A brief history of the RCA

50 years of regional cooperation in nuclear science and technology

(1972-2022)

RCA

BRINGING PROSPERITY TO THE ASIA-PACIFIC

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List of acronyms

BARC	Bhabha Atomic Research Centre, India
CT	Computed tomography
CRT	Conformal radiotherapy
FNCA	Forum for Nuclear Cooperation in Asia
FRN	Fall-out radionuclide technology
HDR	High Dose Rate
IAEA	International Atomic Energy Agency
IBA	Ion Beam Analysis
IGBT	Image-guided brachytherapy
IMRT	Intensity-modulated radiation therapy
IPA	Philippines and India Agreement for Cooperation in the Peaceful uses of Atomic Energy
JAERI	Japan Atomic Energy Research Institute
JSNDI	Japanese Society for Non-destructive Inspection
LCC	Lead Country Coordinator
LDR	Low Dose Rate
MAED	Model for Analysis of Energy Demand
NAA	Neutron Activation Analysis
NDT	Non-Destructive Testing
PET	Positron emission tomography
RCA	Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology
RCA GCM	General Conference Meeting of the representatives of the parties to the RCA
RCA SP	RCA State Parties
RCA MTS	RCA Medium Term Strategy
RCA NRM	Regional Meeting of the representatives of the parties to the RCA
RCARO	RCA Regional Office
RCA PAC	RCA Programme Advisory Committee
RCA WGM	Working Group Meetings of the representatives of the parties to the RCA
RRU	Regional Resource Unit
RVNRL	Radiation vulcanization of natural rubber latex
SBRT	Stereotactic body radiation therapy
SISIR	Singapore Institute for Standards and Industrial Research
SPECT	Single photon emission computed tomography
TCDC	Technical Cooperation among Developing Countries
UNDP	United Nations Development Programme
WASP	Wien Automatic System Planning Package
XRF	X-ray Florescence Analysis

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50 years of regional cooperation in nuclear science and technology (1972–2022)

RCA is an inter-governmental agreement established under the auspices of the IAEA for regional cooperation in the peaceful use of nuclear science and technology and for socio-economic development in the countries that are parties to the agreement.

Introduction

A new era of regional cooperation among the Member States of the International Atomic Energy Agency (IAEA) in the Asia and the Pacific region began in 1972, with the birth of the Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (RCA). From its modest beginning with just four State Parties in 1972, over the past 50 years, it has expanded to an entity with 22 members and has contributed to the well-being of the populations of Asia and the Pacific region (South Asia, East Asia, Southeast Asia and the Pacific) through the use of nuclear techniques for socio-economic development.

173 IAEA Technical Cooperation Projects with the RCA

10 000+ counterparts trained

650+ Regional Training Courses

560+ meetings and workshops supported a network of

7 000 professionals

4 500 experts and lecturers recruited to provide knowledge, experience and skills for the safe, effective and efficient use of nuclear technologies in support of sustainable social and economic development

These successes can be attributed to the people driving the RCA: the National RCA Representatives, the RCA Regional Office, the Working Groups, the Programme Advisory Committee, Lead Country Coordinators, National Project Counterparts, the IAEA RCA Focal Persons and everyone involved through the IAEA TC Programme. Through the years, as a team, they have consistently pursued the ideals set by the founders and transformed those according to the evolving environment of the region. With its substantial intellectual, economic and technological strengths, the RCA has infinite opportunities to lead and further demonstrate innovative approaches. This report commemorates the many milestones and achievements in the history of the RCA, as well as key policies and strategies adopted during this time.

The beginning

The origins of regional cooperation in nuclear science and technology in the Asia and Pacific region could be traced to a five-year agreement among India, the Philippines, and the IAEA, which entered into force in 1964

Under this agreement, which was known as IPA (India, Philippines and the Agency), India provided a neutron crystal spectrometer for installation at the 1 MW (thermal) research reactor of the Philippine Atomic Research Centre. The IAEA financed the transportation of equipment and personnel. In addition to India and the Philippines, Indonesia, the Republic of Korea, the People's Republic of China and Thailand also benefitted from the IPA of 1964. It is worth noting that the Chair of the IPA Committee was the late Raja Ramanna, who later became the Chairman of the Atomic Energy Commission of India [1, 2].

The success of the IPA of 1964 led to a more comprehensive agreement between India and the Philippines under the auspices of the IAEA which entered into force in August 1969. The contracting parties agreed to a) cooperate in planning and executing collaborative programmes involving the research reactors of the Philippine Atomic Research Centre and BARC of India, b) cooperate in the application of radioisotopes in medicine, agriculture, industry, engineering, and general scientific research, and c) continue the activities initiated under IPA of 1964 in using the neutron crystal spectrometer for studies on solid state and nuclear physics [3].

It soon became apparent that many Member States of the IAEA in Asia and the Pacific region could benefit from similar collaborative programmes in the peaceful uses of nuclear technology. The IAEA convened a meeting in Manila, Philippines, in March 1969 and another meeting in Bangkok, Thailand in July 1970, to examine the feasibility of creating a framework for promoting regional cooperative projects. Based on the recommendations of these meetings and consultations carried out by the then Director General of the IAEA, Sigvard Eklund with the Governments of the IAEA Member States in South Asia, Southeast Asia and the Far East, it was decided to formulate a regional agreement for this purpose. The *Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology*[1] was formulated under the auspices of the IAEA in 1971 for acceptance by Member States [4].

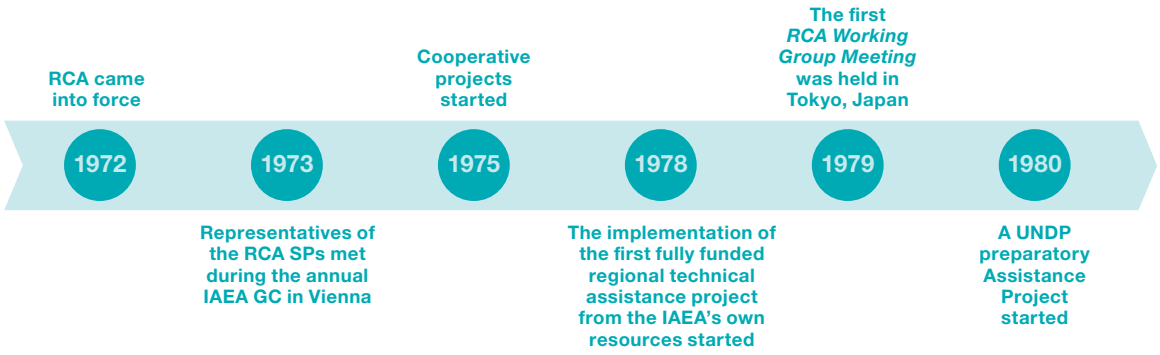
[1] IAEA INFCIRC/167

RCA came into force on 12 June 1972 in accordance with its Article IV (Section 10), upon IAEA receiving the notification of acceptance by India (7 June 1972) and Vietnam (12 June 1972). According to Section 11 of Article IV, the agreement was to be in force for five years.

The following sections describe the changes in the management of the RCA, the RCA projects that were implemented, the achievements, the expansion of the parties to the RCA, and the IAEA staff involved in the RCA programme, during each of the past five decades.

The first decade (1972–1981)

Major milestones and achievements



RCA management

From the inception of the RCA, the representatives of the RCA State Parties met during the annual IAEA General Conference to discuss matters related to the implementation of the agreement. The first of such meetings was held during the IAEA General Conference in Vienna, Austria in 1973. Representatives of India, Indonesia, the Philippines, Singapore, Thailand, Viet Nam and the relevant staff members of the IAEA participated. Representatives of Australia, Bangladesh, Japan, the Republic of Korea, Malaysia, and New Zealand attended as observers.

The RCA General Conference Meeting (RCA GCM) of 1978 decided to hold additional annual meetings in one of the Member States for a more detailed discussion on project implementation and other outstanding issues. These meetings held a few months before the annual IAEA General Conference meetings were called *RCA Working Group Meetings (RCA WGMs).* The first of such meetings was held in Tokyo, Japan in October 1979. Representatives of nine RCA State Parties (Australia, Bangladesh, India, Indonesia, Japan, the Republic of Korea, Malaysia, the Philippines, and Thailand) together with H. Kakihana, the Deputy Director General of the IAEA Department for Research and Isotopes, and Eugene Fowler, the RCA Coordinator, attended the meeting where they reviewed the progress of the ongoing RCA projects and proposals for future projects [5, 6].

The RCA was extended to another five years in 1977.

