostic and therapeutic techniques, began its first year of implementation in 2024.

As part of its activities, the project held its first coordination meeting in April, followed by its inaugural RTC from 3rd to 7th September 2024. Hosted by the Government of Indonesia at Dr Hasan Sadikin Hospital, the RTC focused on enhancing participants' knowledge and skills in hybrid imaging using fluorine-18 and other novel radiotracers. This RTC was conducted alongside a separate training programme organized by ARASIA project, fostering collaboration and networking opportunities between professionals from both regions.

In 2024, the project utilized 72,230 Euros (58%) from its allocated TC budget of 125,175 Euros.

Status of Achievements based on LFM.

Objective: To contribute to strengthening diagnostic and therapeutic capacities in clinical nuclear medicine by enhancing theranostic to improve cancer management.		
Outcome: Developed capabilities to implement theranostic techniques in the RCA region		
Output	**Indicator and Target**	**Status of Achievements until 2024**
Output 1: Project management team operational..		**On track.** The project's kick-off meeting was held online in April 2024, bringing together participating GPs to discuss and plan the activities to be implemented under the project.
Output 2: Trained and qualified staff available in RCA GPs in the development and clinical application of theranostic procedures	**Indicator**: No of trained and qualified professionals (in each MS lab) capable of performing the improved cancer diagnosis and treatment. **Target**: Each GP having at least one qualified professional team to practice and administer theranostics	**On track.** A total of 40 professionals, including 17 women, from participating GPs benefited from the RTC on Hybrid Imaging with Fluorine-18 and other novel radiotracers, as well as sponsorship for IPET 2024 conference.
Output 3: Increased awareness, knowledge and accessibility of theranostics and radiopharmaceuticals among health authorities, regulatory bodies, decision makers, patients, and general public	**Indicator**: Engagements/ collaborations related to the clinical use of theranostic procedure in each GP. **Target**: Each GP initiating coordination or collaboration At least one adopted in each GP	**On track.** Participation in the RTC and IPET 2024 conference outlined in Output 2 enhances candidates' awareness and knowledge, ultimately improving access to theranostic-grade biomolecules in their respective GPs.
Output 4: Developed Consensus document on the utilization of theranostic practice in the management of cancer developed for the RCA region	**Indicator**: Availability of document for distribution to relevant stakeholders. **Target**: Publication at the end of the project	**On track.** The collection of data from each participating GPs' cancer registry has begun to support the preparation of this document.
Output 5: Developed Procedures and protocols for emerging theranostic techniques and their clinical applications adopted and adapted to suit national needs and standards	**Indicator**: Guidelines developed for the region. **Target**: At least one guideline	**On track.** Although preliminary work on developing these guidelines has begun, the final guidelines are expected to be completed by the end of the project.

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• **RAS6108** is a three-year project that began implementation in 2024. It aims to enhance patient care and health outcomes by improving the quality of oncology data collection and its application. The project is fully funded by an extrabudgetary fund from Australia.

In May 2024, the project held its first coordination meeting virtually to discuss the work plan. Additionally, a service order was issued to the George Institute for Global Health, a leading independent global medical research institute based in Australia with an extensive network of experts and collaborators, including in radiation oncology. The institute has been tasked with designing and conducting a regional survey to assess the current capacity of radiation oncology teams to utilise Oncology Information Systems (OIS) across RCA member countries in Asia and the Pacific. It is also responsible for collating and interpreting the survey results to develop a report with recommendations for action. All RCA participating GPs are involved in this survey.

In 2024, the project utilized 32,100 Euros (19%) from its allocated EB budget, which was planned at 173,225 Euros.

Status of Achievements based on LFM.

Objective: To improve care and health outcomes of cancer patients through improved quality of oncology data collection and application.		
Outcome: By 2027, targeted hospitals and health ministries in participating RCA countries apply the minimum standard of data within oncology electronic medical systems (EMS) for the purpose of quality improvement of cancer care treatment.		
Output	**Indicator and Target**	**Status of Achievements until 2024**
Output 1: Functional infrastructure for project implementation established	**Baseline**: No project team or expert pool. **Target**: Project teams, software, expert pool operational by 2Q2024. Aim for 50% women: men gender balance	**On track.** The project's kick-off meeting was held online in May 2024, bringing together participating GPs to discuss and plan the activities to be implemented under the project. The project team has been successfully established, with National Project Coordinators (NPCs) identified from all participating countries. All NPCs attended the kick-off meeting in May, facilitating initial introductions and alignment on project goals. Papua New Guinea also attended as observers.
Output 2: Minimum standard for radiation oncology dataset for participating RCA countries established (based on the assessment on the status of current use of EMSs).	**Indicator**: A document outlining a minimum dataset for radiotherapy, formulated by expert consultation. **Baseline**: No documented standard dataset **Target**: A minimum dataset document, developed by 1Q2025	**On track.** The minimal dataset was initially discussed at the May kick-off meeting, with further development contingent on upcoming survey results; the dataset will be revisited in detail during the initial workshop planned for 2025.
Output 3: Radiotherapy professionals in RCA countries trained in the collection of data in the OIS for quality improvement	**Indicator**: Number of trained radiotherapy professionals participating in the project who are able to use the OIS to collect and apply data. **Baseline**: Zero. .	**On track.** The survey was distributed to assess the current capacity of radiation oncology teams to utilise Oncology Information Systems (OIS), with the aim of identifying knowledge gaps that will be addressed in an initial RTC scheduled for 2025.

II. Implementation Status of the Technical Project

	Target: A minimum of 18 trained professionals across the region by 4Q2026	
Output 4: Health professionals within RCA countries incorporated the use of OIS for data collection into their clinical practice in managing cancer patients.	**Indicator**: % of participating RCA countries with operational OIS for data collection. **Baseline**: 5-10% **Target**: At least 30% RCA participating countries have departments using their OIS for minimum dataset data collection and use in management of patients, by 4Q2026	At preparation stage.

• **RAS6109** focuses on improving the quality and safety of diagnostic and interventional radiology services to enhance healthcare by strengthening the status, knowledge, and skills of medical physicists. The project has been on track in its first year, with no anticipated delays for activities scheduled in the early quarters of 2025.

In April 2024, it held its first coordination meeting virtually, followed by a regional workshop from 15th to 18th October 2024, hosted by the Government of Malaysia. The workshop addressed the status, roles, and responsibilities of medical physicists in diagnostic and interventional radiology.

In 2024, the project utilized 84,338 Euros (51%) from its combined TC and EB budget of 166,953 Euros.

Status of Achievements based on LFM.

Objective: To enhance patient health care through the improvement of the quality and safety of diagnostic and interventional radiology by strengthening the clinical roles of medical physicists.		
Outcome: Enhanced status, knowledge, and skills of medical physicists in diagnostic and interventional radiology in RCA GPs.		
Output	**Indicator and Target**	**Status of Achievements until 2024**
Output 1: Project Management Structure	**Indicator**: The number of GPs that have established a project management structure. **Baseline**: 0 **Target**: All participating GPs appoint National Project Coordinators, establish National Project Teams, prepare national work plans within 3 months after the commencement of implementation of the project, participate in kick-off and annual progress meetings, and submit progress reports on a regular basis	**On track.** All participating GPs have appointed National Project Coordinators and have established National Project Teams. They have also participated in the project kick-off meeting making meaningful contributions to the project plan.

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Output 2: Established database containing information on the current workforce and workforce requirements for diagnostic and interventional radiology Medical Physicists in each participating GP.	**Indicator**: Database with current and required work force established. **Baseline**: 0 (no data) **Target**: Database with current work force and work force requirements of all participating GPs, prepared within the first two years of project implementation.	**On track.** Database has been populated for participant GPs, based on information provided by the National Project Coordinators. First findings have also been submitted for publication in a peer reviewed journal, in order to reach a wider audience and promote the objectives of the project to the broader the community. Next step would be to collate feedback directly from the regional workforce through a survey, which is scheduled to be released by Q35 2025.
Output 3: Developed action plans for meeting the identified workforce requirements.	**Indicator**: Action plans. **Baseline**: 0 **Target**: 60% of the participating GPs prepare/endorse action plans by project completion.	**On track.** Early elements of this output are under development, but the overall output will be closer to completion towards the end of the project. The early stages of the project entail collecting and analysing information and data required to develop the action plans.
Output 4: Trained Medical Physicists on quality management of radiological equipment and dose assessment/ optimisation methodologies.	**Indicator**: Number of trained personnel. **Baseline** – 0 **Target**: At least one person from each GP trained	No training was scheduled for the first year of the project. Training activities for the second year of the project have been planned and are on schedule.
Output 5: Improved quality management practices in diagnostic and interventional radiology	**Indicator 1**: Database with current status of implementation of agency guidance related to Quality Assurance in diagnostic and interventional radiology. **Baseline**: 0 **Indicator 2**: Number of trained personnel **Baseline**: 0 **Target 1**: Database with current status of implementation of agency guidance related to Quality Assurance in diagnostic and interventional radiology of all participating GPs prepared within the first three years of project implementation. **Target 2**: At least one person from each GP trained	**On track.** Database has been populated for participant GPs, based on information provided by the National Project Coordinators. First findings have also been submitted for publication in a peer reviewed journal, in order to reach a wider audience and promote the objectives of the project in the community. Training activities will start in the second year of the project; they have been planned to be delivered on schedule.

• **RAS6110** focuses on enhancing the radiotherapy capacity of newcomer GPs and began implementation in 2024. The project aims to equip these countries with the capability to provide comprehensive cancer care for their patients.

The first coordination meeting was held virtually in April 2024, followed by a technical planning workshop in Fukushima, Japan, from 15th to 18th October. The RTC on safety and quality management in radiotherapy

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took place in Pakistan from 9th to 13th December 2024. Since its launch, the project has progressed smoothly, meeting its planned objectives for 2024 with only minor adjustments to the schedule.

A key feature of the project is its mentor-mentee framework, designed to support five newcomer GPs, Cambodia, Fiji, Lao PDR, Nepal, and Palau, by pairing them with experienced mentor countries. Mentor selection is based on factors such as geographic proximity and expertise. This structured approach has proven highly effective in ensuring the successful implementation of project activities.

One of the mentor-mentee system's greatest strengths is its ability to facilitate the development of comprehensive and realistic action plans for newcomer GPs. Experienced countries with established radiotherapy infrastructure provide practical guidance, enabling the creation of feasible and impactful plans. The small-group structure fosters closer collaboration and personalized support. Additionally, by leveraging regional experts through expert missions (EMs), the project has minimized travel costs while ensuring frequent and effective mentorship.

Each mentee country is supported by a dedicated group of mentor nations such as Cambodia receives guidance from Indonesia, Bangladesh, and Pakistan; Lao PDR is supported by Thailand, Vietnam, and Sri Lanka; Nepal works with India, China, and Myanmar; Fiji is mentored by Australia, Malaysia, and New Zealand; and Palau is guided by Japan, Mongolia, and the Philippines. These mentor-mentee groups are encouraged to maintain strong communication through platforms and online meetings, ensuring continuous engagement and support.

In 2024, the project utilized 107,497.42 Euros (99.9%) of its allocated TC budget of 107,625 Euros.

Status of Achievements based on LFM.

Objective: To develop the capacity of newcomer GPs in providing comprehensive cancer care for their cancer patients.

Outcome: Improved capability in newcomer GPs to provide sustainable access to radiotherapy

Output	Indicator and Target	Status of Achievements until 2024
Output 1: Project Management Team Operational	**Indicator**: NPT formed, NWP formulated, NPT meetings held, Periodical reporting completed. **Baseline**: 0 as of the start of the project. **Target**: All completed as agreed for each time period	**On track.** The first coordination meeting was held virtually on 23rd to 24th April 2024. During this meeting, the project's overview and plans were discussed, with a particular focus on establishing National Project Teams (NPT) in each participating country. This was followed by a technical workshop in Fukushima, Japan, from 15th to 18th October 2024. The workshop cantered on the overall project plan, with an emphasis on the activities scheduled for completion by the end of 2025.
Output 2: Radiotherapy / Oncology professionals trained on comprehensive management of radiation therapy	**Indicator**: Number of radiotherapy / oncology professional trained in the RTCs. **Baseline**: 0 **Target**: 20 in total	**On track.** A total of 26 professionals, including 7 women, from 14 countries—9 of whom were from newcomer GPs—benefited from the first RTC on "Safety and Quality of Radiotherapy," held from 9th to 13th December 2024, in Islamabad, Pakistan. The programme featured lectures on radiation oncology workflows, quality assurance protocols, and advanced techniques such as transitioning from 2D to 3D treatment planning. Hands-on workshops focused on dosimetry, QA procedures, and equipment calibration. Key topics also included regulatory requirements, incident reporting, and radiation biology.

