Annex 29

THE LEGEND OF RCA[1]

A.K. Anand
Former RCA National Representative
India

1.0 Introduction

1.1 Technical Cooperation Programme is a major programme of the IAEA (International Atomic Energy Agency) under which many technical cooperative activities are implemented. A regional agreement within an agreed framework by the Agency and the participating MSs (Member States) is a means to administer regional programmes. For the regional cooperative activities in the Asia-Pacific Region a formal RCA (Regional Cooperative Agreement) for Research, Development and Training related to Nuclear Science & Technology is in force since June 12, 1972 with the Agency and the governments of the participating MSs. The agreement was modified in 1987 and extended several times until the present.

1.2 There are a number of phases of the regional cooperative activities in the Asia-Pacific Region. Before the formal RCA agreement came in force, TCDC (Technical Cooperation among Developing Countries) was introduced in the region through the IPA (India-Philippines-Agency) arrangement in 1964. This is considered as the precursor of both the RCA for Asia-Pacific and TCDC policy of the region.

2.0 IPA – 1964-1969

2.1 **The very first cooperative programme was for Research Reactor Utilization** (neutron beam experiment) that was established under the fiveyear IPA agreement entering into force on 11th June 1964. India offered to supply equipment and experts. The programme emphasized on Neutron Crystal Spectrometer, which was made in India and located in Manila, Philippines. The participating countries were India, Indonesia,

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the Philippines, Republic of Korea, Taiwan and Thailand. Six nuclear scientists were trained to use Neutron Crystal Spectrometer, for solid state physics studies, and these scientists later became the key scientists to conduct a programme in their respective countries. In some of these countries, this activity could not be sustained, however, the TCDC was established. The Chairman of the IPA Committee was Dr. R. Ramanna from India, who later became Director, BARC (Bhabha Atomic Research Centre) and the Chairman, Atomic Energy Commission and is now a respected member of the Indian Parliament.

3.0 **1969-1972**

3.1 Although initially, there was a plan to extend the IPA by five years with more participating countries, instead, a number of meetings among participating members took place for establishing a new regional cooperation in the South East Asia, the Pacific and the far East. All the consultative meetings among the MSs and the Agency, were arranged and coordinated by the Department of Research and Isotopes (now Department of Nuclear Sciences and Application). The draft agreement was also prepared by the same department. Upon official acceptance, the RCA for Research Development and Training related to Nuclear Science and Technology entered into force on June 12, 1972.

4.0 **1972-1996**

4.1 The first 25 years of RCA can be divided into 2 phases. During the first phase of 15 years (with two extensions of five years each) i.e. 1972-1987, it had initially 11 members, which increased to 14 in later years. The second phase can be from 1987 to 1996; the agreement was modified to become RCA agreement 1987. Till 1985, RCA was administered by the Department of Research and Isotopes and since 1985, it is administered by the Department of Technical Cooperation. The RCA agreement 1987 has been extended twice, this had 14 members, later the number expanded to 17 which is also the present strength. The members are Australia, Bangladesh, China, India,

Indonesia, Japan, Republic of Korea, Malaysia, Mongolia, Myanmar, New Zealand, Pakistan, Philippines, Singapore, Sri Lanka, Thailand and Vietnam.

4.2 Experience and achievements from implementing RCA activities have been well recognized by the Agency and the MS; in its 25 years, RCA demonstrated effective ways in which regional cooperation could solve common regional problems. It has been instrumental in introducing the regional cooperative concept in Latin American and African regions, which led to the formation of ARCAL & AFRA like RCA. The general outputs of the RCA projects have been the development of technical manpower. National capacity building in developing MS has benefited and their self reliance in terms of competent scientists and reliable laboratory services have increased over the years.

4.3 The first meeting of the RCA was held in Vienna in September 1973 and till December 1979, all the meetings of the RCA, held in Vienna or outside, were chaired by DDG-RI. During the RCA meeting of December 1979 held in New Delhi, India, Dr. V.K. Iya, Representative from India was elected as the Chairman. It was the first time that the Chairman was elected by the meeting. Since then, the Chairman is elected from the country hosting the meeting; he/she also chairs the following RCA GC meeting.