12 SPs joined the RCA from 1972–1981

India (1972)
Viet Nam (1972)
Singapore (1972)
Indonesia (1972)
Thailand (1973)
Bangladesh (1974)
The Philippines (1974)
The Republic of Korea (1974)
Malaysia (1975)
Sri Lanka (1976)
Australia (1977)
Japan (1978)

RCA projects

The initial focus of the RCA was on organizational and administrative matters associated with the implementation of the agreement. The establishment of cooperative projects commenced in 1975. Based on the needs of Member States, the highest priority was given to the training of personnel in the medical use of radioisotopes, and in food and agriculture. The first regional project under RCA was a Coordinated Research Project on the use of ionizing radiation for the preservation of fish and fishery products [4].

The other Coordinated Research Projects implemented during this period were on improving legume grain production, improving domestic buffalo production, health-related environmental issues, material sciences, industrial isotope and radiation applications, maintenance of nuclear instrumentation, hydrology, and sedimentology [7].

At the meeting of the representatives of the State Parties to the RCA during the IAEA General Conference held in Rio de Janeiro, Brazil in 1976, it was decided that over the next five-year period of the RCA (1977–1982), 'regional co-operation must be directed more toward solving industrial problems of the countries in the region, as these will assume primary importance toward the end of the century. In 1977, the IAEA Board of Governors approved a request for a regional technical assistance project for industrial isotopes and radiation applications. The implementation of this project commenced in April 1978. This was the first regional technical assistance project funded from the IAEA's own resources [4].

The first regional project under RCA was a Coordinated Research Project on the use of ionizing radiation for the preservation of fish and fishery products.

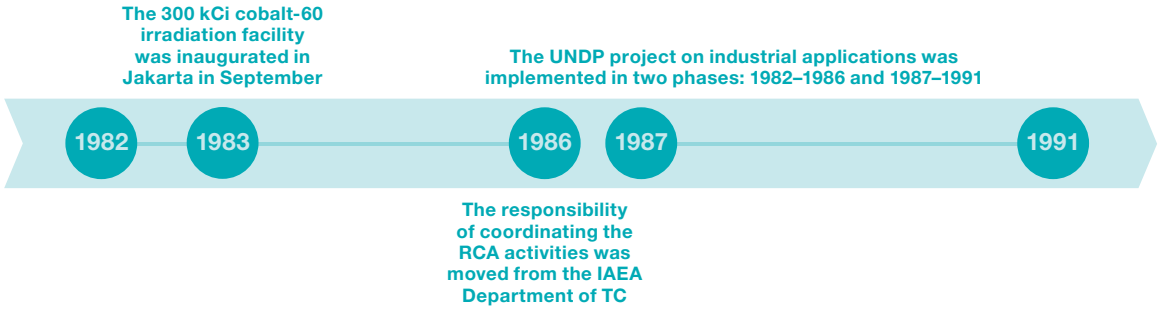
This period also saw the initiation of activities to obtain the support of the United Nations Development Programme (UNDP) to expand the activities in industrial applications of radioisotopes and radiation implemented with IAEA support. A UNDP Preparatory Assistance Project initiated for this purpose commenced in August 1980 and was completed in March 1982 [8].

IAEA staff

During this period, the RCA Secretariat was under the Department of Research and Isotopes of the IAEA (currently the Department of Nuclear Sciences and Applications). The IAEA appointed David Richman (1972–1975), Eugene Fowler (1975–1980), and Masatoshi Kobayashi (1980–1983) as RCA Coordinators during the period 1972 to 1983. [5] Eugene Fowler was later appointed as the Project Director and the Chief Technical Adviser of the UNDP Regional Industrial Project while H. Kakihana served as the Deputy Director General and the Head of the Department of Research and Isotopes.

The second decade (1982–1991)

Major milestones and achievements



RCA management

The representatives of the State Parties continued to meet annually for half a day during the IAEA General Conferences and in one of the State Parties for a longer period, to review the progress of implementation of the RCA projects. Each State Party appointed a person designated as the National RCA Coordinator to coordinate RCA activities.

The Regional Cooperative Agreement of 1972 was extended for another five years in 1982. A more comprehensive agreement was introduced in 1987.[2]

The responsibility of coordinating the RCA activities was moved from the Department of Research and Isotopes to the Department of Technical Cooperation of the IAEA in 1986.

3 SPs joined the RCA from 1982–1991

Pakistan (1982)
The People's Republic of China (1987)
Mongolia (1992)

[2] Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology, 1987-INFCIRC/167Add. 13. The cover page of this document erroneously referred to this as the Third Extension of the 1972 Agreement. This error was corrected by INFCIRC/167/Add 13.Mod.1.

RCA projects

Twenty-five RCA projects implemented under the IAEA technical cooperation programme were initiated during this period, comprising two projects each in agriculture, environment and energy planning; six projects in the industrial sector; seven projects in the human health sector, three projects on research reactors, and one project each on nuclear instrumentation, radiation protection, and development of TCDC (Technical Cooperation among Developing Countries). The agricultural projects focused on grain legumes and food irradiation; the environmental projects on isotope hydrology, and marine contaminants and sedimentation; the health sector in areas of brachytherapy, radioimmunoassay, nuclear imaging, and radiation sterilization of tissue grafts. Seven projects out of 25 were completed during this period [9].

UNDP project on industrial applications

The RCA project on industrial applications of nuclear technology implemented during this period with the financial support of the UNDP deserves a special mention. The overall objective of the project was to increase the use of nuclear technology in regional industries and, through this, further regional economic development and industrial competitiveness. The total budget of the project was US $12.5 million. The contributions of the participating State Parties, the UNDP, and participating industries were US $6.42 million (52%),

Participants of the 8th RCA Working Group Meeting with Byong-Whi Lee, RCA Chair (seated 5th from left), Noramly Bin Muslim, DDG-TC (seated 5th from right) and Peter Airey, RCA Coordinator (4th from right), The Republic of Korea, 1986. (Photo: IAEA)

Participants of the First NDT Training Course in Tokyo, 1983. (Photo: Norikazu Ooka)

US $4.38 million (35%), and US $1.65 million (13%) respectively. The project was implemented in two phases, with Phase 1 (RAS/79/061) from 1982 to 1986 and Phase 2 (RAS/86/073) from 1987 to 1991.

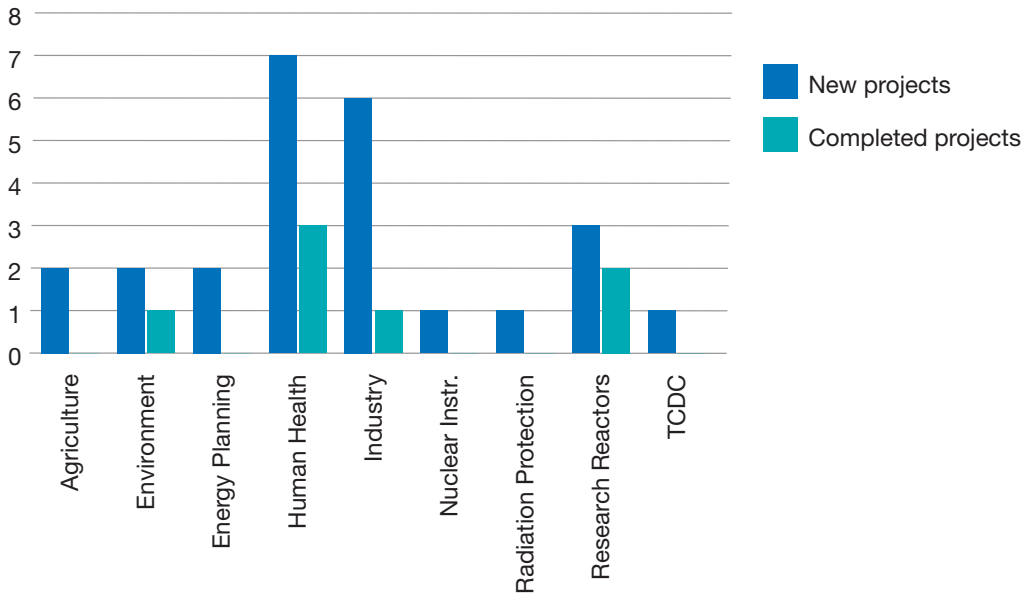
RCA State Parties (Australia, Bangladesh, India, Indonesia, Japan, the Republic of Korea, Malaysia, Pakistan, the Philippines, Singapore, Sri Lanka, and Thailand) participated in the project.

The project comprised five main components, namely: industrial tracer applications, non-destructive testing (NDT), nucleonic control systems, radiation processing, and maintenance of nuclear instruments. RCA State Parties that are well advanced in these technologies played leadership roles in implementing the project. The Bhabha Atomic Research Centre of India contributed to the component on industrial tracer applications by conducting training programmes and demonstrations. Under the component on non-destructive testing, advanced training courses on radiography and ultrasonic inspection were carried out at the SISIR and at the Japanese Society for Non-destructive Inspection in Tokyo.

The world's first workshop on manufacturing technology for NDT specimens was held at the Japanese Society for Non-destructive Inspection

The world's first workshop on manufacturing technology for NDT specimens was held at the Japanese Society for Non-destructive Inspection in Tokyo.

