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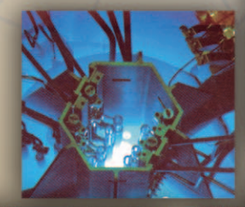
2007 Edition

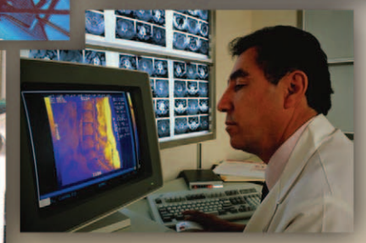
RCA

Regional Co-operative Agreement

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

A TRUE PARTNER IN REGIONAL DEVELOPMENT





RCA Regional Office
www.rcaro.org

RCA

Regional Co-operative Agreement

For Research Development and Training
Retated to Nuclear Science and
Technology for Asia and the Pacific

RCA

RCA Related Websites

IAEA/TC- RCA Website	www-tc.iaea.org/tcweb Vienna-based
RCA Members Website	www.rca.iaea.org Malaysia-based
RCA Regional Office Website	www.rcaro.org Korea-based

What is RCA?

The RCA (Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology for Asia and the Pacific) is an intergovernmental agreement among IAEA Member States of South Asia, South East Asia and the Pacific, and the Far East that entered into force in 1972 under the aegis of the International Atomic Energy Agency (IAEA).

This arrangement provides a framework for Asian and the Pacific Member States to co-operate with each other and the IAEA to promote and coordinate cooperative research, development and training projects in nuclear science and technology through their appropriate nuclear institutions.

RCA Member States

The following 17 IAEA Member States in Asia and the Pacific region are the current signatories of the RCA:

Australia (AUL), Bangladesh (BGD), The People's Republic of China (CPR), India (IND), Indonesia (INS), Japan (JPN), The Republic of Korea (ROK), Malaysia (MAL), Mongolia (MON), Myanmar (MYA), New Zealand (NZL), Pakistan (PAK), The Philippines (PHI), Singapore (SIN), Sri Lanka (SRL), Thailand (THA), and Viet Nam (VIE)

FIRST Milestones in RCA

- 1972 : First regional co-operative agreement under the aegis of IAEA
- 1973 : First RCA Representatives Meeting at IAEA Headquarters in Vienna, Austria
- 1973 : First RCA project launched (on preservation of fish and fishery products)
- 1979 : First Meeting of National RCA Representatives held in an RCA Member State (Japan)
- 1982 : First UNDP / IAEA / RCA Industrial Project implemented
- 2002 : First regional co-operative agreement to establish its own regional office. The RCA Regional Office (RCARO) opened in Korea.
- 2005 : The RCARO went into full operation beyond the interim operation
- 2006 : The RCA Medium Term Strategy was established for 2006-2011

RCA Vision

The vision of the RCA is to be recognized as an effective partner in providing nuclear technologies that address socio-economic needs and contribute to sustainable development in the region.

RCA Mission

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

What does RCA have?

- A positive history of accomplishment
- A unique record of regional nuclear science and technology co-operation
- A well established network of scientists trained in the use of nuclear technologies in the agricultural, medical, industrial, and environmental sectors
- A good potentiality to use its regional technical and scientific resources to contribute to the solution of some of the significant problems that the region is facing

RCA strengthens TCDC

The Regional Agreement is a vehicle for stimulating the Technical Co-operation among Developing Countries (TCDC) by enhanced networking and partnership among developing Member States. It also has flow-on effects to other organizations and regional partners.

RCA Strategic Directions

- Ensuring effective management of the RCA
- Achieving greater impact for RCA projects
- Developing sustainable nuclear technology capacity in Member States relevant to the needs
- Enhancing the uptake of nuclear technologies and increasing the visibility of the RCA

What are the IAEA/RCA Projects?

Over its lifetime the RCA has received funding for its projects from many of its Member States and other international organizations, such as the United Nations Development Programme (UNDP), but the main source of funding has been the IAEA. Irrespective of the source of funding, almost all the RCA projects have been implemented through the IAEA's Technical Cooperation (TC) Programme. Where required or requested, the IAEA provides technical support and project management services including planning, formulation, implementation and evaluation. The RCA projects implemented through the IAEA TC Programme are referred to as IAEA / RCA projects. The projects supported under the TC Programme should be aligned with the strategic goal of IAEA's Technical Co-operation (TC), which is to increasingly promote tangible socio-economic impact of the Member States and the region. The main objectives of the TC programme are:

- To produce sustainable benefits within the framework of national development plans,
- To gain recognition as a partner in resolving development problems through the cost-effective transfer of nuclear technologies,
- To increase the level of funding for technical cooperation activities particularly from non-traditional sources, and to increase the number of opportunities for direct and "parallel funding" to help resolve development problems, and
- To strengthen the capacity of institutions in Member States using nuclear technologies to become more technically and financially self-reliant.

The IAEA in accordance with the RCA Agreement also functions as the RCA Secretariat.

