REGIONAL COOPERATIVE AGREEMENT

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

ANNUAL REPORT 2023

RCA

www.rcaro.org

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Disclaimer

Acknowledgements

This RCA Annual Report is prepared by the IAEA Technical Cooperation Department for Asia-Pacific with the support of the 22 RCA Government Parties and RCA Regional Office.

This report is available for downloading: www.rcaro.org/arp.

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ANNUAL REPORT 2023

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Natascha Spark
RCA Chair,
National RCA Representative of Australia
Senior Manager
International Affairs, Chief Operating Group
Australian Nuclear Science and Technology Organisation (ANSTO)

Committed to social and economic impact
Strengthened our governance
Future focus on diversity and inclusion

Dear Valued Partners,

2023 was an operationally significant year for the Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology for Asia and the Pacific (RCA-AP).

We revived our technical cooperation programme following the disruptions of the global pandemic, and deepened our commitment to social and economic impact. Strategically, we set a stronger future focus on diversity and inclusion.

Nuclear science and technology are more important than ever. The intersecting challenges of the climate crisis, plastic pollutions in our oceans, increasing demands for nuclear medicine, and delivering food security for all have elevated the relevance of nuclear science and technology in addressing regional challenges.

It's something Australia as Chair – through the Australian Nuclear Science and Organisation (ANSTO), Australia's primary nuclear organisation – has been at the forefront of, and stands committed to sharing expertise across the region.

The RCA-AP responds to these challenges by delivering regional technical cooperation programmes in the fields of human health (eight projects), environment (five projects), agriculture (five projects), industry (one project) and radiation safety (one project).

We deliver these projects through the **joint cooperation** of the IAEA, National Representative teams within Government Parties along with the generosity from experts in our region in nuclear science and technology. We do this with a small budget in the most diverse and populated region of our planet.

Our projects work hard to deliver on the IAEA's flagship initiates *Rays of Hope*, *Atoms4Food*, *NUTEC Plastics*, and *Global Water Analysis*.

Revival of our Technical Cooperation Program

In 2023, we fully revived our technical cooperation programme following the 2020-2022 years of disruption due to the global pandemic.

We saw the **return of hands-on regional training courses to enhance professional development and build regional networks, experts undertook capacity building, as well as in-person policy dialogue providing strategic oversight, transparency and accountability.**

Re-starting the programme was not without its challenges. Our technical programme leads, who generously volunteer their time to lead at the project level in each country, had competing demands. University professors, medical professionals, radiation safety specialists and industry leaders were pivoting to internal pressures as they navigated 2023. Within this environment, some technical programme leads were able to deliver RCA project milestones, whilst others were, understandably, deferred to 2024.

In 2023, we trained 744 regional practitioners through 15 regional training courses, across 15 projects and held 15 meetings.

Highlights included:

- first in-person policy dialogue since 2019 (hosted by ANSTO, Australia in Sydney)
- regional training courses in
  - cancer care to strengthen regional capability to produce cyclotron-based radiopharmaceuticals at ANSTO in Australia
  - advanced data analysis of isotopic approaches to assessment and tracing of agro-contaminants in catchments in China
  - mixing models of tracers and complementary approaches to apportion sources of contaminants in ground water in Indonesia
  - phased ultrasonic testing (PAUT) with ISO 9712 Level 2 Certification in the Republic of Korea
  - train the trainers course on radio-graphic testing-digital (RT-D) Level 2 in Malaysia
  - palliative radiotherapy for brain metastases and other clinical scenarios in Pakistan
  - significance and importance of dosimetry system and associated uncertainty for radiation processing facilities in Thailand
  - mutation by speed breeding for abiotic stress tolerance in Vienna (virtual)
  - isotopic approaches to monitor sources of agro contaminants in the environment in Viet Nam
- four multi-year projects came to a close, and
- 57 pre-concept papers for the next round of projects were submitted by Government Parties

Strengthening our Governance

In 2023, we strengthened our governance through **streamlining our structure and strategies**.

With the goal of improving our effectiveness and efficiency, we reduced our working groups and committees, while remaining connected to our vision and values. We reaffirmed the Regional Programme Framework 2024-2029 as our strategy to guide the selection and development of our technical cooperation.

We agreed that the creation of any future working groups or committees be carefully considered by Government Parties, and that the balance of our effort is focused delivering our technical cooperation programme.

Deepened our understanding of our social and economic impacts

Whilst our internal stakeholders report that our projects are having impact, in 2023 we recognised the importance of communicating our reach to an external audience.

The 2022 innovation in RCA-AP programme **social and economic impact assessment** in the fields of cancer care, industry and agriculture demonstrated we are advancing the **2030 Agenda for Sustainable Development and its Sustainable Development Goals** in far-reaching ways.

Our efforts have increased the number of cancer patients using domestic radiotherapy facilities by 121% and improved cancer survival rates from 41% in 2000 to 55% in 2020. We want more social and economic impact assessments to tell our story, and inform better programming.

This shift is a **game changer.** It has placed a greater emphasis on improved performance reporting, so that the data we collect year on year at the individual project level can be harnessed to translate into our outcomes at the regional social and economic impact level. It will ensure the contributions of nuclear science and technology towards international development will be more widely recognised.

Gender diversity increases our reach

We stepped up our commitment to gender and inclusion in 2023.

We identified the **gender** of the proposed leads for the programme development phase for the 2026/2027 cycle. We found that of the 57 pre-concept proposals submitted for projects to start in 2026, only around 20% were led by women, and of those, only 25% were recommended to move forward to the next concept stage.

This compared to 75% of men-led projects being successfully recommended of the proposals proposed to move to the concept stage.

Furthermore, the committee making the recommendations comprised around 75% men.

As an immediate response, we agreed to take gender equality into account when selecting the projects to move to the final design stage during the decision-making process in 2024.

Better inclusion charts a better regional programme

We agreed that all pre-concept proposals submitted by **Least Developing Countries** and **Small Island Developing States** move to the next concept stage.

With the **value** of diversity and inclusion in mind, we agreed to conduct a review of our process for selecting and designing the regional programme for policy discussion in 2024.

Small, well-managed budget backed up by generosity of regional technical experts sets the stage for continued growth

In 2023, the total **financial budget** for the RCA-AP Programme was **EUR3.26m**.

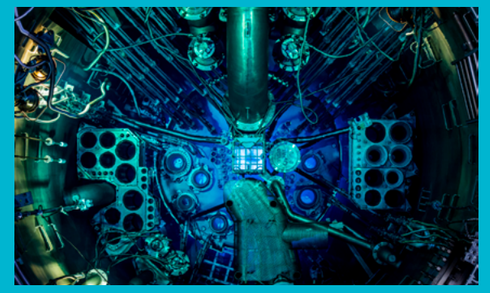
Of this amount, EUR2.3m funded 14 Technical Cooperation Projects and EUR0.80m funded RCA policy, administration and management. The funding is derived from three sources, approximately:

- EUR1.9m allocated (with actuals being EUR1,736,609) from the IAEA Technical Cooperation Fund (TCF)
- EUR1.3m Extra budgetary contributions from IAEA Member States
- EUR0.06m Government Cost Sharing.

Government Parties delivered an outstanding EUR0.8 in-kind contributions.

The 2024 forecast is EUR 2.09m, including EUR 1.7m from the IAEA TFC, EUR 0.39m from IAEA Member States (RCA Government Parties). Of this, EUR 1.99m will fund 15 Technical Cooperation Projects and EUR 0.1m will fund policy, administration and management.

Yet the budget spreadsheet does not tell the full story. Technical experts from within our Government Parties lead projects without financial compensation. They gave freely of their time to design, deliver and monitor projects. Many self-funded their travel and time. They spent their nights and weekends on virtual coordination meetings, drafting reports, responding to queries and reviewing project performance. If we were to account for their input, it would probably increase the financial value of our programme tenfold.



OPAL Reactor of ANSTO

Thank you

It was a great honour for Australia, through ANSTO, to transition as Chair from Viet Nam, through Viet Nam's Atomic Energy Institute (VINATOM), during 2023. Australia valued the grace, determination and purpose that Viet Nam brought to the RCA, especially in the delivery of the 2022 Ministerial Declaration. Australia maintained the focus on RCA growth in 2023, and stands ready to transition the Chair to China, through China Atomic Energy Authority, in May 2024.

On behalf of the National Representatives of Government Parties, we want to thank you for your support and confidence as we continue to implement and grow our technical cooperation programme so that we can deliver the social and economic returns you expect.

On behalf of my Australian counterparts and ANSTO colleagues, we thank the RCA community for your trust in our leadership, and look forward to continuing our collaborations for many years to come.

I would like to sincerely thank the RCA Community for their support and spirit of collegiality through-out the Chair year. It was an honour and delight to work with you all.

Messages from RCA Support Team

Gashaw Gebeyehu Wolde

Section Head
Division for Asia and the Pacific
International Atomic Energy Agency

In 2023, the RCA saw significant progress in post-pandemic recovery. With successful events like the 50th Anniversary celebration and Ministerial level meeting, RCA emerged resilient and forward-looking. Operations resumed fully, providing equipment, conducting 30 capacity-building activities, and reviewing key projects. A new program launched in January 2024. The IAEA Department of Technical Cooperation, Division for Asia and the Pacific, will continue supporting RCA to maximize its socioeconomic impact. Congratulations to all for the 2023 achievements and we look forward to further cooperation in 2024.

Prinath Dias

Chair
RCA Programme Advisory Committee

Since its humble beginnings in 1972, RCA has developed into a significant regional program for Asia and the Pacific, supporting its 22 Government Parties in adopting nuclear technologies for development priorities. While largely achieving its vision, it aims to gain recognition from regional development agencies. The main mechanism for transferring well-developed nuclear technologies to the RCA GPs are the IAEA TC Programme. RCARO programs also support technological development through research and cooperation projects. The RCA Programme Advisory Committee advises National RCA Representatives on implementing the IAEA/RCA TC program and aims for strategic project development and resourceful implementation. The PAC will continue to provide whatever assistance the National RCA Representatives expect from the PAC.

Dae Ki KIM

Director
RCA Regional Office

Following its 20th anniversary in 2022, RCARO expanded its cooperative activities to enhance RCA's visibility and viability. This included launching a new partnership project with the US DOE on election beam applications and establishing a Policy and Information Centre, along with improving the RCA information service. Additionally, RCARO continued projects on radiation safety and unique research in air quality and radiotherapy. Capacity building activities with Korean nuclear institutes aimed to nurture young nuclear professionals. As part of RCARO's support for the RCA, it is our pleasure to prepare the 2023 RCA Annual Report, acknowledging the contributions of the IAEA and Government Parties (GPs). We thank the IAEA and GPs for their contributions and look forward that the enhancements made in this report will contribute to a better presentation of the RCA and highlight its achievements in delivering socioeconomic development to the region.

Implementation of RCA Programme in 2023

RCA Programme Activities

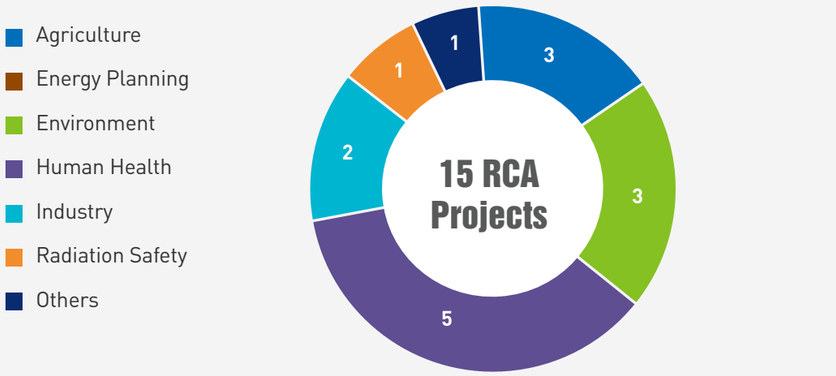
15 RCA Projects

15 Training Courses
396 Participated

15 Meetings
331 Participated

18 Expert Assignments for
122 days

RCA Projects by Thematic Areas in 2023



48 RCA Activities **744** Participants

RCA Programme Fund

1.9 Million Euro
Budget Allocated

861,409 Euro
In-kind Contribution Contributed

90,461 Euro
Extrabudgetary Contributed

Implementation of RCA Programme Since 1972

180
RCA Projects

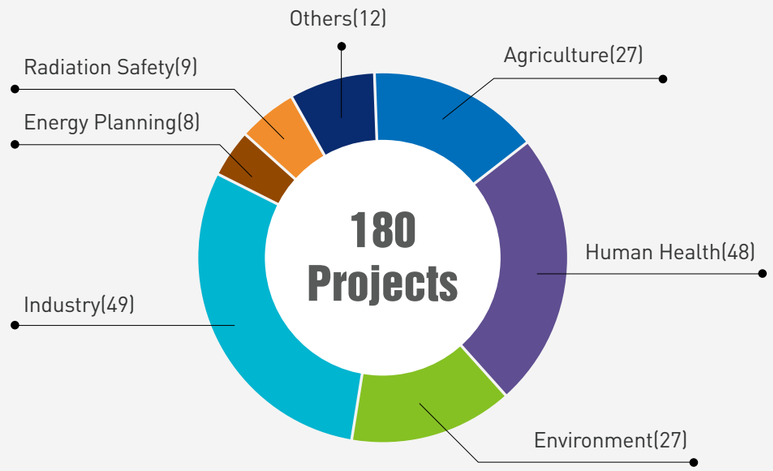
577
Meetings & Workshops

673 Training Courses

10,396
Trained Professionals

4,579
Experts and Lecturers

Total Budget:
92.2 Million US$



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

ABOUT RCA

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, South East 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 annually policy issues, development priorities, overall management of the RCA Programme and other relevant issues.

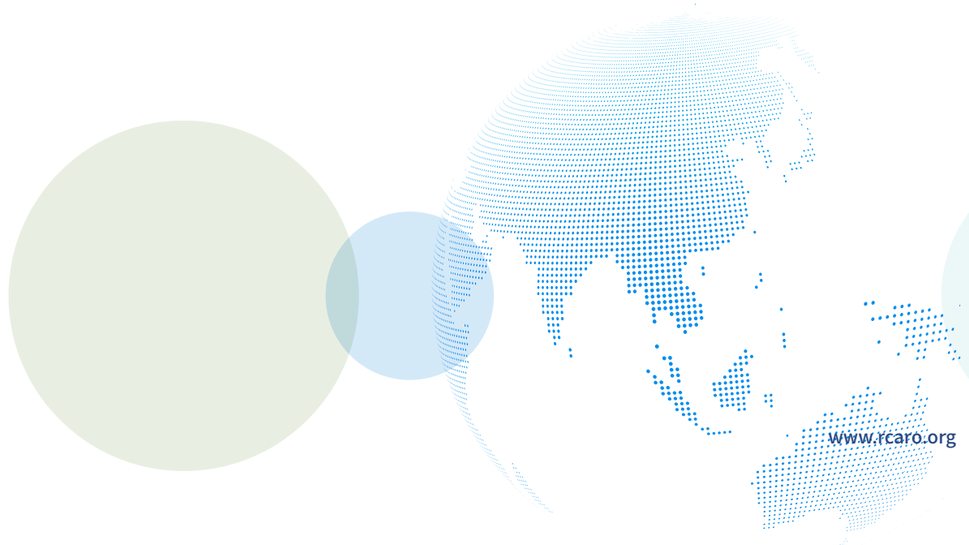
22 RCA Government Parties

RCA Programme

The RCA celebrated its 50th Anniversary in 2022. 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 180 projects, held 577 meetings and workshops and trained over 10,346 professionals through more than 670 training courses with a total budget of USD 92.2 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, 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, 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

For more information please visit the RCA website: www.rcaro.org.