RCA projects in 1982–1991



in Tokyo. At the same time, education and training under the IAEA guidance related to the certification of NDT personnel and other activities were held in Malaysia, Thailand, and Vietnam.

A semi-commercial irradiation plant was constructed at the Centre for Application of Isotope and Radiation in Jakarta as a regional centre for radiation processing. This 300 kCi cobalt-60 irradiation facility was inaugurated in September 1983. The Rubber Research Institute of Malaysia and the Takasaki Radiation Chemistry Research Establishment of the JAERI also contributed to this project, mainly in research on radiation vulcanization of natural rubber latex (RVNRL).

A demonstration nucleonic control system for use in paper production was installed at the Siam Kraft Paper Company in

It was estimated that a total of US $190 million was invested (US $40 million from the public sector and US $150 million from the private sector) over five years as a result of this project.

Thailand, and training courses were held in Japan and Thailand. A thickness gauge for use in steel production was installed at the Bokhara Steel Plant, India, and was used in training and demonstration courses held in India and Japan. Australia provided leadership and expertise for the transfer of nucleonic control technology and methods to the minerals industry. Under the component on nuclear instrumentation, workshops and on-the-job training courses were held in Japan, in cooperation

with the Japan Atomic Industrial Forum and the Japanese industry.

It was estimated that a total of US $190 million was invested (US $40 million from the public sector and US $150 million from the private sector) over five years as a result of this project. The investment in radiation technology alone was US $117million [8,10,11].

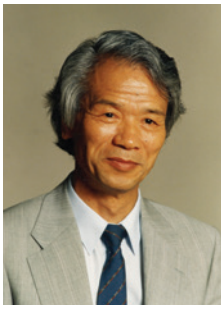
RCA Chairpersons

M. Ghazali (Malaysia), Anwar Hossain (Bangladesh), P.K. Bhatnagar (India), Byong-Whi Lee (the Republic of Korea), K.G. Dharmawardena (Sri Lanka), Wang Chuanying (Peoples' Republic of China), David Cook (Australia), Suchat Mongkolphantha (Thailand) and Nguyen Tien Nguyen (Viet Nam) served as RCA Chairpersons during this period.

S.P. Kasemsanta, the Project Coordinator of the UNDP Industrial Project (second from the left) and staff from Australia and the Philippines visiting an analytical laboratory during a Training/Demonstration Course (Photo: IAEA Bulletin).

Noramly Bin Muslim
IAEA Deputy Director General – TC

John Easey
RCA Coordinator



Sueo Machi
RCA Coordinator

Manoon Aramrattana
Coordinator RCA/ UNDP Project

IAEA staff

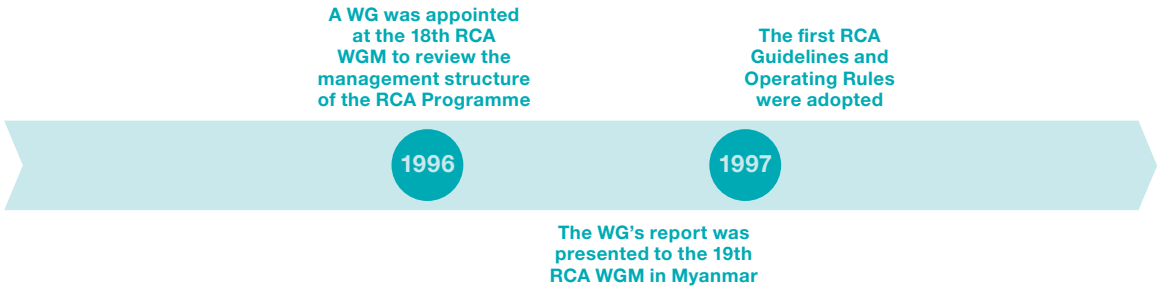
Masatoshi Kobayashi (1980–1983) and Sueo Machi (1983–1986) functioned as RCA Coordinators during this period while the RCA Secretariat was in the Department of Research and Isotopes. Sueo Machi was later appointed as the Deputy Director General and Head of the Department of Research and Isotopes of the IAEA. He was also the first coordinator of the Forum for Nuclear Cooperation in Asia (FNCA) established in 2000, and played a key role in establishing collaboration between FNCA and RCA. Maurizio Zifferero was the Deputy Director General and the Head of the Department of Research and Isotopes.

After the secretariat of the RCA programme was transferred to the Department of Technical Cooperation in 1986, Peter Airey (1986–1990) and John Easey (1990–1995) served as RCA Coordinators. John Easey made an unparalleled contribution to the advancement of the RCA. He was responsible for developing the RCA Profile in 2010, served in several RCA Working Groups, and remained a very active member of the RCA family afterwards. He was a member of the expert panel that prepared the RCA Strategic Priorities for 2012–2017 and was the Chair of the RCA Programme Advisory Committee (PAC).

Noramly Bin Muslim was the Deputy Director General and Head of the Department of Technical Cooperation during 1986–1992. Eugene Fowler served as the Project Director and the Chief Technical Adviser of the UNDP Regional Industrial Project. A. Tajuddin of Malaysia served as the Coordinator of the project until 1988 and Manoon Aramrattana of Thailand was the Coordinator from 1988 until 1991. Pham Duy Hien of Viet Nam served as the Chief (regional) Technical Officer of the project and was stationed in Indonesia. Wandowo of Indonesia served as a long-term expert on tracer technology.

The third decade (1992–2001)

Major milestones and achievements



RCA management

A transformation in the RCA management structure took place during this decade. The 18th RCA Working Group Meeting (RCA WGM) held in 1996 in the Peoples' Republic of China, appointed a working group to review the management structure of the RCA Programme and develop proposals for the future. National RCA Coordinators of Indonesia, Japan, Malaysia, New Zealand, Pakistan, the Philippines, and Sri Lanka were members of the working group, which was chaired by John Rolland, the National RCA Coordinator of Australia. Two of the working group members, Carlito Aleta (The Philippines) and Prinath Dias (Sri Lanka), later served as IAEA RCA Coordinators.

The Working Group met in Vienna on 11 to 13 September 1996 and its report was presented to the 19th RCA WGM held in Myanmar in March 1997. The specific issues discussed were, a) mechanism for new project proposals, b) project review and reporting, c) RCA WGMs, RCA GCMs, and the RCA Annual Reports, d) project implementation, e) IAEA-RCA interaction, and f) increased regional management and coordination. The working group made 12 recommendations, some of the more notable ones are given below.

It was recommended that in the future, only a Member State (i.e., an RCA State Party) should be able to table a new project proposal. It was also recommended that the National Coordinators Meetings for each project assume the responsibilities of the Project Committee, as set out in Article VI of the RCA Agreement, and that the focus of the RCA WGMs should be on policy issues rather than the review of RCA projects. Another recommendation was on improving coordination to avoid duplication of RCA and non-RCA regional projects. The working group also recommended the development of a mechanism for implementation of regional activities by RCA State Parties

2 SPs joined the RCA from 1992–2001

New Zealand (1997)
Myanmar (1994)

Participants of the 15th RCA Meeting of RCA National Representatives with Carlito Aleta, RCA Chair (extreme left), Qian Jihui DDG-TC (centre), and John Easey, RCA Coordinator (extreme right) seated in the first row, Philippines, 1993. (Photo: IAEA)

(i.e., State Parties). Commencement of RCA projects fully funded by the Member States, or a non-Agency source at any time within the biennial programming cycle was also a recommendation. Another recommendation was to station a senior RCA Representative in the region by January 2000 [12].

The first RCA Guidelines and Operating Rules were adopted during this period (RCA GCM of 1997). Other developments that took place during this period include the introduction of Lead Country Coordinators and RRUs to the RCA programme. There were some changes in the terminology as well, to improve alignment with the RCA Agreement of 1987. The RCA National Coordinators were renamed RCA National Representatives and RCA Working Group Meetings (WGMs) were renamed Regional Meetings of RCA National Representatives. (RCA NRMs)

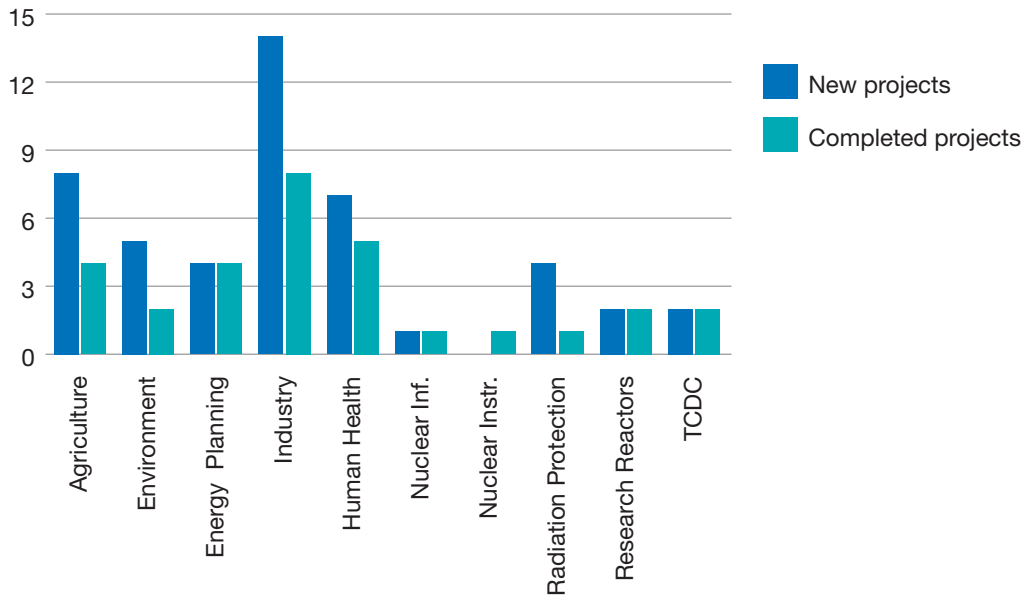
The Regional Cooperative Agreement of 1987 was extended to another five years in 1992 and in 1997.