Critical Success Factors of the RCA Projects

- Projects should be 'needs-driven' and benefit from regional cooperation
- Projects of sufficient size to achieve high impact and measurable outcomes
- High use of regional networks and resources
- Designed to enhance sustainability of national nuclear technology capabilities
- Built on adequate national resources, infrastructure and existing programmes
- Avoids duplication with other mechanisms (national projects, non-RCA projects and other agreements)
- Choosing projects where a nuclear technique is a high value-adding approach and technology transfer is a major focus
- Consistent with Technical Cooperation strategy and Millennium Development Goals
- Ability to attract external funding

Thematic Sectors

The RCA Programme is divided into the following Thematic Sectors:

- Agriculture (Applications of nuclear technology in the agricultural sector)
- Human Health (Applications of nuclear technology in the medical and healthcare sector)
- Industry (Applications of nuclear technology in the industrial sector)
- Environment (Applications of nuclear technology in the environmental sector)
- Energy (Assessment of the role of nuclear power and other energy options in competitive electricity market)
- Research Reactor (Improvement of research reactor operation and utilization)
- Radiation Safety

Lead Country Coordinators

The activities in each Thematic Sector are coordinated by a Thematic Sector Lead Country Coordinator.

The present Thematic Sector Lead Countries (until 2008) are:

- Agriculture : China
- Human Health : Japan
- Industry : India
- Environment : New Zealand
- Energy : Korea
- Research Reactor : Korea
- Radiation Protection : Australia

A person designated as the Project Lead Country Coordinator (PLCC) provides leadership in project formulation and implementation of the RCA projects on a regional level.

What Does RCA Value Most?

The RCA Medium Term Strategy has identified the following as the core values of the RCA Programme:

- Safety, Security and Sustainability: ensuring safe, secure and environmentally aware utilization of nuclear science and technology and contributing to sustainable development within the region
- Honesty, Openness and Integrity: building trust and respect within the Member States and with all other stakeholders through effective communication
- Collaboration and Responsiveness: understanding stakeholders' needs, fostering cooperation and teamwork, embracing new ideas and recognising new trends
- Competence and Professionalism: striving to improve standards of expertise and delivery to our stakeholders

Developing Partnerships

In the years to come, the RCA will seek strategic partnerships through collaboration with other funding organizations to become an active partner in regional development and develop joint projects and networks with influential organizations, so that the benefits can be more widely shared. This mechanism will ensure that RCA pursue regional collaborations with other funding organizations in a more systematic way, and RCA development partnerships, both in each country and regionally, are focused on just a few priority collaboration areas that can produce the greatest benefits.

By strategically focusing its human and technical resources on areas of maximum benefit with other funding organizations, RCA's efforts will continue to meet the needs of its Member States, regardless of their level of development or technological sophistication since the criteria for selecting partnerships are: regional involvement; consistency with the RCA Medium Term Strategy goals and the UN Millennium Development Goals; compatibility, including similar planning cycles; and, projects where nuclear techniques have a leading role to play. An example of the on-going partnership projects is the RCA-UNDP (K) Project on Post-Tsunami Environment Impact Assessment Project which is being undertaken with involvement of 14 RCA Member States and partly funded by the UNDP Office in Korea.

RCA Achievements in Nuclear Technology Applications to Solve Regional Problems

There are numerous ways in which nuclear technologies are being applied to solve everyday problems, from alleviating hunger and poverty to treatment of complex forms of cancer. Some examples are given below on how nuclear technologies contribute and what the major RCA achievements during the past years are. (Source: RCA Annual Reports, RCA Success Stories, and IAEA at a Glance. Editor)

Meeting Basic Human Needs

Many developing countries in the region face enormous constraints in ensuring food security and safety. Efforts have been made to address this by enhancing the capacity to use nuclear technology for improving crop and livestock productivity, food safety and overall quality.

Improving soil fertility is essential for increasing agricultural productivity and through regional projects implemented under the RCA programme, the participating Member States have been able to acquire the capability of applying nuclear and nuclear related techniques to improve soil fertility in order to contribute to their national efforts in improving agricultural output. One way to improve soil fertility is to stimulate biological nitrogen fixation - by treating soil with special bacteria that allow a plant to produce its own fertilizer in its roots. A nuclear related technique based on the stable isotope Nitrogen-15 can be used to assess the nitrogen supply from organic sources in the soil-plant system. The following is a short summary of the some of the achivements of the RCA Member States.

- Short-duration nitrogen-fixing mungbean has been introduced into the commonly grown rice-wheat-cropping systems in Bangladesh and Pakistan, which resulted in the reduction in the need for nitrogen based fertilizers by about 20%.
- China, Indonesia, Malaysia, Philippines, Sri Lanka, and Thailand have developed management practices for the combined use of organic residues and chemical fertilizers for improving soil fertility status and demonstrated the benefit of this management practice for sustenance of soil productivity in rice-based cropping systems.
- China, India, and Vietnam carried out studies on the management of crop residues in rice systems. The benefits of recycling rice residues using various techniques were documented and quantified with the help of isotope techniques.

The results of the studies have been utilized to formulate recommendations on improved agronomical practices, which have been disseminated and transferred to the farmers and producers.

Erosion of top soil due to poor agricultural practices resulting in poor soil fertility is a problem faced by most RCA Member States. The Member States participating in the RCA projects on soil erosion, have been able to acquire the capabilty of using a nuclear technique based on the measurement of the radioactive isotope Cs-137 in the soil, to measure soil erosion. The results obtained are being used to improve agricultural practices for reducing soil erosion.