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Output 3: Development plan for improvement of radiotherapy access in newcomer GPs devised and presented	**Indicator**: Number of formal discussions of future plans of radiotherapy with expert missions completed - baseline: 0 Number of planning/ roadmap documents presented to Ministry of Health of newcomer GPs. **Baseline**: 0 **Target**: 2 per newcomer GP 1 per newcomer GP	A formal discussion between mentor and mentee countries took place during the technical workshop in October 2024. Fiji has drafted a roadmap document, which is currently awaiting approval from the Ministry of Health. The first expert mission is scheduled for Q2 2025.
Output 4: Connection with/participation in regional radiation oncology community established	**Indicator**: Meetings of the delegates of newcomer GPs with representative of the regional radiation oncology society implemented through scientific visits. **Baseline**: 0 **Indicator 2**: Number of international mentoring relationship between radiotherapy centres established. **Baseline**: 0 **Target**: 2 per newcomer GP 3 (Nepal, Cambodia, Lao)	**On track.** The first Regional Radiation Oncology Society conference is scheduled for Q4 2025. In 2024, one newcomer GP (Nepal) officially participated in the Regional Radiation Oncology Society conference.

2.2.4. Isotope Hydrology

By supporting the application of isotope hydrology, the RCA TC programme contributes importantly to sustainable water management efforts in the Asia-Pacific region. Through targeted projects, including technical training, workshops, and expert missions, the programme has enhanced regional capacities in water quality assessment and monitoring of both surface and groundwater. These efforts contribute to addressing water scarcity by supporting informed decision-making and promoting effective practices such as artificial groundwater recharge, ultimately strengthening the development, management, and conservation of vital water resources.

• **RAS7040** entered its third year of implementation in 2024, aiming to enhance regional capacity in water quality assessment and water resource monitoring for the effective development and management of surface water and groundwater.

The project has significantly contributed to capacity development among participating GPs, particularly through the establishment of isotope hydrology laboratories, strengthening of human resources, and procurement of essential equipment and consumables. As a result, the capacity of isotope hydrology laboratories across the region has been enhanced, and a regional water isotope network has been established. A study on isotopic

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techniques and the recursive digital filter method was published in the Journal of Hydro-Environmental Research.

In 2024, a mid-term review meeting was held in Mumbai from 21st to 25th October, hosted by the Government of India, to assess progress and refine priorities for the remainder of the project. Additionally, a home-based assignment (HBA) was issued to an expert for preparing the national hydrological sketch in preparation for the IWAVE initiative. This hydrological sketch compiles key information on national water resources, hydrological data availability, institutional responsibilities, and strategies for the sustainable management of surface and groundwater resources.

An expert mission was deployed to Lao PDR to assist the national project team in designing field sampling strategies for various isotope geochemical parameters, conducting field demonstrations, assessing analytical and human resource capabilities, and providing recommendations to the TC.

An RTC on groundwater Flow Modelling was organized in Malaysia on 15-19 July 2024. The project also supported international training and networking opportunities of two participants from Lao PDR and one from Bangladesh attended the first coordination meeting of the Global Water Analysis Laboratory Networks in Vienna from June 18 to 20, 2024; and one participant from Mongolia and one from Viet Nam participated in the training course on Isotope-enabled Water Balance Modelling Using the JAMS/J2000 Modelling System, held in Vienna from 2nd to 6th September 2024.

In 2024, the project utilized 195,970 Euros, exceeding its allocated TC budget of 149,100 Euros due to expanded project activities and additional capacity-building efforts. The additional funds were met by the IAEA TC fund.

Status of Achievements based on LFM.

Objective: To enhance the regional capability in water quality and water resource monitoring for effective development and management of surface water and groundwater..

Outcome: Capacity of participating countries in APR enhanced in the use of isotopic techniques for water quality improvement and water resource management.

Output	Indicator and Target	Status of Achievements until 2024
Output 1: Project implementation and monitoring structure established and managed.	**Indicator**: National project teams identified for each GP. **Target**: Listed key components in place by end of Q2 2022	**On track.** National project teams have been appointed in each participating country and are working effectively.
Output 2: Improved skills in isotopic analysis of dissolved nitrogen species in water (NH4, NO3), in groundwater dating analysis, and in carbon isotope analysis.	**Indicator**: Numbers of technical staffs trained and skilled of isotopic analysis (competent in using laser N2O isotope analyser) improved by 2023. Numbers from ILGPs and BLGPs trained on dual stable isotope analysis of NOx by 2023. **Baseline**: No research institution from ILGPs and BLGPs is capable of performing dual in stable isotope analysis of NOx.	**On track.** A total of 47 professionals, including 12 women, benefited from the two RTCs and three sponsorships provided by the project on the related areas.

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	Target: 9 technical staffs from ILGPs in the region trained and their skills of isotopic analysis (competent in using laser N2O isotope analyser) improved by 2023. **Target**: 15 researchers from ILGPs and BLGPs trained on dual stable isotope analysis of NOx by 2023.	
Output 3: Improved models/development of scenarios for surface water and groundwater management for socioeconomic benefits.	**Indicator**: Numbers of researchers from ILGPs and BLGPs trained in water modelling. Names of numerical models available in GPs by the end of 2025. **Baseline**: Water isotopic calibrated and validated hydrological models are not popular in GPs. **Target**: 15 researchers from ILGPs and BLGPs trained in water modelling. **Target**: Surface and/or ground water models available in GPs by the end of 2025	**On track.** A total of 39 researchers, including 16 women, benefited from the 2 RTCs in 2023 on mixing models of tracers and complementary approaches to apportion sources of contaminants in ground water and on groundwater flow modelling in 2024.
Output 4: Isotope, chemical, and hydrogeological database established.	**Indicators**: Number of databases developed by 2024 - Numbers of GIS maps in some GPs available by 2025. **Baseline**: Most GPs do not have integrated isotopic, chemical and hydrogeological database. **Target**: 15 researchers from ILGPs and BLGPs trained in water modelling. **Target**: Surface and/or ground water models available in GPs by the end of 2025	**On track.** Partial chemical and hydrogeological data on groundwater and surface water were presented by NPCs at the Mid-Term Review Meeting in Mumbai, India, in October 2024. The full dataset is expected to be collected and finalized before the Final Project Review Meeting, which will be hosted by Lao PDR in October 2025.
Output 5: Water isotopic monitoring networks integrated for the region.	**Indicators**: Guideline to set up water isotopic monitoring networks by 2025. **Baseline**: No regional network of water isotope monitoring has been established in APR. **Target**: Water isotopic monitoring networks (RNIP and RNIR) supported/ considered by the GPs authorities to have some protocols and agreements among GPs in setting monitoring networks and sharing	**On track.** The network will be officially formalized at the Final Project Review Meeting, scheduled to take place in Lao PDR, in October 2025.

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• **RAS7043** is a four-year project aimed at addressing water scarcity in affected regions by improving water resource management through artificial groundwater recharge.

The project commenced with its first coordination meeting virtually in June 2024, bringing together NPCs from participating GPs to discuss key activities. Additionally, an expert mission was deployed to Lao PDR to support the development of a numerical model designed to enhance understanding of groundwater recharge to deep aquifers in the Vientiane Basin.

In 2024, the project utilized 7,473 Euros (11%) from its allocated TC budget of 67,675 Euros.

Status of Achievements based on LFM.

Objective: To address scarcity of water in affected regions through improved management of water resource using artificial recharge of ground water.		
Outcome: Enhanced groundwater replenishment through artificial recharge leading to sustainable water management in water scarce RCA regions.		
Output	**Indicator and Target**	**Status of Achievements until 2024**
Output 1: Project coordination established	**Indicator**: An agreed project implementation team and programme adopted at the project coordination meeting. **Baseline**: The project teams from the MS of previous RCA projects **Target**: Fully established teams and implementation plan ready to carry out the project.	**On track.** The project team has been identified, and kick-off meeting was organized.
Output 2: Developed human resources for measurement and interpretation of isotope data	**Indicator**: At least 27 professionals are trained in measurement of isotopes and their application in assessing artificial recharge of groundwater **Baseline**: The professionals in five to six participating MS have limited knowledge on isotope hydrological techniques in artificial recharge evaluation **Target**: At least 27 professionals from 9 MS would develop expertise in evaluation of artificial recharge of groundwater through isotope techniques.	**On track.** As part of the RTC activities, two RTCs are planned for 2025. Both programs have been finalized, with host countries selected and tentative dates and schedules set.
Output 3: Established monitoring networks, isotope and chemical regional database including water regime	**Indicator**: Number of monitoring networks in each MS Number of new datasets on isotopes and hydrochemical constituents needed for artificial recharge of groundwater Baseline: No regional database relevant to artificial recharge is available at present. **Target**: At least 9 MS establish monitoring networks. Create at least 9 data sets. Creating a new regional database on isotope and chemical constituents for RCA Region.	**On track.** Participating GPs have identified the study areas where artificial measures will be or have been already adopted. 3 out of 13 participating GPs have established the networking stations for isotope monitoring.
Output 4: Developed guideline for evaluating efficacy of artificial recharge to groundwater	**Indicators**: Feedbacks from the participating nine MS to water authorities. **Baseline**: Currently there are limited guidelines available for evaluating artificial recharge to groundwater in selected MS using isotope techniques. **Target**: At least one comprehensive technical document consisting of isotope sampling, measurement and modelling.	This is planned for the 4th year of this project.
Output 5: Recommendation for end-users/water authorities to plan effective groundwater management through artificial recharge	**Indicators**: Number of MS that provide recommendations. **Baseline**: No regional recommendations are available for artificial recharge for MS using isotope techniques. **Target**: At least 9 MS will provide recommendations to respective water authorities/ government agencies. One technical document integrating the recommendations for entire RCA region.	This activity is planned during the 4th year of the project timeline

II. Implementation Status of the Technical Project

2.2.5. Management of RCA Programme

• **RAS0092** is a strategic management project designed to strengthen the governance, coordination, and overall effectiveness of the Regional Cooperative Agreement for Research, Development, and Training Related to Nuclear Science and Technology for Asia and the Pacific.

In 2024, the project held its first coordination meeting virtually in June. It also supported the participation of National Representatives (NRs) from newcomer countries at the 46th National Representatives Meeting (NRM), which took place from 14th to 17th May 2024, in Beijing, People's Republic of China (PRC), and at the 53rd General Coordinating Meeting (GCM), held in Vienna on 13th September 2024.

As part of the 68th General Conference, the RCA GPs, with the support of RCARO, organized a side event on September 17th titled "RCA: Advancing Sustainable Development in the Asia-Pacific Region." This event brought together delegates and experts to discuss strategies for enhancing regional cooperation in nuclear science and technology.

Additionally, with RCARO's support, the RCA GPs hosted a Special Exhibition at the 2024 IAEA Ministerial Conference, themed "Bringing Prosperity to the Asia-Pacific: RCA." The exhibition highlighted the RCA's achievements over its 52 years of operation and attracted a distinguished audience.

The "Introductory Workshop for New National RCA Representatives on RCA Programme and its Policy" was held by the RCARO in July in Seoul, Republic of Korea. The workshop aimed to provide information on IAEA/ RCA frameworks and programmes to newly appointed National RCA Representatives from the past three years. A total of 35 participants attended the workshop.

II. Implementation Status of the Technical Project

The project conducted a social and economic impact assessment of the RCA programme on air quality monitoring, food irradiation, and authenticity projects supported through the TC programme from 2000 to 2023. By the end of 2024, a draft report on the impact of air quality monitoring had been completed and reviewed by the RCA GPs, with preparations underway for its final design and publication. Meanwhile, work continued on the food safety impact assessment report, which remained under preparation in 2024.

Among the six planned outputs, output 2 and output 6 have been deemed no longer relevant. Three outputs are progressing as scheduled. One output has experienced delays.

In 2024, the project utilized a TC budget of 181,355 Euros and an EB budget of 83,305 Euros.

Status of Achievements based on LFM.

Objective: To ensure the effective and efficient operation and management of the RCA programme to support the RCA mechanism to achieve its vision.

Outcome: Enhanced RCA management capacity in the promotion and application of nuclear technologies in the region.