2023 RCA **Programme**

Thematic Sector	Project Number	Project Title	Lead Country	Implementation Period
Others (Management and Implementation)	**RAS0086**	Enhancing the Management and Implementation of Activities under the Framework	**ROK**	2020-2023
Industry	**RAS1028**	Improving the Quality Management Practices in Radiation Processing Facilities for Better Performance and Applications	**MAL**	2022-2025
	RAS1029	Enhancing Regional Capabilities in Advanced Non-Destructive Testing Techniques for Improved Safety and Inspection Performance in Industries	**MAL**	2023-2026
Agriculture	**RAS5087**	Promoting Food Irradiation by Electron Beam and X-Ray Technology to Enhance Food Safety, Security and Trade	**VIE**	2020-2023
	RAS5088	Enhancing Crop Productivity and Quality through Mutation by Speed Breeding	**CPR**	2021-2025
	RAS5091	Assessing and Mitigating Agro-Contaminants to Improve Water Quality and Soil Productivity in Catchments Using Integrated Isotopic Approaches	**AUL**	2022-2025
Human Health	**RAS6096**	Empowering Regional Collaboration among Radiotherapy Professionals through Online Clinical Networks	**NZE**	2020-2023
	RAS6097	Enhancing Capacity and Capability for the Production of Cyclotron-Based Radiopharmaceuticals	**ROK**	2020-2023
	RAS6098	Standardizing Radiotherapy in Palliative Care	**JPN**	2022-2025
	RAS6100	Strengthening Clinical Application of Hypofractionated Radiotherapy	**ROK**	2022-2025
	RAS6101	Improving the Quality and Safety of Radiation Medicine through Medical Physicist Education and Training	**CPR**	2022-2025
Environment	**RAS7035**	Enhancing Regional Capability for the Effective Management of Ground Water Resources Using Isotopic Techniques	**CPR**	2020-2023
	RAS7037	Enhancing Wetland Management and Sustainable Conservation Planning	**AUL**	2020-2023
	RAS7040	Improving Water Resources Management Practices by Enhancing the Regional Collaboration in Environmental Isotope Analysis and Applications	**VIE**	2022-2025
Radiation Safety	**RAS9092**	Strengthening the Capacity to Respond to Radiological Emergencies of Category II and III Facilities	**ROK**	2020-2023

" For more details please refer to Annex 1"

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SECTION 1 - OVERVIEW OF THE RCA PROGRAMME IN 2023

Section 1 provides a comprehensive overview of the RCA Programme in 2023, detailing its management and implementations, financial and in-kind contributions, policy meetings, and a summary of RCARO activities, offering valuable insights into the programmes' scope and achievements throughout the year.

OVERVIEW OF THE RCA PROGRAMME IN 2023

1. Summary of the RCA Programme in 2023

In 2023, a total of fifteen (15) active projects were undertaken, each falling into distinct categories: five (5) projects focused on human health, three (3) projects dedicated to environmental concerns, three (3) projects centred around food and agriculture, two (2) projects in the realm of industrial applications, one (1) project supporting RCA management, and one (1) project addressing radiation safety. Diversifying projects across various categories highlights a strategic approach, demonstrating a comprehensive effort to address multifaceted challenges. Notably, six (6) projects (RAS0086, RAS5087, RAS5088, RAS6096, RAS6097, and RAS7035) and reached completion by the end of 2023, reflecting the RCA's steadfast commitment to meeting its goals.

Additionally, two (2) projects organized and run by RCARO successfully concluded their journey. RCARP01 and RCARP02 aimed to assess the impact of industrial activities on air quality and its surrounding environment in the Asia Pacific region. Beyond immediate outcomes, these initiatives involved over 46 stakeholders, spanning 11 countries, contributing not only to knowledge enhancement but also leaving a lasting impact on expertise and understanding across diverse regions.

A comprehensive overview of all ongoing projects is provided in the upcoming Section 2. The list of RCA projects in 2023 is presented in Annex 1. Throughout the year, forty-eight (48) RCA activities were meticulously planned and executed, including meetings, workshops, Regional Training Courses (RTC), expert missions, and home-based assignments.

Taking advantage of the relaxation of travel restrictions due to COVID-19, a combination of physical events and virtual sessions were implemented. Specifically, fifteen (15) regional meetings, comprising mid-term and final project review meetings, and project design meetings were conducted, alongside regional workshops. A total of three-hundred-thirty-one (331) participants, including forty (40) experts, actively engaged in these events. In addition to the project-related and expert meetings, two (2) policy-level meetings were successfully conducted, namely the 45th Meeting of the National RCA Representatives (NRM) and the 52nd RCA General Conference Meeting (GCM).

As for regional training courses, fifteen (15) courses were held engaging a total of three-hundred-ninety-six (396) participants, including twenty (20) lecturers and experts who attended the training courses.

Participation by GPs in RCA events in 2023 is presented in Annexes 2a-b.

In 2023, there were eighteen (18) expert-engaged activities including expert missions and home-based assignments. Twelve (12) expert missions were conducted, providing crucial technical assistance to the GPs to augment their active involvement in RCA projects. These missions collectively spanned a total duration of fifty-seven (57) expert days. Out of the twelve (12) experts enlisted for these missions, eleven (11) were sourced from the RCA GPs. Furthermore, six (6) home-based assignments were executed, with three (3) of the five (5) experts recruited from the region. The cumulative expert days dedicated to home-based assignments amounted to sixty-five (65) days. These endeavours underline the commitment to fostering regional expertise and collaboration within the RCA framework.

RCA expert missions and home-based assignments in 2023 are listed in Annexes 2c-d.

2. Management and Implementation of the RCA Programme in 2023

2.1 Summary of Financial and In-Kind Contributions

The budget allotment from the TC Fund for 2023 was (€1,912,465). The encumbrances and actuals in 2023 were (€1,736,609) at an Implementation Rate of about (86.70 %).

GPs continued supporting the RCA programme through extrabudgetary contributions and in-kind contributions. In 2023, a total of € 90,461 in extrabudgetary contributions were received from Australia. When cumulated, the overall extrabudgetary contributions from 2015 to 2023 amount to € 2,964,745.

Allocations of extrabudgetary contributions to RCA projects 2015-2023 are shown in Annex 3.

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 € 861,409 in 2023.

Detailed account of In-kind contributions per RCA GP is shown in Annex 4.

2.2 Planned Regional Events in 2024

In 2024, a total of (15) RCA projects are being implemented, including (7) projects that were initiated in the same year. As the travel restriction has been lifted, all events of the project activities, including project coordination and review meetings, workshops, and training courses, will be carried out both virtually and physically as it was before COVID-19, to achieve the set objectives and complete according to the project timelines. Indicative plan for RCA regional events in 2024 is given in Annex 5.

2.3 Progress Monitoring and Reporting

Progress monitoring and reporting of the projects was undertaken through the annual progress reports by National Project Coordinators (NPCs) and the consolidated Project Progress Assessment Reports (PPARs) were timely submitted by LCCs via the IAEA platform https://tcreports.iaea.org. To continue this good practice, NRs are requested to ensure that NPCs submit national project reports to LCCs on time so that LCCs have sufficient inputs and time to consolidate and submit PPARs to the IAEA. NPCs are requested to submit annual project progress reports to LCCs in a full and timely manner, preferably by 10 January every year, so that LCCs have enough time for review and preparation for Project Progress Achievement Reports (PPARs) to be submitted on the TC Report platform (https://tcreports.iaea.org/) by 31 January every year.

The progress of the projects was reviewed at the 45th Meeting of the National RCA Representatives and the 52nd RCA General Conference Meeting,

2.4 Challenges in Implementation

While the RCA programme was successfully implemented in 2023, several challenges and areas for improvement emerged. Efforts were stressed to enhance programme development by fostering increased improvement of NRs in identifying high-priority regional projects. This includes allowing sufficient time for consultation during the NRMs to achieve a more balanced approach among thematic sectors, facilitate effective long-term planning, and identify emerging needs. The issue of an excessive number of pre-concepts was highlighted, prompting the need for a more streamlined screening process. Furthermore, the issue of a lack of information on RCA Programme was brought to attention, hindering the preparation of the annual report and acquisition of project data. Enhanced collaboration from the key RCA project stakeholders, such as LCCs is required for providing the project information to the RCARO to improve the RCA information service and prepare relevant materials for the RCA.

3. Summary of the RCA Regional Office (RCARO) Activities Related to Promotional and Other Non-technical Activities in 2023

In the process of transitioning to the next 20 years, RCARO outlined its future vision and strategies across five strategic pillars: establishing the Asia-Pacific Nuclear Think-Tank, expanding partnerships with RCA stakeholders, supporting technical advancement through R&D cooperation, developing an integrated information system, and nurturing the next generation through quality education programs.

To begin, RCARO initiated the establishment of the Asia-Pacific Nuclear Think-Tank, reforming its organizational structure to include a policy and information centre. This centre aims to assist various stakeholders, including the IAEA Secretariat, RCA Working Groups/Committees, and the RCA Chair. Additionally, RCARO drafted a guidebook on the RCA and RCA operating procedures.

Expanding its influence, RCARO broadened the horizon of the RCA stakeholders in the region and beyond by developing the concept for a new partnership project with the US DOE. This project, spanning 2024-2028, seeks to improve environmental quality in the Asia-Pacific region by supporting the establishment of eBeam infrastructure. The First Project Coordination Meeting was held in Bangkok, Thailand on 12-15 December 2023, with more than eighty (80) representatives from the twenty-one (21) RCA Government Parties. In addition, visual manuals and handbooks were developed to enhance emergency preparedness and response capabilities in partnership with the ASEAN Network of Regulatory Bodies on Atomic Energy (ASEANTOM).

Moreover, RCARO continued its support for cooperative research activities through RCA RP02 and RCA RP03, as the only research projects of the RCA Programme. This year, research coordination meetings and technical workshops were held inviting Chief Scientific Investigators of the participating countries in the fields of air pollution and radiotherapy. The events provided a forum for networking and knowledge sharing among the experts and facilitated R&D in the relevant fields. With RP02 completed in 2023, RCARO is in the process of drafting an achievement report for publication in the first half of 2024. Beyond the immediate outcomes of conducting the elemental analysis of various pollutant sources from over 13,000 environmental samples collected, this initiative benefited the governments and relevant stakeholders in formulating appropriate policies/actions to reduce pollution and its impact on the environment by providing critical data on pollution sources analysed by nuclear analytical techniques.

In its fourth strategic initiative, RCARO launched the RCA Integrated Information System aiming to provide comprehensive information on the RCA and the overall status of NS&T in the Asia-Pacific region. The reformed RCA website now serves as the website, the NS&T Data Hub, the RCA E-CAMPUS, and RCARO e-Management.

Concluding its efforts, RCARO conducted various capacity-building activities and trained more than 1,300 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. Additionally, a new Master's degree and PhD programme with the University of Science and Technology (UST) was launched, accepting ten students to start their studies in the spring semester of 2024.

The RCARO activities related to promotional and other non-technical activities in 2023 are given in Annex 8.

SECTION 2 - DETAILS OF THE TECHNICAL PROGRAMME IN 2023

Section 2 is structured into two main sections: 2.1 Completed Project in 2023 and 2.2 Ongoing Projects in 2023, each encompassing six thematic sectors including agriculture, energy planning, environment, human health, industry, radiation safety, and others. Within each project, information is meticulously presented, starting with the status of achievement based on the Logical Framework Matrix (LFM), followed by project activities, and highlights from the year 2023.

2.1 Completed Projects in 2023

In 2023, a total of seven (7) projects successfully concluded their journey, leaving an indelible mark across diverse sectors including management, agriculture, human health, and the environment. The following highlights offer an overview of the completed RCA projects, specifically focusing on the project activities and noteworthy achievements that have emerged from these dedicated endeavours.

1. OTHERS (Management and Implementation)

RAS0086	**Enhancing the Management and Implementation of Activities under the Framework**
Objective	To enhance the overall continuing development, improvement and sustainability of the RCA and its programme to support the RCA MTS 2018-2023 and the related UN Sustainable Development Goals (SDGs)

| Status of Achievement based on LFM

Output	Indicator and Target	Status of Achievement until 2023
Output 1 Upgraded and updated documented RCA policies, procedures and practices.	Implementation of the decisions made at the NRMs and GCMs.	On target / Behind target/**Completed** Updated RCA policies procedures and practices are implemented at the NRMs and GCMs.
Output 2 Proposed mechanisms to increase synergies between RCA and other IAEA TC initiatives and frameworks.	Implementation of the decisions made at the NRMs and GCMs concerning agreements reached between the RCA and IAEA TC on the mechanism to increase the synergies.	On target / Behind target/**Completed** Decisions made at the NRMs and GMS on the mechanism to increase the synergies between the RCA and IAEA TC are successfully implemented.
Output 3 Support of newly joining GPs and LDCs.	Implementation of specific actions to address the identified training/ information needs of newly joining GPs and LDCs.	On target / Behind target/**Completed** Specific actions to address the identified training and information needs for newly joining GPs and LDCs are implemented as planned.
Output 4 Social and economic impact assessment of the RCA programme conducted.	Meetings and expert missions to conduct social and economic impact assessments implemented.	On target / Behind target/**Completed** Meetings to conduct social and economic impact assessments are conducted.

| Project Activities for 2023

Event	Title	Summary of Purpose	Dates /Duration	Host Country
Meeting	**RCA Project Design Meeting**	To review and enhance the draft project documented under the RCA programme for the 2024-2025 TC cycle, agree on follow-up actions to complete and submit high-quality RCA project documents to the IAEA on or before the scheduled deadline of 17 May 2023.	6-10 Feb.	Austria
Meeting	**RCA Chairs Meeting**	To discuss and propose action plans for deployment and execution of the RCA Declaration.	27 Feb. - 2 Mar.	Viet Nam
Meeting	**45th Regional Meeting of National RCA Representatives**	To discuss strategy, policy, and management related to the RCA Declaration adopted in 2022, Vienna, as well as the execution of the RCA Medium-Term Strategy, RCA Programme implementation, planning for 2024-2025, and the operation of the RCARO.	8-12 May.	Australia
Meeting	**RCA MTSC WG Meeting**	To conclude performance indicators and criteria, gather data sources, formulate recommendations for the RCA GOR strategic review in 2024, discuss WG MTSC recommendations, and review/update the WG MTSC Work Plan for 2023.	14-18 Aug.	Austria
Meeting	**RCA PAC Meeting**	To discuss and propose appropriate measures to enhance the management of the RCA programme.	18-20 Sep.	Austria
Meeting	**RCA Chair and RCARO SAC Meeting**	To discuss and review the progress, status and future plan of the RCARO activities.	21 Sep.	Austria
Meeting	**52nd RCA General Conference Meeting**	To discuss and agree on strategy, policy, and management issues under the RCA, the implementation of the RCA programme, the operation of the RCA Regional Office, as well as other relevant issues.	22 Sep.	Austria

| Project Highlights for 2023

Throughout 2023, the project actively contributed to support the National RCA Representatives, Working Groups and the Programme Advisory Committee (PAC). Initiating the year with the RCA Project Design Meeting in Austria, the project extensively reviewed and enhanced the draft project documentation for the 2024-2025 TC cycle, aiming to submit high-quality documents to the IAEA by May 17, 2023. Subsequent events included the RCA Chairs Meeting in Viet Nam, which focused on proposing action plans for the deployment and execution of the RCA Declaration, and the 45th Regional Meeting of National RCA Representatives (NRM) in Australia, which

addressed strategy, policy, and management issues related to the RCA Declaration and the Medium-Term Strategy 2018-2023. The MTSC WG Meeting in Austria played a crucial role in finalizing performance indicators, target criteria, and performance levels for the final review of the MTS 2018-2023, as well as formulating recommendations for the strategic review of the RCA GOR in 2024. The year concluded with the 52nd RCA General Conference Meeting where discussion centered around strategy, policy, and management issues, emphasizing the commitment to the successful implementation of the RCA programme and its ongoing impact.