Breeding new varieties of crops with higher yields, early maturity and resistance to diseases is also a way of increasing agricultural productivity. Radiation induced mutation breeding is one of the techniques that can be very effectively used for this purpose. When the genetic material of existing varieties of crops is exposed to radiation, mutations are induced, which result in varieties with modified properties. These can be selected and propagated to produce crop varieties with desired properties. The Member States participating in RCA projects on plant breeding have been able to acquire this technology and have applied it in their national plant breeding programmes. They have succeeded in breeding and releasing four new varieties of soybean, five varieties of groundnut, two varieties of mungbean, two varieties of wheat, and five varieties of sesame, during the period of 2004 ~ 2006. Several more new varieties are being field tested prior to the release to the farmers.

The RCA Member States have also exchanged genetic material of promising varieties of crops to assist each other in their plant breeding programmes. Many of the crop varieties have been found to retain the desired characteristics when grown in countries other than the country of origin in spite of the different environmental conditions. This additional element of regional cooperation has made it possible to reduce the efforts required over a very long period of time in breeding new crop varieties. For example, the soybean varieties DT84 produced by Vietnam, and Bangsakong produced by Republic of Korea, have found to be suitable for growing in Thailand. Groundnut varieties B/30/12/10, Kidang, Binschinabadam 2 and Karisma Serene received from other Member States were found to have the desired characteristics during field-testing in Sri Lanka and will be released shortly to the farmers.

Animal productivity and health need to be improved since livestock plays a vital role in the livelihood of rural people in most developing countries., Productivity is often much lower than in industrialised countries due to diseases and under-nutrition. Nuclear technology contributes to the solution of this problem. For example, isotopes have been used to examine the utilization of feeds by ruminants and to develop more cost-effective feeding strategies. Measurements of animal hormones by radioimmunoassay (RIA) have given a better understanding of the reproductive physiology of livestock. By applying these techniques, for example, an increased milk production has been achieved in many Member States.

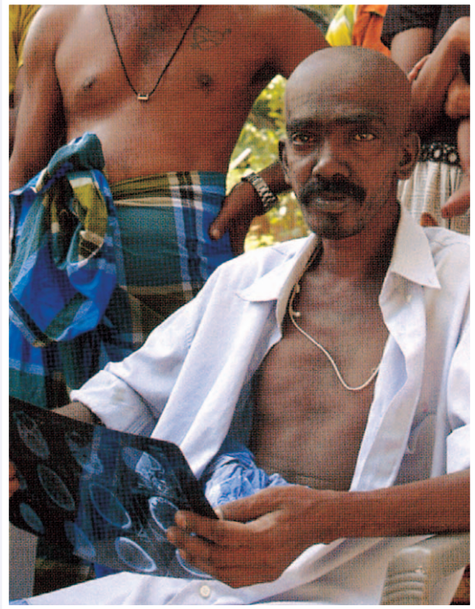
RCA Member States have been able to:

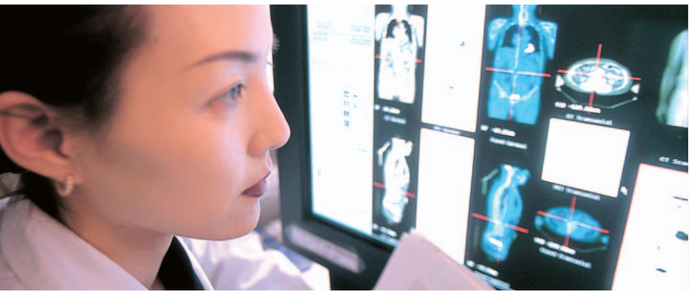
- Introduce the use of the medicated UMMB (Urea Molasses Multi-nutrient Blocks) for controlling internal parasites, resulting in the increase of income per animal to the farmers ranging from 33% to 445%.
- Introduce feeding strategies based on indigenous feeds previously not utilized, resulting in an increase in the income for the farmers ranging from 9% to 185%.
- Develop and use the AIDA (Artificial Insemination Database Application), a software program, for keep recording important data on each breeding animal. It also facilitates recording the AI (Artificial Insemination) progress

Reduction of post harvest losses is a need in a number of developing countries, since up to 40% of all agricultural products are lost after harvesting. Radiation can be used to reduce the post harvest losses and to increase the shelf life of agricultural products, since exposure to radiation destroys bacteria, insects and their larvae and inhibits sprouting in some products such as onions and potatoes. The use of radiation is also necessary to meet the stringent requirements of countries that import food products especially since the other alternatives such as chemical fumigation are being phased due to environmental and health considerations. Several projects on Food Irradiation have been implemented under the RCA Programme and the participating Member States have acquired the know-how to use this technology.

Nine RCA Member States (Australia, China, India, Indonesia, Malaysia, Pakistan, the Philippines, Thailand and Vietnam) have established commercial food irradiation facilities and two Member States (Bangladesh and Sri Lanka) are in the process of establishing such facilities. RCA Member States are also engaged in adopting common standards and protocols on Food Irradiation, which should facilitate trade in irradiated food.

Several RCA Member States have adopted harmonized regulations for food irradiation and developed common protocols for the use of irradiation for quarantine treatment.