RCA projects

Forty-seven RCA projects implemented under the technical cooperation programme of the IAEA were initiated during this period, comprising 8 projects on agriculture, 5 on environment, 4 on energy planning, 14 projects on industry, and 7 projects on human health. There were also four projects on radiation protection, 2 on research reactors, 2 on development of TCDC, and 1 project on nuclear information.

The agricultural projects were on food irradiation, plant breeding, animal production and health, and soil fertility. The environmental projects were on assessment of air pollution, management

RCA projects in 1992–2001



of marine pollution, management of drinking water sources, investigation of geothermal energy sources, and dam safety. The projects on energy planning were related to comparative assessment of electricity generation options, options for mitigating greenhouse gas emissions and planning for nuclear power. The focus of the projects on human health was in areas of nuclear medicine, quality assurance in radiotherapy and sterilization of tissue grafts, and low dose rate (LDR) and high dose rate (HDR) brachytherapy. Two projects on distance learning in nuclear medicine and radiation oncology were also initiated during this period. The focus of the projects on industry continued to be tracer technology, non-destructive testing, radiation processing, and nucleonic control systems. The projects in radiation protection were on harmonization of practices, environmental monitoring and disposal of radioactive waste from non-power applications. The projects on research reactors were focused on improving their operation and utilization.

Thirty projects, including projects that were initiated during the previous decade were completed during this period [9].

Achievements

The following are some of the achievements of RCA during this period. Further details can be found in the RCA Regional Profile [13].

- As a result of the RCA projects on food irradiation, several countries adopted regulations on food irradiation, established irradiation plants, and processed a significant amount of food products by irradiation.

The capability to provide radiotherapy for cervical cancer improved in the RCA SPs as a result of the RCA projects on radiotherapy.

- New varieties of soybean, groundnut, mung bean, wheat, sorghum, and sesame were developed and released to farmers through RCA projects on plant breeding.
- Projects on soil fertility enabled the identification of promising crop, soil, and fertilizer management practices for increasing crop production in rice-based cropping systems using Nitrogen-15 techniques.
- Projects on animal production and health increased the income of farmers through the use of medicated feed blocks to combat diseases. New feeds with a cost-benefit ratio of 1:3:7 were introduced to farmers in five countries [13].
- RCA projects on energy planning made it possible for RCA SPs to use energy planning tools developed by the IAEA, in expansion planning of electrical power systems (e.g., WASP, ENPEP, MAED).
- In the environmental sector, the project on air-pollution monitoring enabled the participating countries to develop the capability of collecting and analysing air pollution data for source identification and apportionment.
- Countries that participated in RCA projects on the management of marine pollution developed capabilities for the collection and preparation of marine sediments and the analysis of chemical and radioactive pollutants.
- Through the RCA projects on water resources, the participating countries developed the capability to undertake a quantitative assessment of water resources and to assess the impact of industrialization and urbanization on these resources.
- The project on dam safety enhanced the capabilities of RCA SPs to assess the safety of dams, particularly in investigating dam and reservoir leakages through the application of isotope technology.
- Participating RCA SPs developed the capability of applying isotope techniques, with the aid of both natural isotopes and artificial radiotracers, in the management of their geothermal reservoirs. In particular, benefits were extended to seven geothermal fields with a total installed electric power generation capacity of 1320 MWe.
- RCA projects on tissue grafting enabled RCA SPs to produce tissue grafts of skin, bone chips, and ligaments for use in surgical operations and amnion for dressing of wounds and burns.
- The capability to provide radiotherapy for cervical cancer improved in the RCA SPs as a result of the RCA projects on radiotherapy. They also enabled the development of harmonized protocols for quality assurance in LDR and HDR brachytherapy.

Qian Jihui
IAEA Deputy Director General – TC

Carlito Aleta
RCA Coordinator

- Distance learning programmes in nuclear medicine and in radiation oncology prepared under two RCA projects have been made available to the RCA SPs and are being used for the training of nuclear medicine technologists and radiation oncologists.
- The RCA projects on non-destructive testing (NDT) implemented during this period, with the financial support of UNDP, enabled RCA SPs to establish national programmes in NDT and to form national NDT societies. These SPs have developed indigenous capabilities for training NDT technologists up to level 3 and for providing professional NDT inspection services to the industry [10].
- Through the projects on radiation technology, several participating SPs were able to develop the capability to provide radiation sterilization services to the industry. Several SPs established new irradiation facilities [10].
- Under the projects on radiation protection, assistance was provided to RCA SPs to establish radiation protection infrastructures conforming to Basic Safety Standards (BSS)[3]. It was also possible to develop distance learning material for training personnel of RCA SPs on radiation protection. Under an RCA Coordinated Research Project data was compiled for an Asian Reference Man. These data had been published in IAEA TECDOC-1005 and provided to the International Commission on Radiation Protection.
- Through the projects on research reactors, participating SPs improved coordination and information exchange on common research reactor operation and safety-related problems and received additional technical know-how.

[3] Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards

RCA Chairpersons

Masanori Wada (Japan), Carlito Aleta (Philippines), A. Djaloei (Indonesia), Ahmad Sobri Haji Hashim (Malaysia), Li Donghui (Peoples' Republic of China), Tin Hlaing (Myanmar), Peter Roberts (New Zealand), Tan Teng Huat (Singapore), A.K. Anand (India), and Naiyyum Choudhury (Bangladesh), served as RCA Chairpersons during this period.

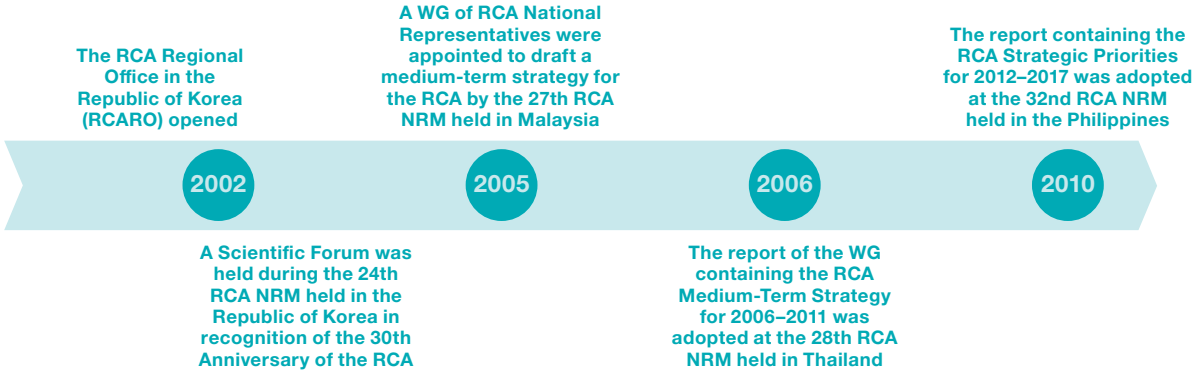
IAEA staff

John Easey (1990–1995), K. Yanagisawa (1996–1997), and Carlito Aleta (1997–2003) functioned as RCA Coordinators during this period. In between the appointment of RCA Coordinators, the Section Heads of former East Asia and Pacific Section, Javed Alsam (November 1995–March 1996) and M.N. Razely (March–July 1996) and P.M. Baretto, Director of the Division for Africa and Asia, assisted by Alexander Rogov (June–November 1997), served as RCA Coordinators in acting capacities. Qian Jihui was the Deputy Director General and the Head of the Department of Technical Cooperation during this period.