The 45th NRM, 9-11 May 2023, Sydney, Australia

The 52nd GCM, September 2023, IAEA, Austria

2. AGRICULTURE

RAS5087	**Promoting Food Irradiation by Electron Beam and X-Ray Technology to Enhance Food Safety, Security, and Trade**
Objective	To enhance food safety and trade in the region through developing and promoting electron beam and x-ray technologies for food irradiation.

Final Project Review Meeting "Promoting Food Irradiation by Electron Beam and X-Ray Technology to Enhance Food Safety, Security and Trade", Hanoi, Viet Nam, 20 Oct - 3 Nov, 2023

Status of Achievement based on LFM

Output	Indicator and Target	Status of Achievement until 2023
Output 1 Project initiation completed and national project plans generated	Work plan reviewed and adopted Project teams and national plans finalised within first 6 months and forwarded to LCC and RCA Focal Person by end year 1, Q2.	On target / Behind target/**Completed** • The project teams were nominated and the work plan was reviewed and adopted by all participating countries at the virtual launch of the project in September 2020. • The results of the project implementation were discussed and assessed during the final review meeting organized in 2023.
Output 2 A comparative analysis of different radiation modalities (gamma, EB, X-ray and methods under development) completed and solutions to key technical barriers to the establishment of EB/X-ray facilities demonstrated.	a) Analysis circulated to all participating countries by year 1, Q2. b) Two inter-comparison exercises in dosimetry for irradiated food completed and assessed (year 2/Q1 to year 3/Q4) c) Recommendation to harmonize food regulations based on a maximum energy of X-rays used for food irradiation to be7.5 MeV agreed by year 2, Q3. d) Directory of EB/X-ray equipment suppliers by end of year 2/Q2.	On target / Behind target/**Completed** • Regional Training Course was held virtually from 30 August to 1 September 2021. Various documents related to inter-comparison in dosimetry for food irradiation and EB/X-ray dosimetry systems were introduced. Additionally, discussions were held on the current dosimetry practices in the region. Recommendations to harmonize regulations on food irradiation based on the 7.5 MeV X-ray were circulated for approval. • By the end of 2023, the inter-comparison exercises in dosimetry for irradiated food will be performed in Vietnam and Thailand.
Output 3 Food industry engaged by setting up national and regional fora for the food trade that use updated resource materials and identify industry needs more fully.	Two regional workshops held with food trade representatives in year 2/Q2 and year 3/Q4). National fora completed by end of year 3, Q4. New EB/X-ray facilities are installed and/or operated for food irradiation.	On target / **Behind target**/Completed • New EB/X-ray facilities were installed and operated for food in the RCA region (2 in Vietnam, 1 in Thailand, and some in China) • National seminars and forums were held in some GPs to promote EB/X-ray technology for food irradiation. • Representatives from selected member states were supported to participate in the International Food Irradiation Symposium.
Output 4 A resource document providing an overview of EB and X-ray food irradiation technology for the food industry submitted as an IAEA publication.	Document endorsed at final project meeting and forwarded to IAEA publications section by end of year 4, Q2.	**On target** / Behind target/Completed • In 2022, the current status of the development of EB/X-ray technology for food irradiation was updated, and the document was prepared on time. • The results and achievements at the national level were collected and submitted to TOs and LCCs for preparing the resource documents.

Project Activities for 2023

Event	Title	Summary of Purpose	Dates /Duration	Host Country
Expert	**Home Based Assignment on electron beam and X-ray irradiation and dosimetry system at 3 MeV electron beam machine for sanitary and phytosanitary purposes**	To conduct assignment on electron beam and X-ray irradiation and dosimetry system at 3 MeV electron beam (EB) machine for sanitary (1-10 kGy) and phytosanitary (< 1 kGy) purposes.	27-31 Mar.	France
Expert	**Expert Mission on Validation and Verification of Dosimetry System at 3 MeV Electron Beam Machine for Sanitary and Phytosanitary Purposes**	To review the validation and verification of the dosimetry system at a 3 MeV electron beam (EB) machine.	03-06 Apr.	France
Expert	**TC Sponsored Participation on International Food Irradiation Symposium**	TC sponsored participation in the International Food Irradiation Symposium in Dallas under RAS5087.	26-28 Sep.	USA
Meeting	**Final Project Review Meeting**	To review project RAS5087, assess results, and agree on a follow-up plan for sustaining and promoting EB technology.	30 Oct.- 3 Nov.	Viet Nam

Project Highlights for 2023

In 2023, three expert missions were conducted, comprising one home-based assignment, one on-site expert mission, and one TC-sponsored participation in Dallas, U.S. The Final Project Review Meeting took place in Hanoi, Viet Nam, from October 30th to November 3rd, 2023, aimed at reviewing activities, summarizing achievements, and extracting lessons learned from the RCA regions. A draft of the meeting report has been prepared and distributed to all GPs for their review. The document is set to be submitted to the Agency for consideration of publication in the near future. During the meeting, all GPs unanimously agreed to establish the International Food Irradiation Network (iFINE). The primary objective of iFINE is to promote, expand, and achieve highly efficient and safe applications of irradiation technologies for plant quarantine and food sterilization processes. The ultimate goal is to contribute significantly to ensuring food security and environmental protection.

Regional Workshop on "Food Irradiation Using Electron Beam/ X-ray Technology", Cairns City, Australia, 1-5 Aug, 2023

RAS5088	**Enhancing Crop Productivity and Quality through Mutation by Speed Breeding**
Objective	To improve food security in the Asia Pacific region through faster release of mutant varieties with improved crop productivity and quality.

Status of Achievement based on LFM

Output	Indicator and Target	Status of Achievement until 2023
Output 1 Project management structure established.	Project activities and budget are implemented and utilized as planned	**On target** / Behind target/Completed • The project teams were nominated, and the work plan was reviewed and adopted by all participating countries at the kick-off meeting at the start of the project. • A mid-term project review meeting held in China on 16-20 October 2023, discussed and reviewed the achievements as well as finalization of priorities for the remaining project period.
Output 2 Personnel trained in mutation by speed breeding (MbyS) protocols in GPs institutions	6 researchers per GP are to be trained on MbyS by the end of the project	**On target** / Behind target/Completed • During the project implementation, at least 70 researchers have been trained through the following training courses: • RTC was held on 7 to 18, August 2023, in Jakarta, Indonesia. Twenty-four (24) participants from 14 different RCA countries were trained through lectures and lab practices.
Output 3 Mutation by speed breeding (MbyS) protocols established in GPs.	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	**On target** / Behind target/Completed • In the process of developing. • Several countries have protocols for marker-assisted mutation breeding and double haploid techniques. Malaysia's LED-lit speed breeding lab boosts tomato growth. China advances four generations of winter wheat in a year, while Korea tests a high-throughput phenotyping platform.
Output 4 Promising mutant lines from mutation by speed breeding (MbyS) protocols by GPs.	At least 5 mutant lines developed by MbyS approach by the end of the project.	**On target** / Behind target/Completed • Twenty-four (24) mutant varieties have been developed using the speed breeding method, demonstrating improvement in yield and quality traits. • A number of advanced mutant lines and mutant populations have been developed for further evaluation of desired traits.

| Project Activities for 2023

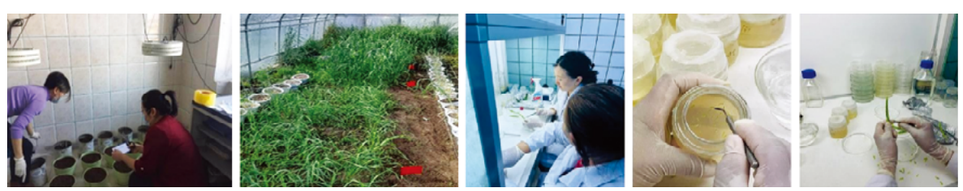
Event	Title	Summary of Purpose	Dates /Duration	Host Country
Training Course	**RTC on Mutation by Speed Breeding (MbyS) for Abiotic Stress Tolerance**	To provide knowledge, experience, and skills in establishing national plant breeding programmes.	7-18 Aug.	Virtual
Meeting	**Mid-Term Project Review Meeting**	To review the implementation progress of the project RAS5088, discuss and update the work plan for 2023-2024.	10-20 Oct.	China

| Project Highlights for 2023

An in-person RTC and a mid-term review meeting were conducted, aimed at enhancing human resources in member states regarding plant mutation through speed breeding techniques. A total of twenty-four (24) mutant varieties, produced using the speed breeding method and exhibiting enhanced yield and quality traits, were released and distributed to farmers. This initiative aims to bolster food security across various crops. Furthermore, numerous advanced mutant lines and populations have been cultivated for further assessment of desired traits. Project stakeholders emphasized the necessity of ongoing project activities to facilitate the continued development of mutant lines and varieties, thereby ensuring the project's sustainability.

RTC on Mutation by Speed Breeding (MbyS) for Abiotic Stress Tolerance, 7-18 Aug, 2023

Mid-Term Project Review Meeting of RAS5088, Beijing, China, 16-20 October, 2023



3. HUMAN HEALTH

RAS6097	**Enhancing Capacity and Capability for the Production of Cyclotron-Based Radiopharmaceuticals**
Objective	To enhance disease control in the Asia-Pacific region through strengthening the capacity and capability for qualified cyclotron-produced radiopharmaceuticals for imaging and treatment.

| Status of Achievement based on LFM

Output	Indicator and Target	Status of Achievement until 2023
Output 1 Project successfully implemented	Project completed on schedule and on budget.	On target / Behind target/**Completed** • All planned items have now been fully completed within the project period. The final project review meeting organized in December 2023 reviewed the implementation of the project, assessed the achieved results, and agreed on follow-up cooperative activities to ensure the sustainability of the achieved results of the project.
Output 2 Establishment of core group of trained personnel for the production of cyclotron-based radiopharmaceuticals.	• 86 train-the-trainers from 4 RTCs by 4Q 2023. • 206 trainees trained at national training activities by Q4 2023.	On target / Behind target/**Completed** • 167 trainers were trained during the RTCs. 2,393 trainees trained at the national training activity in the Member States.
Output 3 New capabilities for the production of cyclotron-based radiopharmaceuticals.	Production of new radiopharmaceuticals in at least 4 Member States by 4Q 2023.	On target / **Behind target**/ Completed • Radiopharmaceuticals with NaF were newly produced in Mongolia, and Myanmar. Due to the COVID-19 pandemic, the expert mission to the Member States was blocked.

| Project Activities for 2023

Event	Title	Summary of Purpose	Dates /Duration	Host Country
Expert	**Expert Mission on Setting up of a Medical Cyclotron and PET Radiopharmaceuticals production equipment**	To support setting up on medical cyclotron and PET Radiopharmaceuticals production equipment.	20-24 Feb.	India
Training Course	**RTC on Production and Quality Control of Commercial Cyclotron-based Radiopharmaceuticals**	To provide participants with experience of production, quality control, and recent information of commercial cyclotron-based radiopharmaceuticals.	29 May. - 2 Jun.	Virtual
Training Course	**RTC on the Production and Preclinical Evaluation of Emerging Cyclotron-based Radiopharmaceuticals**	To provide recent experiences on the production, quality control, and preclinical evaluation of emerging cyclotron-based radiopharmaceuticals.	16-20 Oct.	Australia
Meeting	**Final Project Review Meeting**	To review the implementation of the project RAS6097, assess achieved results, and discuss and agree on follow-up cooperative activities to ensure the sustainability of the achieved results of the project.	20-22 Dec.	Virtual

| Project Highlights for 2023

In 2023, two (2) RTCs and one (1) expert mission were conducted. The initial virtual RTC concentrated on the production and quality control of commercial cyclotron-based radiopharmaceuticals, while the subsequent RTC in Australia focused on the production and preclinical evaluation. The participants, comprising various professionals in cancer care, such as radio pharmacists, nuclear medicine physicians, lab technologists, and cyclotron operators, acquired both theoretical knowledge and practical skills to advance radiopharmaceuticals. The expert mission in India supported the establishment of medical cyclotron facilities and PET radiopharmaceutical production equipment. Following these activities, a final project review meeting was conducted virtually in December to assess the project's implementation and achievements. During the meeting, several comments and suggestions were raised. Notably, there were discussions regarding the technical support and training needs of specific countries, including Cambodia, Indonesia, and Vietnam. Additionally, there was varying emphasis on specialized training, with Japan and Pakistan expressing differing perspectives. Japan emphasized the importance of expanding the training scope to include medical accelerator specialists and radiopharmaceutical experts, while Pakistan advocated for specific trainers focused on cyclotron troubleshooting and radiochemistry. Furthermore, there was a consensus on the necessity for ongoing regional training, expert missions, and the development of educational materials to enhance educational standards and the effectiveness of training programs. These discussions underscored the commitment to continuously improve and advance the capabilities within the field.

Final Project Review Meeting, Dec 2023, Virtual

RTC on the Production and Preclinical Evaluation of Emerging Cyclotron-based Radiopharmaceuticals, Oct. 2023, Australia

4. ENVIRONMENT

RAS7035	Enhancing Regional Capability for the Effective Management of Groundwater Resources Using Isotopic Techniques
Objective	To enhance the management of groundwater pollution using isotopic techniques.

| Status of Achievement based on LFM

Output	Indicator and Target	Status of Achievement until 2023
Output 1 Project implementation and monitoring structure established and managed.	National project teams identified for each GP.	On target / Behind target/**Completed** • Each participating country designated a project team and had an agreed work plan for implementation at the start of the project. • In October 2023, the final project review meeting assessed the achieved results and agreed on follow-up cooperative activities to ensure the sustainability of the achieved results of the project.
Output 2 Trained personnel in various aspects of isotopic techniques.	At least 60 number of personnel trained in basic principles of isotopic techniques, in advanced isotopic techniques to investigate source and fate of ground water pollution and in processing and interpretation of isotopic and hydrogeochemical data by the end of 2023.	**On target** / Behind target/Completed • Two RTCs, one at the basic level and the other at the advanced level, were implemented. Key members of projects teams received training to work with their respective isotope techniques.