Advancing Life Sciences

The Human Health Sector has benefited from the applications of nuclear technology in numerous ways. The use of X-rays as a diagnostic tool is well known but there are also numerous ways in which radioisotopes can be used in diagnosis and treatment of many common diseases. In most RCA Member States, emphasis is put on diagnosis and treatment of cancer, early detection and treatment of other common non-hereditary and hereditary diseases, and identification of nutritional deficiencies.

Radiotherapy is a widely used method of treating cancer, along with chemotherapy and surgery. RCA Member States have been able to acquire the knowledge of more advanced techniques of radiotherapy through training courses conducted under the RCA Programme. In 2005 and 2006 ninety-three professionals from RCA Member States participated in such courses. A distance-learning programme has been developed for training of radiation oncologists to supplement the national training and educational programmes in the Member States.

Early Diagnosis of diseases especially cancer, significantly contributes to management of the patients. Chemical compounds labeled with radioactive isotopes serve as very useful tools in medical diagnosis and treatment in conjunction with the conventional methods. RCA Member States now have acquired the following capabilities in nuclear medicine:

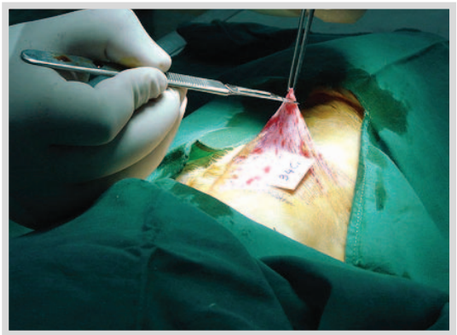
- All RCA Member States have the capability of using nuclear imaging based on Technetium - 99m.
- Most of the RCA Member States have acquired the capability of using more advanced imaging techniques such as SPECT (Single Photon Emission Computed Tomography), and PET (Positron Emission Tomography).
- A technique known as sentinel lymph node imaging introduced to the RCA Member States is now being routinely used by a number of Member States for early detection of breast cancer. Scintimammography is another technique used for this purpose by many Member States.
- Lipiodol labeled with the radioisotope Re-188, a new radiopharmaceutical developed by ROK, is effectively used for treatment of liver cancer. As a first step, this method has been introduced to AUL, CPR, IND, MON, PHI, SIN, THA, and VIE.
- Myocardial Perfusion Scintigraphy (MPS) for diagnosis of coronary diseases has been introduced to BGD, INS, MAL, SRL, VIE.
- All RCA Member States are using Iodine -131 for treatment of thyroid cancer.

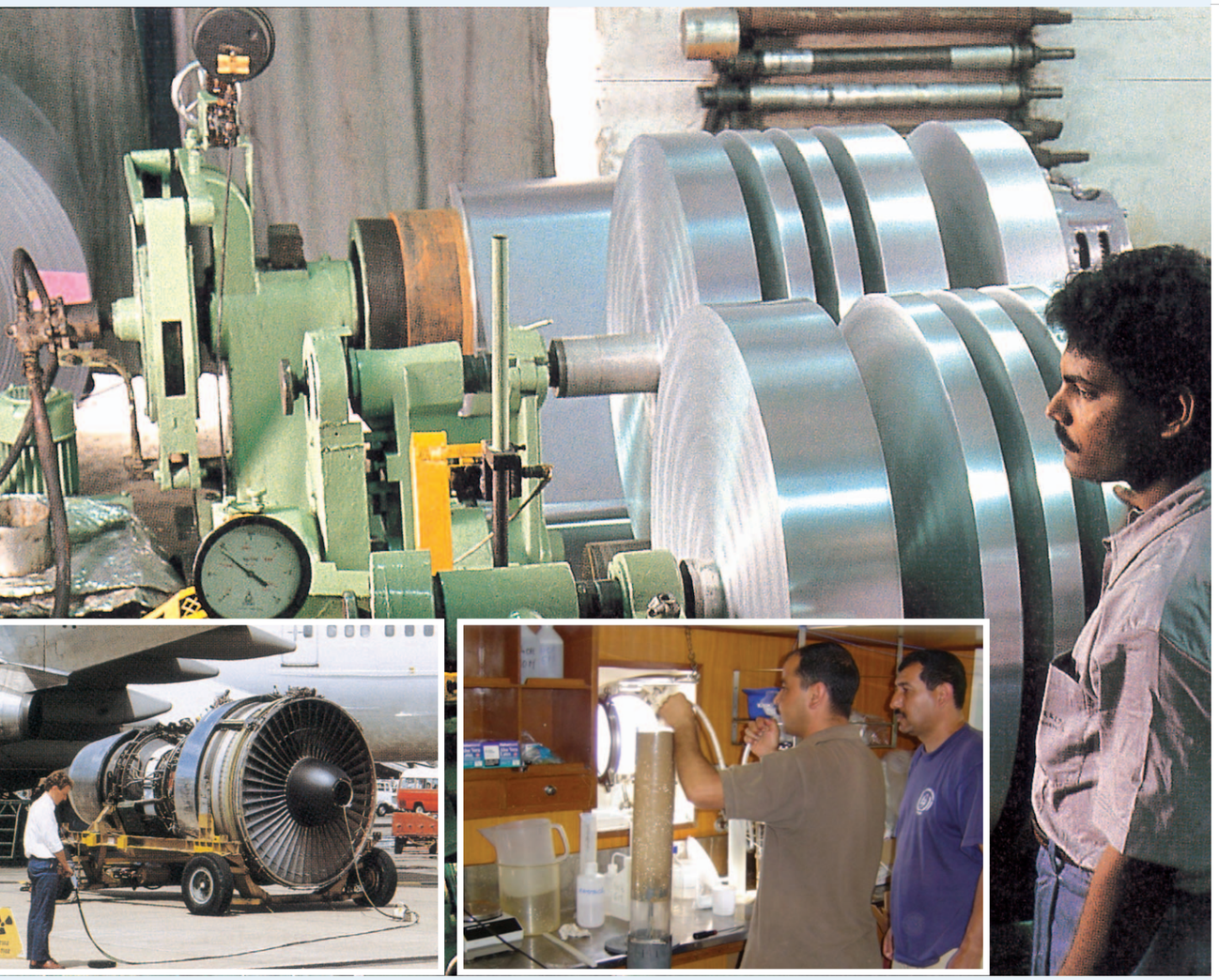
RCA also has contributed to the Nuclear Medicine Programmes of the Member States by providing Distance Assisted Training package to train nuclear medicine technologists. A lack of proper training opportunities for a very large number of Nuclear Medicine Technologists has been identified as a major constraint in the use of more advanced nuclear medicine technologies by the Member States.

