

Concept paper to establish and operate a Network of National Nuclear Research Institutes (NNRIs) of the RCA Government Parties

1. Background

Research and Development (R&D) is perceived as a key element to contribute to the advancement of knowledge, innovation and the development of advanced technologies for the introduction of new products, processes and services. It also provides solutions to complex problems by applying innovative and multidisciplinary approaches. In this way, R&D can be the very first to develop and disseminate innovative technologies, thus contributing to addressing technological challenges and socio-economic development.

With regard to the RCA Programme, it is clearly stated in the RCA Agreement – Article I – and the RCA Mission that the Government Parties (GPs) undertake to promote and coordinate cooperative research, development and training activities in applications of nuclear science and technology (NS&T) through their appropriate national institutions. Despite this emphasis, there has been little focus particularly on the R&D component of the RCA Programme in particular, and most of its projects and activities have focused on the transfer of existing proven technologies through training programmes.

During the Ministerial Conference on the 50th Anniversary of the RCA, held in Austria on 26 September 2022, and the International Symposium Celebrating the 20th Anniversary of the RCA Regional Office (RCARO), held in Korea on 15 December 2022, it was emphasized that R&D in NS&T should be further facilitated in order to enhance the national and regional technological capabilities, encourage young scientists and researchers challenging to innovate, and address emerging challenges.

In response, RCARO and Vietnam submitted proposals to the meeting of the RCA Chairs Committee, held in Vietnam from 27 February to 2 March 2023, to establish a Network of National Nuclear Research Institutes (NNRIs) of the RCA GPs, aiming to facilitate the exchange of information and knowledge, share R&D resources and promote R&D activities among NNRIs by identifying common needs and priorities for the regional cooperation in nuclear science, technology and innovation. The meeting noted the importance of establishing the network and requested RCARO to prepare a concept paper for consideration by the RCA National Representatives (NRs).

2. Current Status of R&D in the RCA Framework

In the early stages of the RCA, when it was managed by the IAEA's Department of Research and Isotopes (RID), the research component of the RCA programme was given the highest priority. However, after the RCA Coordinator was transferred to the Department of Technical Cooperation (TCD) in the mid-1990s, the main focus of the RCA programme shifted to technology transfer of proven nuclear technologies and training, and the focus on R&D was significantly weakened. In addition, it was difficult to meet the requirements and needs for R&D under the RCA programme, which was managed and funded according to the strategic direction and priorities of the TCD.

Similarly, because of the nature of the RCA, with the majority of its members being developing and least developed countries, the RCA programme placed the highest

priority on building the capacity of the GPs to apply existing technologies. As a result, most of the IAEA TC funds for the RCA Programme were allocated to these activities, and little to the R&D component due to the limited project funds.

Another factor that hindered R&D activities was the lack of a proper platform for the actual participants in the relevant activities, namely nuclear research institutes and researchers, to interact with each other, which made it difficult for them to facilitate the sharing and exchange of necessary information, personnel, and R&D infrastructure, and to seek opportunities for potential R&D cooperation and collaboration.

In order to meet the GPs' demand for cooperative research in NS&T, according to the directions of the RCA GOR, RCARO initiated its Managed Project: Research Project (RP) on Air Pollution in 2018. So far, two other RPs – one on air pollution and the other on radiotherapy – have been implemented. During the development and implementation of the RPs, RCARO has observed a strong and growing demand from the GPs for collaborative research in a wide range of nuclear technologies.

On the other hand, there have been increasing voices within the RCA community emphasizing the importance of research as an essential part of the RCA Programme activities. These voices culminated in the International Symposium organized by RCARO in December 2023, which highlighted the significance of R&D cooperation in the field of NS&T for the second half century of the RCA. The main opinions and suggestions were as follows: i) there is a need to establish a strong collaborative network among NNRI of GPs to exchange information, researchers and research results; ii) new areas of research cooperation, such as RI production, radiolabelling of biomaterials and other compounds, could facilitate collaborative research projects challenging young scientists to innovate; and iii) more R&D activities should be encouraged to generate more new knowledge, information and innovations, etc.