Output	Indicator and Target	Status of Achievements until 2024
Output 1: Revised and amended policies, processes and procedures such as GoR, MTS and RPF	**Indicator**: Adoption of the document by the NRs	**On track.** The project supported the participation of National Representatives (NRs) from newcomer countries at the 46th National Representatives Meeting (NRM), held from 14 to 17 May 2024 in Beijing, People's Republic of China (PRC), and at the 53rd General Coordinating Meeting (GCM), held in Vienna on 13 September 2024. These facilitated a broad exchange of views on RCA governance by funding the participation of selected NRs, ensuring that all representatives could attend and actively engage in policy discussions. The funding support were from the extrabudgetary funds received from Australia, China, and Korea.
Output 2: Enhanced contribution of RCA TC projects that are in the priority areas solve regional issues	**Indicator**: The RCA TC projects conform to the RPF and they are successfully implemented. **Target**: All RCA projects are completed within the implementation cycle	**Dropped.** Based on the first coordination meeting of the project in 2024, this output is no longer considered relevant and is therefore recommended for removal from the project's work plan.
Output 3: Formulated sustainable HRD strategies for applying nuclear technology	**Indicator**: Adequate human resource capability for implementing nuclear technology application. **Target**: At least one partnership for nuclear technology application	As the HRD strategy is included as Annex 10 of the GoR, the RCA Focal Person presented at the 53rd GCM on how the strategy is being monitored.

II. Implementation Status of the Technical Project

Output 4: Developed strategy for resource mobilization to attract financial resources available for the RCA	**Indicators**: RCA GPs succeed in attracting funds from new sources. **Target**: At least one new source per project cycle	The direction of the RCA regional programme for 2026/27 is towards more strategic, larger and thematic projects. This requires significant resources, and thus resource mobilization and new partnerships for these projects is a key priority for this project. The LCC and RCARO are working hard to secure funds for these new RCA projects due to commence in 2026 and will report on their progress at the 47th RCA NRM. NRs are also encouraged to consider new partners and funding. The project notes the kind and generous extra-budgetary contributions in 2024 to the RCA TC Programme from our partners, including Australia, Japan, Korea/RCARO, and Malaysia. RCARO has successfully implemented cooperative activities and projects with the US DOE and ASEANTOM to mobilize additional resources and strengthen the sustainability of the RCA Programme. RCA has been developing strategies to mobilize resources from external partners, with the support of RCARO. This includes visibility activities such as hosting a side event during the 68th IAEA General Conference titled "RCA: Advancing Sustainable Development in the Asia-Pacific Region." The event attracted over 100 participants, including representatives from RCA GPs, the IAEA, RCARO, and other organizations and countries from outside the region. At the IAEA Ministerial Conference 2024, RCA organized a Special Exhibition under the theme "Bringing Prosperity to the Asia-Pacific: RCA." RCARO facilitated the preparations for this exhibition with the IAEA and GPs, showcasing the achievements of the RCA over the past 52 years. The exhibition drew a large audience, including the IAEA Director General, RCA Chair, National Representatives (NRs), and officials from both RCA GPs and the IAEA.
Output 5: Facilitated knowledge-sharing and technology diffusion for uptake of the technology by end-users	**Indicators**: Number of technologies being presented for adoption. **Target**: One in every thematic sector	**On track.** Following the earlier RCA Social and Economic Impact Assessments on mutation breeding, non-destructive testing (NDT), and radiotherapy, the impact assessment on air quality monitoring has been completed, while the impact assessment on food safety is currently in progress. In July 2024, the Introductory Workshop for New RCA NRs was held in Seoul, Republic of Korea. The workshop featured presentations by representatives from the IAEA, RCA Chair, NRs, and RCARO, aimed at enhancing the understanding of the RCA Programme among newly appointed NRs. The event brought together 14 RCA NRs, RCA Focal Persons, and RCA PAC, providing participants with comprehensive information on the IAEA TC frameworks and RCA policy matters.

II. Implementation Status of the Technical Project

		RCARO has been actively managing the RCA website, facilitating knowledge-sharing and technology diffusion by collecting and providing information on RCA activities in collaboration with the IAEA, RCA GPs, and experts. In addition, the RCA Annual Report, RCA Newsletters, and RCA Issue Briefs have been published and distributed to ensure that stakeholders both within and outside of the RCA are well-informed.
Output 6: Developed strategies for the inclusion of matters in Ministerial Declaration during the 50th Anniversary in RCA projects	**Indicators**: Inclusion of matters in Ministerial Declaration during the 50th Anniversary in RCA projects. **Target**: All projects contain relevant elements of the Ministerial Declaration	**Dropped.** Based on the first coordination meeting of the project in 2024, this output is no longer considered relevant and is therefore recommended for removal from the project's work plan.

2.2.6. Partnership Projects

US DOE Partnership Project on Supporting the Adoption of eBeam Technology and its Applications in Areas of Food and Agriculture, Industry, Human Health and Environment Treatment

In partnership with the Office of Radiological Security (ORS) of the National Nuclear Security Administration, U.S. Department of Energy, RCARO is implementing the "Project on Supporting the Adoption of eBeam Technology and its Applications in Food and Agriculture, Industry, Human Health, and Environmental Treatment" from 2024 to 2028. The First Project Coordination Meeting was held in December 2023, with invitations extended to all twenty-one (21) RCA Government Parties (GPs).

* AUL, BGD, CPR, KAM, FIJ, IND, INS, JPN, ROK, LAO, MAL, MON, MYA, NZE, NEP, PAK, PHI, SIN, SRL, THA and VIE.

Four activities were implemented according to the work plan.

- Participation in Hands-on Electron Beam Technical Workshop in Texas A&M (Apr. 2024): Thirteen (13) participants from RCA Government Parties (GPs) were invited to attend sessions designed to provide a comprehensive understanding of the principles and applications of eBeam and X-ray technologies, specifically for countries planning to adopt these technologies.
- Expert Missions to Mongolia and Cambodia (Oct. & Dec. 2024): National awareness seminars and stakeholder meetings across various sectors were successfully conducted during these missions.
- Hands-on Regional Workshop on eBeam Applications (Dec. 2024): Co-hosted by the Vietnam Atomic Energy Institute (VINATOM), the event brought together over 80 participants from 19 countries and featured over 18 presentations under the topics ranging from foundational principles of the technology to applications on various sectors.

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Implementation of the "Project on Enhancing Emergency Preparedness and Response Capabilities in the ASEAN Region through Building Technical Capacity in Radiation Monitoring and Dose Assessment (Phase 2)

In partnership with the ASEAN Network of Regulatory Bodies on Atomic Energy (ASEANTOM), RCARO has been implementing the "Project on Enhancing Emergency Preparedness and Response Capabilities through Building Technical Capacity in Radiation Monitoring and Dose Assessment Following Nuclear and Radiological Emergencies" since 2020. Led by the Office of Atoms for Peace (OAP) of Thailand and the Korea Research Institute of Standards and Science (KRISS), the project involves participation from all ten ASEAN member countries.

*ASEAN: Association of Southeast Asian Nations: INS, KAM, LAO, MAL, MYA, PHI, SIN, THA, VIE, Brunei

Three activities were implemented according to the work plan.

- Virtual Introductory Workshop on In-Situ Radiation Detection and Basic Gamma Spectrometry (Feb. 2024): As part of the project work plan confirmed in November 2023, this online workshop was conducted for beginner countries, engaging around 50 participants from the region. The sessions covered key topics, including equipment usage, site selection for monitoring, and the fundamentals of gamma spectrometry.
- Regional Training Course on Practical Application of Radiation Measurement and Radioanalytical Method for Environment Monitoring (Jun. 2024): Co-hosted by the Office of Atoms for Peace (OAP) of Thailand, this course provided advanced theoretical and practical training on environment monitoring to 26 participants from the region.
- Participation in the 11th Annual Meeting of ASEANTOM (Aug. 2024): RCARO participated in the 11th Annual Meeting of ASEANTOM held in August 2024 in Laos and presented the progress of the project and a plan to have a follow-up project starting in 2025, accommodating the regional needs on the advanced technology on radiation monitoring.

REGIONAL COOPERATIVE AGREEMENT

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Annex 1
List of RCA On-going Projects in 2024

Annex 2
Planned Regional Events under RCA Projects in 2025

Annex 3
List of National RCA Representatives

Annex 4
RCARO Actions in 2024

List of RCA On-going Projects in 2024

No.	Project Number	Project Title	Implementation Period	LC/LCC	TO
1	**RAS1028**	Improving the Quality Management Practices in Radiation Processing Facilities for Better Performance and Applications (RCA)	2022-2025	**MAL** Ms Ruzalina Baharin Malaysian Nuclear Agency **Email**: ruzalina@nuclearmalaysia.gov.my	Mr Bum Soo Han Ms Celina Ines Horak
2	**RAS1029**	Enhancing Regional Capabilities in Advanced Non-Destructive Testing Techniques for Improved Safety and Inspection Performance in Industries (RCA)	2023-2026	**MAL** Mr Ilham Mukriz Zainal Abidin Malaysian Nuclear Agency **Email**: mukriz@nuclearmalaysia.gov.my	Mr Gerardo Antonio Ms Hannah Affum
3	**RAS5088**	Enhancing Crop Productivity and Quality through Mutation by Speed Breeding (RCA)	2021-2024	**CPR** Ms Huijun GUO Institute of Crop Science, Chinese Academy of Agricultural Science (CAAS) **Email**: guohuijun@caas.cn	Ms Fatma Sarsu
4	**RAS5091**	Assessing and Mitigating Agro-Contaminants to Improve Water Quality and Soil Productivity in Catchments Using Integrated Isotopic Approaches (RCA)	2022-2025	**AUL** Mr Timothy Ralph Macquarie University Department of Environmental Sciences **Email**: tim.ralph@mq.edu.au	Ms Mariko Fujisawa
5	**RAS6098**	Standardizing Radiotherapy in Palliative Care (RCA)	2022-2025	**JPN** Mr Masaru Wakatsuki National Institute for Quantum and Science and Technology, QST Hospital **Email**: wakatsuki.masaru@qst.go.jp	Ms Elena Fidarova Mr Daniel Berger
6	**RAS6100**	Strengthening Clinical Application of Hypofractionated Radiotherapy (RCA)	2022-2025	**ROK** Mr Wonil Jang Korea Institute of Radiological and Medical Sciences (KIRAMS) **Email**: zzang11@kirams.re.kr	Ms Soha Salem Mr Daniel Berger
7	**RAS6101**	Improving the Quality and Safety of Radiation Medicine through Medical Physicist Education and Training (RCA)	2022-2025	**CPR** Mr YANG Ruijie Department of Radiation Oncology Peking University Third Hospital **Email**: ruijyang@yahoo.com	Ms Olivera Ciraj Bjelac Ms Graciela Remedios Velez Mr Daniel Berger
8	**RAS6105**	Improving Cancer Management through Theranostics by Using Radioisotope Based Diagnostic and Therapeutic Techniques (RCA)	2024-2027	**PKT** Mr Irfan Ullah Khan Institute of Nuclear Medicine and Oncology (INMOL); Pakistan Atomic Energy Commission (PAEC) Pakistan **Email**: drirfankhan69@gmail.com	Mr Enrique Estrada Lobato Mr Peter Knoll Ms Aruna Girish Korde
9	**RAS6108**	Strengthening Cancer Care by Training Radiation Oncology Health Professionals in Consistent and Accurate Data Collection through Oncology Information Systems (RCA)	2024-2026	**AUL** Ms Mei Ling Yap Level 18 International Towers 3 300 Barangaroo Ave Sydney, NSW 2000 AUSTRALIA **Email**: MYap@georgeinstitute.org.au	Ms Elena Fidarova Mr Daniel Berger
10	**RAS6109**	Improving the Quality and Safety of Diagnostic and Interventional Radiology Services to Benefit Health Care by Enhancing the Status, Knowledge and Skills of Medical Physicists (RCA)	2024-2027	**AUL** Mr Delakis, Ioannis Prince of Wales Hospital Medical Imaging Department NSW 2031 Randwick AUSTRALIA **Email**: ioannis.delakis@googlemail.com	Ms Olivera Ciraj Bjelac Ms Graciela Remedios Velez
11	**RAS6110**	Improving the Radiotherapy Capacity of Newcomer Government Parties (RCA)	2024-2027	**JPN** Mr Yoshiyuki Suzuki Fukushima Medical University School of Medicine 1 Hikarigaoka, Fukushima-City 960-1295 Fukushima JAPAN **Email**: ysuzu@fmu.ac.jp	Ms Soha Salem Mr Daniel Berger
12	**RAS7040**	Improving Water Resources Management Practices by Enhancing the Regional Collaboration in Environmental Isotope Analysis and Applications (RCA)	2022-2025	**VIE** Dr Trinh Anh Duc Nuclear Training Center Vietnam Atomic Energy Institute **Email**: rinhanhduc@vinatom.gov.vn	Mr Umaya Doss Sarvana Kumar
13	**RAS7043**	Evaluating the Efficacy of Artificial Recharge to Groundwater in Water Scarce Regions using Isotope Techniques (RCA)	2024-2027	**IND** Mr Tirumalesh Keesari B 10 Deepak Anushaktinagar Mumbai INDIA **Email**: tirumal@barc.gov.in	Mr Umaya Doss Sarvana Kumar
14	**RAS9092**	Strengthening the Capacity to Respond to Radiological Emergencies of Category II and III Facilities (RCA)	2020-2023	**ROK** Ms Hyun Kyoung Jeon RCA Regional Office Daedeok-daero 989-111, Yuseong **Email**: hkjeon@rcaro.org	Mr Mousa Mesfer M Alkaltham
15	**RAS0092**	Enhancing the Strategic Management of the Programme under the Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology for Asia and the Pacific (RCA)	2024-2027	**ROK** KIM Bomi Global Cooperation Center Korea Nuclear International Cooperation Foundation (KONICOF) 111, Daedeok-daero 989beon-gil, Yuseong-gu, Daejeon 34057 Email: bmkim@konicof.or.kr	Mr Gashaw Gebeyehu Wolde