Staff of the IAEA RCA Office celebrating the 25th Anniversary of the RCA in 1997
L–R: Madeleine Mandorff (partly hidden), Thoko Muller, Evelyne Ranharter, Fran Wright, Paulo Baretto and Alexander Rogov (Photo: Evelyne Ranharter)

The fourth decade (2002–2011)

Major milestones and achievements



RCA management

One of the main developments during this period was the establishment of the RCA Regional Office (RCARO) in the Republic of Korea. As a follow-up to the recommendation made by the working group on RCA management[4] in 1997 to station a senior RCA representative in the region, a proposal to establish a RCARO in the Republic of Korea was submitted by the Republic of Korea for the consideration of the 29th RCA General Conference Meeting (RCA GCM) held in September 2000.

Following discussions at the 23rd Regional Meeting of the RCA National Representatives (RCA NRM) held in March 2001 in Bangladesh and at the 30th RCA GCM held in September 2001, the RCA SPs agreed in principle to the proposal to establish a Regional Office in the Republic of Korea, taking into consideration the recommendations of the working group appointed to review the proposal. The Regional Office was opened in March 2002 during the 24th RCA NRM held in the Republic of Korea. Jin-Kyoung Kim was the first Director of the RCARO.

The status of the RCARO was formalized through a resolution adopted at the 32nd RCA GCM held in 2003. The functions of the RCARO were identified as, a) pro-actively seeking out opportunities for the RCA to participate in projects being formulated and designed by major regional and international donors, b) negotiating and securing funding for RCA projects, c) promoting the peaceful uses of appropriate nuclear technology to assist in addressing regional and national

One of the main developments during this period was the establishment of the RCA Regional Office (RCARO) in the Republic of Korea.

[4] Working Group to Review the Management Structure of the RCA Programme and Develop Proposals for the Future, 1997

Opening of the RCA Regional Office, the Republic of Korea, March 2002. L–R, Hee-yol Yu, Vice-Minister of Science and Technology of the Republic of Korea, Jin-kyung Kim, Director RCARO, Qian Jihui, DDG-TC, IAEA, and Naiyyum Choudhury, RCA Chair. (Photo: RCA Regional Office)

needs, and d) enhancing the visibility of the RCA at regional and national fora [15]. Subsequently, assisting the IAEA in the performance of its secretariat duties (Article VII of the Agreement of 1987), assisting the RCA Chair in carrying out his/her responsibilities, and assisting the implementation of projects and project activities were added as additional functions of the RCARO. RCARO has entered into a Practical Arrangement with the IAEA regarding secretariat duties.

All the operational costs of the RCARO have been borne by the Government of the Republic of Korea, the host country of the RCARO.

An advisory committee (RCARO Standing Advisory Committee – RCARO SAC), comprising the current RCA Chair, the previous RCA Chair, the next RCA Chair, the RCA National Representative of the Republic of Korea, and the RCA Coordinator was formed to advise the RCARO on operational matters, to review its work plans and to monitor the progress of their implementation. The RCARO SAC meets twice a year prior to the annual RCA NRMs and RCA GCMs.

Since its establishment, the RCARO has made a very significant contribution to RCA by numerous means. Some of the notable contributions made over the past 20 years are the establishment and management of the RCA website (www.rcaro.org), establishment of partnerships with several regional organizations

including UNDP, UNOSSC, publication of RCA Success Stories and RCA brochures, representing RCA at international fora, and funding and managing the RCARO managed projects including the RCA Research Project. A detailed description of all the contributions of the RCARO is beyond the scope of this document.

Since its establishment, the RCARO has made a very significant contribution to RCA by numerous means.

Another notable development during this period was the strategic session held during the 26th RCA NRM in Pakistan in 2004. Among the topics discussed are, a) formulation of an RCA medium term strategy, b) procedure for the formulation of new RCA projects, c) appointment and roles and responsibilities of RCA stakeholders, and d) format of the RCA Annual Report. The recommendations of the strategic session on the above topics were incorporated in the RCA Guidelines and Operating Rules [16]. Criteria for RCA projects, a revised procedure and timeframe for development of RCA projects, the appointment of national project teams and adoption of national work plans, and a revised format of the RCA Annual Report aimed at improving the visibility of the RCA, were some of the outcomes of this Strategic Session.

As a follow-up to one of the recommendations of the strategic session held during the 26th RCA NRM, a working group comprising RCA National Representatives of Australia, India, Malaysia, New Zealand, and the Philippines were appointed to draft a medium-term strategy for the RCA by the 27th RCA NRM held in 2005 in Malaysia. The report of the working group, which was chaired by the RCA National Representative of Australia, Ronald Cameron, containing the RCA Medium-Term Strategy for 2006–2011, was adopted at the 28th RCA NRM held in 2006 in Thailand. The 28th RCA NRM also recognized the need to identify RCA strategic priorities [17].

The RCA Medium Term Strategy (RCA MTS) for 2006–2011 was subsequently extended to 2012–2017 by a working group comprising RCA National Representatives/nominees of Australia, the People's Republic of China, India, Indonesia, Japan, Malaysia, New Zealand, and Pakistan. The report of the working group, which was also chaired by Ronald Cameron of Australia, was adopted at the 38th RCA GCM held in 2009. The RCA MTS for 2012–2017 contained an updated version of the MTS for 2006–2011 and an implementation plan [18].

The working group appointed to extend the RCA MTS to 2012–2017 also recommended identification of RCA strategic priorities for this period. The procedures recommended by the working group, namely, a) conducting a survey to determine the needs and priorities of the RCA State Parties, b) developing a regional profile, and c) forming working groups in each thematic area, were approved by the 38th RCA GCM.

The report of the working group, which was chaired by the RCA National Representative of Australia, Ronald Cameron, containing the RCA Medium-Term Strategy for 2006–2011, was adopted at the 28th RCA NRM held in 2006 in Thailand.

Following the decision of the 38th RCA GCM, the RCA Regional Profile was drafted by former RCA Coordinator, John Easey of Australia. It contained the outcomes of the survey conducted to identify the needs and the priorities of the RCA State Parties and an analysis of the past RCA projects. [13]. The working groups comprising experts in each thematic area and chaired by an RCA National Representative met on 22–26 February 2010 at the IAEA headquarters in Vienna. The report containing the RCA Strategic Priorities for 2012–2017, prepared based on the recommendations of the respective working groups, was adopted at the 32nd RCA NRM held in the Philippines in 2010 [18,19] and was used in identifying the priority areas for the RCA projects during this period (2012–2017).

The restructuring of the IAEA Department of Technical Cooperation in 2006 had an impact on RCA and other regional agreements. The IAEA Secretariat of the regional agreements were brought under the direct supervision of the Directors of the relevant regional divisions and focal persons were appointed to assist the Directors, replacing the coordinators of the regional agreements. The RCA Coordinator, Prinath Dias continued to serve the RCA under the new designation of RCA Focal Person. Another change that impacted RCA was the amalgamation of former East Asia and West Asia Sections under the Division of Asia and the Pacific (TCAP), which increased the number

Participants of the 38th RCA General Conference Meeting held in Vienna in 2009. RCA Chair, Alumanda Dela Rosa (7th from the left), Ana Maria Cetto, DDG-TC (6th from left), Dazhu Yang, IAEA Director, TCAP (2nd from left), and Prinath Dias, RCA Focal Person (5th from right) are in the first row (Photo: IAEA)

… the amalgamation of former East Asia and West Asia Sections under the Division of Asia and the Pacific (TCAP), which increased the number of IAEA Member States participating in non-agreement regional TC projects managed by this division.

of IAEA Member States participating in non-agreement regional TC projects managed by this division. Before the amalgamation, RCA functioned under the East Asia and the Pacific Section of the Division of Asia and Africa (TCAF).

30th Anniversary of the RCA

A Scientific Forum was held during the 24th RCA NRM held in the Republic of Korea in 2002, to celebrate, and in recognition of the 30th Anniversary of the RCA. Presentations were made on *The Legend of the RCA* by A.K. Anand (India), *Serving for Human Needs* by Naiyyum Choudhury (Bangladesh), *New Challenges with Nuclear Techniques* by Sueo Machi (Japan), *For a Better Partnership* by John Easey (Australia), and *Toward a Viable Economic Development* by Byong-Whi Lee (the Republic of Korea).

RCA State Parties

The RCA membership remained at 17 State Parties during this period. Palau and Nepal, which became Member States of the IAEA in 2007 and 2008 respectively, were invited to join the RCA.