Safer medical supplies are required since disinfections of medical supplies, such as hypodermic syringes, are essential for better health standards worldwide. Gamma irradiators are widely used to decontaminate pre-packed medical supplies. Radiation sterilization of tissue grafts (bones, skins, etc) is another important application of nuclear techniques, which has benefited a wide spectrum of the region's population. A number of RCA Member States have established Human Tissue Banks with facilities for processing and sterilizing the tissues by radiation. A total quality assurance system and regulatory guidelines to ensure that these tissue banks could operate at the highest international standards were developed and adopted through a project implemented under the RCA Programme. The project provided advice, expertise, training and some amount of infrastructural support to assist the RCA Member States in their operation of the Tissue Banks. A multi-media training course, leading to a diploma in Tissue Banking was also established for training Tissue Bank Operators, in collaboration with the National University of Singapore. These Tissue Banks provide a very large number of tissues for the benefit of patients undergoing surgical operations in the RCA Member States . Prior to the establishment of the Tissue Banks in the RCA Member States, surgical tissue grafts had to be imported from developed countries at a very high cost, which was beyond the reach of many patients from developing countries.

Improved nutrition and well-being can be achieved by using isotope techniques to assess human body composition, nutrient intake and vitamin and mineral absorption. Such methods are ideal and useful in determining the success of food supplementation programmes aimed at combating malnutrition.

Several RCA Member States are engaged in using nuclear and isotopic techniques to evaluate the effectiveness of food-based dietary intervention programmes to promote enhancement of bone mass and prevent bone loss, which is the main cause of osteoporosis.





Benefiting from the Physical Sciences

Clean Drinking Water is in short supply in the Asia and Pacific Region. More than one billion people live in conditions of water stress, where population growth, and competition between agricultural, industrial and domestic users are placing an overwhelming strain on limited freshwater resources. Furthermore, a vast proportion of these limited water resources is contaminated, making them unsafe to drink.

In response to this situation, the RCA implemented a long-term programme to help the Member States to develop skills and facilities to use isotopic (nuclear) tools and techniques, which allow very sensitive and often unique insights into the behaviour of water resources. Isotopic techniques employ isotopes of the elements of water and some dissolved chemicals and tracers. They can be used to obtain information on how old the groundwater is; where it comes from; how it is re-charged and at what rates; what its flow patterns are; how it interacts with other aquifers and with surface and sea water, and its vulnerability to man-made pollutants and natural contaminants.

The information obtained using these techniques have been used in collaboration with the relevant national authorities of the RCA Member States to improve the management of water resources.

Upgrading industry and especially industrial processes and products has become an important area benefiting from the application of radioisotopes and radiation. Some prominent examples include: radiation processing for manufacturing new materials; non-destructive testing for quality control; nucleonic control systems for quality control and mineral analysis; and, tracer and sealed source technology for problem analysis and process optimization. RCA Member States now have such capabilities as follows:

- Radiotracers, sealed sources and nucleonic gauges are widely used in Member States and benefit the industrial end-users and assist in the economic development of priority sectors such as petroleum, chemical and petrochemical industries. Specialist groups in five Member States have been awarded contracts to solve industrial problems in petrochemical industries as a result of the capabilities developed.
- Techniques such as Tracer Residence Time Distribution (RTD) for troubleshooting diagnosis, process analysis and optimization; flow rate measurement, calibration and leak detection; gamma and neutron scanning techniques for inspection of distillation columns and tanks in oil refineries are already established and used in the region (INS, MAL, THA).
- The use of tracer techniques in oil fields has increased of oil recovery to 10~15% in VIE and other countries. Thin Layer Activation (TLA) technique for monitoring wear and corrosion has also been established in many Member States for practical application.
- NDT techniques for concrete structures have been introduced in many Member States. Certification of NDT personnel based on ISO has been introduced to AUL, BGD, IND, MAL, NZE, PHI, and SRL. RCA Member States have adopted an Agreement for Mutual Recognition of the schemes of certification of NDT personnel.
- Radiation processed hydrogels for use as wound dressings for use in the treatment of burns and leprosy are now commercially available in many Member States.
- Growth promoters have been developed from radiation processed natural polymers resulted in increase of yield of cucumber by 15~20%.