Output 3 Isotopic chemical and hydrogeological database established.	Aquifer vulnerability map in some GPs available by 2023 and recommendations made to policymakers.	**On target** / Behind target/Completed
Output 4 Improved models for groundwater management for socioeconomic benefits.	Groundwater models available in some GPs by the end of 2023.	**On target** / Behind target/Completed • Preliminary models have been developed for the selected project site, awaiting refinement using hydrological information generated from isotope techniques.

| Project Activities for 2023

Event	Title	Summary of Purpose	Dates /Duration	Host Country
Meeting	**Final Project Review Meeting**	To review the implementation of the project RAS7035, assess achieved results, discuss and agree on follow-up cooperative activities to ensure the sustainability of the achieved results of the project.	23-27 Oct.	China
Expert	**Training on data interpretations for isotope hydrology, and provide advice on project activities**	To train on data interpretations for isotope hydrology and advice on project activities.	05-09 Jun.	Japan
Expert	**HBA to develop a regional database of all data obtained from RAS7030 and RAS7035 project**	To develop a regional database from RAS7030 and RAS7035 projects.	17 Jul - 15 Dec.	Sri Lanka

| Project Highlights for 2023

The project aimed to enhance the overall capacity of isotope hydrology for groundwater quality management by focusing on laboratory support, workforce, and practical experience in lab work, field investigations, and isotope data interpretation. Its goal was to promote the transfer of technologies among Government Parties in the Asia Pacific region. The final project review meeting took place in Beijing, China in October 2023. It was attended by national project coordinators and representatives of twelve (12) Government Parties who reviewed the project's progress and its socio-economic impacts on water resource management. Additionally, participants from RAS7030 attended the International Symposium on Isotope Hydrology for Sustainable Water Resources in a Changing World in Vienna, Austria, from 3-7 July 2023. The symposium covered various topics, including isotopic variation in shallow coastal aquifer systems in Sri Lanka. Furthermore, a home-based expert assignment for developing a regional database from both RAS7030 and RAS7035 was conducted in December.

2.2 Ongoing Projects in 2023

The following section discusses the ongoing projects, detailing their activities and achievements. A total of eight (8) projects have successfully continued their journey while making marks on their progress in various sectors including industry, agriculture, human health, environment, and radiation safety.

1 INDUSTRY

RAS1028	**Improving the Quality Management Practices in Radiation Processing Facilities for Better Performance and Applications**
Objective	To improve the level of competitiveness and customer satisfaction of radiation processing facilities of RCA GPs.

| Status of Achievement based on LFM

Output	Indicator and Target	Status of Achievement until 2023
Output 1 Project management team operational.	The number of GPs that have established a project management structure. Baseline-0.	**On target** / Behind target/Completed • 13 targeted GPs have established a project management structure – NPC and team members.
Output 2 Guidelines on conforming to the international standards relevant to the radiation processing facilities established.	Availability of the manual. Baseline- 0.	**On target** / Behind target/Completed • 14 guidelines are delivered to all GPs in 2023

Output 3 Personnel trained in establishing integrated/QM practices in radiation processing facilities.	The number of trained personnel. Baseline: 109 (trained personnel from China is not counted).	**On target** / Behind target/Completed • 140 trained personnel from regional and national training courses.
Output 4 Laboratories capable of carrying out calibrations and measurements required to conform to quality standards.	Number of GPs with laboratories capable to carry out calibrations and measurements required to conform to quality standards. Baselines: 8.	**On target** / Behind target/Completed • One exercise on dosimetry intercomparison is arranged among high-energy radiation processing facilities (gamma and EB) of the targeted GPs.
Output 5 Documentation required to obtain certification of the QMSs from certification bodies of the participating GPs established.	Number of GPs with required documentation. Baseline: 10.	**On target** / Behind target/Completed • Most of the targeted countries are working on it.

Project Activities for 2023

Event	Title	Summary of Purpose	Dates /Duration	Host Country
Meeting	**Regional Workshop on Dosimetry Intercomparison, QA/QC and Quality Management Practices**	To execute dosimetry intercomparison exercise for radiation processing facilities, and prepare a guideline containing quality management procedures towards improving the quality management practices.	19-23 Jun.	Korea
Training Course	**RTC on Significance and Importance of Dosimetry System and Associated Uncertainty for Radiation Processing Facilities**	To provide trained personnel on uncertainty for radiation processing facilities.	13-17 Nov.	Thailand

Project Highlights for 2023

The regional workshop in Korea took place from June 19 to 23, 2023, with sixteen (16) participants and two (2) experts from Poland and Korea. The workshop included five (5) lectures, two (2) demonstrations, three (3) exercises and two (2) technical visits to KAERI ARTI and KARA. Similarly, the RTC in Thailand hosted twenty-four (24) participants and one expert from Hungary from 13 to 17 November 2023. The event featured thirteen (13) lectures and six (6) exercises with a technical visit to the gamma and electron beam facilities at TINT. Furthermore, a dosimetry intercomparison exercise was initiated among high-energy radiation processing facilities as part of a two-year activity spanning 2023-2024. The objective is to ensure dose compliance in dosimetry measurements and compare results among facilities, which include twelve (12) gamma irradiators and seven (7) EB irradiators. To facilitate this exercise, the procurement of a gamma calibration set, EB calorimeter, and alanine dosimeters was shared with the targeted GP to enhance their capacity for conducting the measurements.

Regional Workshop on Dosimetry Intercomparison QA/QC and Quality Management Practices, 19-23, Jun. 2023, Korea

RAS1029	**Enhancing Regional Capabilities in Advanced Non-Destructive Testing Techniques for Improved Safety and Inspection Performance in Industries**
Objective	To establish regional advancement in NDT to fulfil the requirements set by global standards for self-reliance and sustainable NDT system of GPs.

Status of Achievement based on LFM

Output	Indicator and Target	Status of Achievement until 2023
Output 1 Project management team established and operational.	Management team in place (NPCs for 21 participating GPs appointed and NPTs constituted)	On target / Behind target/**Completed** • Project implementation team was established in 2023, during which the NPCs for 21 participating GPs were appointed.
Output 2 Personnel trained and competent in advanced NDT inspection.	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 of20 = 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). - Baseline :0 trained, qualified and certified Level 2 TOFD personnel (based on past effort analysis).	**On target** / Behind target/Completed • 1 RTC on RT-D has been implemented. 17 personnel have been trained through this RTC with 14 been qualified. • 1 RTC on PAUT has been implemented. 21 personnel have been trained in PAUT Level 2 (with no qualification exam).

Output 3 Personnel trained and competent in NDT for civil structures.	No. of personnel trained and qualified in NDT for civil structures - Baseline: 40 personnel are expected to be trained during 2020-2021 under RAS1022 (without certification); 0 qualified and certified personnel at any level (based on past effort analysis).	**On target** / Behind target/Completed • No planned activity related to this output for 2023.
Output 4 Capabilities in advanced radiation-based NDT for composite inspection established.	No. of personnel trained in radiation-based NDT for composite inspection. -Baseline: 0 trained personnel (based on past effort analysis).	**On target** / Behind target/Completed • No planned activity related to this output for 2023.

| Project Activities for 2023

Event	Title	Summary of Purpose	Dates /Duration	Host Country
Expert	**TC Sponsored Participation on 2nd Consultancy Meeting on NDT Applications in Civil Engineering**	To train radiation technology in industrial applications.	08-12 May.	Austria
Training Course	**Train-the-Trainers Course on Radiographic Testing - Digital (RT-D) Level 2**	To train and qualify participants in ISO 9712 RT-D Level 2.	15 May. - 1 Jun.	Malaysia
Meeting	**Meeting on Harmonization of National Programmes for Development and Application of Advanced NDT Techniques**	To discuss and agree on national-level programs and activities for implementing advanced NDT techniques.	21-25 Aug.	Indonesia
Training Course	**RTC on Phased Ultrasonic Testing (PAUT) with ISO 9712 Level 2 certification**	To train and qualify participants in ISO 9712 PAUT Level 2.	16 Oct.- 8 Nov.	Korea

| Project Highlights for 2023

RAS1029 commenced this year with three (3) activities successfully implemented as per the project work plan. The first RTC took place in Malaysia, gathering seventeen (17) eligible participants from ten (10) GPs. This training course delivered RT-D Level 2 training and examinations according to ISO 9712 standards. Fourteen (14) candidates successfully passed both the theoretical and practical examinations, qualifying them to apply for the internationally recognized ISO 9712 RT-D certification pending fulfilment of industrial experience and visual requirements. The second RTC, hosted by Korea, welcomed twenty-one (21) participants from fourteen (14) GPs. This course aimed to train participants and qualify them for PAUT Level 2 certification under ISO 9712 standards. Additionally, a training syllabus for Non-Destructive Testing in civil engineering (NDT-CE) has been developed and submitted to the IAEA for publication. This document will ensure uniformity and harmonization in training requirements, serving as a valuable reference for GPs and aiding them in developing materials for training programs to enhance personnel competency in NDT-CE.

TC Sponsored Participation on 2nd Consultancy Meeting on NDT Applications in Civil Engineering, 8 – 12 May 2023, IAEA Headquarters, Vienna, Austria

Train-the-Trainers Course on Radiographic Testing - Digital (RT-D) Level 2, 15 May – 1 Jun. 2023, Malaysia

2 AGRICULTURE

2 ZERO HUNGER

RAS5091	**Assessing and Mitigating Agro-Contaminants to Improve Water Quality and Soil Productivity in Catchments Using Integrated Isotopic Approaches**
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.

Status of Achievement based on LFM

Output	Indicator and Target	Status of Achievement until 2023
Output 1 Project management team operation and 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 target** / Behind target/ Completed 1 project coordination meeting held, 15 national project teams established and 13 national workplans prepared. In 2023, an additional LCC was welcomed to the project team to support project leadership.
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 target** / Behind target/ Completed 3 Regional Training Courses held by 2023.
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) 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 target** / Behind target/ Completed Activities will occur in remaining years of project as planned.
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) 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 target** / Behind target/ Completed Activities will occur in remaining years of project as planned.

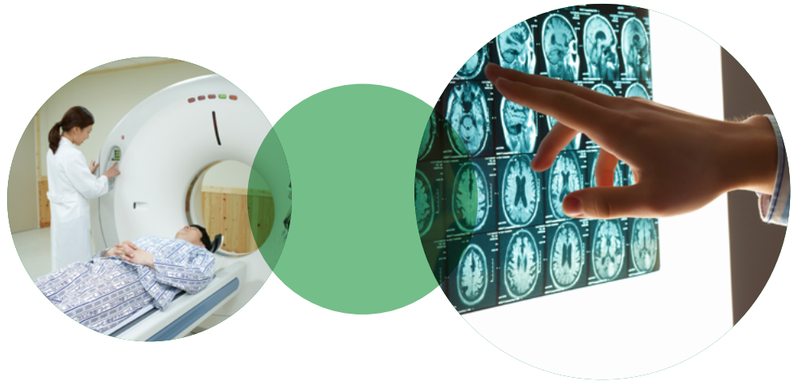
Project Activities for 2023

Event	Title	Summary of Purpose	Dates /Duration	Host Country
Training Course	**RTC on Integrated Isotopic Approaches to Monitor Sources of Agro-Contaminants in the Environment**	To train the participants on design and sampling techniques for isotopic and complementary soil and water quality monitoring of agro-contaminants in catchments.	27-28 Jul.	Viet Nam
Training Course	**RTC on Advanced Data Analysis for Isotopic Approaches to Assessment and Tracing of Agro-Contaminants in Catchments**	To provide knowledge, experience, and skills in data analysis assessment, and tracing of agro-contaminants in catchments	23-27 Oct.	China

Project Highlights for 2023

In 2023, there were two regional training courses: one in Viet Nam on 24-28 July on integrated isotopic approaches to monitor sources of agro-contaminants in the environment, and the other in China on 23-27 October on advanced data analysis of isotopic approaches to assessment and tracing of agro-contaminants in catchments. Regarding the project's effectiveness, personnel training to acquire skills and knowledge, national studies for mitigation measures and a database of water and soil isotopic signatures are on track as planned. Nevertheless, there needs attention to the management of the national project team. Several points were made such as lack of evidence on training being employed in national activities, reporting on capacity building, and in-person coordination meetings. To address such issues, recommendations were made including updating the annual reporting format to the contemporary situation, clarifying responsibilities for coordination and collecting performance reporting, and considering IAEA TC funding to include attendance by LCC at project events.

3 HUMAN HEALTH



RAS6098	Standardizing Radiotherapy in Palliative Care
Objective	To improve the quality of life for cancer patients in the RCA region.

Status of Achievement based on LFM

Output	Indicator and Target	Status of Achievement until 2023
Output 1 Project management team operational.	The number of GPs that have established a project management structure. Baseline – 0.	On target / **Behind target**/Completed • The First Coordination Meeting was held on 22-25 March 2022
Output 2 Radiotherapy professionals trained on comprehensive management of palliative RT	Number of radiotherapy professionals trained on comprehensive management of palliative radiation therapy in the RTCs (2025). Baseline is zero (0).	**On target** / Behind target/Completed • RTC1: Participants 47 radiotherapy professionals from 15 countries • RTC2: Participants 22 radiotherapy professionals from 10 countries
Output 3 Clinical practice guidelines for palliative RT suited for situations in RCA GPs developed.	Number of practice guidelines for palliative radiotherapy suited for situations in RCA GPs. Baseline is zero (0).	On target / **Behind target**/Completed • It is currently being prepared and workshops will be held during 2024.

Project Activities for 2023

Event	Title	Summary of Purpose	Dates /Duration	Host Country
Training Course	**RTC on Palliative Radio-therapy for Brain Metastases and other Clinical Scenarios**	To provide participants with skills and knowledge in palliative radiation therapy for various clinical scenarios.	18-21 Sep.	Pakistan

Project Highlights for 2023

Two RTCs aimed at standardizing palliative radiotherapy were successfully conducted, providing training to numerous participants. Forty-seven (47) professionals from fifteen (15) countries participated in the first RTC, and twenty-two (22) participants from ten (10) countries completed the training. The Midterm Review Meeting, initially scheduled for December 2023, was rescheduled and took place in the first quarter of 2024. Additionally, clinical practice guidelines and workshops are planned to be held in 2024. Anticipated outcomes of the project include the dissemination of results to individual countries and the broader international community through the National Training Centres (NTCs). Regarding the development of guidelines, the results of the discussion will be consolidated into a comprehensive guidance document. Subsequent workshops will then tailor the document to the unique circumstances of each country.

RTC on Palliative Radiotherapy, Sept. 18-21, 2023, Pakistan

RAS6100	**Strengthening Clinical Application of Hypofractionated Radiotherapy**
Objective	To enhance cancer treatment in the RCA region through the application of hydrofractionated radiotherapy.

Status of Achievement based on LFM

Output	Indicator and Target	Status of Achievement until 2023
Output 1 Project management team operational.	Number of GPs that have established a project management structure by 4Q2022 (baseline:0).	**On target** / Behind target/Completed • 18 GPs appointed National Project Teams and prepared National Work Plans
Output 2 Professionals trained in hypofractionated radiotherapy at regional and national level.	Radiation oncologists, medical physicists, and radiation therapists trained on regional training courses and functional as national trainers by 4Q2025. At least one follow-up national training activity by 4Q2025.	**On target** / Behind target/Completed • Thirty-five (35) professionals from 15 countries were trained during the 1st RTC in 2022 • The 2nd RTC in 2023 benefited 57 participants from 7 countries. • The 1st EM) in VIE (16 to 19 May, 2023) was held for Radiation Oncologists, Medical Physicists and Radiation Therapists in VIE
Output 3 Safety and quality of hypofractionated radiotherapy improved.	A package of practical information provided to implement hypofractionated radiotherapy by 4Q2025. Implementation of QA/QC programs in counterpart institutions for hypofractionated radiotherapy by 4Q2025. Collecting, sharing, and distributing information on hypofractionated radiotherapy by using established IT resources by 4Q2025.	**On target** / Behind target/Completed • The necessary equipment/items in support of HFRT were provided to the 4 MSs (INS, MAL, MON, VIE) requested through a demand survey (Dec 2022).