4.4 During the first 25 years of the RCA being in force, there were about 275 meetings & training events; about 65 projects were implemented and about 1250 persons were trained. These projects were in the following areas:

- Food and Agriculture
- Nuclear Energy
- General Development
- Human Health
- Industry
- Radiation Protection
- **Research Reactors**

4.5 Although, the IPA the pre-cursor to RCA was focused on **Research Reactor Utilization** on Neutron Beam Experiments, there was not enough emphasis on **projects directly connected with Research Reactors between 1972-1996. 3 main topics/projects listed under Research Reactors are 'Basic Science Using Research Reactors', 'Neutron Scattering Techniques in the Study of Solids' and 'Application of Personal Computers to Enhance Operation and Management of Research Reactor'.**

5.0 **1997-2001**

5.1 As the Agency's strategic approach of the Technical Cooperation Programme changed during 1995/1996, the RCA programme also had to adjust to the new strategy. Earlier, the RCA programme was literally 'directed' from the Agency through the RCA office; the ownership by the MS of the RCA programme was manifested only through discussions and endorsement of the projects during working group meetings or approval during the GC meetings. Developing countries rarely proposed the projects, mostly the proposals came from technical officers of the Agency. For large projects like UNDP/RCA/IAEA projects, the Agency was deeply involved in the conceptualization and realization.

5.2 The concept of ownership of the RCA programme was first proposed in 1995. The DDG-TC in subsequent statements propounded that MS should play a greater role in managing the RCA programme. At the working group meeting in Beijing, China in 1996, the role of the Agency and that of the Secretariat were examined again. Prior to the RCA CG meeting, MS proposed a number of recommendations on the management of RCA programme. At the RCA WGM in Myanmar in march 1997 a daft operating guidelines and procedures prepared by the Agency was presented to the MS and a final version was endorsed during the RCA GC meeting in 1997. This has led to the new phase in the RCA programme; it is a coincidence that the present RCA coordinator also joined the Agency during the same time. All the national representatives during these 5

years, along with the RCA Coordinator can be given credit for making this transition smooth and more productive. They also play a very proactive role.

5.3 A meeting, of the Ad-hoc Committee, which was set up to study the structure of RCA, was held in March 1999 in Singapore. The committee examined various models for the RCA structure and concluded that the 'Lead Country' concept should be pursued. This was approved by the MS during the RCA GC meeting in 2000; the revision of the RCA operating rules and guidelines with the role, duties and responsibilities of Lead Country, were documented.

5.4 Now the MS do all the upstream work of initiating and formulating project proposals, proposing the training events and identifying the appropriate RRUs (Regional Resource Units/facilities with the MS) along with the faculty; this is done in the presence and participation of the technical officer from the Agency and with full knowledge of the RCA Coordinator, who is also present most of the time. For choosing the projects 'Model Project Criteria' is discussed and followed.

5.5 During the last 5 years, there has been a progressive increase in the number of training events and the number of persons trained. Attached Tables-1 to 8 give the details of 1997 to 2000, the data for 2001 is still being collated for the RCA-2001 Annual Report, which is under preparation. The total number of participants 1773 in the training events in these 4 years far exceed 1250 which was approximately the numbers trained in the first 25 years of the RCA. The total number of meeting and training events in these 4 years was 203 (111 training events, 92 meetings) compared to approximate 275 in the first 25 years. There were as many as 29 projects during 2000; most of these projects were continued from previous year. In 2001, there were 30 projects out of which 18 were continuing projects and 12 were new.

5.6 The projects are now distributed in the following Thematic Areas and cover major activities as given below. The examples of few success stories in different areas are given in Annexure-1 to 40.

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Agriculture

- Enhanced genetic diversity in rice
- Irradiation as sanitary and phytosanitary measures
- Animal nutrition and reproduction
- Agroforestry
- Restoration of soil fertility and sustenance of agricultural productivity

Health

- Nuclear medical applications (Diagnosing heart disease, breast cancer, treatment of thyroid cancer, diabetic nephropathy)
- QA in radiation therapy (including brachytherapy)
- QA in radiation sterilization of tissue grafts (Public awareness; training by distance learning)
- Distance learning in nuclear medicine
- Distance learning in basic radiation oncology
- Nutrition

Industry

- Optimization of processes using tracers,sealed sources and nucleonic control systems
- Non destructive testing
- Radiation processing of natural polymers
- Mineral resources recovery