Planned Regional Events under RCA Projects in 2025

Project No.	Task No	EVT Sub-Type	EVT Number	Category: Face to Face Virtual	Title of Event	Objective and Participation	Venue	Counterpart details	Start Date	End Date
Q1/2025										
RAS6101	03.04.02	RTC	EVT2400801	Face to Face	RTC on clinical programmes	Objective: To enhance knowledge and skills of the participants on how to establish and carry out structured and supervised clinical training programmes in Medical Physics, in alignment to the IAEA documents and guidelines (HHS 25, TCS-37, TCS-47, TCS-50). Target participants: Radiation Therapy (RT), Nuclear Medicine (NM), and Diagnostic Radiology (DR)	Hanoi, Viet Nam	**Mr Ngo Toan Tran**, 59 Ly Thuong Kiet, Hanoi, Viet Nam Tel: 0912391207 Email: tntoan@vinatom.gov.vn Course Director: **Mr. NGUYEN, Thanh Binh** Deputy Head of Radiation Therapy Physics Department, National Cancer Hospital, Hanoi, Vietnam. Tel.: +84 904685880 Email: Ntbinh.nci@gmail.com Administrative official: **Ms. VU, Thu Thao** Deputy Head of International Cooperation and R&D Department, National Cancer Hospital, Hanoi, Vietnam. Email: tthao1308@gmail.com	6.Jan.25	10.Jan.25
RAS6109	04.01.01	RW	EVT2406282	Face to Face	Regional workshop on the role of the medical physicist in quality management of radiology department	Objective: To discuss the concepts of Quality Management Systems (QMS) in Diagnostic and Interventional Radiology Practices Target participants: Target Participants from RCA participating countries and observers from Pacific Island in the following fields: a) a diagnostic radiology medical physicist working in a tertiary referral hospital; or b) a medical physicist representing of a medical physics professional society, i.e. national Medical Physics Societies; or c) a medical physicist working in a tertiary referral hospital in another specialty of medical physics (e.g. radiotherapy or nuclear medicine) but also involved in diagnostic radiology activities; or d) a professional involved in providing diagnostic radiology medical physics services to hospitals.	Chiang Rai, Thailand	**Ms Anchali KRISANACHINDA** Department of Radiology Faculty of Medicine Chulalongkorn University Rama IV Road 10330 BANGKOK THAILAND Tel:+66 (2)256 4000 X80309 Email:anchali.kris@gmail.com	27.Jan.25	31.Jan.25
RAS6105	02.04.02	SP		Face to Face	Expert group mission to attend nuclear medicine update 2025	Objective: To support experts to attend the nuclear medidine update Target participants: Two experts from Indonesia, Malaysia, Pakistan, Singapore, and Thailand are to be supported if their applications got accepted by the conference	Singapore	**Dr S. SOMANESAN** Department of Nuclear Medicine and PET Singapore General Hospital Outram Road; Block 2, Basement 1 Singapore 169608 SINGAPORE email: somanesan@sgh.com.sg	6.Feb.25	9.Feb.25

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Planned Regional Events under RCA Projects in 2025

Planned Regional Events under RCA Projects in 2025

Project No.	Task No	EVT Sub-Type	EVT Number	Category: Face to Face Virtual	Title of Event	Objective and Participation	Venue	Counterpart details	Start Date	End Date
RAS5105	01.01.01	ME	EVT2406289	Face to Face	First coordination and technical planning meeting	Objective: To bring together national counterparts and professionals from all participating countries of RAS5101 to discuss the objectives of the project, finalize the project implementation plan, as well as the respective national plans. Target participants: NPCs from RCA participating countries	Vienna, Austria	**Mr Yongdun Xie** Chinese Academy of Agricultural Sciences (CAAS); Institute of Crop Sciences 12 Zhongguancun South Street 100081 Beijing CHINA Tell: +86-10-82108575 Email: xieyongdun@caas.cn	17.Feb.25	21.Feb.25
RAS6098	03.02.01	EM	EVT2406271	Face to Face	Expert group meeting to develop palliative RT at TMH	Objective: To develop a guideline on palliative radiotherapy Target participants: Selected 7 experts from participating countries together with IAEA TO	Mumbai, India	**Ms Sarbani Ghosh Laskar** Tata Memroial Hospital Department of Radiation Oncology Dr Ernes Borges Road, 400012 Mumbai, India Email: sarbanilaskar@yahoo.co.in	24.Mar.25	28.Mar.25
Q2/2025										
RAS1028		SP		Face to Face	Participation to the International Conference on Applications of Radiation Science and Technology (ICARST-2025)	Objective: To present and document the activities on dosimetry, and QMS relevant to radiation processing facilities	Vienna, Austria	**Ms Ruzalina Baharin** B-13A-1, Saujana Aster Condominium, Jalan P11H1 Putrajaya MALAYSIA Tel: +60389112000 Email: ruzalina@nm.gov.my	7.Apr.25	11.Apr.25
RAS6098	02.01.04	RTC		Face to Face	4th RTC on Optimization of re-irradiation in palliation	Objective: To enhance the knowledge and skills of radiotherapy professionals in the optimization of re-irradiation techniques for palliative care Participants: Radiation oncogies from RCA participating countries	Malaysia	**Mr Muthukkumaran THIAGARAJAN** Department of Radiotherapy and Oncology General Hospital Kuala Lumpur Jalan Pahang 50586 KUALA LUMPUR MALAYSIA Tel:60 3 26155555 Email:drmuthuk@gmail.com	12.May.25	16.May.25
RAS0092	01.01.02	ME		Face to Face	47th RCA NR Meeting	Objective: To discuss strategy, policy and management issues RCA Participants: National Representatives from RCA Government Parties	Nadi, Fiji	**Dr Shalendra Prasad** Ministry of Agriculture - Fiji Agriculture Reasearch Division P.O. Box 77 Nausori FIJI Email: shalendra.prasad@moa.gov.fj	19.May.25	23.May.25
RAS7040	03.01.01	RTC		Face to Face	RTC on Sampling protocols and QA/QC programme of isotope and chemistry analyses for water samples	Objective: To train participants with in filed sampling protocols that are adapted to the regional conditions and QA/QC programmes in isotope and chemistry analyses of water samples	Quizon city, Philiipines	**Dr Charles Darwin Racadio** The Philippines Nuclear Research Institute. Email: ctracadio@puri.dost.gov.ph	26.May.25	30.May.25

Planned Regional Events under RCA Projects in 2025

Project No.	Task No	EVT Sub-Type	EVT Number	Category: Face to Face Virtual	Title of Event	Objective and Participation
RAS6105	02.01.02	RTC	EVT2406312	Face to Face	RTC on Clinical applications of theranostics by using Ga-68 labeled/ Lu-177/ Ac-225 radiotracers.	Objective: To enhance participants' knowledge and practical skills in the clinical applications of theranostics, focusing on the use of Ga-68, Lu-177, and Ac-225 radiotracers. Participants: Professionals in the clinical applications of theranostics
				Q3/2025		
RAS7043	02.03.01	RTC		Face to Face	RTC on measurement of stable isotopes and radioisotopes in water.	Objective: To train participants, particularly those who are new to isotope hydrology, in isotope measurement techniques. Participants: Experts in water resource magagement from participating countries
RAS6100		RTC		Virtual	RTC on hypofactionate radiotherapy for brain and spine metastases	Objective: To train radiation oncologists and medical physicists on hypofactionate radiotherapy for brain and spine metastases
RAS1029	02.01.02	RTC		Face to Face	Train the trainers course on RT-D Level 3 for Personnel Involved in the NDT qualification and certification scheme	Objective: To train participants in radiographic testing - digital (RT-D) Level 3 in accordance with ISO9712 and qualify them for certification. Participants: RCA GPs participating in the project RAS 1029, especially to GPs in the process to develop or expand their qualification and certification scheme for RT-D. Each GP may submit a maximum of 2 nominations.
RAS7040	02.02.01	RTC		Face to Face	RTC on dating groundwater by the use of 14C and Noble Gases prospectus	Objective: To train participants on groundwater dating using C-14 and noble gases

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Planned Regional Events under RCA Projects in 2025

Venue	Counterpart details	Start Date	End Date
Lahore, Pakistan	**Mr Irfan Ullah Khan** Institute of Nuclear Medicine and Oncology (INMOL); Pakistan Atomic Energy Commission (PAEC) P.O. Box 10068, New Campus Road Email: Irfan Khan <drirfankhan69@gmail.com>	26.May.25	30.May.25
	Q3/2025		
Bangkok, Thailand	**Mr Kiattipong KAMDEE** Thailand Institute of Nuclear Technology TINT 9/9 Moo7 Tambol Saimoon Ongkarak 10900 NAKHONNAYOK THAILAND Tel:+66 66863627408 Email:kiat090@yahoo.com	16.Jun.25	20.Jun.25
Virtual	**Dr Tejpal Gupta** Tata Memorial Hospital Email: tgupta@actrec.gov.in	1.Jul.25	4.Jul.25
Kajang, Malaysia	**Mr Ilham Mukriz Zainal Abidin** Malaysian Nuclear Agency, Institute Technology Division, Block 29 T, 43000 Bangi Selangor, Malaysia Email: mukriz@nm.gov.my	7.Jul.25	16.Jul.25
Bangkok, Thailand	**Mr Chalempong Polee,** Thailand Institue of Nuclear Technology (TINT) Email: chalermpong@tint.or.th	21.Jul.25	25.Jul.25

Planned Regional Events under RCA Projects in 2025

Project No.	Task No	EVT Sub-Type	EVT Number	Category: Face to Face Virtual	Title of Event	Objective and Participation	Venue	Counterpart details	Start Date	End Date
RAS1028		EM	EVT2503163	Face to Face	TC Expert Meeting in Hanoi, Viet Nam to develop a checklist document that serves as a guideline for radiation processing facilities seeking quality management system certification, with the aim of improving quality management practices.	Objective: To develop a checklist document that serves as a guideline for radiation processing facilities seeking quality management system certification, with the aim of improving quality management practices. Participants: Experts from Korea, Malaysia, Sri Lanka, Thailand, Viet Nam	Hanoi, Viet Nam	**Mr Quynh Minh Tran** Vietnam Atomic Energy Institute (VINATOM) Minh Khai, Bac Tu Liem Hanoi Irradiation Center 11915 Hanoi VIET NAM Email: tmqthuquynh@yahoo.com	28.Jul.25	1.Aug.25
RAS6100	02.01.04	RTC		Face to Face	Regional Training Course on adopting ultra-hypofractionated radiotherapy as a standard of care	Objective: To strenthen the knowledge and skills of medical physicists and radiation therapists on hypofractionated radiotherapy. Participants: medical physicists and radiation therapists	Putrajaya, Malaysia	**Ms Suhana Binti Yusak** Department of Radiotherapy and Oncology National Cancer Institute No. 4, Jin P7, Precinct 7, Putraya, 62250 Kuala Lumpur, Malaysia Email: drsuhana@nci.gov.my	11.Aug.25	15.Aug.25
RAS6108	03.01.02	RTC	EVT2406310	Face to Face	RTC on the minimum dataset, demonstration, potential ways to use the data for quality improvement	Objective: To train radiotherapy professionals on the minimum dataset required to effectively use their Oncology Information System (OIS) for data collection and quality improvement purposes. Target participants: Radiotherapy professionals from each participating countries	Sydney, Australia	**Ms Mei Ling Yap** Level 18 International Towers 3 300 Barangaroo Ave Sydney, NSW 2000 AUSTRALIA TEL: 61412481718 Email: MeiLing.Yap@health.nsw.gov.au	25.Aug.25	29.Aug.25
RAS1029	03.01.03	RW		Face to Face	Regional Workshop on ISO 9712 qualification and certification requirement in NDT for civil structures	Objective: To provide participants with a comprehensive understanding of the qualification and certification process for Non-Destructive Testing (NDT) personnel in civil structures, in alignment with the ISO 9712 standard. Participants: RCA GPs participating in the project RAS 1029, especially to GPs in the process to develop certification scheme for NDT in civil engineering. Each Member State may submit a maximum of 2 nominations.	CrristChurch, New Zealand	**Mr Leslie Dick** New Zealand Non-Destructive Testing Association (NZNDTA) 17-19 Gladding Place, P.O. Box 76-134 - Manukau city, Auckland - 2241 Email: ljdick@ndt.co.nz	8.Sep.25	12.Sep.25
RAS0092	01.02.02	ME		Face to Face	54th RCA General Conference (including RCA Chairs Meeting and RCARO SAC Meeting)	Annual RCA GCM of NRs	Vienna, Austria		12.Sep.25	12.Sep.25