Project Activities for 2023

Event	Title	Summary of Purpose	Dates /Duration	Host Country
Expert	**Expert Mission to Enhance Clinical Application of Hypofractionated Radiotherapy in Vietnam**	To provide enhancement in the clinical application of Hypofractionated Radiotherapy in Vietnam.	16-19 May.	Viet Nam
Training Course	**RTC on Mild to Moderate Hypofractionated Radiotherapy (HFRT): Basics to Clinical Application for Curative Treatment of Malignancies**	To familiarize participants with basic knowledge and fundamental principles of applying mild to moderate HFRT for curative malignancy treatment.	23-27 Oct.	Pakistan

Project Highlights for 2023

RAS6100 aimed to strengthen the application of hypofractionated radiotherapy in the RCA region through comprehensive approaches, encompassing both clinical and medical physics aspects of the entire treatment process. The first expert mission took place in May, catering to radiation oncologists, medical physicists, and radiation therapists. During this mission, lectures were delivered on the application of hypofractionated radiation therapy (HFRT) in actual patient scenarios. Topics covered included treatment decisions, target volume determination, dose-fractionation schemes, and beam delivery methods. Experts and specialists engaged in discussions regarding multicentre clinical trials, educational programs, and external audits related to HFRT. In October, the second regional training course convened, with fifty-seven (57) trainees from seven (7) countries in attendance. This course primarily focused on imparting fundamental knowledge and principles for the clinical application of mild to moderate HFRT in the curative treatment of malignancies. The course comprised fifteen (15) sessions, covering topics such as the medical physics of HFRT, radiobiology, and various cancer sites including head and neck (H&N), breast, lung, rectum, bladder, prostate, and cervix.

Expert Mission, 16-19, May. 2023, Hanoi, Viet Nam

RAS6101	**Improving the Quality and Safety of Radiation Medicine through Medical Physicist Education and Training**
Objective	To improve the quality and safety of radiation medicine in the Asia-Pacific region through medical physicist education, training, and certification.

Status of Achievement based on LFM

Output	Indicator and Target	Status of Achievement until 2023
Output 1 Project management structure established.	Project activities and budget are implemented and utilized as planned. Baseline: Not Mandatory.	On target / Behind target/**Completed** • In 2022, the project management structure was established in the regional and national level.
Output 2 Medical physicists trained on quality management and audits.	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 the end of the project. Baseline: No physicists in the region trained on quality management and audit.	**On target** / Behind target/Completed • More than sixty (60) medical physicists trained on quality management and audits in the virtual RTC in 2022.
Output 3 Increased structured and supervised clinical training programmes for medical physicists implemented in the region (supported through AMPLE).	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.	**On target** / Behind target/Completed • The AMPLE system was supported for the region clinical training. The residents from Thailand, China, Malaysia, Vietnam, et. al use this system for clinical training.
Output 4 Postgraduate academic medical physics programmes linked to clinical training.	Number of postgraduate academic programmes. Baseline: postgraduate academic programmes available in about 10 countries.	**On target** / Behind target/Completed • The basic framework was briefly discussed in the Krabi, Thailand meeting March 2023. The RTC will be held in 2024. Some new postgraduate academic programmes are started.
Output 5 Establishment of certification and relevant mechanisms for CQMPs supported.	Number of certifications 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.	**On target** / Behind target/Completed • Specific RTC will be held in 2025. The certification for CQMP and CPD program are being prepared and progressed.

Project Activities for 2023

Event	Title	Summary of Purpose	Dates /Duration	Host Country
Expert	**Expert mission to support the assessment of medical physics residents and conduct an orientation program**	To support the assessment of medical physics residents and conduct an orientation program.	23-27 Jan.	Australia
Training Course	**RTC on Roles, Responsibilities, Education & Training of Medical Physicists and Certification for Clinically Qualified Medical Physicists.**	To provide participants with IAEA guidelines and resources on the roles, responsibilities, education, and certification of medical physicists.	27-31 Mar.	Thailand
Training Course	**RTC on quality management and quality assurance in medical imaging for medical physicists**	To provide participants with knowledge, skills, and competencies in quality assurance in nuclear medicine and diagnostic radiology.	22-26 May.	Thailand
Expert	**TC Home-Based Assignment to support AMPLE**	To support the AMPLE.	15 Sep - 10 Oct.	Australia

Project Highlights for 2023

In 2023, two (2) expert-based missions and two (2) training courses were conducted under RAS6101. One of the significant outcomes achieved by the project was the establishment of recommendations from the IAEA to the respective governments, including the Ministry of Health, the Ministry of Education, and the regulatory agency. The recommendations laid the foundation for recognizing medical physicists as health professionals and requiring all radiation medicine service providers to adopt medical physics staffing levels, ensuring the safe and effective diagnosis and treatment of patients. Furthermore, the recommendations acknowledge the role of the national professional association in managing, approving, and certifying the Clinically Qualified Medical Physicist (CQUMP) program while providing appropriate budgets to support education training.

4 ENVIRONMENT

RAS7037 Enhancing Wetland Management and Sustainable Conservation Planning

Objective

To enhance the sustainable development of wetlands and their ecosystem services in the Asia Pacific region.

Status of Achievement based on LFM

Output	Indicator and Target	Status of Achievement until 2023
Output 1 Project efficiently managed	Activities planned and timelines established, project workplan advances on time.	Timelines were established and met.
Output 2 Personnel equipped with isotopic skills, including collection and preparation of samples, use of isotopic techniques, and data analysis and interpretation of results in the context of wetland and fisheries management.	Completion of training and course regarding collection and preparation of samples for isotopic analysis, sample analysis, and data analysis and interpretation. Completion certificate provided following completion of each training course. Completion of country meeting reports.	All training courses completed. Courses covered collection and preparation of samples, analysis of samples, data analysis and interpretation. Completion certificates provided.
Output 3 User manual developed regarding the application of isotopic techniques to wetland management.	User manual developed regarding application of isotopic techniques to wetland management. Developed by the LCCs as modules associated with each training course, this manual will provide step-by-step instructions in sample collection preservation, and preparation, isotopic analysis, and the interpretation of isotopic analysis, and the interpretation of isotopic data in the context of wetland and sustainable fisheries management. The manual will be revised on feedback following expert field missions.	User manual was completed to a high standard, covering all aspects of sample collection, preparation, analysis, data analysis and interpretation. Feedback was provided through courses. The manual has been published by the IAEA.
Output 4 Implications or results for the wise use of wetlands, including conservation and enhanced fishery production, reported to relevant government agencies and other stakeholders.	Completion of reports by at least half of the participating GPs, incorporating results and interpretation of isotopic data by project completion in Q4 2023.	Reports were provided by Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka and Thailand.
Output 5 Proficiency test results available and continual improvement in procedures.	Proficiency test report provided by IAEA.	Proficiency tests were not conducted.

Project Activities for 2023

Event	Title	Summary of Purpose	Dates /Duration	Host Country
Training Course	**RTC on the Interpretation of Isotopic Data for Environmental Management Including the Application of Mixing Models**	To provide training in the sampling, data analysis, and interpretation of stable isotope isotopic data results for environmental management including the application of mixing models.	22-23 Jun.	Virtual

Project Highlights for 2023

RAS7040	**Improving Water Resources Management Practices by Enhancing the Regional Collaboration in Environmental Isotope Analysis and Applications**
Objective	To enhance the regional capability in water quality and water resource monitoring for effective development and management of surface water and groundwater.

Status of Achievement based on LFM

Output	Indicator and Target	Status of Achievement until 2023
Output 1 Project implementation and monitoring structure established and managed.	National project teams identified for each GP	On target / Behind target/**Completed** • The output has been completed in the first quarter of 2023.
Output 2 Improved skills in isotopic analysis of dissolved nitrogen species in water (NH4, NO3), groundwater dating analysis, and carbon isotope analysis.	Indicators: Number 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 target** / Behind target/Completed • 27 participants from 15 GPs in the region took part in two RTCs held in Islamabad, Pakistan, 07 – 11 August 2023. • 6 participants from the region took part in an International TC held in Seibersdorf, Austria.
Output 3 Improved models/ development of scenarios for surface water and groundwater.	"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"	**On target** / Behind target/Completed • 25 participants from 15 GPs in the region took part in RTC held in Jakarta, Indonesia, 28 August – 01 September 2023.
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 databases.	**On target** / Behind target/Completed • National Project Teams of GPs have been collecting the isotopic, chemical and hydrogeological databases for their study areas. • Workshop was held in Ha Noi, Vietnam from 20-23 November 2023.
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.	**On target** / Behind target/Completed • Most GPs have established their monitoring stations and are ready to integrate into a regional monitoring network.

Project Activities for 2023

Event	Title	Summary of Purpose	Dates /Duration	Host Country
Expert	**Draft IWAVE National Synthesis Report (ISR) of Sri Lanka for preparation of the national hydrological sketch**	To make a draft of the IWAVE National Synthesis Report (ISR) of Sri Lanka.	16 Jan - 16 Feb.	Tunisia
Training Course	**RTC on Enhancing Water Resources Management in the Asia and Pacific region through Isotopic Techniques**	To familiarize young scientists in the region with isotopic hydrology science.	7-11 Aug.	Pakistan
Training Course	**RTC on Mixing Models of Tracers and Complementary Approaches to Apportion Sources of Contaminants in Ground Water**	To train participants in using various models and statistical methods to quantify individual sources of contaminants in groundwater.	28 Aug. - 1 Sep.	Indonesia

Expert	**TC Sponsored Participation in Training Course on Groundwater Vulnerability Modelling**	TC sponsored participation in a training course on groundwater vulnerability modelling.	28-31 Aug.	Austria
Meeting	**Workshop on Current Studies on Improving Water Resources Management Using Environment Isotopes Tracers**	To exchange experiences among water research experts and regional managers on using environmental isotopes and complementary approaches to enhance water resource management.	20-23 Nov.	Viet Nam

Project Highlights for 2023

The two (2) RTCs hosted by Pakistan and Indonesia played a crucial role in introducing young scientists to isotope hydrology for the first time. The TC focusing on isotope data quality was particularly significant for staff directly engaged in analysing stable isotopes in water, as well as dissolved constituents such as nutrients and agrochemicals. Unfortunately, in 2023, training on dual isotopic analysis for NOx was not conducted due to the limited availability of suitable facilities in the region. Nonetheless, the prospect of utilizing dual isotopic analysis for NOx, employing reduction with TiCl3 followed by laser spectrometry, generated considerable interest among isotope scientists in the region. Consequently, a training course on this advanced analytical method is planned for 2025. Furthermore, it was strongly recommended that HL GPs and resource countries actively engage and contribute more to the project. Their participation in workshops and their involvement in training young scientists in water resource assessment based on isotopic data are deemed essential.

RTC on Mixing Models of Tracers and Complementary Approaches to Apportion Sources of Contaminants in Ground Water, Jakarta, Indonesia, Aug. 2023.

Workshop on Current Studies on Improving Water Resources Management using Environment Isotopes Tracers, Ha Noi, Viet Nam, 20-23 Nov. 2023

5 RADIATION SAFETY

RAS9092	**Strengthening the Capacity to Respond to Radiological Emergencies of Category II and III Facilities**
Objective	To ensure radiation safety for workers and the public during nuclear or radiological emergencies in the RCA region.

Status of Achievement based on LFM

Output	Indicator and Target	Status of Achievement until 2023
Output 1 Project management structure established.	An agreed project implementation programme.	On target / **Behind target**/Completed Several project implementations, which were previously agreed upon, are currently behind schedule and are planned to be implemented in the upcoming 2024 programme cycle.
Output 2 Regulators and operators trained in the field of radiation protection strategies for emergencies of category II and III facilities.	The number of regulators and operators trained in the field of radiation protection strategies for emergencies of the Category II and III facilities.	On target / **Behind target**/Completed • A regional workshop on the development of a National Radiation Emergency Plan (EREP) is rescheduled to be implemented in the first quarter of 2024.

Output 3 A handbook of pilot cases of protection strategies for emergencies of category II and III facilities developed.	A handbook of pilot cases of protection strategies for emergencies of Category II and III facilities.	It was decided to replace the development of a handbook with expert missions and workshops in response to the specific demands of the targeted countries and to avoid redundancy with existing IAEA publications.
Output 4 Expert network established.	Online platform established on the RCARO website.	On target / Behind target/**Completed** • A dedicated online platform for expert networks was successfully established on the RCARO website.

Project Activities for 2023

Event	Title	Summary of Purpose	Dates /Duration	Host Country
Meeting	**Mid-term Review Meeting**	To review the implementation progress of the project RAS9092, discuss and update the work plan for 2023-2024.	13-17 Feb.	Malaysia

Project Highlights for 2023

In February 2023, a mid-term review meeting took place in Malaysia on 13 -17 February to assess the progress of implementation and outline the work plan for 2023-2024. The Meeting, attended by the LCC and NPCs from fourteen (14) Government Parties, along with two representatives from the IAEA, consisted of two sections. Section 1 focused on reviewing the project's implementation, followed by Section 2, which evaluated its achievements. Regarding expert missions, it was agreed that countries must be prepared with a draft of the emergency plan and/or protection strategy before the planned Regional Workshop in 2024. The plan for RAS9092 was finalized, including both a regional and virtual workshop in 2024 and the Final Review Meeting in November 2024 in Pattaya, Thailand. Overall, the Meeting successfully achieved its objective, leading to the revision of the project work plan to align with project progress and current national needs, incorporating expert missions and regional workshops.

Mid-term Review Meeting, Malaysia, Feb. 2023

Annexes

ANNEX 1

List of RCA On-going Projects in 2023

No.	Project Number	Project Title	Implementation Period	LC/LCC	TO
1	**RAS0086**	Enhancing the Management and Implementation of Activities under the Framework (RCA)	2020-2023	**ROK** Ms Lee Doyeon Nuclear and Fusion Energy Cooperation Division Ministry of Science and ICT **Email**: leedy@korea.kr	Mr Gashaw Gebeyehu Wolde
3	**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
3	**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 Antonio Maghella Seminario
4	**RAS5087**	Promoting Food Irradiation by Electron Beam and X Ray Technology to Enhance Food Safety, Security and Trade (RCA)	2020-2023	**VIE** Mr Tran Minh Quynh Hanoi Irradiation Center, Vietnam Atomic Energy Institute **Email**: tmqthuquynh@gmail.com	Mr Carl Michael Blackburn
5	**RAS5088**	Enhancing Crop Productivity and Quality through Mutation by Speed Breeding (RCA)	2021-2025	**CPR** Ms Huijun GUO Institute of Crop Science, Chinese Academy of Agricultural Science (CAAS) **Email**: guohuijun@caas.cn	Ms Fatma Sarsu
6	**RAS5091**	Assessing and Mitigating Agro-Contaminants to Improve Water Quality and Soil Productivity in Catchments Using Integrated Isotopic Approaches (RCA)	2020-2025	**AUL** Mr Timothy Ralph Macquarie University School of Natural Sciences **Email**: tim.ralph@mq.edu.au **Second LCC** : Dr Chathurika Perera	Mr Joseph Adu-Gyamfi
7	**RAS6096**	Empowering Regional Collaboration among Radiotherapy Professionals through Online Clinical Networks (RCA)	2020-2023	**NZE** Mr Iain Gordon Ward Canterbury Regional Cancer and Blood Service, Christchurch Hospital **Email**: Iain.Ward@cdhb.health.nz	Mr Gregorius Ben Prajogi
8	**RAS6097**	Enhancing Capacity and Capability for the Production of Cyclotron-Based Radiopharmaceuticals (RCA)	2020-2023	**ROK** Mr Byung Ii Kim Korea Institute of Radiological and Medical Sciences (KIRAMS) Email: kimbi@kirams.re.kr	Mr Amirreza Jalilian
9	**RAS6098**	Standardizing Radiotherapy in Palliative Care (RCA)	2022-2025	**JPN** Mr Masaru Wakatsuki National Institute for Quantum and Radiological Science and Technology, QST Hospital Email: wakatsuki.masaru@qst.go.jp	Mr Kamal Akbarov Mr Daniel Berger
10	**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	Mr Kamal Akbarov Mr Daniel Berger
11	**RAS6101**	Improving the Quality and Safety of Radiation Medicine through Medical Physicist Education and Training (RCA)	2022-2025	**PRC** Mr YANG Ruijie Department of Radiation Oncology Peking University Third Hospital Email: ruijyang@yahoo.com	Mr Pavel Kazantsev Ms Olivera Ciraj Bjelac
12	**RAS7035**	Enhancing Regional Capability for the Effective Management of Ground Water Resources Using Isotopic Techniques (RCA)	2020-2023	**PRC** Zhonghe PANG Institute of Geology and Geophysics, Chinese Academy of Science Email: Z.Pang@iaea.org	Mr Umaya Doss Sarvana Kumar
13	**RAS7037**	Enhancing Wetland Management and Sustainable Conservation Planning (RCA)	2020-2024	**AUL** Prof. Neil Saintilan Macquarie University Email: neil.saintilan@mq.edu.au	Ms Inmaculada Tolosa Bertral
14	**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
15	**RAS9092**	Strengthening the Capacity to Respond to Radiological Emergencies of Category II and III Facilities (RCA)	2020-2023	**ROK** Mr Mincheol Park Programme Division RCA Regional Office Email: mcpark@rcaro.org	Ms Muzna Assi