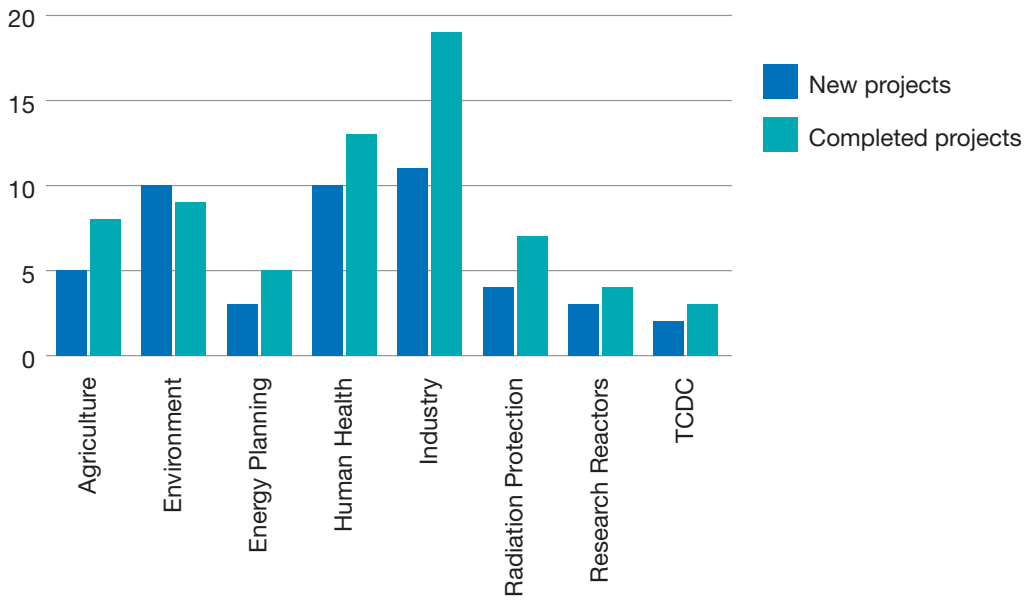
RCA projects

Forty-eight RCA projects implemented under the technical cooperation programme of the IAEA were initiated during this period, comprising 5 projects on agriculture, 10 on environment, 3 on energy planning, 10 on human health, and 11 projects on industry. There were also 4 projects on radiation protection, 3 on research reactors, and 2 on development of TCDC.

The agricultural projects were on food irradiation (sanitary and phytosanitary treatment), plant breeding for stress tolerance, and management of soil erosion. The environmental projects were on characterization and identification of sources of air pollution, assessment of radiological impacts of nuclear power on the marine environment, the study of groundwater contamination in urbanized and industrial areas, and marine benchmark study on the possible impact of the Fukushima radioactive releases. The project on Fukushima radioactive releases was implemented fully with extra-budgetary funds provided by RCA State Parties, developed off the IAEA TC cycle, and also accepted participation of non-State Parties, which reflected well on the flexibility of the RCA in addressing emerging issues/challenges.

A Scientific Forum was held during the 24th RCA NRM held in the Republic of Korea in 2002, to celebrate, and in recognition of the 30th Anniversary of the RCA.

RCA projects in 2002–2011



The projects on energy planning included studies on nuclear power and other energy options in competitive electricity markets and sustainable energy development strategies in the context of climate change.

The projects in human health included management of liver cancer using transarterial radioconjugate therapy, education and training of medical physicists, tumour imaging, positron emission tomography (PET), and 3D radiotherapy for predominant cancers. The projects in the industrial sector included modification of natural polymers using radiation technology, radioisotope technology for natural resource exploration and exploitation, advanced industrial radiography and tomography, and the use of radiotracers and sealed sources for diagnosing industrial multiphase systems by process visualization. The projects in radiation protection were on harmonization of practices, assessment of radiological risks, radiological emergency response, and sustainability of radiation protection infrastructures. The research reactor projects were on radioisotope production and neutron beam applications, and adding value to materials through irradiation with neutrons.

Sixty-eight projects, including projects initiated during the previous decade were completed during this period [9].

Achievements

The following is a summary of the achievements of RCA during this period. Further details can be found in the references [13, 14, 20].

- Several new varieties of crops with improved stress tolerance were developed during this period. They include barley, rice, soybean, papaya, and mung bean.
- Through projects on soil erosion studies the RCA SPs developed the capability of applying fall-out radionuclide technology (FRN) to investigate soil erosion.
- The projects on food irradiation made it possible for RCA SPs to apply novel methods of food irradiation.
- RCA projects on energy planning implemented during this period made it possible for RCA SPs to use tools and methodologies developed by the IAEA to carry out mitigation studies on greenhouse gas emissions.
- RCA SPs participating in the projects on air-pollution monitoring continued sampling of air-particulate matter, which were analysed using nuclear techniques. (XRF, IBA, and NAA). They also carried out source identification and apportionment and long-range transport analysis. These results were provided to the environmental regulators.
- RCA projects on the protection of the coastal and marine environment contributed to the formulation of environmental protection policies and environmental protection guidelines.

RCA projects on energy planning implemented during this period made it possible for RCA SPs to use tools and methodologies developed by the IAEA to carry out mitigation studies on greenhouse gas emissions

- RCA projects in nuclear medicine enabled the development and adoption of guidelines for the establishment of PET facilities and guidelines on clinical applications of PET. These projects also contributed to the installation of new gamma cameras, SPECT CTs, and PET CTs in RCA SPs.
- RCA projects on radiotherapy helped RCA SPs to use 3D conformal radiotherapy (3D CRT) and image-based radiotherapy and to develop quality assurance procedures for the techniques.
- RCA projects on Medical Physics produced guidelines for clinical training of medical physicists in radiation oncology, diagnostic radiology, and nuclear medicine (IAEA Training Course Series 37, 47, and 50) which are being used by all IAEA Member States.
- RCA projects on radiation processing made it possible for RCA SPs to develop hydrogels to be used for dressing of burns and wounds, super water absorbents for use in irrigation, plant growth promoters, and toxic metal absorbers. Several new irradiation plants have been constructed in RCA SPs during this period.
- RCA projects on radiation protection

continued to assist RCA SPs to develop their radiation protection infrastructures in conformity with the IAEA Basic Safety Standards. It was also possible to develop training material on the assessment of radiological risks and to enhance capabilities for responding to radiological emergencies.

- RCA projects on research reactors implemented during this period enabled participating RCA SPs to develop capabilities in isotope production and to improve neutron beamline applications. Guidelines on the enhancement of the value of semi-precious gemstones through improving coloration by neutron radiation and neutron doping of silicon were prepared and provided to participating RCA SPs.

RCA Chairpersons

In-soon Chang (the Republic of Korea), R. Hewamanna (Sri Lanka), Munim Awais (Pakistan), Nahrul Khair Alang Md Rashid (Malaysia), Somporn Chongkum (Thailand), Ronald Cameron (Australia), Le Van Hong (Viet Nam), Tsutomu Arai (Japan), Alumanda dela Rosa (Philippines) and Anhar Riza Antariksawan (Indonesia) served as RCA Chairpersons during this period.

IAEA staff

Carlito Aleta (1997–2003), Prinath Dias (2003–2010), Kesrat Sukasam (2011–2013) functioned as RCA Coordinators/ RCA Focal Persons during this period. In between the appointment of RCA Coordinators, the Section Head of former East Asia and Pacific Section, M. N. Razely (February – May 2003) served as the RCA Coordinator in an acting capacity. Manase Peter Salema (2005–2009) and Dazhu Yang (2009–2012) were the Directors of the TC Division for Asia and the Pacific. Ana Maria Cetto was the Deputy Director General and the Head of the Department of Technical Cooperation during this period.

Ana Maria Cetto
IAEA Deputy Director General – TC
(2002–2010)

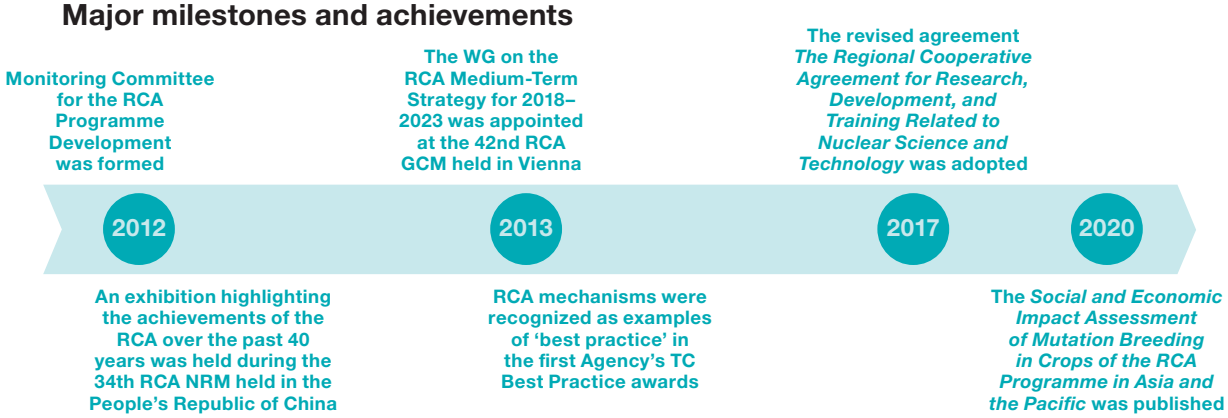
Manase Peter Salema
IAEA Director – TCAP
(2005–2009)

Dazhu Yang
IAEA Director – TCAP
(2009–2012)

Prinath Dias
RCA Coordinator/ Focal Person

The fifth decade (2012–2022)

Major milestones and achievements



RCA management

Several improvements were made to the RCA Management during this period as well. One of the main developments was the formation of a Monitoring Committee for RCA Programme Development in 2012, following a proposal made at the 34th RCA NRM held in the People's Republic of China. Frank Bruhn, the RCA National Representative of New Zealand, was appointed the Chair of this Committee, which was renamed the RCA Programme Advisory Committee (PAC) at the 42nd RCA GCM held in 2013. Following the appointment of Frank Bruhn as the Head of the TC Section of Quality Assurance of the IAEA, John Easey (Australia) was appointed the Chair of the PAC in 2014 and was succeeded by Prinath Dias (Sri Lanka) who was appointed in 2020.