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Project No.	Task No	EVT Sub-Type	EVT Number	Category: Face to Face Virtual	Title of Event	Objective and Participation	Venue	Counterpart details	Start Date	End Date
RAS6105	02.01.03	RTC	EVT2406312	Face to Face	Regional Training Course on theranostic applications of radiotracers in endocrine related cancer	Objective: To enhance participants' knowledge on the Theranostic applications of radiotracers in endocrine related cancer Participants: Professionals in the clinical applications of theranostics	Being, China	**Ms Yansong Lin** Peking Union Medical College Hospital, Chinese Academy of Medical Sciences 1, Shuaifu, Wangfujing Beijing, Dongcheng District 100730 CHINA Tel: 86-13671116837 Email: linyansong1968@163.com	22.Sep.25	26.Sep.25
					Q4/2025					
RAS6101	02.02.01	RTC		Face to Face	RTC on Quality Management and Quality Assurance audits in Nuclear Medicine Medical Physics	Objective: To train participants on principles of quality management and quality assurance audits in nuclear medicine practices. Participants: Up to 2 candidates per country from the field of nuclear medicine, medical physics.	Bangkok, Thailand	**Mr Krisanat Chuamsaamarkkee Ph.D.** Associate Professor and Medical Physicist Division of Nuclear Medicine Department of Diagnostic and Therapeutic Radiology Faculty of Medicine Ramathibodi Hospital Mahidol University, Bangkok, Thailand E-mail krisanat.ch@gmail.com Mobile Phone +66(89)1696676	6.Oct.25	10.Oct.25
RAS5101	02.01.01	RTC		Face to Face	RTC on advanced mutation breeding techniques for improvement of nutritional quality.	Objective: To provide participants with advanced knowledge and practical skills in mutation breeding techniques for improvement of nutritional quality Participants: Up to 2 candidates from particpating countries	Faisalabad, Pakistan	**Mr Zia Ul Qamar** Pakistan Atomoic Energy Commission (PAEC) Nuclear Institute for Agriculture and Biology (NIAB) Pakistan Email: zia_ul_qamar2003@yahoo.com	6.Oct.25	18.Oct.25
RAS1028		RTC		Face to Face	RTC on Quality Control Procedures Implementation of ISO 13485 with provision of ISO 11137 for Medical Device Industries	Objective: To train participants on QC Procedures Implementation of ISO 13485 with provision of ISO 11137 for Medical Device Industries Participants: up to 2 candidates from each RCA GP.	Colombo, Sri Lanka	**Ms Roshani Ranasinghe** NPC - Sri Lanka Sri Lanka Atomic Energy Board 60/460, Baseline Road, Orugodawatta, Wellampitiya, Sri Lanka E-mail: roshani@aeb.gov.lk	13.Oct.25	17.Oct.25
RAS6105		RTC		Face to Face	Regional Training Course on Hybrid Imaging with non-FDG Tracers	The purpose of this event is to train the participants on the principles, applications, and clinical advantages of advanced PET imaging techniques utilizing non-FDG radiotracers.	Jordan	**HE Mr Mohammed Hindawi** Resident Representative Permanent Mission of the Hashem ite Kingdom of Jordan to the IAEA Rennweg 17/4 1030 VIENNA	19.Oct.25	23.Oct.25
RAS6110	02.01.01	RTC		Face to Face	RTC on management of external radiotherapy	Objective: To train radiotherapy professionals on management of external radiotherapy Participants: up to 2 candidates from each RCA GP and upto 3 candidates from new RCA countries (Cambodia, Fiji, Lao PDR, Palau, Nepal). The nominations are professionals in medical physics and oncologists	Jakarta, Indonesia	**Ms Soehartati Gondhowiardjo** Dr. Cipto Mangunkusumo National General Hospital P.O.Box 1086 Diponegoro 71, 10430 Jakarta, Indonesia Email: gondhow@gmail.com	8.Dec.25	12.Dec.25

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Project No.	Task No	EVT Sub-Type	EVT Number	Category: Face to Face Virtual	Title of Event	Objective and Participation
RAS1028				Face to Face	Final review meeting of RAS1028 on Improving the Quality Management Practices in Radiation Processing Facilities for Better Performance and Applications (RCA)	Objective: To discuss the outcomes of the project since its inception in 2022. The project team will assess and document collective success stories related to the project's impact. Lessons learned will be analyzed and recorded to inform the future design of the RCA TC project. Tartget participants: One NPC from each participating country
RAS1029	02.01.01	RW		Face to Face	Refresher course and qualification examination on Phased Array Ultrasonic Testing (PAUT) Level 2	Objective: To prepare participants for the qualification examination in Phased Array Ultrasonic Testing (PAUT) at Level 2 and qualify them for certification in accordance with ISO9712. Participants: Two participants from RCA GPs participating in RAS1029, especially GPs in the process to develop or expand their qualification and certification scheme for PAUT.
RAS7043	02.03.01	RTC		Face to Face	RTC on Tritium and organic contaminant	Objective: To provide participants with knowledge and practical skills in the detection and analysis of tritium and organic contaminants in water resources, enhancing their ability to monitor and manage environmental and public health risks. Participants: Up to 2 candidates from each RCA participating countries
RAS7043	01.04.01	ME		Face to Face	Mid-term review meeting of RAS7043 on Evaluating the Efficacy of Artificial Recharge to Groundwater in Water Scarce Regions using Isotope Techniques (RCA)	Objective: To discuss and assess the project's achievements and lessons learned since its inception in 2024, as well as to review and finalize the detailed work plan and content of the regional activities for the remaining period until 2027. Tartget participants: One NPC from each country

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Planned Regional Events under RCA Projects in 2025

Venue	Counterpart details	Start Date	End Date
Kular Lumpur, Malaysia	**Ms Ruzalina Baharin** B-13A-1, Saujana Aster Condominium, Jalan P11H1 Putrajaya MALAYSIA Email: ruzalina@nuclearmalaysia.gov.my	27.Oct.25	31.Oct.25
Seoul, S. Korea	**Mr Cheul Muu Sim** Researcher, Korean Atomic Energy Research Institute, 111 Daedeokdaero 989 Beon-gil, Yuseong-gu. Email: oh2s73@gmail.com	27.Oct.25	31.Oct.25
Islamabad, Pakistan	**Ms Saira Butt** Pakistan Institute of Nuclear Science and Technology (PINSTECH) Nilore 45650 Islamabad PAKISTAN Email: sairaasloob@yahoo.com	27.Oct.25	31.Oct.25
Hanoi, Viet Nam	**Vo Thi Anh** (PhD) Deputy Director of Nuclear Techniques Centre responsible for Isotopes Hydrology Studies Instiitute for Nuclear Science and Technology, 179 Hoang Quoc Viet, Cau Giay, Hanoi, Viet Nam Email: vothianhinst@gmail.com	3.Nov.25	7.Nov.25

Planned Regional Events under RCA Projects in 2025

Project No.	Task No	EVT Sub-Type	EVT Number	Category: Face to Face Virtual	Title of Event	Objective and Participation	Venue	Counterpart details	Start Date	End Date
RAS5091	04.01.01			Face to Face	Final coordination meeting of RAS5091 on Assessing and Mitigating Agro-Contaminants to Improve Water Quality and Soil Productivity in Catchments Using Integrated Isotopic Approaches (RCA)	Objective: To discuss the outcomes of the RAS5091 project since its inception in 2022. The project team will assess and document collective success stories related to the project's impact. Lessons learned will be analyzed and recorded to inform the future design of the RCA TC project. Tartget participants: One NPC for each participating countries	Vienna, Austria	**Mr Timothy John Ralph** 30 Vaughan Ave Pennant Hills AUSTRALIA Email: tim.ralph@mq.edu.au	10.Nov.25	14.Nov.25
RAS7040	01.07.01	ME		Face to Face	Final review meeting of RAS7040 on Improving Water Resources Management Practices by Enhancing the Regional Collaboration in Environmental Isotope Analysis and Applications (RCA)	Objective: To discuss the outcomes of the RAS7040 project since its inception in 2022. The project team will assess and document collective success stories related to the project's impact. Lessons learned will be analyzed and recorded to inform the future design of the RCA TC project. Tartget participants: One NPC from each participating country	Vientiane, Lao PDR	**Mr Sitthideth Nonthaxay** Ministry of Natural Resources and Environment Nahaideo Road Vientiane Capital LAO PEOPLE'S DEMOCRATIC REPUBL Email: s_nonthaxay@yahoo.com	17.Nov.25	21.Nov.25
RAS1028	04.01.01	RTC		Face to Face	Sub-regional workhsop on EB irradiator development for RCA new comer Countries	Objective: To strengthen the technical capacity of participants in the development of radiation processing facilities, including infrastructure design, legal requirements, and practical applications. Participants: Upto 3 representative from Lao PDR, Cambodia, Fiji, Palau, Myanmar, Mongolia, Nepal	Being, China	**Yin Yuji** China Isotope and Radiation Corporation Email: yinyuji@circ.com.cn	17.Nov.25	21.Nov.25
RAS6101	05.01.02	RW		Face to Face	Regional Workshop to Share and Disseminate National Practices in the Certification of Medical Physicists	Objective: To facilitate the sharing of lessons learned, experiences, and best practices from participating countries in the certification of medical physicists. Tartget participants: Two representatives from each participating countries	Surakata district, Java Island of Indonesia	**Mr Supriyanto PAWIRO** University of Indonesia Kampus Basru UI Depok DEPOK INDONESIA Tel:+62 (21)7872610 Email:supriyanto.p@sci.ui.ac.id	24.Nov.25	28.Nov.25

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Project No.	Task No	EVT Sub-Type	EVT Number	Category: Face to Face Virtual	Title of Event	Objective and Participation
RAS6100	01.03.01	ME		Virtual	Final coordination meeting	Objective: To discuss the RAS6100 project's outcomes since its inception. The project team will also assess and document the collective findings and success stories related to the project's impact and lessons learned will be discussed and documented for the future design of the RCA TC project. Tartget participants: NPCs
RAS6098	01.02.03	ME		Face to Face	Final review meeting of RAS6098 Project on Standardizing Radiotherapy in Palliative Care (RCA)	Objective: To discuss the outcomes of the RAS6098 project since its inception in 2022. The project team will assess and document collective success stories related to the project's impact. Lessons learned will be analyzed and recorded to inform the future design of the RCA TC project. Tartget participants: One NPC for each participating countries
RAS6105	01.02.01	ME		Face to Face	Mid-term review meeting	Objective: To assess its achievements and challenges since its inception in 2024, and to discuss the detailed work plan for the remaining period until 2027. Tartget participants: NPCs
RAS6109		ME		Face to Face	Mid-term review meeting	Objective: To assess its achievements and challenges since its inception in 2024, and to discuss the detailed work plan for the remaining period until 2027. Tartget participants: NPCs

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Venue	Counterpart details	Start Date	End Date
Virtual	**Ms Wonkyung Teresa** Team Leader International Affairs and Coordination Team, Department of Strategic Planning and Coordination Korea Institute of Radiological and Medical Sciences (KIRAMS) Email: wkna@kirams.re.kr	25.Nov.25	28.Nov.25
Mumbai, India	**Ms Sabani Ghosh Laskar** Tata Memorial Hospital Department of Radiation Oncology Dr Ernest Borges Road 400012 Mumbai India Email: sarbanilaskar@yahoo.co.in	1.Dec.25	5.Dec.25
Vienna, Austria	**Dr Irfan Ullah Khan** Institute of Nuclear Medicine and Oncology (INMOL); Pakistan Atomic Energy Commission (PAEC) P.O. Box 10068, New Campus Road Lahore, Punjab 54600 PAKISTAN Email: drirfankhan69@gmail.com	8.Dec.25	12.Dec.25
Vienna, Austria	**Mr IOANNIS DELAKIS** Prince of Wales Hospital Medical Imaging Department NSW 2031 Randwick AUSTRALIA Email: ioannis.delakis@googlemail.com	15.Dec.25	17.Dec.25