ANNEX 2

Planned Regional Events under RCA Projects in 2024

Project	MT/WS: Meeting/ Workshops RTC: Regional Training Course	Title of Event	Proposed Country (City, Country)	Date (Specific Day & Month)	Objective and Participation
			Q1/2024		
RAS1028	MT	Mid-Term Review Meeting	Suzhou, China	4-8 Mar. 2024	**Objective:** To review the implementation progress of project RAS1028, and discuss and update the workplan for the remaining project period. **Target participants:** LCC, NPCs, A/NPCs, and senior members of national project teams. 24 Participants from participating countries attended.
RAS7037	MT	Final project Review meeting	Virtual	11-15 Mar. 2024	**Objective:** To assess the results, impact, challenges, and lessons learned from the implementation of project RAS7037 at national and regional level. **Target participants:** LCC, NPCs, A/NPCs, and senior members of national project teams. 21 participants from participating countries attended.
RAS5091	WS	Workshop on Soil-Water Management Practices to Reduce Agro-Contaminants and Improve Water Quality	New Delhi, India	18-22 Mar. 2024	**Objective:** To support the development of sustainable management practices to improve soil and water quality through the assessment and mitigation of agro-contaminants. By the end of this workshop, practical guidelines on sustainable management practices to improve soil and water quality in transboundary rivers and agricultural catchments will be drafted and adopted for implementation. The workshop will also enhance the capacity of countries in the Asia–Pacific region to develop their technical capabilities to monitor agro-contaminants in catchments and transboundary rivers. **Target participants:** 12 representatives from research institutes of RCA Government Parties attended the workshop.
RAS9092	WS	Regional Workshop on Development of National Radiation Emergency Plan (NREP) (Including Hazard Assessment)	Pattaya Thailand	25-29 Mar. 2024	**Objective:** To assess the results, impact, challenges, and lessons learned from the implementation of project RAS7037 at national and regional level. **Target participants:** 28 participants attended the workshop.
			Q2/2024		
RAS6105	MT	Kick Off meeting to launch the project and finalize the work plan	Virtual	8-9 Apr. 2024	**Objective:** To (a) discuss and analyse the activities that will be included in the work plan, such as defining objectives, proposing venue, setting dates, and identifying potential experts; (b) drafting prospectuses for regional courses and other scheduled activities; (c) developing a comprehensive understanding of cancer epidemiology, causes,
RAS6105	MT	Kick Off meeting to launch the project and finalize the work plan	Virtual	8-9 Apr. 2024	risk factors, clinical manifestations/symptoms; (d) exploring perspectives on the use of hybrid imaging and theranostics techniques, and incorporating these topics into the training programmes for different professionals within the specialty, and (e) improvement and updating training and educational programmes, including discussions on the use of artificial intelligence for educational purposes and routine diagnosis. **Target participants:** 25 participants representing LCC, NPCs, A/NPCs attended the meeting.
RAS6109	MT	Kick Off meeting to launch the project and finalize the work plan	Virtual	15-19 Apr. 2024	**Objective:** To (i) discuss the needs and gaps in participating Government Parties (GPs) related to diagnostic radiology medical physics, (ii) gather data to inform baseline indicators to facilitate project performance, (iii) agree to a project workplan, including identifying host countries for regional training courses, (iv) establish methods of project communication, (v) build a network of medical physicists in the Asia and Pacific region to deliver the project over four years. **Target participants:** 26 participants representing LCC, NPCs, A/NPCs attended the meeting.
RAS1029	MT	Expert Group Meeting to develop a draft document and question banks on PAUT	Christchurch NZ	15-19 Apr. 2024	To develop a draft document and question banks on PAUT
RAS5088	MT	Consultancy meeting on development of MbyS protocols, consultation of MbyS implementation and linkage of mutant lines with AOAPM	Hanoi, Viet Nam	15-19 Apr. 2024	**Objective:** Review and enhance protocols for mutation through speed breeding methods such as double haploidy, rapid cycling, and molecular marker selection, focusing on their applications in mutant selection and mutation breeding in crops within the RCA GPs.Discuss and outline preliminary contents for the book titled "Accelerating Plant Breeding: Advanced Techniques in Plant Mutation Breeding for Crop Improvement. Identify and address gaps and requirements in mutation by speed breeding and smart breeding approaches to develop new crop varieties aimed at enhancing quality and productivity. Discuss and reinforce the role of the Asia and Oceania Association of Plant Mutagenesis (AOAPM). **Partcipants:** 14 National project coordinators (NPCs) from Asian and Pacific countries participated in the meeting.

ANNEX 2

Planned Regional Events under RCA Projects in 2024

Project	MT/WS: Meeting/ Workshops RTC: Regional Training Course	Title of Event	Proposed Country (City, Country)	Date (Specific Day & Month)	Objective and Participation
RAS6110	MT	Kick Off meeting to launch the project and finalize the work plan	Virtual	23-24 Apr. 2024	Objective: To (i) discuss the needs and gaps in participating Government Parties (GPs) related to diagnostic radiology medical physics, (ii) gather data to inform baseline indicators to facilitate project performance, (iii) agree to a project workplan, including identifying host countries for regional training courses, (iv) establish methods of project communication, (v) build a network of medical physicists in the Asia and Pacific region to deliver the project over four years. Target participants: 28 participants representing LCC, NPCs, A/NPCs attended the meeting.
RAS0086	MT	46th Regional Meeting of National RCA Representatives (including RCA Chairs Meeting and RCARO SAC Meeting)	Beijing, China	13-17 May. 2024	Objective: To discuss strategy, policy and management issues for the deployment and execution of the RCA Declaration adopted at the RCA Ministerial Level Meeting in Vienna, Austria, on 26 September 2022. Partcipants: National Representatives from RCA Government Parties, except India, and RCARO attended the meeting.
RAS6108	MT	Kick Off meeting to launch the project and finalize the work plan	Virtual	22-23 May. 2024	Objective: To introduce the project coordinators and counterparts from all participating countries and establish methods of project communication for RAS6108, provide a briefing on the project and work plan, discuss the scope and expectations on the planned survey to identify the present status and prepare a report on the current status of use of EMS. Partcipants: 23 appointed LCC, NPCs, A/NPCs of the project attended the meeting.
RAS7043	MT	Kick Off meeting to launch the project and finalize the work plan	Virtual	11-12 Jun. 2024	Objective: (a) introduce the project coordinators and counterparts from all participating countries, (b) establish methods of project communication for RAS7043, (c) discuss and analyse the activities that will be included in the work plan, such as defining objectives, proposing venue, setting dates, and identifying potential experts; (d) drafting prospectuses for scheduled regional activities; (d) developing an understanding of the efficacy of Artificial recharge to ground water. Partcipants: All appointed LCC, NPCs, A/NPCs of the project.
RAS0092	MT	Kick Off meeting to launch the project and finalize the work plan	Virtual	14 Jun. 2024	Objective: To introduce the project coordinators and counterparts from all participating countries and establish methods of project communication for RAS0092, provide a briefing on the project and work plan. Partcipants: LCC, NPCs, A/NPCs of the project.
RAS7040	MT	Sponsored Participation on First Coordination Meeting of the Global Water Analysis Laboratory Network	Vienna, Austria	18-20 Jun. 2024	Sponsored Participation on First Coordination Meeting of the Global Water Analysis Laboratory Network
RAS1028	RTC	Regional Training Course on Quality Assurance and Quality Control for Gamma Dosimetry Applications	Quezon City, Philippines	24-28 Jun. 2024	Objective: The objective of the event is training the participants on QA/QC for gamma dosimetry applications. Partcipants: 19 participants from Member States participating in the project RAS1028.
RAS6101	MT	Mid-term Review Meeting	Chiba, Japan	24-28 Jun. 2024	Objective: To assess its achievements and challenges since its inception in 2022, and to discuss the detailed work plan for the remaining period until 2025. Target participants: 20 NPCs, A/NPCs, and senior members of national project teams attended.
RAS6098	MT	Mid-term Review Meeting	Chiba, Japan	24-28 Jun. 2024	Objective: To assess its achievements and challenges since its inception in 2022, and to discuss the future work plan in details for the remaining period until 2025. Target participants: 23 NPCs, A/NPCs, and senior members of national project teams attended the meeting.
RAS5091	MT	Mid-term Review Meeting	Virtual	25-27 Jun. 2024	Objective: To review the implementation progress of project RAS5091, and discuss and update the workplan for the remaining project period. Target participants: 14 NPCs, A/NPCs, and senior members of national project teams attended the meeting.

ANNEX 2

Planned Regional Events under RCA Projects in 2024

Project	MT/WS: Meeting/ Workshops RTC: Regional Training Course	Title of Event	Proposed Country (City, Country)	Date (Specific Day & Month)	Objective and Participation
			Q3/2024		
RAS6100	MT	Mid-term Review Meeting	Virtual	10-12 Jul. 2024	**Objective:** To review the implementation progress of project RAS6100, and discuss and update the workplan for the remaining project period. **Target participants:** 22-25 NPCs, A/NPCs, and senior members of national project teams.
RAS7040	RTC	RTC on groundwater dating using C-14 and noble gases	Bangkok, Thailand	8-12 Jul. 2024	
RAS7040	RTC	RTC on Groundwater Flow Modelling	Kular Lumpur, Malaysia	15-19 Jul. 2024	**Objective:** To (i) Develop and refine the strategy for plant mutation breeding including vision, mission, strategy, operating framework, and work plans for Asia and Pacific and Global context. ii) Provide technologies and capacities utilizing nuclear science and technologies, including seed system modalities, to identify or refine successful models contributing to food security and sustainable agriculture. iii) Promote applied mutation breeding and advanced biotechnologies research and fostering both regional and interregional cooperations iv) Establish a plant health-related network to address issues concerning plant health, further enhancing the scope and impact of the mutation breeding efforts. v) Expand the network to other regions (Africa, Latin America, Europe, and Central Asia) to contribute to the Sustainable Development Goals. **Target participants:** 20 experts from RCA countries attended the meeting
RAS5088	MT	Mutation breeding network meeting	Vienna	22-26 Jul. 2024	To develop a draft document and question banks on PAUT
RAS7040	RTC	Training Course on Isotope-enabled Water Balance Modelling Using the JAMS/ J2000 Modelling System	Vienna, Austria	2-6 Sep. 2024	Sponsored Participation on Training Course on Isotope-enabled Water Balance Modelling Using the JAMS/J2000 Modelling System
RAS6105	RTC	RTC 1 on hybrid imaging with flurine-18 and other novel radio tracers	Bali, Indonesia	3-7 Sep. 2024	**Objective:** To review the implementation progress of project RAS6100, and discuss and update the workplan for the remaining project period. **Target participants:** 22-25 NPCs, A/NPCs, and senior members of national project teams.
RAS1029	WS	Workshop on NDT techniques for quality control in civil engineering	Singapore	9-13 Sep. 2024	**Objective:** provide participants with wide ranging technical deliberations on NDT techniques in civil engineering practices, guidelines, and standards. **Target participants:** 20 participants from RCA GPs in the process to develop certification scheme for NDT in civil engineering have been confirmed.
RAS0092	MT	53rd RCA General Conference (including RCA Chairs Meeting and RCARO SAC Meeting)	IAEA, Vienna, Austria	13 Sep. 2024	Annual RCA GCM of NRs
RAS1028	MT	Expert Mission to Selangor of Malaysia to provide training on uncertainty measurements for gamma and EB plant dosimetry system in Malaysia	Malaysia	26-29 Sep. 2024	• Provide training to measure uncertainty in the dosimetry system. • Offer hands-on training for the operation of dosimetry equipment. • Provide a written report to the IAEA and Malaysia Nuclear Agency with observations and findings from the mission.
RAS6101	RTC	RTC on clinical programmes	Malaysia	30 Sep. - 4 Oct. 2024	To establish Structured Clinical Training in Medical Physics in the region
			Q4/2024		
RAS1028	RTC	RTC on on Quality Assurance and Quality Control for Electron Beam Dosimetry Applications	Ho Chi Minh City, Viet Nam	7-11 Oct. 2024	**Objective:** To train the participants on QA/QC for electron beam dosimetry applications. **Target participants:** 18 participants have been confirmed.

ANNEX 2

Planned Regional Events under RCA Projects in 2024

Project	MT/WS: Meeting/ Workshops RTC: Regional Training Course	Title of Event	Proposed Country (City, Country)	Date (Specific Day & Month)	Objective and Participation
RAS6105	MT	sponsored participation for IPET 2024	Vienna, Austria	7-11 Oct. 2024	
RAS1029	MT	Mid-Term Review Meeting	Bangkok, Thailand	7-11 Oct. 2024	**Objective:** To review the implementation progress of project RAS1029, and discuss and update the workplan for the remaining project period. **Target participants:** 22-25NPCs, A/NPCs, and senior members of national project teams.
RAS6109	WS	Regional Workshop on the Status and Roles and Responsibilities of Medical Physicists in Diagnostic and Interventional Radiology	Malaysia	15-18 Oct. 2024	**Objective:** The purpose of the workshop is to discuss the status of diagnostic radiology medical physics and associated roles and responsibilities, aligned with the IAEA guidelines outlined in the publications "Roles and Responsibilities, and Education and Training Requirements for Clinically Qualified Medical Physicists" (IAEA HHS No. 25) and "Medical Physics Staffing Needs in Diagnostic Imaging and Radionuclide Therapy: An Activity-Based Approach" (IAEA HHR No. 15). **Target participants:** 30 medical physicists from RCA GPs.
RAS6110	WS	Technical workshop on Improving the Radiotherapy Capacity of Newcomer RCA Governmental Parties	Fukushima, Japan	15-18 Oct. 2024	**Objective:** To bring together national counterparts and professionals from all participating countries in RAS6110 to discuss and agree on the support plan to be provided by mentor countries to mentee countries. The workshop will address the priorities of the newcomer RCA Governmental Parties and identify areas for improvement where mentor countries can offer assistance. National implementation plans for the newcomer RCA Governmental Parties will be developed and agreed upon for execution through project support. **Target participants:** 1 representative from RCA participating countries.
RAS1029	MT	Expert group meeting	Vienna, Austria	14-18 Oct. 2024	To develop question banks on RT-D in accordance with ISO 9712 and ISO/TS 25107.
RAS6100	RTC	RTC on Hypofactionated radiotherapy and radio surgery for brain and spine metastases	Vienna, Austria	14-18 Oct. 2024	To develop question banks on RT-D in accordance with ISO 9712 and ISO/TS 25107.
RAS7040	MT	Mid-term review Meeting	Mumbai, India	21-25 Oct. 2024	**Objective:** To assess its achievements and challenges since its inception in 2022, and to discuss the future work plan in detail for the remaining period until 2025. **Target participants:** 22-25NPCs, A/NPCs, and senior members of national.
RAS5088	RTC	RTC on Genomics; Genotyping; Phenotyping; Genetics, Handling of mutants to speed up the Breeding Process	Faisalabad, Pakistan	28 Oct.- 8 Nov. 2024	**Objective:** enhance the capabilities of scientists and breeders through lectures, demonstrations, hands-on training, and practical exercises using innovative and revolutionary techniques, both in the lab and the field. These efforts are designed to accelerate the breeding process and foster the development of resilient, high-yield crop varieties. **Target participants:** 20 participants engaging in mutation breeding and biotechnologies.
RAS5088	WS	Final project Review meeting	Vientiane, Lao PDR	18-22 Nov. 2024	**Objective:** discuss the RCA RAS5088 project's outcomes since its inception in 2021. The project team will also assess and document the collective findings and success stories related to the project's impact on agricultural productivity and quality, as well as the knowledge and skills gained by the participating countries' counterparts. Additionally, challenges and lessons learned will be discussed and documented for the future design of the RCA TC project. **Target participants:** 22-25NPCs, A/NPCs, and senior members of national project teams.