Environment

- Air pollution measurements and trends
- Marine pollution
- Radiation processing of agrowastes
- Impact of geothermal waters on environment
- Dam safety and sustainability

Energy/Research Reactor/Waste Management

- Comparative assessment of energy options
- Role of nuclear power in mitigating greenhouse gases
- Disposal of radioactive waste from non-power sources
- Utilization of Research Reactors
  - Production of radioisotopes
  - Neutron Activation Analysis
  - Power Reactor component Testing
  - Neutron Radiography for NDT
  - Neutron Beam Research for condensed matter studies
  - Education and Training

Radiation Protection

- To build radiation protection infrastructure
- Implementing the basic safety standards
- Occupational and public exposure
- Radioactive Waste Safety
- Environmental monitoring
- Emergency response

General TCDC

- Training programmes
- Expert missions
- Regional Resource Units (RRU)
- Electronic Networking & Outreach (ENO)

5.7 **Energy/Research Reactor/Waste management** has focused its rightful place after a lot of discussions in the WG meetings. The reason being that out of 17 MS only 4 i.e. China, India, Japan and Republic of Korea have a large and vigorous nuclear power programme. 12 of the 17 MS have **at least one Research Reactor; in one of the countries the Research Reactor is closed down**, the attached table 9 gives the details. Unless a special effort is put to extend the **life of the existing Research Reactors** and put up new ones in the region, the isotope production programmes will suffer, consequently this will affect drastically the application of nuclear techniques for improvement in agriculture, health, industry and environment in the region, which is the main objective of the RCA programme. **A reasonably large research reactor** is also a stepping stone for a nuclear power programme for any country. Regional seminar on **'Ageing Management of Research Reactors'**, **'Regional Training Course on Safe Operation**

of Research Reactors', **'Regional Training Course on Thermal Hydraulic Analysis for Research Reactors'**, and **'Workshop on In-Service Inspection of Research Reactors'** were held in the past 2 years. Republic of Korea and India are taking the lead in this thematic programme.

5.8 Electronic Networking and Internet has become an essential tool for the rapid socio-economic advancements and realising this need, the sub-project "Electronic Networking and Outreach (ENO)" under the UNDP/RCA/IAEA project was initiated. The first phase has been successfully implemented and the RCA web scheme (Annexure-40) with regional home page, 14 national home pages, Vienna RCA office home page and linkage to various related sites, has established the role of ENO as a coordinating link and communication vehicle of RCA. The initiation of the Interregional Tripartite Forum linkage with ARCAL and AFRA has enhanced the scope for wider cooperation. The strong foundation developed in the first phase needs to be further consolidated and expanded for sustaining the benefits by making it a comprehensive Management Information System for RCA

6.0 The Way Ahead

6.1 Out of 17 MS, there are only 3 MS which have not yet started conducting training events, their facilities probably have not yet reached a reasonable level of competence, although their scientists have been trained under IAEA fellowships and as participants in the training events conducted in other countries. Some special efforts would be required so that these 3 MSs also build national capacity in terms of competent scientists and reliable laboratory services in isotope applications. This will have a multiplying effort in the region.

6.2 There should be relatively more projects in the thematic areas of **Energy/Research Reactors/Waste Management**. The MS should be given all help and cooperation to add more facilities for isotope production. The **Research Reactor** not only produces various isotopes for application in the different thematic areas but is also a

facility for training the required manpower for the nuclear power programme and doing a lot of R&D for the power programmes, most of which is done in the high pressure & high temperature loops installed in the core of Research Reactor. These loop simulator power reactor conditions, and can be used for development of nuclear fuels and structural materials, fuel chemistry, radiochemistry, activity transportation studies etc. The research reactors are also used for radiation protection and emergency preparedness. Last year, in March, there was 'Experts Meeting on Sharing of Research Reactor Resources' held in OAEP, Bangkok. 9 of the 17 MS attended the meeting. India, Republic of Korea and Indonesia offered their beam facilities to other countries in the region. China, India, Indonesia and Vietnam offered their facilities for Neutron Activation Analysis for the use of other countries in the region.

The RCA countries together have more than 50% of the world population but do not have same percentage of fossil fuels. One of the major parameters to gauge the development & progress, is the per capita consumption of electricity; nuclear power is the inevitable option for this region, this should be one of the main emphasis of the RCA programme in the future.

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