Home Based Assignments in 2025 RCA Programme

Project No.	Assignment Title	No. of days	Start Date	End Date	Experts recruited
RAS0092	HBA for Social and Economic Impact Assessment of hydrology and nuclear medicine (800 days)	148	2025.2.20	2025.6.30	**Dr Aaron Schiff** Independent consulting economist and data analyst Email: aaron@schiff.nz www.schiff.nz
		174			
		56			
		138			**Mr Jaime Andrés Arau Pontones** https://www.andresarau.com Pablo Ruiz Picasso, No.4, 8D. Zaragoza, Spain.
		148			**Mr Julian King** Public Plicy Consultant, specialising in evaluation and value for money Director of Julian King and Associates Limited New Zealand Email: jk@julianking.co.nz
					Ms Kat Mckegg Research and evaluation consultant, specialising in use of rubrics, and evaluation specific methodology, and use of value for investment approaches in evaluation Director of the Knowledge Institute Ltd member of the Kinnect Group New Zealand Email: kmckegg@me.com
		104			**Ms Martina Garcia Aisa** Economic research statistical analysis and impact evaluation, Spain Email: martina.garciaaisa@outlook.com
					Dr Sinh Van Hoang Assessment coordinator Former RCA FP VietNam E-mail: hvsinhun@gmail.com
RAS6109	HBA to develop a survey on the Status and Roles and Responsibilities of Medical Physicists in Diagnostic and Interventional Radiology in the RCA region.	10	2025.2.10	2025.3.30	**Mr Ioannis Delakis** Prince of Wales Hospital Medical Imaging Department NSW 2031 Randwick AUSTRALIA Telephone: 974+61254269603 E-mail: ioannis.delakis@googlemail.com ioannis.delakis@gmail.com **Dr Zoe Brady** Alfred Health, 55 Commercial Road, Melbourne VIC 3004 Australia Mailing address: Dept of Radiology, The Alfred PO Box 31, Prahran VIC 3181, Australia Tel: +61 03 90762368 E-mail: Z.Brady@alfred.org.au

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Home Based Assignments in 2025 RCA Programme

Project No.	Assignment Title	No. of days	Start Date	End Date	Experts recruited
RAS1029	HBA to Develop Learning Materials for Non-Destructive Testing (NDT) in Civil Engineering Methods	15	2025.3.10	2025.3.30	**Mr. Ilham Mukriz ZAINAL ABIDIN** Malaysian Nuclear Agency 43000 Bangi, Selangor, Malaysia. Tel: +6 019 231 4855 Email: mukriz@nm.gov.my
RAS6109	HBA to produce technical document based on the results of RAS5091 project for publication	10	2025.7.28	2025.8.30	**Dr Chathurika Perera** (PhD, M.Phil, B.Sc. (Hons)) Faculty of Science and Engineering School of Natural Sciences Macquarie University North Ryde, NSW 2109 Australia M: (+61) 426942147 Email: Chathurika.perera@mq.edu.au
	Total	**803**			

Expert Missions in 2025 RCA Programme

Project No.	Assignment Title	No. of days	Start Date	End Date	Total no. of expert	women	Experts recruited
RAS7040	Expert mission to conduct 1. Conduct and facilitate the IWAVE National Consultation Workshop, 2. Lead and coordinate the completion of the hydrological gap matrix, 3. Lead and coordinate the preparation of the draft National Hydrological Sketch report involving the inputs provided by the stakeholders attending the workshop.	5	2025.2.2	2025.2.6	1	0	**Ratan Kumar MAJUMDER, D.Sc.** Chief Geologist and Head Isotope Hydrology Division Institute of Nuclear Science and Technology Bangladesh Atomic Energy Commission Dhaka, Bangladesh E-mail: ratankm@baec.gov.bd Ph:+88-02-7790409 (off) Cell:+88-01675000723
RAS6100	The Expert is expected to deliver a lecture and facilitate a multidisciplinary case discussion for radiation oncologists, aiming to provide practical insights into implementing hypofractionation in clinical practice, enhancing both theoretical understanding and practical application.	1	2025.4.5	2025.4.5	0	1	**Mi-Sook Kim, MD, PhD** Professor at UST (University of Science and Technology) Nowon-ro, Nowon-gu, Seoul 01812 Korea Email: mskim@kirams.re.kr
RAS6109	Expert mission to Thailand to assess knowledge, skills and competences of medical physics residents following clinical training in Radiation Oncology Medical Physics.	5	2025.4.23	2025.4.27	1		**James C L Lee, PhD** Chief Radiation Physicist Division of Radiation Oncology National Cancer Centre Singapore DID +65 6306 1133 Email: trdjas@nccs.com.sg
		5			1		**Prof. Dr. Ngie Min UNG** Tel: +60198861951 University of Malaysia E-mail: nmung@ummc.edu.my

Expert Missions in 2025 RCA Programme

Project No.	Assignment Title	No. of days	Start Date	End Date	Total no. of expert	women	Experts recruited
RAS6110	Expert mission to Cambodia to discuss and devise national development plan of radiotherapy access with NPC and external experts	5	2025.7.21	2025.7.25	1	0	**Gregorius Ben Prajogi** Radiation Oncologist Cipto Mangunkusumo National General Hospital, Jakarta, Indonesia Email: ben.prajogi@proton.me
		5			1		**Muhamad Iqbal Assegab** Medical Physicist Cipto Mangunkusumo National General Hospital, Jakarta, Indonesia Email: iqbalassegab@gmail.com
		5			1		**Wahyu Edy Wibowo** Medical Physicist Cipto Mangunkusumo National General Hospital, Jakarta, Indonesia Email: Wahyu.bovie@gmail.com
		5			1		**Hamdi Rubiyanto** Quality Officer, RTT Cipto Mangunkusumo National General Hospital, Jakarta, Indonesia Email: hamdiruby@gmail.com
		36			**7**	**1**	

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RCARO 2024 Work Performance

Highlights in RCARO's Activities in2024

1. Host of the First RCA Side-Event during the 68th IAEA General Conference Meeting in September 2024

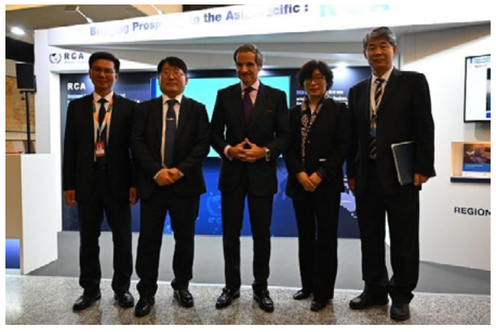
The first RCA side-event ever was held during the 68th IAEA General Conference Meeting in September 2024. This was a follow-up of the decision made at the 46th RCA NRM. With the efforts by the RCA Task Force coordinated by the RCARO, the event was successfully hosted under the title of "RCA: Advancing Sustainable Development in the Asia-Pacific Region", bringing together more than 100 delegates and experts to discuss and strategize on enhancing regional cooperation in nuclear science and technology across Asia and the Pacific.

Keynote speeches were delivered by Mr Rafael Mariano Grossi, Director General of the IAEA, Mr Sang-Im YOO, Minister of Science and ICT, Republic of Korea, and Mr Jing LIU, Vice Chairman of China Atomic Energy Authority.

This side event served as a dynamic forum for RCA stakeholders to discuss and share ideas on the RCA's contributions to socio-economic development across the Asia-Pacific region. Key topics included the contribution of RCA to socio-economic development, creating synergies between the RCA programme and IAEA initiative, and strategies for future partnerships.

2. Increasing Visibility through Holding Special RCA Exhibition at the IAEA Ministerial Conference in November 2024

Under the theme "Brining Prosperity to the Asia-Pacific: RCA", RCARO facilitated the preparations for the RCA exhibition in cooperation with the IAEA and GPs to showcase the achievements of the RCA over the last 52 years. RCA promotional videos were demonstrated at the RCA booth and various RCA publications were distributed to the visitors, such as RCA brochure, newsletter and issue brief, RCA history and socio-economic impact assessment report of the RCA Programme. In addition, experts from CPR, MAL and PAK provided their support in operation of the RCA booth and promotion of the RCA at the conference, supported by RCARO.



RCARO 2024 Work Performance

The opening ceremony of the RCA exhibition was successfully held on 27th November with the participation of a big audience including IAEA Director General, RCA Chair, NRs and representatives of the RCA GPs, RCA experts and IAEA representatives. This event showed a strong engagement of the RCA GPs demonstrating a strong regional ownership and engagement and ensuring broader representation and reinforcing the collaborative spirit of the RCA. The exhibition surely increased the awareness and visibility of the RCA among the stakeholders and reconfirmed the role of the RCA in the regional prosperity and development.

3. Enhancing Regional Coordination through Introductory Workshop for the New RCA NRs

As recommended by the 45th RCA NRM, RCARO hosted "Introductory Workshop for New National RCA Representatives (NRs) on RCA Programme and Its Policy" on 22-25 July 2024 in Seoul, Korea, inviting 35 participants from 12 RCA GPs, the IAEA and RCA experts. The 3 workshop was successful in meeting its objective to support the newly appointed RCA NRs to enhance their understanding on the RCA Programme and its policy. The event was conducted hybrid to expand the participation of NRs and relevant experts.

The event served as a platform for knowledge exchange, strengthening regional collaboration. By familiarizing the new NRs with RCA policies and programmes, the workshop contributed to better alignment and coordination between RCA Government Parties, and is expected to contribute to facilitating smoother implementation of RCA projects and activities across the region.

4. Launching of Partnership Project with the US DOE "Project on Supporting the Adoption of eBeam Technology and its Applications in Areas of Food and Agriculture, Industry, Human Health and Environment Treatment"

A new partnership project on "Supporting the Adoption of eBeam Technology and its Applications in Areas of Food and Agriculture, Industry, Human Health and Environment Treatment" was successfully launched this year, under the partnership with the Office of Radiological Security (ORS), National Nuclear Security Administration of the US Department of Energy. This project spans the next five years with the objective of facilitating technology transfer, enhancing awareness, and promoting the adoption of eBeam technology in the Asia Pacific region as a safer alternative to radioactive isotope-based technologies, while improving industrial capabilities, environmental quality, and living conditions.

In 2024, the project was implemented according to the work plan set up in the Project Coordination Meeting held in December 2023. Two Expert Missions, one to Mongolia in October and the other to Cambodia in December, were carried out and two Hands-on Electron Beam Technical Workshops, one in April in Texas A&M and the other in December in Viet Nam were conducted, benefiting over 90 participants from the region.

The capacity building activities at national and regional level will serve as a crucial basis for the adoption and facilitation of the technology in the RCA.

ANNEX 4

RCARO 2024 Work Performance

2024 Work Performance Details

1. Increasing the Awareness of the RCA

1.1 Host of RCA Side-event during the 68th IAEA GC

At the 46th NRM, RCARO expressed its intention to host a side event during the 68th IAEA General Conference Meeting in September 2024. The Task Force comprising of PAK, KAM, INS, MAL, JPN, AUL, FIJ, MON, VIE, ROK, and CPR was formed to follow up.

As part of the 68th IAEA General Conference, the RCA side event was held on 17 September 2024, bringing together delegates and experts to discuss and strategize on enhancing regional cooperation in nuclear science and technology acrossAsia and the Pacific. This event, titled "RCA: Advancing Sustainable Development in the Asia-Pacific Region", gathered over 100 participants including the representatives from the RCA Government Parties, the IAEA, RCARO and other organizations and countries outside the region.

Keynote speeches were delivered by Mr Rafael Mariano Grossi, Director General of the IAEA, Mr Sang-Im YOO, Minister of Science and ICT, Republic of Korea, and Mr Jing LIU, Vice Chairman of China Atomc Energy Authority.

This side event served as a dynamic forum for RCA stakeholders to discuss and share ideas on the Regional Cooperative Agreement's (RCA) contributions to socio-economic development across the Asia-Pacific region. Key topics included the contribution of RCA to socio-economic development, creating synergies between the RCA programme and IAEA initiative, and strategies for future partnerships.

1.2 Host of RCA Special Exhibition at the IAEA Ministerial Conference 2024

At the request of the IAEA, RCARO drafted a plan to hold an RCA exhibition during the IAEA's Ministerial conference* scheduled in November and presented it to the 46th NRM. Upon approval of the meeting, RCARO finalized the exhibition concept including time/venue, exhibition theme, promotional contents, in consultation with the Task Force.