ANNEX 2

Planned Regional Events under RCA Projects in 2024

Project	MT/WS: Meeting/ Workshops RTC: Regional Training Course	Title of Event	Proposed Country (City, Country)	Date (Specific Day & Month)	Objective and Participation
RAS6098	RTC	RTC on Optimizing Access to Palliative Radiotherapy within a Multidisciplinary Framework	Indonesia	2-5 Dec. 2024	**Objective:** To provide knowledge on the following: deciding on the role of palliative radiotherapy in the management of tumours with bleeding and/or obstruction; determining the optimal RT volumes, techniques, and dose fractionation; and understanding the issues and needs regarding access to palliative RT as part of comprehensive palliative care for cancer management in their national context. **Target participants:** The participants nominated from RCA GPs will be 1 RO and 1 MP.
RAS6110	RTC	RTC on safety and quality management of radiotherapy	Pakistan	9-12 Dec. 2024	
RAS9092	MT	Final project Review meeting	Virtual	9-12 Dec. 2024	**Objective:** To assess the results, impact, challenges, and lessons learned from the implementation of project RAS9092 at national and regional level. **Target participants:** LCC, NPCs, A/NPCs, and senior members of national project teams. 21 participants from participating countries attended.

ANNEX 3

List of National RCA Representatives

Country	Name and Address
AUSTRALIA	**Ms Natascha Spark** International Affairs Senior Manager Australian Nuclear Science and Technology Organisation Locked Bag 2001, Kirrawee DC NSW 2232, AUSTRALIA
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CAMBODIA	**Mr Lek Vansopanha** Director Department of Nuclear Science and Technology Ministry of Mines and Energy Kingdom of Cambodia
CHINA	**Mr Huang Ping** Division Director Department of International Cooperation| China Atomic Energy Authority (CAEA) Contact Person: **Ms Qiujing Wu (Claire)** Project Officer China Atomic Energy Authority (CAEA)
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List of National RCA Representatives

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NEW ZEALAND	**Mr Mike Sim** Laboratories, Collections & Workshops Manager, GNS Science PO Box 30368, Lower Hutt 5040 New Zealand
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PALAU	**Mr Jeffrey Antol** Chief of Staff, Director, Bureau of Freign Affairs and Trade **Mr Jordan S. Yuri**
PHILIPPINES	**Mr Carlo A. Arcilla** Director, Philippine Nuclear Research Institute **Contact Person:** **Ms Ana Elena Lopo Conjares** Supervising Science Research Specialist Philippine Nuclear Research Institute (PNRI)

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List of National RCA Representatives

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THAILAND	**Ms Ampika Apichaibukol** Director, Strategy and Planning Department Office of Atoms for Peace (OAP) **Mr Yutthana Tumnoi (RCA Contact)** **Ms Benya Rajabhandaraks (NLO)** **Ms Chonrithon Boonprasop (NLA)**
VIET NAM	**Mr Tran Chi Thanh** President Viet Nam Atomic Energy Institute (VINATOM) Ministry of Science and Technology 59 Ly Thuong Kiet Street, Hoan Kiem District, Hanoi **Contact Person:** **Ms Tran Ngoc Hoan**
RCA Regional Office – Korea	**Mr Dae Ki, Kim** Director, RCA Regional Office Korea Atomic Energy Research Institute (KAERI) Daedeok-daero 989-111, Yuseong-gu, Daejeon (34057) Republic of Korea **Contact Person:** **Mr Mincheol Park** Head, Programme Division

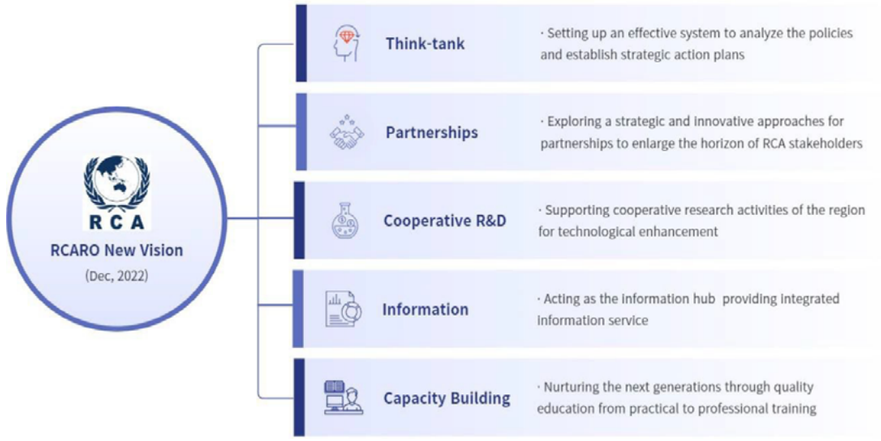
* For more information, please visit https://www.rcaro.org/states1.

ANNEX 4

RCARO 2023 Work Performance

Highlights

As part of the transition to the next 20 years in December 2022, RCARO set out its future vision and strategies under the following five strategic pillars:



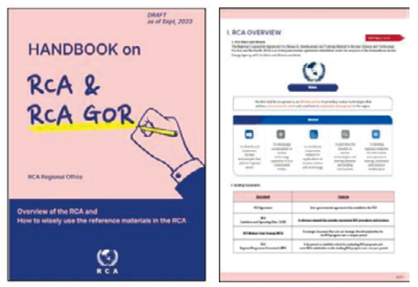
In 2023, RCARO supported the RCA according to each strategy and successfully carried out various activities.

1. Establishing the Asia-Pacific Nuclear Think-Tank for the RCA

In order to provide more effective support to the RCA, RCARO reformed its organizational structure and established the **"Policy and Information Centre"**. To strengthen the role of the "think-tank" of the RCA region, RCARO, with the support of this Centre, aims to assist the IAEA Secretariat, the RCA WGs/Committees, the RCA Chair and the Committee of Chairs, and the RCA NR meetings in providing resource materials and conducting policy analysis. Throughout 2023, RCARO provided assistance to and performed secretariat functions for the RCA GPs, the RCA Chairs' Committee and the IAEA.

The second amendment to the **"Practical Arrangements between the IAEA and the RCARO on Cooperation in the Performance of Secretariat Duties under the 2017 RCA"** was signed in September to continue effective cooperation in the performance of secretariat functions for the RCA.

According to the recommendation of the 45th RCA NRM, the RCARO drafted **a handy guidebook on the RCA and RCA GOR** for the RCA stakeholders. It provides comprehensive information on the RCA as a whole and on the specifics of key RCA procedures.



Handbook on RCA and RCA GOR

PA Signing Ceremony

RCARO 2023 Work Performance

2. Enlarging the Horizon of the RCA Stakeholders in the Region and Beyond

Based on the successful event held in November 2022, with the US DOE, the "Workshop on Accelerating the Adoption of EBeam/X-ray Technologies in Asia and the Pacific", the **RCARO developed the concept for the new partnership project with the US DOE** and reported to the 36th RCARO SAC meeting and 45th RCA NRM in May, 2023. The final project design was endorsed by the RCA in September, 2023.

This project will be implemented over the next five years (2024-2028) and aims to improve the quality of the environment and living conditions in the Asia-Pacific region by supporting the establishment of eBeam infrastructure and facilitating of its applications. **The First Project Coordination Meeting** was held in Bangkok, Thailand on 12-15 December 2023, with more than eighty (80) representatives from the twenty-one (21) RCA Government Parties, experts from the US, and the IAEA.

Project Coordination Meeting

In addition, under the partnership project with the **ASEAN Network of Regulatory Bodies on Atomic Energy (ASEANTOM)**, RCARO developed **visual manuals and handbooks to enhance the emergency preparedness and response (EPR) capabilities in the region**. These materials are expected to contribute to the promotion of accurate and rapid radiation monitoring and the dissemination of harmonized approaches throughout the region.

As a follow-up, **"Regional Training Course on Enhancing Technical Capabilities on Radioactivity Measurements for Environmental Radiation Monitoring during Radiation Emergencies"** was held from 21 to 24 August, 2023, training 14 participants from 6 countries. The course provided advanced theoretical and practical training on rapid and accurate radioactivity measurements during a radiological emergency.

Educational Materials Developed under the RCARO-ASEANTOM Partnership

Regional Training Course on Radiation Monitoring

3. Supporting the Technical Advancement of the RCA through R&D Cooperation

Through **RP02 and RP03**, the RCARO has supported **the cooperative research activities** of the RCA. This year, under both projects, Project Coordination Meetings and Technical Workshops were held inviting regional experts in the fields of air pollution treatment and radiotherapy. These events provided a forum for networking and knowledge/know-how sharing among the experts and facilitated R&D in relevant fields. As the RP02 will be completed by the end of 2023, the RCARO is drafting an achievement report of the project to promote and highlight the major outcomes and progress made in the RCA region. The report will be published in the first half of 2024.

4. Building up the RCA Integrated Information System

In 2022, the RCARO launched the **RCA Integrated Information System**, which aims to provide comprehensive information and data on the RCA as well as the overall status and trends of NS&T in the Asia-Pacific region. The RCA website has been reformed to provide four main functions: the RCA website, the NS&T Data Hub, the RCA E-CAMPUS, and RCARO e-Management.

The Practical Arrangements between the IAEA and RCARO signed in September expanded its cooperation on effective information/data information sharing on the RCA projects in order to provide a better information service on the RCA and its programme.

The Data Hub is also in the process of collecting information to provide relevant and comprehensive information on the NS&T of each GP. This is expected to make the data-hub a valuable resource platform for setting up future directions and strategies for the RCA, as well as designing future projects.

5. Nurturing the Next Generations through Quality Education Programs

Since its establishment, RCARO has conducted various capacity building activities and trained more than 1,300 professionals in the application of nuclear science and technology. The **RCARO Scholarship Programme** is one of them and aims to provide scholarships for Masters and PhD students to study and carry out R&D activities. Three leading educational institutes in Korea are cooperating with RCARO under this programme: KAIST, KINGS and UST. RCARO newly supported one student from SRL from KAIST course and five (MON, THA, INS (2), PHI) FOR KINGS course and two students from KINGS.

RCARO also launched a new Master's degree and Ph.D. scholarship programme in cooperation with the University of Science and Technology (UST), and accepted ten students to start their studies from spring semester 2024 .

2023 Work Performance Details

1. Taking on the Role of a Think-Tank for the RCA

1.1 Establishment of a Policy and Information Centre

At the International Symposium held in celebration of its 20th Anniversary last December, the RCARO announced its future vision to bring sustainable, innovative and inclusive growth to the region, and to serve as a think-tank for the RCA.

The RCARO was able to secure an additional budget from the Korean government and established the "Policy & Information Centre" to provide better and more effective support to the RCA. With thesupport of this Centre, the RCARO assisted the IAEA Secretariat, the RCA WGs/Committees, the RCA Chair and the Committee of Chairs, and the RCA NR meetings in providing resource materials and conducting policy analysis.

The second amendment to the "Practical Arrangements between the IAEA and the RCARO on Cooperation in the Performance of Secretariat Duties under the 2017 RCA" was signed in September to continue effective cooperation in the performance of secretariat functions for the RCA.

ANNEX 4

RCARO 2023 Work Performance

1.2 Support to the RCA Chair and Policy Meetings

RCARO assisted the IAEA and the RCA Chair in the preparation of the 45th RCA NRM and the 52nd RCA GCM and supported the preparation of the meeting agenda and background documents. In cooperation with the IAEA and GPs, RCARO prepared the 2022 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 reported to the 45th RCA NRM for approval.

RCARO also participated in the RCA Chairs' Committee meetings in March and July, and provided its views on the RCA policy issues.

1.3 Development of a Handbook on RCA and RCA GOR

During the 45th RCA NRM, it was recommended that the RCARO consider holding an introductory workshop and developing a comprehensive booklet for the RCA NRs to familiarize them with their roles and responsibilities.

In response to the recommendation of the 45th RCA NRM, the RCARO drafted a handy guidebook on RCA and RCA GOR for the RCA stakeholders. It provides comprehensive information on the RCA as a whole and on the specifics of key RCA procedures. Reflecting the comments from the NRs, the RCARO will prepare a final version and distribute it to the NRs and relevant stakeholders for their use.

In addition, the RCARO reported to the 52nd RCA GCM on its plans to organize a workshop for the RCA NRs in 2024.

2. Enhancing and Exploring Partnerships with Regional/International Organizations

2.1 Development of a Partnership Project/Activity with Relevant Organizations

The RCARO continued its efforts to develop partnerships with regional/international organizations in order to expand the RCA and provide more opportunities for the GPs.

Taking note of the recommendation of the 32nd RCARO SAC to seek possibilities for a follow-up activity/project to the RCA/UNOSSC project for continued support to the region, RCARO has explored opportunities for partnerships with other institutes/organizations for the development of a follow-up project on EBeam technology.

2.1.1 Development of a Follow-up Project/Activity on EBeam Technology

Based on the successful event with the US DOE, "Workshop on Accelerating the Adoption of EBeam/Xray Technologies in Asia and the Pacific" in November 2022, the RCARO developed the concept for the new partnership project with the US DOE which was endorsed by the 36th RCARO SAC and the 45th RCA NRM. The final project design was endorsed by the RCA via electronic communication in September 2023.

RCA-DOE Partnership Project:
Supporting the Adoption of Electron Beam Technology and its Applications in Areas of Food and Agriculture, Industry, Human Health and Environment Treatment

- Objective: to improve the quality of environment and living conditions of the Asia-Pacific region through supporting the eBeam infrastructure building and facilitation of its applications
- Countries: RCA Government Parties in Asia-Pacific Region
- Project Period: Five Years (2024-2028)
  - Start Date: January 2024
  - End Date: December 2028
- Total Estimated Budget: $2,403,265
  - NNSA ORS: $2,059,265
  - RCARO: $344,000
- Activities: Meetings, Workshops, Training Courses, Establishment of Data-base, Expert Missions, etc.