Solving environmental problems is necessary since many populations are facing serious economic and health problems due to degradation of the terrestrial and marine environments due to pollution. A wide range of nuclear techniques can be used to measure these pollutants and in some instances to identify the sources of pollutants in order to take mitigative measures. A number of RCA Member States have acquired the capability of using these techniques, which are being applied, in their respective countries to address environmental issue.

- **Air Pollution** is a problem faced by a number of RCA Member States mainly as a result of industrialization. A number of major cities in the Asia and Pacific Region are heavily polluted which is adversely affecting the health of the population. Taking measures to control air-pollution firstly require information on the type and level of pollution and on the main sources of pollution. Many RCA Member States have initiated programmes to mitigate affects of air-pollution and the RCA projects contributing to these efforts by using nuclear techniques to identify and quantify hazardous elements in air-borne particulates. The RCA Member States have developed the capability of sampling pollutants in air-borne particulates using equipment provided under an RCA Project. The samples are analyzed using nuclear techniques. A regional data-base on the levels of key pollutants in the main urban and industrial areas in the region has been established using the data generated under the RCA Projects. The RCA Member States also have been trained on using statistical analytical techniques to identify the sources of pollution from the generated data. The personnel engaged in these activities have established close links with the national authorities responsible for controlling air-pollution and the information generated through the RCA Projects have been provided to them, to facilitate regulation of the sources of pollution. One example of the measures taken is the banning of vehicles with two-stroke engines in Bangladesh after it was established they were key sources of air-borne particulate pollution. The information generated under the RCA projects have also been shared with the Clean Air Initiative (CAI-Asia) funded by the Asian Development Bank and the World Bank.
- **Marine coastal environmental pollution** has been documented with the completion of the first comprehensive IAEA / RCA database on marine radioactivity for the region, the Asia-Pacific Marine Radioactivity Database (ASPAMARD). It has a format that can be easily incorporated into the Global Marine Radioactivity Database (GLOMARD). This database is useful for assessing the short-term and long-term impact of man-made sources on marine radioactivity for the region. Member States are increasingly applying nuclear techniques (Receptor Binding Assays) to assist in the response to Harmful Algal Bloom (HAB) outbreaks (PAK, MAL, THA, PHI). Several Member States have capability for rapid detection of the red tide toxins through radiometric receptor binding assay.

▲ HANARO Research Reactor, Korea

Other RCA Endeavors

Sustainable energy development has increasingly become a long-term objective for both the developed and developing countries. Energy development is an essential part of social development and economic growth. However, production and use of energy causes environmental problems. Thus the provision of adequate energy services at an affordable cost, in a secure and environmentally benign manner, and in conformity with social and economic developmental needs, is very important for sustainable development. In many countries in the region the establishment of a long-term energy policy has to include an assessment of the option of the role of nuclear energy for power production. RCA Member States now have such capabilities as follows:

- The results of the RCA project on comparative energy assessment, 'Electric System Expansion Planning (ESEP)' has impacted on the long-term national planning of several Member States (ROK, CPR, PAK).
- The results of this project also supported several other Member States in formulating their ESEP with positive consideration on the role of nuclear power (INS, MAL, PHI, SRL, VIE).

Research Reactors are operated in the Member States for radioisotope production as well as for neutron beam applications. The use of both radioisotopes (RI) and neutron beams is significantly increasing. Member States have been sharing state-of-the-art technology and information on these topics as well as on matters of the safety and effectiveness of research reactors. RCA Member States now have such capabilities as follows:

- Member States are sharing information on research reactor resources to improve current utilization and also to prepare for future needs.
- Member States have initiated a RI back-up supply system. This idea is particularly valuable for a country that has temporarily shutdown its research reactor(s) and cannot produce radioisotopes.

Radiation Protection is essential to protect people, the environment and facilities from the impact of radiation. The need to support the establishment and maintenance of an effective, reliable and sound radiation protection infrastructure in Member States has been well recognized. There is also a need to harmonize the RCA project with other regional projects on radiation protection not only to avoid duplication and overlaps in activities but also to provide a more effective and efficient regional outcome through developing the synergies between them. RCA Member States now have such capabilities as follows:

- As a result of the harmonization, all activities under the radiation protection projects address specific milestones of the Basic Safety Standards (BSS). Several workshops and training events have been organized to support their different milestones.
- Increased awareness of development of codes of practice for industrial sources of radiation, especially in licensing and inspection.
- Member States are more knowledgeable about the need to develop sufficient infrastructure for meeting possible radiation incidents. RCA peer review missions have supported many Member States in assessing the effectiveness of their radiation protection infrastructures in many Member States.
- Member States have contributed to the understanding of the important radiation-related parameters of a Reference Asian man.
- Experts in the region developed training material on 'Radiation Protection Applied to Radioisotope Production'.
- A distance learning package for training in Radiation Protection has been developed under an RCA Project and is being used by the RCA Member States for training personnel.