The main function of the PAC was to assist in the development of the RCA programme. Since its inception, the RCA PAC had assisted the RCA National Representatives to develop the biennial RCA TC programmes by reviewing the pre-concepts and project concepts submitted by the RCA SPs and has assisted the LCCs with project designs, in addition to several other tasks assigned to the PAC.

Another notable development was the appointment of a number of working groups important to the strategic management of the RCA. The Working Group on RCA Medium Term Strategy (MTS) for 2018–2023 was appointed at the 42nd RCA GCM held in Vienna in 2013. The working group comprised representatives of Australia (as a Consultant), Bangladesh, the People's Republic of China, Malaysia, the Philippines, and Singapore. Alumanda Dela Rosa, who served as the RCA National Representative of the Philippines from 1998 to 2015 was appointed as the Chair of the Working Group on MTS.

5 SPs joined the RCA from 2012–2011
(increasing the RCA membership to 22)

Cambodia (2014)
Nepal (2014)
Fiji (2016)
Laos (2016)
Palau (2016)

The Working Group on MTS recommended the formation of a Working Group on Human Resources Development, a Working Group on Financial Gap Analysis and Resource Mobilization, and a Working Group on Medium Term Strategy Coordination (MTSC) to assist in the implementation of the RCA MTS. These working groups were approved at the 38th RCA NRM held in Mongolia in 2016. Syed Mohamed Hossain (Director, Bangladesh Atomic Energy Commission), Steven McIntosh (National Representative, Australia), and Chris Daughney (National Representative, New Zealand), chaired the Working Groups on Human Resources, Financial Analysis, and MTS Coordination (MTSC), respectively. Later, Mark Alexander, the National Representative of Australia, succeeded Daughney as Chair of the MTSC. The current Chair of the MTSC is Alumanda Dela Rosa of the Philippines.

The RCA Medium Term Strategy for 2018–2023, prepared by the Working Group on MTS and approved at the 46th RCA GCM held in 2017, also contained the RCA strategic priority areas for this period [21]. The Working Group on MTS Coordination carried out a baseline review of the RCA MTS for 2018–2023 after developing detailed guidelines for the review of the implementation of the MTS. The midterm review of the MTS was carried out by the RCA Programme Advisory Committee according to these guidelines at the request of the RCA State Parties.

The RCA Regional Programme Framework (RPF) for 2024–2029, containing the RCA strategic priority areas for this period was prepared by RCA PAC, with the assistance of experts in the RCA thematic areas,

RCA representatives with IAEA Director General Yukiya Amano at the opening of the RCA Exhibition (Photo: IAEA)

[5] IAEA INFCIRC/919

Panel Discussion Speakers and IAEA staff (Photo: IAEA)

following a survey conducted to identify the priorities and the needs of the RCA SPs. [22] The RCA PAC also compiled the details of the RCA technical cooperation projects implemented since 2007. [20] The RPF was approved at the 43rd RCA NRM held in 2021 as a virtual meeting (on account of the COVID-19 pandemic) hosted by Thailand. The TOR of the PAC was revised at the same NRM, making the PAC responsible for advising the RCA national representatives on matters related to the development, implementation, monitoring, and evaluation of the RCA programme.

Unlike the agreement of 1986, which was in force for a period of five years following extensions by RCA State Parties, the agreement of 2017 was of unlimited duration.

RCA mechanisms were recognized as examples of 'best practice' in the first Agency's Technical Cooperation Best Practice awards in January 2013 [23].

The Regional Cooperative Agreement of 1987 was extended to another five years in 2012. A revised agreement, *The Regional Co-operative Agreement for Research, Development, and Training Related to Nuclear Science and Technology,* was adopted in May 2017. Unlike the agreement of 1986, which was in force for a period of five years following extensions by RCA State Parties, the agreement of 2017 was of unlimited duration.

40th Anniversary of the RCA

An exhibition highlighting the achievements of the RCA over the past 40 years was held during the 34th RCA NRM held in the Peoples' Republic of China in April 2012. The exhibit reflected

the outcomes of RCA projects and other RCA activities in all thematic areas. Another exhibition and a panel discussion were held at the IAEA headquarters in Vienna during the 56th General Conference of the IAEA held in September 2012. The exhibition, organized by the RCARO, was declared open by Director General Yukiya Amano of the IAEA.

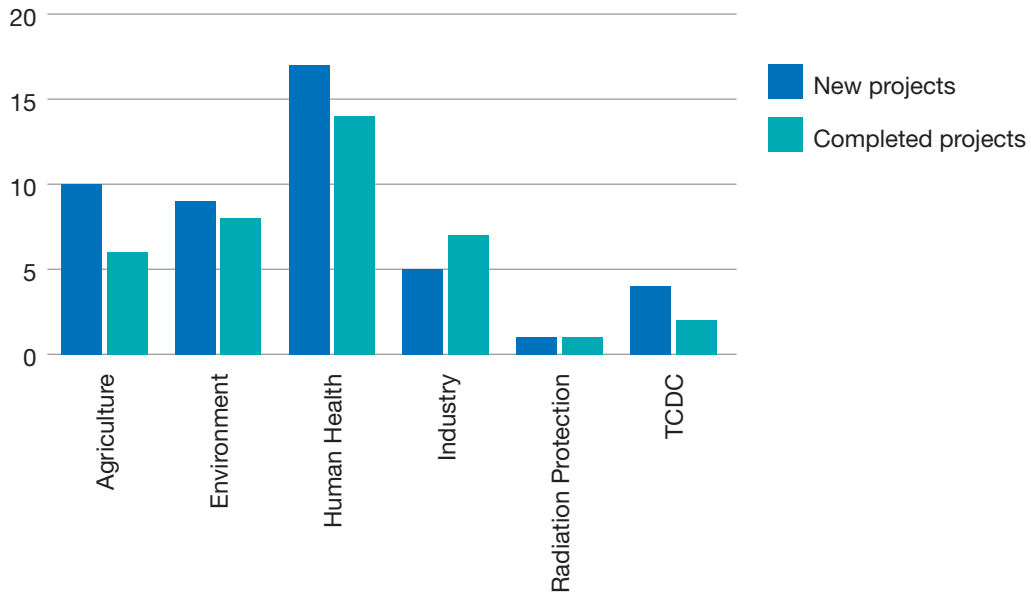
The panel discussion was chaired by Anhar Riza Antariksawan, the NR of Indonesia. Prinath Dias, former RCA Coordinator/Focal Person and the keynote speaker delivered a presentation *RCA – Yesterday, Today and Tomorrow.* The other speakers were Heather Patterson (Australia), Liu Luxiang (the People's Republic of China), Gursharan Singh and N. Ramamoorthy (India), and Alumanda Dela Rosa (Philippines), who spoke on RCA achievements in human health, agriculture, industry, and environment, respectively.

RCA projects

Forty-six RCA projects implemented under the technical cooperation programme of the IAEA were initiated during this period, comprising 10 projects on agriculture, 9 on environment, 17 on human health, 5 on industry, 1 on radiation protection, and 4 on the development of TCDC.

The agricultural projects included mutation breeding of crop varieties adaptable to climate change, improving soil fertility and land productivity, use of food irradiation to improve food security, food safety, and authentication of foodstuffs. The projects in the environmental sector were on the investigation of groundwater dynamics, sustainable management of deep groundwater resources, assessment of the impact of air particulate matter on urban air quality, assessment of the effect of sea-level rise due to

RCA projects in 2012–2021



climate change on coastal areas, and on the management of wetlands.

The projects on human health included 3D image-guided brachytherapy, stereotactic body radiation therapy (SBRT) for cancer treatment, hybrid nuclear imaging of cancer patients, nuclear medicine for cardiovascular diseases, intensity-modulated radiation therapy (IMRT), training of medical physicists, and the production of cyclotron-based radiopharmaceuticals. The distance learning programs in nuclear medicine and radiation oncology developed through previous RCA projects were further developed and updated.