3. Draft Concept of Establishing a NNRI Network

3-1. Objective of the NNRI Network

The objective of the NNRI network is to contribute to enhancing the sustainability and resilience of the region by creating an R&D innovation ecosystem for building a strong nuclear technology capability of the RCA GPs. An R&D innovation ecosystem is a collaborative concept of interconnected diverse stakeholders, including researchers, research institutes, the government agencies and end-users, as well as other resources, working together to generate and disseminate innovative technologies. It serves as a platform for the stakeholders to exchange information and knowledge, leading to the generation of new ideas that can address societal challenges and drive economic growth. It also provides an innovation environment where researchers can collaborate across sectors and access the resources they need to develop and experiment their ideas.

In this context, it is proposed to establish the NNRI Network as a key vehicle for building an innovation ecosystem to vitalize R&D cooperation and collaboration among NNRI. Its main roles and functions may be the followings:

- To provide mechanisms for the exchange of NS&T R&D information, such as, national R&D programmes, facilities, scientists and researchers;

- To identify areas of common interest and mutual benefit for collaborative R&D and to develop joint R&D projects among NNRIIs;
- To facilitate the exchange of researchers among NNRIIs, including post-doctoral programmes and the sharing of key R&D facilities;
- To institutionalize the organization of presidential meetings of NNRIIs and support networking activities for key sectoral research communities to explore opportunities for collaborative partnerships among NNRIIs; and
- To consider organization of (so-called) “RCA Nuclear Tech-Fair” and “RCA International NS&T Conference” on a regular basis.

The fundamental feature of this network is its ownership. All stakeholders and elements should be well connected and co-operative to promote R&D innovation in the field of NS&T and to extend its impact, thereby promoting socio-economic development in the region. This strategic approach will also provide the momentum for the RCA to become a pathfinder in the global nuclear community.

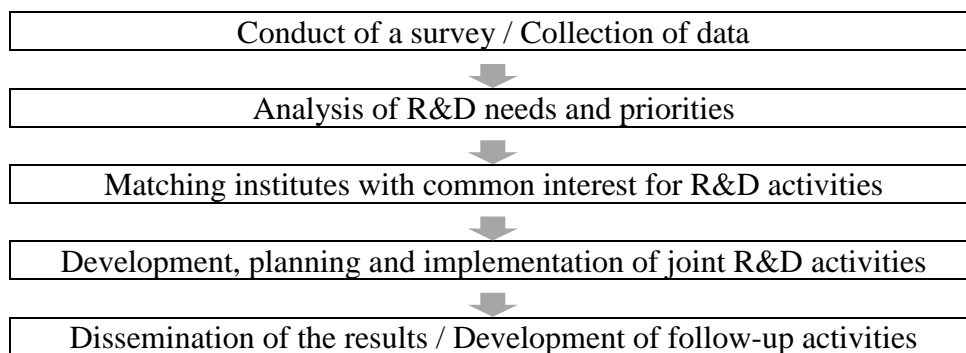
3-2. Setting-up and Operation of the NNRIIs Network

➤ Correlation with the RCA Framework

- The primary objective of the NNRIIs network is to complement the impact of the RCA programme by facilitating the R&D component. Its activities will focus on the consistency and complementarity with the RCA Programme, also taking into consideration national R&D activities and needs of the GPs.
- The NNRIIs network must be an independent entity, with members having the authority to make decisions and implement directives in order to enable the network to operate efficiently and deliver substantial results.
- The work plan and performance of the network will be shared with the NRs to seek for their suggestions and advices. Moreover, the results and database produced under the network’s activities will be provided to the GPs and relevant stakeholders to maximize the impact of the activities.
- The close support and intervention of the RCA GPs and other stakeholders will be necessary for an ownership-based sustainable network based on building a strong R&D innovation ecosystem in the region.

➤ R&D Projects and Relevant Cooperative Activities

- The scope of R&D activities is defined by the objectives of the network and the level of commitment of the participating institutes to share information and support the activities of common interest and mutual benefit.
- On the basis of a survey and analysis of the needs and priorities of the member institutes, strategic and various forms of partnership, which could lead to bilateral or multilateral undertakings, will be created to increase the effectiveness of the cooperative R&D activities from development to dissemination of the results.



- Each R&D activity will promote the exchange and collaboration of knowledge, expertise and resources among the participating institutes, with the aim of mutually enhancing technological capabilities, human resources and infrastructure of the RCA GPs.