IAEA/RCA Projects for the 2007~2008 Cycle

I. Agriculture

1. Development of Sustainable Land Use and Management Strategies for Controlling Soil Erosion and Improving Soil and Water Quality
2. Improvement of Quality Traits and Stress Tolerance in Selected Crops by Mutation Techniques and Biotechnology
3. Novel Applications of Food Irradiation Technology for Improving Socio-Economic Development

II. Human Health

1. Improvement in QA for Brachytherapy of Frequent Cancers in the Region
2. Prevention of Osteoporosis and Promotion of Bone Mass in Asian Populations using a Food-based Approach
3. Tumor Imaging Using Radioisotopes
4. Strengthening Medical Physics through Education and Training Phase II
5. Upgrading Nuclear Medicine Technologist Training
6. Upgrading of Sustainability of PET Technology in RCA Member States
7. Application of 3D Conformal Radiotherapy for Predominant Cancers in the RCA Region

III. Industry

1. Improvement of Production Quality and Safety in Steel, Petrochemical and Civil Industries Using Advanced Industrial Radiography and Tomography Techniques
2. Consolidation of Radiation Processing Applications for Health and Environment
3. Intensification of Productivity in Coal, Minerals and Petrochemical Industries Using Nucleonic Analysis Systems (NAS) and Radiotracers

IV. Environment

1. Characterization and Source Identification of Air Particulate Pollution in the Asian Region
2. Assessment of Trends in Freshwater Quality Using Environmental Isotopes and Chemical Techniques for Improved Resource Management
3. Establishment of a Benchmark for Assessing the Radiological Impact of Nuclear Power Activities on the Marine Environment in the Asia-Pacific Region

V. Radiation Protection

1. Sustainability of Regional Radiation Protection Infrastructure

VI. Energy

1. Evaluation of Sustainable Energy Development Strategies for Addressing Climate Change Issue

VII. Research Reactor

1. Increasing Material Value by Neutron Irradiation

History of the RCA Regional Office

1997 A long time issue in the RCA community, the need for the regional office was strongly raised at the Member States' Meeting

2000 -2001 Korea offered to host the office and the offer was agreed by the members

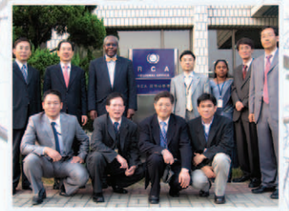
2002 The Office was inaugurated in Daejeon, Korea.

- The host government provides financial support for the operation of the office

2003 RCA adopted the resolution on the RCA regional office to provide a legal framework for the office

2005 RCA regional office entered into full operation beyond the interim one

2007 RCA adopted the resolution on RCARO acting on behalf of RCA



RCA Regional Office

Mission

RCA Regional Office has been established to contribute further to the development of the overall RCA programme; increasing ownership by the Member States, in particular increasing RCA visibility in the region; and, increasing the possibilities for new co-operative partnerships.

- To increase RCA Awareness: Visibility
- To promote Partnerships for RCA Program: Viability

Milestones of RCARO

- In 1978, the need to have an RCA Office in the region was first mentioned at an RCA Representatives Meeting in Vienna.
- In 2000, at the 22nd Meeting of National RCA Representatives in India, Korea offered to host the RCA Regional Office if established in Korea. RCA Member States supported this proposal.
- In September 2001, at the 30th RCA General Conference Meeting in Vienna, RCA Member States agreed on the establishment of the RCA Regional Office in Korea.
- On 27 March 2002, the RCA Regional Office was officially opened at Daejeon, Korea on the occasion of the 30th Anniversary of the RCA and the 24th Meeting of National RCA Representatives in Korea.
- In September 2003, the 32nd RCA General Conference Meeting adopted an RCA Resolution on the Establishment and Management of the RCA Regional Office in Korea.
- In April 2005, the 27th Meeting of National RCA Representatives in Malaysia decided full operation of the RCARO beyond the interim operation. The 27th NRM also appointed the new Director of RCARO.
- RCA adopted the resolution on RCARO acting on behalf of RCA.

RCARO Governing Bodies

The RCARO Standing Advisory Committee was constituted in April 2005 in conjunction with the full operation of RCARO. Members are one representative each from the Member States occupying the position of past, current and future RCA Chair, the host Member State of the RCARO, and the RCA Focal Person.

The RCARO Steering Committee has been operating since by the Korean government as the host country of RCARO to give advice and supervise managerial matters of the RCARO. RCARO's annual budget, employment of staff members, major activities are controlled by the RCARO Steering Committee.

The Roles and Functions of the Director of RCA Regional Office

- To pro-actively seek out opportunities for the RCA to participate in projects being formulated and designed by major regional and international donors, including international agencies
- To negotiate and secure funding for RCA projects,
- To promote the peaceful uses of appropriate nuclear technology to assist in addressing regional and national needs,
- To provide enhanced visibility for the RCA at regional and national fora, and
- To implement the directives of the RCA Member States as agreed upon at the Meetings of National RCA Representatives.

Programme Initiated by the RCA Regional Office

The RCA Regional Office has initiated several new projects in order to support RCA Member States in their nuclear capability building as well as their nuclear knowledge preservation endeavors.