The First Project Coordination Meeting was held in Bangkok, Thailand, on 12-15 December 2023, with more than eighty (80) participants, including the representatives from the RCA Regional Office, National Project Coordinators of twenty-one (21) RCA Government Parties, experts from the US, and the IAEA. The meeting shared the status and needs of the region in regards to the adoption of the technology and facilitating its applications. Based on this, the meeting reviewed and established a detailed work plan for the next five years. The meeting also included a technical session on the trends in the technology use and a technical tour of the relevant facilities in the host country, Thailand.

2.2 Implementation of the RCARO/ASEANTOM Project

The RCARO has been implementing a partnership project with the ASEANTOM (ASEAN Network of Regulatory Bodies on Atomic Energy) entitled "Enhancing emergency preparedness and response capabilities through building technical capacity in radiation monitoring and dose assessment following the nuclear and radiological emergencies" since 2020.

Led by the OAP (Office of Atoms for Peace) of Thailand and KRISS (Korea Research Institute of Standards and Science), 10 ASEAN countries are participating in the project.

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

2.2.1 Development of Educational Materials

According to the work plan, the RCARO, in collaboration with KRISS, developed three visual manuals and two handbooks to enhance the EPR capabilities of the region. These materials are expected to contribute to the promotion of accurate and rapid radiation monitoring and the dissemination of harmonized approaches throughout the region.

Visual Materials
- Radioactivity analysis of gamma-emitting radionuclides of environmental samples in a nuclear or radiological emergency (https://youtu.be/1GekRk1jW70)
- counter for measuring tritium of environmental samples in a nuclear or radiological emergency (https://youtu.be/e4l2dyHqj-w)
- Tritium radioactivity analysis of environmental samples in a nuclear or radiological emergency (https://youtu.be/a70DiQlQfR4)

Handbooks
- Radioactivity analysis of gamma-emitting radionuclides of environmental samples in a nuclear or radiological emergency
- Radioactivity analysis of beta-emitting radionuclides of environmental samples in a nuclear or radiological emergency

In addition, the RCARO participated in the 10th Annual Meeting of ASEANTOM in August and presented on the progress of the project.

2.2.2 Implementation of Regional Training Courses

Two regional training courses were conducted in 2023. An online training course entitled "Online Training Course on Enhancing EPR Capabilities in ASEAN Region in Radiation Monitoring and Dose Assessment" was held on 15-24 February 2023 via the RCA E-CAMPUS. A total of 48 trainees from 6 countries completed the course.

"Regional Training Course on Enhancing Technical Capabilities on Radioactivity Measurements for Environmental Radiation Monitoring during Radiation Emergencies" was held on 21-24 August 2023, in Daejeon, Korea, in

cooperation with KRISS. This course provided the participants with theoretical and advanced knowledge on radiation monitoring, as well as practical training to improve on-site capabilities in the event of radiological emergencies. A total of 14 participants from 6 ASEAN countries working in regulatory bodies, technical support organizations and/or relevant competent authorities were trained.

2.2.3 Holding a Project Review Meeting

The RCARO organized a Mid-term Review Meeting in conjunction with a Technical Workshop in Seoul and Daejeon, Korea, on 6-8 November 2023, inviting NPCs from participating countries and relevant experts. The meeting reviewed project achievements, set up a work plan for 2024, and discussed the national status and future needs/priorities. A technical workshop was held in conjunction with the meeting to share technical expertise and issues/trends in radiation monitoring and dose assessment.

During the meeting, an on-site tour and technical seminars were provided at various radiation monitoring facilities in Korea.

2.3 Implementation of a Joint Workshop with the ARCCNM

Since 2008, the RCARO has supported a 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 for the advancement of nuclear medicine in these countries. In 2023, the RCARO supported the trainees participating in the training on 3-4 November, in Korea and provided an opportunity for young professionals to present selected papers and receive training on the latest advances in nuclear medicine.

2.4 Participation in the FNCA Coordinators Meeting

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

Representing the RCA, the RCARO participated in the 23rd Coordinators Meeting of the Forum for Nuclear Cooperation in Asia on 21 June, and delivered a presentation on the RCA activities and the progress of the RCA-FNCA cooperative activities.

3. Expanding Support for the Benefit of the Government Parties

3.1 Implementation of RAS9092

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 to establish adequate emergency preparedness and response procedures for category II and III facilities, using a graded approach. Funded by the Korean Government, the project is scheduled to run 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 as a result of the COVID-19 pandemic.

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

3.1.1 Implementation of a Mid-Term Review Meeting

The Mid-term Review Meeting was held in Malaysia on 13-17 February 2023 to review the progress of the project at the national and regional levels, and to discuss and agree on follow-up and future activities.

It was attended by the LCC and NPCs from 14 countries and experts from the IAEA. The meeting noted that the project was on track despite the pandemic situation of Covid-19 and its impact on the work plan.

3.2 Implementation of Research Projects

3.2.1. Implementation of RCARP02 on Air Quality and Environmental Impact Assessment of Industrial Activities in the Region

The 2n^{d} phase of the project is being implemented with the aim of improving the quality of the environment by providing appropriate pollutant data to researchers and relevant stakeholders. Ten (10) GPs are participating in the project: AUL, NZE, ROK as Agreement Holders and CPR, INS, MAL, MON, PAK, THA and VIE as Contract Holders. NEP could not continue participating in the project in 2023 due to the lack of research progress in 2022, as reviewed by the RRC.

According to the work plan, the Research Coordination Meeting was held on 17-19 May in Bali, Indonesia, inviting 18 participants including the Chief Scientific Investigators (CSIs) from the participating countries, Technical Officer and experts, to review and assess the project progress and to discuss the work plan for 2023-2024. The meeting concluded that, despite some delays caused by the COVID-19 pandemic, the project was on track to meet the project performance indicators set at the beginning of the project.

In conjunction with the meeting, Technical Workshop on Nuclear Analytical Techniques for Environmental Pollution Monitoring and Impact Assessment was held to share knowledge and experience on the latest R&D trends, success stories and emerging challenges.

According to the Work Plan, all CSIs submitted final reports on the research activities carried out in 2021-2023 for review by the RRC. The RCARO will prepare an achievement report by integrating the results/outputs of the project at national and regional level. In cooperation with the Technical Officer and the CSIs, the RCARO will publish the final version in the first half of 2024 to promote and highlight the achievements and progress made in the region through the project.

3.2.2. Implementation of RCARP03 on Closing the Gap in Access to Radiotherapy in RCA Government Parties

With the aim of improving cancer planning and scaling up radiotherapy services by providing evidencebased information on the radiotherapy services, the project started in 2022 and will run for three years until 2024.

Six (6) GPs participated in the project: AUL and PHI as Agreement Holders and INS, MAL, MON, and THA as Contract Holders. ROK and VIE could not continue participating in the project in 2023 due to difficulties in collecting the necessary data and lack of human resources.

The Research Coordination Meeting was held on 22-24 May in Bali, Indonesia, where 19 participants, including the Chief Scientific Investigators (CSIs) of the participating countries, the Technical Officer and experts were invited to review the project progress and discuss the work plan for 2023-2024. The meeting recognized the importance of bringing the project results to the attention of policy makers for the establishment of new radiotherapy centres in the region, and agreed to make an achievement report summarizing the project outcomes and achievements.

In cooperation with the AUL CSI, TO and an invited expert, Technical Workshop on Cancer Problem and Radiotherapy Utilization in Asia & Estimating Core Investment required was held in conjunction with the meeting. Practical sessions on 1) Calculation of the radiotherapy utilization rate 2) Estimation of core investment required for radiotherapy were conducted to analyze the gap in the radiotherapy services in the region.

ANNEX 4

RCARO 2023 Work Performance

According to the work plan, all CSIs submitted annual progress reports on the research activities carried out in 2023 for review by the RRC. Based on the RRC's review, the RCARO will make the necessary financial contributions to the Research Contract Holders for their continued research in 2024.

3.2.3. Initiation of a New R&D Programme

As part of RCARO's efforts to increase the scale of the research component, the RCARO submitted a proposal to the Korean government in 2022 and secured additional funding to further expand R&D in the use of nuclear technology to launch two R&D projects in 2024;

- Development of an AI-based Automatic Detection Programme and Critical Technology Elementsfor Portable X-ray Diagnostic Devices
- Collaborative Research and Technical Support for Water Purification Using E-beam Technology

4. Provision of Information Service and RCA Promotion

4.1 Providing RCA information through the Integrated Information System

In 2022, the RCARO reformed the website and launched the "Integrated Information System". The system consists of the RCA website for general information about the RCA, RCA E-Campus for online education and training, ROEM for the management of the RCARO projects/activities and DATA-HUB as an archive of information and data related to nuclear science and technology in the region.

In accordance with the recommendation of the 41st NRM to upload the RCA project documents on the RCA website, RCARO has continued to collect and update information and documents on the RCA meetings, projects and news.

For a more effective flow of information, the second amendment to the "Practical Arrangements between the IAEA and the RCARO on Cooperation in the Performance of Secretariat Duties under the 2017 RCA" includes a new clause for the RCARO to receive documents and materials resulting from RCA projects and activities from the IAEA for archiving on the RCA website. In close coordination with the IAEA, the PAC and the LCCs/NPCs, the RCARO has collected available information and documents related to the RCA programme and uploaded them to the RCA website.

4.2. Publication of the Newsletters

A meeting of the Editorial Advisors and RCARO was held in January 2023 to identify the topics and content of the 2023 Newsletter. A provisional plan was set for the 2023 issues.

According to the plan, RCARO published the 4th, 5th and 6th issues of the RCA Newsletter, in May, September and December respectively. The newsletters featured information on the key outcomes of the RCA policy meetings and projects, columns on insights and perspectives on the RCA or issues related to NS&T, contributed by the NRs, LCCs and relevant experts. The Newsletters were distributed to over 750 subscribers and uploaded on the RCA website.

4.3. Participation in Regional/International Events

The RCARO participated in the 15th Vietnam Conference on Nuclear Science and Technology (VINANST-15) held in August, and showcased posters on the RCA and its 50 years of achievements at

the event. The RCARO also participated in various domestic events in Korea to increase its visibility, including the Korea Nuclear Society Conference held in May.

5. Assistance to the Government Parties in Human Resources Development

5.1. Capacity Building through the Korean Institutes/Universities

5.1.1. Implementation of RCARO Scholarship Programme

With the aim of nurturing regional professionals in the field of nuclear science and technology by providing opportunities to young generations of the RCA to study in renowned universities in Korea, the RCARO has implemented the RCARO Scholarship Programme.

This year, one student (SRL) from KAIST and five students (MON, THA, INS (2), PHI) from KINGS were newly granted with scholarships. Two students from KINGS completed a summer internship at the RCARO.

*KINGS: KEPCO International Nuclear Graduate School
KAIST: Korea Advanced Institute of Science and Technology

In addition, aiming to assist the GPs in capacity building in nuclear science and technology, the RCARO launched a new Master's and Ph.D programme in various fields of nuclear science and technology, in cooperation with the University of Science and Technology (UST), a university of several national research institutes in Korea. In 2023, the programme accepted ten students to start their studies from 2024 spring semester.

5.1.2. Implementing Capacity Building Activities on Radiation Technology

The RCARO has been implementing regional training courses in various fields of radiation technology in cooperation with Korean institutes.

The RCARO hosted the Workshop on Enhancing Capability for Developing, Using and Maintaining Radiation Equipment from 7 to 9 March 2023, inviting 12 participants from 6 countries. The workshop provided knowledge and know-how on the use and maintenance of various radiation equipment and facilities. The participants were divided into sub-groups according to the equipment type and participated in site visits to Korean institutes.

Based on the results and discussions during the workshop, the RCARO hosted two expert missions to the Philippines and Thailand. The dispatched experts participated in policy meetings and delivered theoretical lectures at national workshops. On-site consultations were conducted at the facilities to respond directly to the pressing issues and identify the best solutions.

5.2. Provision of Online Training through the RCA E-CAMPUS

The RCARO operates an e-learning platform on the RCA website and has developed a number of elearning modules to provide extended learning opportunities for RCA stakeholders.

In 2023, open courses on nuclear medicine and radiation safety were available on the RCA E-CAMPUS. One closed online training course was provided in the field of EPR capabilities.

5.3. RCARO Fellowship Programme

The RCARO Fellowship Programme for 2020 and 2021 was postponed due to outbreak of the COVID-19 pandemic. As the situation has been resolved, three fellows from Cambodia, Pakistan, and Laos were invited for two months respectively from November 2022, and contributed to the implementation of various RCARO cooperative activities.

ANNEX 4

RCARO 2023 Work Performance

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

Objectives	Activities	Timeline				Indicators	Status
		Q1	Q2	Q3	Q4		
1. Taking on the Role of a Think-Tank for the RCA	1.1 Establishment of a Policy and Information Centre	■				• Establishment of a Policy and Information Centre	Completed
	1.2 Support to the RCA Chair and Policy Meetings	■	■	■	■	• Supporting the RCA Chair • Supporting preparations and operations of the RCA Policy Meetings	Completed (RCARO supported the 45th RCA NRM, 52nd RCA GCM and participated in RCA Chairs' Meetings (regular/adhoc).)
	1.3 Development of a Handbook on RCA and RCA GOR			■	■	• Developing a handy guidebook on the RCA and the RCA GOR	Completed
2. Enhancing and Exploring Partnerships with Regional/ International Organizations	2.1 Developing a Partnership Project/Activity with Relevant Organizations			■	■	2.1.1. Development of a Follow-up Project/Activity on EBeam Technology	Completed (A new partnership project with the US DOE approved)
					■	2.1.2. Launching of the Project	Completed (First project coordination meeting held)
	2.2 Implementation of the RCARO-ASEANTOM project	■	■			2.2.1. Development of Educational Materials	Completed (three visual manuals and two handbooks on radiation monitoring developed)
		■		■		2.2.2. Implementation of Regional Training Courses	Completed in Feb. and Aug.
					■	2.2.3. Holding a project review meeting	Completed in Nov.
	2.3. Implementation of a Joint Workshop with the ARCCNM				■	2.3.1. Supporting experts for participation in the workshop	Completed in Nov.
	2.4. Participation in the FNCA Coordinators Meeting		■			2.4.1. Participation in the FNCA coordinators meeting	Completed (RCARO participated in the meeting on 26 June, Japan.)
3. Expanding Support for the Benefit of the Government Parties	3.1 Implementation of RAS9092	■				3.1.1. Implementation of a Project Mid-term Review Meeting	Completed in Feb.
	3.2 Implementation of Research Projects	■	■	■	■	3.2.1. Implementation of RCARP02 • Holding a Research Coordination Meeting • Submission of Final Reports	Completed (Research Coordination Meeting was held in May and all final reports were submitted on time.)
		■	■	■	■	3.2.2. Implementation of RCARP03 • Holding a Research Coordination Meeting • Submission of Annual Progress Reports	Completed (Research Coordination Meeting was held in May and all progress reports were submitted on time.)
		■	■	■	■	3.2.3. Initiation of a New R&D Programme	Completed (Two new R&D projects started in 2023.)

6. Financial Report on "Other Cooperative Activities"

Project Name	Budget(EUR)
RCARO Managed Projects-RCARP02, RCARP03	95,916
RCARO/US DOE Partnership Project	22,640
ARCCNM Partnership Project	25,930
RCARO-ASEANTOM Partnership Project	37,042
TOTAL	**181,528**

For further details, please visit the website: https://www.rcaro.org/activities.

REGIONAL COOPERATIVE AGREEMENT

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