The projects in the industrial sector were on optimizing process dynamics in industrial systems using radiotracer and sealed source techniques, advanced non-destructive examination for industrial safety, and the development of advanced grafted materials by radiation technology. The project on radiation protection was on responding to radiological emergencies of Category II and III facilities.

Thirty-eight projects, including projects that were initiated during the previous decade, were completed during this period. Eighteen out of the 46 projects initiated during this period were under implementation at the end of this period and five projects were awaiting closure [9].

Achievements

The following is a brief summary of the achievements of RCA during this period. Further details can be found in the references [14, 20].

- Several advanced mutants with significantly improved stress tolerance, quality, and yield potential characteristics in cereals, legumes, fruits, and vegetables were developed in the RCA SPs during this period. Three hundred fifty-one mutant lines were used in the regional multi-location trials and 102 well-characterized mutants were used for genetic studies. A recent case study on the social and economic impacts of the RCA mutation breeding projects showed a benefit to cost ratio of 11:1, meaning €1 investment yields €11 return to the farmers and consumers of participating countries.
- Guidelines were developed on the audit and accreditation of irradiation facilities used for the sanitary and phytosanitary treatment of food and agricultural products. Most participating RCA SPs have amended their quarantine regulations to include irradiation as a phytosanitary measure.
- Studies carried out on the impact of the Fukushima accident on the marine environment showed there were no detectable releases in territorial waters of RCA SPs beyond Japan.
- It was also possible to improve the understanding of the impact of climate change in the marine ecosystem and the accumulation of contaminants/pollutants through the utilization of nuclear techniques.
- The database containing levels of particulate air pollution, particularly PM2.5 particulate matter in the Asia

Studies carried out on the impact of the Fukushima accident on the marine environment showed there were no detectable releases in territorial waters of RCA SPs beyond Japan.

and Pacific region was updated and provided to the RCA SPs.

- A database containing information on groundwater, surface water, and precipitation in the region obtained from isotopic studies has been prepared.
- In the human health sector, the RCA projects on nuclear medicine have made it possible to enrich the knowledge of nuclear cardiology in the new generation of nuclear medicine specialists. Distance learning material on nuclear medicine, previously developed, has been updated and made more easily available to nuclear medicine professionals through a website. (Human Health Campus – DATOL in English (iaea.org).
- Advanced radiotherapy techniques such as stereotactic body radiation therapy (SBRT), 3D image-guided brachytherapy (IGBT), and intensity-modulated radiation therapy (IMRT), were introduced to the RCA SPs through projects on radiotherapy.
- RCA projects in medical physics enabled the development of distance learning material for the professional development of medical physicists (on-line tool AMPLE) and can be accessed through the IAEA's Cyber Learning Platform for Network Education and Training (CLP4NET).
- In the industrial sector, the RCA projects on radiation processing enabled the development of about 50 advanced radiation grafted materials (adsorbents, ion exchange membranes, catalysts bioactive carriers, tissue scaffold evaporator membranes, and active packaging materials).
- RCA projects on non-destructive testing (NDT) enabled RCA SPs to implement harmonization schemes for NDT certification in accordance with ISO 17024, develop the capability for digital radiography (DIR) and computed tomography (CT), and establish quality management systems (QMS) in accordance with ISO standards.
- The IAEA's First Coordination Meeting on Supporting the Preparation and Recovery of Civil Infrastructures was held at Fukushima in Japan, and in response to this, the Workshop of the IAEA Regional Training-the-Trainers Course on NDT Applications for Damaged Structures was held at the Japanese Society for Non-destructive Inspection JSNDI in Tokyo, Japan.

The database containing levels of particulate air pollution, particularly PM2.5 particulate matter in the Asia and Pacific region was updated and provided to the RCA SPs.

RCA Chairpersons

Feng Dongxin (People's Republic of China), Khin Maung Latt (Myanmar), Chris Daughney (New Zealand), Syed Shaukat Hasan (Pakistan), Mavag Chadraabal (Mongolia), Jafar Sadique (Bangladesh), Kim Young Eun (the Republic of Korea), T.M.R. Tennakoon (Sri Lanka), Abdul Muin Abdul Rahman (Malaysia) and Suchin Udomsomporn (Thailand) served as RCA Chairpersons during this period.

IAEA staff

Kwaku Aning (2011–2015), Dazhu Yang (2015–2021), and Hua Liu (from 2021) were the Deputy Director Generals and the Heads of the Department of Technical Cooperation during these periods.

Ali Boussaha (2012–2015) and Najat Mokhtar (2015–2018) were the Directors of the TC Division for Asia and the Pacific (TCAP). Since 2019, Jane Gerardo-Abaya has been the Director of TCAP.

Kesrat Sukasam (2011–2013) and Sinh Van Hoang (from December 2013 to present) functioned as RCA Focal Persons during this period.

Kwaku Aning
IAEA Deputy Director General – TC
(2011–2015)

Dazhu Yang
IAEA Deputy Director General – TC
(2015–2021)

Hua Liu
IAEA Deputy Director General – TC
(2021–present)

Ali Boussaha
IAEA Director – TCAP
(2012–2015)

Najat Mokhtar
IAEA Director – TCAP
(2015–2018)

Jane Gerardo-Abaya
IAEA Director – TCAP
(2019–present)

Kesrat Sukasam
RCA Focal Person
(2011–2013)

Sinh Van Hoang
RCA Focal Person
(2013–present)

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References

[1] Agreement between the Government of India, the Government of the Philippines, and the International Atomic Energy Agency for a Regional Joint Training and Research Programme Using a Neutron Spectrometer (1964).

[2] The Legend of RCA – A.K. Anand – former RCA National Representative of India (Presented at the Scientific Forum held in 2002 in celebration of the 30th Anniversary of the RCA).

[3] Agreement for Cooperation in the Peaceful Uses of Atomic Energy between the Government of the Republic of the Philippines and the Government of the Republic of India (1969).

[4] A Regional Co-operative Agreement for Research, Development, and Training Related to Nuclear Science and Technology – E.E. Fowler – former RCA Coordinator, IAEA Bulletin (Vol 20, No.4 – 1978).

[5] RCA website (www.rcaro.org/history).

[6] Summary Report of the First Working Group Meeting of the RCA Member States, 15–19 October 1979, Tokyo, Japan.

[7] The Economic and Social Significance of RCA Regional Cooperative Projects, E.E. Fowler, IAEA Bulletin (Vol 21, No.5 – 1979).

[8] Industrial Technology Transfer in Asia and the Pacific, E.E. Fowler, IAEA Bulletin (Vol 24, No.3 – 1982).

[9] The Technical Cooperation Project Information Dissemination Environment (TC-PRIDE), IAEA

[10] Terminal Report of the Regional UNDP Project for Asia and the Pacific (1992).

[11] RCA Activities in the Asian and Pacific Region – M. Kobayashi – former RCA Coordinator, IAEA Bulletin (Vol. 26 No. 1 – 1984).

[12] The Report of the Working Group to Review the Management Structure of the RCA Programme and Develop Proposals for the Future (September 1996).

[13] Development of an RCA Regional Profile, John Easey (January 2010).

[14] RCA Success Stories (www.rcaro.org/success).

[15] Resolution adopted by the 32nd RCA GCM on the establishment of the RCA Regional Office (Annex 10 of the Meeting Report) – September 2003.

[16] Annexes 18–21 of the Report of the 26th RCA NRM (March 2004).

[17] RCA Medium Term Strategy for 2006–2011 (March 2006).

[18] RCA Medium Term Strategy for 2012–2017 (September 2009).

[19] RCA Strategic Priorities for 2012–2017 (April 2010).

[20] Details of the RCA Technical Cooperation Projects Implemented during 2007–2019 (June 2020).

[21] RCA Medium Term Strategy for 2018–2023 (September 2017).

[22] RCA Regional Programme Framework (RPF) for 2024–2029 (April 2021).

[23] IAEA Annual Report 2012 – GC 57/3 (September 2013).

The author

Prinath Dias is the Chair of the RCA Programme Advisory Committee, a former IAEA RCA Coordinator / RCA Focal Person (2003–2010) and a recipient of the IAEA Distinguished Service Award (2010). He is also a former Chairman of the Atomic Energy Authority of Sri Lanka (1993–2002) and was the RCA National Representative of Sri Lanka in 1993–1996. Dias was a member and the Chair (in 2019) of the IAEA Standing Committee on Technical Assistance and Cooperation (SAGTAC) and a member of the expert panel appointed by the IAEA for quality assurance of the IAEA Technical Cooperation Projects. He is a former Associate Professor and Head of the Department of Electrical Engineering of University of Moratuwa, Sri Lanka and a former visiting Associate Professor in Nuclear Engineering at University of California, Santa Barbara. Dias holds Master's and Doctoral degrees in Nuclear Engineering from Texas A&M University, USA.