* Ministerial Conference on Nuclear Science, Technology and Applications and the Technical Cooperation Programme on 26-28 November 2024, Vienna Austria

Under the theme "Brining Prosperity to the Asia-Pacific: RCA", RCARO facilitated the 2024 Work Performance Details 5 preparations for the RCA exhibition in cooperation with the IAEA and GPs to showcase the achievements of the RCA over 52 years. A total of 14 RCA GPs provided the RCA project activity information such as pictures and video clips to the RCARO for making RCA promotional materials. Based on the received materials, RCARO made two RCA promotional videos demonstrated at the RCA booth; RCA promotional video (revised from the RCA's 50th anniversary video) and RCA project activity video. RCARO also distributed various RCA publications to visitors, such as RCA brochure, newsletter, issue brief, RCA history and socioeconomic impact assessment report of the RCA Programme. In addition, experts from CPR, MAL and PAK provided their support in operation of the RCA booth and promotion of the RCA at the conference, supported by RCARO.

The opening ceremony of the RCA exhibition was successfully held on 27th November with the participation of a big audience including IAEA Director General, RCA Chair, NRs and representatives of the RCA GPs, RCA experts and IAEA representatives.

RCARO 2024 Work Performance

1.3 Supporting RCA experts to outreach to the international community and forums

RCARO has provided support for RCA experts for their promotion of the RCA at regional/international events under the Expert Support Programme. Due to the Covid-19 pandemic, the participation of the MAL selectee has been postponed until 2024. After the release of the travel restrictions, RCARO supported the selectee's participation and his RCA promotional activities at the 20th World Conference on Non-Destructive Testing held in May in Korea.

For 2025, RCARO received a total of 14 applications from 7 GPs. According to the guideline of the Programme, RCARO made a shortlist of the applicants for review by the RCARO SAC. Upon approval of the RCARO SAC and 53rd GCM, RCARO finalised the 3 selectees from AUL, IND and INS. RCARO will make the necessary arrangements to support the selectees in due course.

1.4 Provision of RCA information through the RCA Integrated Information System

With the aim of providing a more comprehensive data service to the RCA, the RCARO established the Integrated Information System including the RCA Main Website, E-Campus, and Data Hub.

- **Provision of RCA Information**

  At the 46th NRM, it was recommended that the RCA project information be archived at the IAEA PCMF while the other policy and RCARO managed project documents be stored at theRCA website. According to the recommendation, RCARO has continued collecting and providing information on the RCA policy related meetings and activities in cooperation with the IAEA, GPs and experts.

- **Development of Data-hub**

  A "Data-Hub" is being developed to contribute to archive and provide diverse data related to the nuclear science and technology, such as policies, institutions/organizations, trends and news of the region. All the information will be retrieved from open sources, i.e., media, promotional websites, journals, etc. Progress of developing the platform was presented at the New NR Workshop in July to receive comments. Reflecting comments received at the workshop on the contents of the Data-hub, RCARO will upload relevant information in cooperation with the NRs.

1.5 Publications

- **RCA Newsletters**

  RCARO published the 7th and 8th issue of the RCA Newsletters in May and September respectively. The newsletters featured articles on key outcomes of the RCA Policy Meetings (46th NRM, 53rd GCM), and RCA Projects (RAS7028, RAS6093, RAS6100, RCARP03), insights of the RCA experts on RCA Programme, regional cooperation in human health sector, nuclear science and technology status/activities of RCA Government Parties (GPs) and IAEA/RCA events as well as RCARO activities.

- **RCA Annual Report**

  To support the IAEA's role to publish the RCA annual report, RCARO provided assistance to the IAEA by preparing a draft annual report with the information received from the IAEA and the GPs. It contains information on the implementation of the RCA Programme, key policy decisions of the NR Meetings and achievements of the non-technical activities.

  At the 45th NRM and 52nd GCM, there have been discussions on how to improve the RCA Annual Report as a valuable reference document for the RCA stakeholders, potential partners, and the public. RCARO prepared a draft of 2023 RCA Annual Report with enhancements suggested by the 52nd GCM, including revision of

ANNEX 4

RCARO 2024 Work Performance

the structure, addition of graphical representations and data as well as statements from the RCA Chair and senior IAEA officials and submitted it to the 46th NRM for review and comments of the NRs. Upon the confirmation of the IAEA, final version will be shared with the RCA GPs and uploaded on the RCA website.

- **Other Publications: RCA Issue Brief**

  RCARO has published the 'RCA Issue Brief', with the aim to provide expert analysis and insights on topics that are relevant to the RCA and nuclear science and technology, to a wide audience including policy makers, experts and the general public.

  The first Issue Brief entitled as "Theranostics, a New Innovative Approach to Cancer Treatment" was published in September and uploaded on the RCA website. Co-authored by the former Chair of ARCCNM (Asian Regional Cooperative Council for Nuclear Medicine) and an expert of KIRAMS, it focuses on theranostics which has made significant advance in precision medicine, particularly in the field of oncology. It covers diagnostic imaging and targeted therapy to treat diseases such as cancer with high specificity and efficacy. The Issue Brief was also distributed to the relevant stakeholders together with the RCA Newsletter to promote the RCA.

2. Addressing the needs of the Government Parties for development of the RCA

2.1 Introductory Workshop for the New RCA NRs

As recommended by the 45th RCA NRM, RCARO hosted an introductory workshop for the RCA NRs on overall RCA policy matters to enhance the understanding of the newly appointed NRs on the RCA Programme. It was held on 22-25 July 2024 in Seoul, Korea, inviting 14 RCA NRs, RCA Focal Person and RCA PAC(Chair and a member). The event was conducted hybrid to expand the participation of NRand relevant experts. It was successfully completed meeting its objectives to enhance the understanding on the IAEA TC Programme, RCA framework and activities of the RCARO.

The event served as a platform for knowledge exchange, strengthening regional collaboration. By familiarizing the new NRs with RCA policies and programmes, the workshop contributed to better alignment and coordination between RCA Government Parties, and is expected to contribute to facilitating smoother implementation of RCA projects and activities across the region.

2.2 [EB Project] Implementation of RAS9092 "Strengthening the Capacity to Respond to Radiological Emergency of Category II and III Facilities in the RCA Region"

RAS9092 on "Strengthening the Capacity to Respond to Radiological Emergencies of Category II and III Facilities in the Asia-Pacific region" was developed by the RCARO under the IAEA TC Programme. It aims to transfer knowledge and technology in establishing adequate emergency preparedness and response procedures for category II and III facilities, using a graded approach. Funded by the Korean Government, the project is to be implemented for five years from 2020 to 2024, with a one-year extension decided at the project coordination meeting in 2020 due to the difficulties in undertaking the planned activities resulting from the COVID- 19 pandemic.

Fifteen (15) GPs, with ROK as the lead country, are participating in the project: AUL, BGD, KAM. IND, INS, MAL, MON, MYA, NEP, PAK, PHI, SIN, THA and VIE.

- **Regional Workshop on the Development of a National Radiation Emergency Plan (NREP)**

  Regional Workshop on the Development of a National Radiation Emergency Plan (NREP) (including Hazard Assessment) was held on 25-29 March 2024 at the OAP, Thailand, attended by 28 participants from the IAEA and 13 participating countries. The workshop provided strategies for the development of a national radiation emergency plan, which will serve as an important basis for the implementation of follow-up expert missions under the project.

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- **Expert Missions**

  One Expert Mission to the Philippines was conducted by an expert facilitated by the IAEA. The mission is consisted of a five-day Home Based Assignment and a two-day virtual meeting to review and complete the draft National Radiation Emergency Plan prepared by the Philippines.

- **Final Review Meeting**

  A Final Review Meeting was held on 11-12 December virtually as a completion of the project. The opening ceremony featured remarks from Mr Dae Ki KIM, director of the RCA Regional Office, Ms Khemphone Phaokhamkeo, Programme Management Officer, and Mr. Mousa Alkaltham, Technical Officer of the project. The Meeting brought together 14 participants including the Lead Country Coordinator (LCC) and National Project Coordinators (NPCs) and members of the National Project Team from 11 Government Parties- Australia, Bangladesh, Indonesia, Korea, Laos, Malaysia, Myanmar, Nepal, Philippines, Pakistan, and Thailand.

  Over the two-day sessions, participants reviewed the progress and achievements of the project, particularly in enhancing Emergency Preparedness and Response (EPR) capabilities in the region. Discussions also focused on identifying follow-up activities to address the remaining challenges of capacity-building efforts in the EPR field.

2.3 [RP02] Implementation of the RP on Air Quality and Environmental Impact Assessment of Industrial Activities in the Region

With the aim of improving the quality of the environment by providing appropriate pollutant data to the researchers and relevant stakeholders, the project has been implemented during Phase 1 (2018-2020) and Phase 2 (2020-2023). Ten (10) GPs participated in the project: AUL, NZE, ROK as Agreement Holders and CPR, INS, MAL, MON, PAK, THA and VIE as Contract Holders.

Upon the completion of the project in 2023, RCARO, in cooperation with the Technical Officer (TO) of the project and INS Chief Scientific Investigator (CSI), has drafted an achievement report of the project elaborating the results and outcomes of the project at the national and regional level. After incorporating the inputs of the CSIs, RCARO published two versions of the report; a detailed report with full information and short one with summary of key achievements. Both reports were uploaded on the RCA website for access by relevant experts and the public.

2.4 [RP03] Implementation of the Research Project on Closing the Gap in Access to Radiotherapy in RCA

To improve cancer planning and scale up radiotherapy services by providing evidence-based information on the radiotherapy services, the project was launched in 2022 and is to be implemented for three years until 2024. Six (6) GPs are participating in the project: AUL and PHI as Agreement Holders and INS, MAL, MON and THA as Contract Holders.

A Research Training Course on outcome assessment was held virtually on 19-20 February 2024, inviting over 50 participants including the CSIs and research team members of the participating countries, Technical Officer and relevant experts.

A Research Coordination Meeting was held on 6-8 May 2024 virtually, inviting 23 participants including the CSIs, Technical Officer and relevant experts. The meeting reviewed the progress/results of the research activities towards project completion in 2024. In conjunction with the meeting, a technical workshop on the outcome assessment was held to provide a more practical and advanced knowledge and guidelines for the research to carry out in 2024, following the workshop held in February 2024.

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CSIs were requested to submit final reports for review by the relevant experts and Research Review Committee in December 2024. Incorporating the review by the experts/RRC, RCARO will make a final report of the project in early 2025.

2.5 Survey on Research Needs

As the RCARP03 is to be completed in 2024, RCARO reported to the 38th RCARO SAC and the 46th NRM its plan to launch new projects which will address the needs of the GPs under the framework of the RCARO Managed Projects. Upon the endorsement of the 46th NRM, RCARO called for proposals for new projects in early August. A dedicated online platform was developed for GPs to submit proposals by the end of 2024.

Upon receipt of the proposals, RCARO will make the necessary arrangements for review and selection of the received proposals in consultation with the RCA PAC, relevant experts and NRs according to the relevant guidelines. As recommended by the 46th NRM, projects will be developed taking into consideration of the ways to link them with the IAEA initiatives and the UN SDGs.

3. Empowering next generation in Nuclear Science and Technology in the RCA

3.1 Fellowship Programme

RCARO received in total 15 applications from 10 GPs, which marked a greater number of applications compared to the previous years. Responding to great interests and needs of the GPs, RCARO decided to expand the programme, selecting 5 applications instead of 2 which RCARO originally planned for the year 2024.

The applicants from FIJ, IND, INS, PHI and THA were selected based on the requirements needed for the programme, prior achievements and motivation of the applicants, giving consideration to national distribution.

Two fellows from IND and INS and the other two from FIJ and PHI have completed their fellowships for 2 months from June to July and October and November respectively. One fellow from THA will be invited for her fellowship from February to April 2025.

3.2 Scholarship Programme

Since 2003, RCARO has provided scholarships to support students from the RCA GPs in order to nurture the next generation of nuclear professionals in the RCA and to support the technical development of the region. Students participating in this programme are granted with scholarships for their Master's or Ph.D. studies, and opportunities to participate in national R&D projects to develop research competence, network with subject matter experts and gain handson experience at various Korean institutes/universities, such as KAIST, KINGS and UST.

* **KAIST**: Korea Advanced Institute of Science and Technology
  KINGS: KEPCO(Korea Electric Power Corporation) International Nuclear Graduate School
  UST: University of Science and Technology

- **KAIST Master's Degree Programme**

  KAIST is the first and top science and technology university in Korea, established in 1971 by the Korean Government to educate scientists and engineers.

  The programme supports students for master's degree in Nuclear and Quantum Engineering for two years. Since 2003, a total of 41 students from 11 countries have received degrees. In 2024, three students are supported for their study in KAIST.