RCA/UNDP Project on Post-Tsunami Environment Impact Assessment Project

In line with the UN's Millennium Development Goals and the IAEA Strategy for Technical Cooperation, RCARO has successfully developed a partnership project with UNDP entitled "Mitigation of Coastal Impacts of Natural Disasters like Tsunami using Nuclear or Isotope Techniques". The RCARO, UNDP(K) and MOST of Korea concluded the project proposal contract on 27 June 2006 after the endorsement of the Member States. (Duration: July 2006 - December 2008, Budget: 300,000 USD)

Objectives

- To contribute to the assessment of the environmental impact of tsunami as an input to an integrated coastal management in tsunami-affected areas
- Increased utilization and coordination of national analytical capabilities and capacities to address the adverse impact of anthropogenic activities and assist in the management of the impacts of natural disasters and the management of emergencies involving the marine coastal environment
- Improved communications, awareness and access for regulators, environmental monitoring agencies and others working in the marine coastal environment to specialized technological solutions to address particular needs at both the national and the regional level

Fields

- To assess the level of toxic element contamination in the marine coastal ecosystem by studies of the trace element profile of coastal sediment samples
- To assist in assessing the impact of marine deposits in coastal agricultural areas on agricultural productivity and aquaculture
- To measure the levels of selected toxic elements in tsunami-deposited sediment and assess their impact on the health of coral reefs and associated fisheries

Host Organizations

UNDP Office in Korea, Ministry of Science and Technology in Korea, RCARO

Participating Countries

14 RCA Member States, i.e., AUL, BGD, CPR, IND, INS, ROK, MAL, MYA, NZE, PAK, PHI, SRL, THA and VIE (Project Lead Country Coordinator: PHI, Assistant Project Lead Country Coordinator: INS, Objective Lead Country Coordinators: IND, SRL, AUL)

RCARO Post-Doctoral Fellowship Training Programme

Objectives

- To preserve necessary nuclear knowledge through on-the-project participation in Korea's key nuclear research and development projects by competent nuclear scientists from the RCA Member States
- To contribute to the socio-economic development of the RCA Member States through the ample use of nuclear technology
- To support national endeavors to develop human resources of the RCA Member States in nuclear fields

Fields

- Radioisotope production & radiation application technology
- Radiation protection
- Advanced reactor technology
- Nuclear safety and regulatory technology and others

Host Organizations

Major nuclear related institutes in Korea responsible for national long-term R&D projects and regulatory functions such as,

- Korea Atomic Energy Research Institute (KAERI)
- Korea Institute of Nuclear Safety (KINS)
- Korea Institute of Radiological & Medical Sciences (KIRAMS)

RCARO/KAIST Master's Degree Programme

Objectives

To develop leading scientists and engineers in nuclear energy and quantum engineering fields

Course

Nuclear Energy and Quantum Engineering Course

Host Institution

Korea Advanced Institute of Science and Technology (KAIST). The RCARO provides the participant with a round trip air-ticket, room and board, medical insurance and incidentals. For more information, go to www.kaist.edu.

RCARO/ KOICA Joint Regional Training Programme

Objectives

To support human resources development for the RCA Member States and conduct a programme in the field where the RCA Member States need a training course and where KOICA's objectives coincide such as in the field of the development of human resources and socio-economic infrastructure in the developing world

Fields

Nondestructive Testing (NDT) trainer's training, and other fields that meets the needs from the RCA Member States and the KOICA

Host Institution

Korea International Cooperation Agency (KOICA)

Work Opportunities at the RCARO as Temp Staff

The RCARO invites 2-3 temporary staff including a cost-free expert from RCA Member States each year ranging from three months to 6 months in duration to support the RCARO activities. The RCARO provides them with an excellent opportunity to gain practical experience in a stimulating multi-cultural workplace, which will be reflected in the lasting change that the RCA's work makes for the RCA region. This attachment programme represents the in-kind contribution of the Member States to RCARO activities.

Publication of RCA Success Stories

With a view to enhancing recognition of RCA achievements by wider end-users, and thus to extend its benefits to broader targets in the region, RCARO launched a task to publish and disseminate success stories of the RCA projects. In a first batch of the publication, 5 stories were selected among the 2001~2006 RCA projects as successful cases of nuclear technology applications to the following topics:

Contributing to search for fresh water

Applications of isotope hydrology technique has resulted in more accurate assessment of ground water behavior providing better information on the search and managing of clean drinking water resources. It also contributed to informed decision on water policy and controls in the region.

Alleviating air pollution

Applications of nuclear techniques provided by RCA projects served to alleviating air pollution by monitoring environmental pollution for the local agencies introducing better control of plant emissions. The projects resulted in a development of database to provide such information as source, distance, and trans-boundary aspects of air pollution in the region.

Assistance to medical infrastructure

RCA took initiative to help national agencies build up infrastructure (such as training of surgeons) for sterilizing tissue graft materials by nuclear technique so that they have become widely available. This success has served as a role model for other regions.

Assisting training at distance

The RCA programme has provided regional skills in nuclear medicine of which demand are high in the region with growing economy and welfare. An increasing number of Member States are showing interest in the training at distance and hundreds of students from many Member States have passed the pilot studies.

Enhancing materials properties

The RCA projects have facilitated transfer of radiation processing technology and helped developing the capabilities to design new and innovative products and deliver them to markets. An example is radiation processed polymer (Chitin) which is being developed for medical uses.

NOTE : These success stories are available on the RCARO web site at www.rcaro.org.