➤ **Membership**

- Any NNRI of the RCA GPs (preferably a national research institute representing the GP) could be a member of this network on a voluntary basis.
- The network will consistently seek for possibilities to invite or engage RCA Regional Resource Units (RRUs) and IAEA Collaborating Centres as a means to enhance the efficiency of its activities.
- Members will take turns to chair the network for one year, based on their willingness and ability to do so.
- If necessary, based on a survey of NNRI, sectoral networks of key research communities could be established according to needs and priorities to promote the exchange of R&D information and identify potential joint R&D projects.

➤ **Meetings**

- An NNRI Presidential/Head of Research Forum will be held to discuss research and common concerns in conjunction with the RCA GCM. The agenda could include:
 - ✓ exchange of information on the status of R&D programmes, sharing of key R&D facilities and identification of potential collaborative R&D projects in the areas of NS&T among NNRI; and
 - ✓ reporting and review of joint R&D activities initiated by the network.
- Other appropriate opportunities will be organized either on-line or off-line for relevant stakeholders to address issues arising in the network when necessary.

➤ **Secretariat**

- RCARO may act as the secretariat to make the necessary arrangements and support the establishment and operation of the NNRI network.
- It will support the development and planning of joint R&D projects by analyzing and identifying the R&D needs and priorities of the member institutes.

- A dedicated online platform will be established and operated for the exchange and archiving of information and materials produced as part of the network's activities.

➤ **Funding and Resource Mobilization**

- RCARO, as the secretariat, will provide the financial support to the network for the organizing networking events, operating of the online platform and other activities for the network, subject to its budget availability.
- In principle, the source of funding for joint R&D activities should be identified and secured by the relevant stakeholders during the development of the activities.
- The network will also explore opportunities to build partnerships with other regional/international organizations to mobilize funding for joint R&D projects.
- If necessary and possible, in the long term, the network may consider the possibility of pooling the RCA R&D fund through joint contributions from NNRIIs and GPs to support R&D projects.

4. Follow-up Actions

Timeline	Follow-up actions
May 2023 (45 th NRM)	<ul style="list-style-type: none"> • Submit the concept paper on the establishment of the proposed NNRIIs network.
May – Aug. 2023	<ul style="list-style-type: none"> • Survey and analysis of the detailed status of NNRIIs, including a report on the existing research networks and how this new proposal will differ from those existing networks.
Sep. 2023 (52 nd GCM)	<ul style="list-style-type: none"> • Submit results of research and survey analysis, as well as recommendations to NRs at the 52nd GCM for their consideration.

5. Conclusion and Recommendations

R&D is essential to bring innovation and advancement in knowledge and technologies in the field of NS&T. The RCA Agreement and its Mission require that R&D be promoted and coordinated based on cooperation of the GPs but little focus has been put on the relevant activities in the RCA Programme. The importance to facilitate R&D component was greatly emphasized for the RCA to innovate and grow for the sustainable future as well as to maximize the impact of regional cooperation and seek for untapped possibilities.

In response to this growing voice, it is strongly suggested that a network of nuclear research institutes of the GPs be established, which will serve as a vehicle for the exchange of information and resources and for coordinating joint R&D activities. Based on strong ownership and commitment of the participating institutes, the network could create a R&D innovation ecosystem that will contribute to generating new and comprehensive solutions that can tackle regional challenges and bring socio-economic growth. This strategic approach is also expected to unlock the potential of the region by optimizing the capacity of the GPs in terms of technical and human resources.

In order to make this initiative of forging collaboration of the nuclear research institutes feasible and effective, it is necessary to secure active support and participation of the GPs. For this purpose, it is recommended as follows:

- the NRs note this discussion paper regarding the proposed NNRI Network;
- the NRs nominate appropriate national nuclear research institutes to participate in the proposed NNRI Network survey;
- RCARO develop a paper collating information on all the existing research networks in Asia and the Pacific, and detail how this proposed network will differ from existing networks
- the NRs encourage the candidate institutes to respond to a survey conducted by the RCARO;
- RCARO prepare a paper for the 52nd GCM in Vienna 2023 that presents the analysis and results of the survey and research into existing networks, and makes recommendations for NRs consideration.