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- **KINGS Master's Degree Programme**

KINGS is an educational institute specializing in Nuclear Power and Energy, established in 2012 to foster energy policy decision makers to respond to energy industry transformation and climate change. The programme is designed to produce energy policy makers and leaders who understand both theory and practice through lectures, practical training and exchange of experiences with fellow students from a variety of backgrounds including power companies and institutions.

It is a two-year programme for master's degree in Energy Policy and Engineering, under which the first year is spent studying in the KINGS and the second year for writing a thesis in applicant's home country. Since 2022, 4 students from 3 countries have received degrees. In 2024, three students are sponsored to study at KINGS.

- **UST Doctoral Degree or Integrated/ Master's Degree Programme**

UST is a science and technology graduate school jointly established by the Government-Funded Research Institutes (GFRIs) in Korea in 2004 to nurture future leaders in the fields of science and technology.

Among the 35 GFRIs which currently provide support functioning as Campus, this Programme cooperates with two campuses, namely, KAERI and KIRAMS, and its majors include Nuclear Science and Technology, Radiation Science, Nuclear and Radiation Safety, Artificial Intelligence, and Radiological & Medico-Oncological Sciences.

In 2024, one student was selected to study at UST in the spring semester and two students for the autumn semester.

* **KAERI**: Korea Atomic Energy Research Institute
KIRAMS: Korea Institute of Radiological & Medical Sciences

3.3 Expansion of capacity building activities

RCARO reported to the 38th RCARO SAC and the 46th RCA NRM its plan to expand the HRD Programme to provide more effective and systematic support to the RCA GPs in capacity building by introducing postdoctoral fellowship and on-the-job training, engaging relevant experts and institutes. RCARO conducted a survey of relevant universities and discussions with nuclear research institutes in Korea to identify the needs and feasibility of the programme. Based on the result of the survey and discussions, RCARO will develop and implement HRD activities to support the RCA GPs.

4. Enlarging the horizon of the RCA Programme through establishing partnerships

4.1 [US DOE] Implementation of the "Project on Supporting the Adoption of eBeam Technology and its Applications in Areas of Food and Agriculture, Industry, Human Health and Environment Treatment"

In the partnership with the Office of Radiological Security (ORS), National Nuclear Security Administration of the US Department of Energy, RCARO is implementing the "Project on Supporting the Adoption of eBeam Technology and its Applications in Areas of Food and Agriculture, Industry, Human Health and Environment Treatment" from 2024 to 2028. The First Project Coordination Meeting was held in December 2023, to which a total of twenty-one (21)* RCA GPs were invited.

* AUL, BGD, CPR, KAM, FIJ, IND, INS, JPN, ROK, LAO, MAL, MON, MYA, NZE, NEP, PAK, PHI, SIN, SRL, THA and VIE.

- **Participating at a Hands-on Electron Beam Technical Workshop in Texas A&M**

RCARO 2024 Work Performance

Thirteen(13) participants from the RCA GPs were invited to a hands-on workshop on the use of the eBeam technology which was held on 15-19 April at the National Center for Electron Beam Research (NCEBR) of Texas A&M University. In line with the overarching goal of the project to support the eBeam infrastructure building and facilitation of its applications, this workshop provided a comprehensive understanding of the principles and applications of eBeam and X-ray technologies to those countries who are planning to adopt the technology. During the workshop, participants had a chance to participate in the hands-on sessions where they can learn dosemapping and get preliminary data on the products they bring from their home countries.

- **Implementation of Expert Missions to Mongolia and Cambodia**

According to the work plan, two Expert Missions were carried out in 2024: One in October to Mongolia and the other in December to Cambodia. Prior to the missions, the experts and the countries discussed that there are needs at national level to enhance the awareness of the various stakeholders to adopt the technology. In line with this, the expert missions focused on the successful host of national awareness seminars and meetings with various stakeholders from different sectors.

- **Host of Hands-on Regional Workshop on eBeam Applications in Ho Chi Minh City, Viet Nam**

Hands-on Regional Workshop on eBeam Applications was held from December 2 to 6 2024, in Ho Chi Minh City, Vietnam. Co-hosted by the Vietnam Atomic Energy Institute (VINATOM), the event brought together over 80 participants from 19 countries and featured over 18 presentations under the topics ranging from foundational principles of the technology to applications on various sectors.

A highlight of the workshop was introductory session on PUFFIn simulation software and the hands-on training at VINAGAMMA, where participants gained practical experience in dose mapping and other essential techniques.

Workshop sessions were complemented by engaging discussions that shared lessons learned and good practices across different countries and industries. This blend of theoretical and practical learning provided participants with actionable insights into adopting eBeam technology for socio-economic development.

4.2 [ASEANTOM] Implementation of the "Project on Enhancing Emergency Preparedness and Response Capabilities in the ASEAN Region through Building Technical Capacity in Radiation Monitoring and Dose Assessment (Phase 2)"

- **Online Workshop for Beginner Countries**

According to the work plan confirmed at the project coordination meeting in November 2023, an introductory workshop on in-situ radiation detection demonstration and basic gamma spectrometry technique for enhancing emergency preparedness and response capabilities, was held virtually from 20 to 21 February 2024, inviting around 50 participants from the region. The workshop provided basic lectures including introduction to equipment/detectors (including backpack), selection of sites for monitoring/sampling, basic gamma spectrometry etc.

- **Regional Training Course**

A Regional Training Course on practical application of radiation measurement, radioanalytical method for environment monitoring was held on 10-14 June 2024 in Bangkok, Thailand, with the aim to provide advanced theoretical and practical capacity on accurate radioactivity measurements for environment monitoring. The event was co-hosted with the Office of Atoms for Peace of Thailand and invited a total of 26 participants from the region.

- **Participation in the 11th Annual Meeting of ASEANTOM**

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RCARO participated in the 11th Annual Meeting of ASEANTOM held in August 2024 in Laos, and presented the progress of the project and a plan to have a follow-up project starting in 2025,accommodating the regional needs on the advanced technology on radiation monitoring.

4.3 [ARCCNM] Implementation of a Joint Workshop

Since 2008, RCARO has been supporting the joint workshop with the Asia Regional Cooperative Council for Nuclear Medicine (ARCCNM) to train nuclear medicine physicians and scientists in developing and less developed Asian countries and to further promote regional cooperation to promote nuclear medicine in these countries.

In 2024, RCARO supported the trainees participating in the training on 1-2 November, in Korea and provided an opportunity for young professionals to present selected papers and receive training on the latest advances in nuclear medicine.

4.4 [FNCA] Participation in FNCA Events

On behalf of the RCA, RCARO has been participating in the FNCA Coordinators Meeting to present the achievements of the RCA and promote cooperation between the RCA and the FNCA.

Representing the RCA, RCARO participated in the 24th FNCA Coordinators Meeting on 12-13 March 2024 in Tokyo, Japan, and delivered a presentation on the RCA activities and the progress of the RCA-FNCA cooperative activities.

5. Facilitating the better implementation of the RCA Programme

5.1 Provision of support to the RCA Chair and policy meetings/activities

RCARO provides assistance to the IAEA in performing secretariat support and to the RCA Chair for coordination of various RCA activities. In 2024, RCARO assisted the RCA Chair and the IAEA in the preparation of the 46th RCA NRM and the 53rd GCM, specifically on the preparations of the background documents and meeting reports. In cooperation with the IAEA and GPs, the RCARO prepared a draft 2023 RCA Annual Report providing information on the implementation of the RCA Prorgamme, key policy decisions of the NR meetings and achievements of the non- technical activities, and submitted it to the 46th RCA NRM for review and comments.

5.2 Provision of Extra-Budgetary(EB) contribution to the IAEA

RCARO provided an extra-budget of $70,000 to support the RCA activities implemented on the margins of 2024 IAEA General Conference and the Ministerial Conference and $50,000 to support the effective implementation of the RCAProgramme and projects in need of financial support.

6. Financial Report on “other cooperative activities”

Project Name	**Budget** (EUR)
RCARO Managed Projects(RCARP02,03)	36,740
US DOE Partnership Project	40,663
ARCCNM Partnership Project	26,257
Total	**103,660**

ANNEX 4

RCARO 2024 Work Performance

Annex. Table of Activities, Timelines and Indicators for RCARO Projects/Activities in 2024

#	Objectives	Activities	Timeline				Status
			Q1	Q2	Q3	Q4	
1	Increasing the awareness of the RCA	1.1 Host of RCA Side-event during the 68th IAEA GC			■		Completed • RCA Side-event hosted
		1.2 Host of RCA Special Exhibition at the IAEA Ministerial Conference 2024				■	Completed • Exhibition at the IAEA Conference hosted
		1.3 Supporting RCA experts to outreach to the international community and forums		■	■		Completed • Expert's participation to 20th World Conference on Non-Destructive Testing supported • Experts to be supported in 2025 selected
		1.4 Provision of RCA information through the RCA Integrated Information System	■	■	■	■	Completed • Roles of RCA website and PCMF for archiving RCA information confirmed • Comments of the NRs on the data hub reflected
		1.5 Publications	■	■	■	■	Completed • RCA Newsletters and RCA Issue Brief published • RCAAnnual Report is being drafted and to be finalized after review by the IAEA/GPs
2	Addressing the needs of the Government Parties for development of the RCA	2.1 Introductory Workshop for the new RCA NRs			■		Completed • Workshop hosted in Korea
		2.2 [EB Project] Implementation of RAS9092		■			Completed • Regional Workshop on the Development of a National Radiation Emergency Plan (NREP) held
						■	Completed • Expert Mission to PHI conducted
						■	Completed • Online Final Review Meeting held
		2.3 [RP02] Implementation of the RP on Air Quality and Environmental Impact Assessment of Industrial Activities in the Region				■	Completed • Two versions of achievement report published
		2.4. [RP03] Implementation of the Research Project on Closing the Gap in Access to Radiotherapy in RCA	■				Completed • Online Research Training Course on outcome assessment held in February

RCARO 2024 Work Performance

#	Objectives	Activities	Timeline				Status
			Q1	Q2	Q3	Q4	
2	Addressing the needs of the Government Parties for development of the RCA	2.4. [RP03] Implementation of the Research Project on Closing the Gap in Access to Radiotherapy in RCA		■			Completed • Online Research Coordination Meeting held in May
						■	Completed • CSIs' final reports submitted for review by Research Review Committee
		2.5. Survey on research needs			■	■	Completed • Call for proposals conducted • Platform for proposals on the website developed
3	Empowering next generation in Nuclear Science and Technology in the RCA	3.1. Fellowship Programme		■	■	■	Completed • Five fellows (FIJ, IND, INS PHI, THA) selected for fellowships in the RCARO
		3.2 Scholarship Programme	■	■	■	■	Completed • Nine students granted scholarships
		3.3 Expansion of the capacity building activities				■	Completed • A survey and discussions with relevant universities and institutes in Korea conducted
4	Enlarging the horizon of the RCA Programme through establishing partnerships	4.1 [US DOE] Implementation of the "Project on Supporting the Adoption of eBeam Technology and its Applications in Areas of Food and Agriculture, Industry, Human Health and Environment Treatment"		■			Completed • Experts to the Hands-on Electron Beam Technical Workshop in Texas A&M invited
						■	Completed • Expert Missions to Mongolia and Cambodia implemented
						■	Completed • Expert Missions to Mongolia and Cambodia implemented • Hands-on Regional Workshop on eBeam Applications held in Ho Chi Minh City, Viet Nam held
		4.2 [ASEANTOM] Implementation of the "Project on Enhancing Emergency Preparedness and Response Capabilities in the ASEAN Region through Building Technical Capacity in Radiation Monitoring and Dose Assessment (Phase 2)"	■				Completed • Online Workshop for Beginner Countries hosted
				■			Completed • Regional Training Course held in Korea
					■		Completed • Participated in the 11th Annual Meeting of ASEANTOM

RCARO 2024 Work Performance

#	Objectives	Activities	Timeline				Status
			Q1	Q2	Q3	Q4	
4	Enlarging the horizon of the RCA Programme through establishing partnerships	4.3. [ARCCNM] Implementation of a Joint Workshop				■	Completed • Joint Workshop held in Korea
		4.4 [FNCA] Participation in FNCA Events	■				Completed • Participated in the FNCA Coordinators Meeting
5	Facilitating the better implementation of the RCA Programme	5.1 Provision of support to the RCA Chair and policy meetings/activities	■	■	■	■	Completed • Supported the RCA Chairs' Committee, 46th NRM, 53rd GCM and other policy meetings
		5.2 Provision of Extra-Budgetary (EB) contribution to the IAEA				■	Completed • Contributed EB $120,000 to support the RCA Programme

REGIONAL COOPERATIVE AGREEMENT

ANNUAL REPORT 2024

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