Project Proposals for the RCA Programme 2020/2021
2nd Round Project Concept Template

Part 1: Information Sheet

Project proposals for the RCA Programme 2020/2021 are to be prepared using the attached template. Completed templates will be reviewed by the RCA PAC at the Meeting in Vienna being held 28 January to 2 February 2018.

- **PLEASE NOTE THAT ALL PROSPECTIVE CONCEPTS REQUIRE INFORMATION THAT IS LODGED ON THE RCARO WEBSITE (access is only required to the RCA information not the whole Members Only site).**
- **YOU WILL HAVE TO APPLY FOR A PASSWORD AND ACCESS CODE TO ENABLE ACCESS TO THIS INFORMATION.**
- **PLEASE GET ENDORSEMENT FROM YOUR NATIONAL REPRESENTATIVE FOR THIS ACCESS.**

The 2nd Round Concept Proposals will be evaluated against the response to the feedback you have received from RCA PAC on your 1st Round Concept Proposals as well as the criteria listed below:

- **Is its aims and objectives in line with priorities set out the RCA Medium Term Strategy for 2018/2023?**
- **Identify which elements of the MTS are being complied with.**
- **Why it should be a regional project.**
- **The essential role of the nuclear technology in the project.**
- **Does the proposal identify links to previous projects in this area of technology?**
- **Does the proposal overlap or duplicate current or previous RCA projects?**
- **Is a convincing case made to justify further projects in this area?**
- **Is there a strong TCDC component to exploit the benefits from the earlier projects?**
- **Is there a readily available baseline against which to measure the effectiveness of the project?**
- **If the proposal is essentially an extension of previous projects in this area that have been implemented for more than 2 TC Cycles, does the proposal include arrangements for the transfer of project leadership to others?**

In addition to the above, please address the following specific questions:

Was this concept identified at the 46th RCA GCM as requiring merger with other similar concepts?	**YES**
If "YES" – was this concept prepared as a result of consultation with the other proposers?	**YES** **Concept of China has been addressed in the present form of proposal**
If "NO" - why was this not undertaken?	

(Please note that it is important to address all the dot points in the Concept Template.)

Your National Representative will be reviewing the concept document to ensure that it has been prepared in compliance with the RCA special requirements.

(Please be aware that, if your concept design does not take account of the special requirements for the RCA programme, it will be rejected.)

Part 2: Concept Template

Title:

- *The title should be as concise as possible and should summarize the objective of the project.*

Strengthening the regional capacity to assess the impact of climate change & human activities on marine environment in the Asia-Pacific Region

Compliance with the RCA Medium Term Strategy for 2018/2023:
All RCA projects have to comply with the RCA MTS for 2018/2023 - please refer to the MTS document.

- *Briefly indicate to which specific MTS priorities this project proposal contributes.*

The project proposal will contribute to MTS priorities C.2.4 Priorities in Environment- Coastal and Marine Resources

- *How will these be achieved?*

These will be achieved by:

1. increasing scientific knowledge and developing research capacities
2. utilizing the region's expertise and nuclear facilities for the implementation of the project
3. addressing the impacts of climate change through enhanced scientific cooperation at all levels,
4. finally, creating a regional database for the regulatory body owing to decision making purpose to protect the marine environment deteriorated by increased human activities and climate change.

Overall Objective:

- *State the objective to which the project will contribute. (Note this has to be in line with the RCA MTS for 2018/2023. It should be a short description expressed as: To do ……..)*

1. To strengthen the regional capability and capacity on analysing pollutants (radio nuclides, trace and toxic elements and organic pollutants) in marine biota, water and sediment with a view to produce quality analytical data
2. To develop and strengthen coordinated regional marine pollutants (radio-nuclides, trace and toxic elements and organic pollutants) monitoring programmes for marine and coastal zone pollution studies
3. To assess the impact of human activities and climate change on marine and coastal environment
4. To create a dedicated "Asia and Pacific marine pollutants database" for regulatory purpose
5. To set regional Maximum Limits (MLs) for marine biota for decision making purpose to protect marine ecosystem and for assessing risk to human health.

Proposed Participating Government Parties:

- *List the Government Parties expected to participate in the project.*

1. Australia (Resource)
2. Bangladesh
3. China (Resource)
4. Cambodia
5. India
6. Indonesia
7. Japan (Resource)
8. South Korea
9. Malaysia
10. Myanmar
11. Marshal Island
12. New Zealand (Resource)
13. Pakistan
14. Palau
15. Philippines
16. Srilanka
17. Thailand
18. Vietnam
19. Fiji

Rest of the countries will be recipients.

- *Indicate each of those where you have baseline information on their requirements and needs:*

Review of the past RCA projects on marine environment and available scientific publications & reports reveals that no database or inadequate data on marine non radioactive including organic pollutants available. It is urgently needed to create a marine pollutants database and to set regional maximum limits on these pollutants for regulatory bodies to control further contamination in the marine environment & to meet the SDG goal no. 14.

Technical Cooperation among Developing Countries (TCDC) Project Component:
Review the documentation on line – www.rcaro.org/ *???.*

- *Outline the TCDC strategies to be used in the project to enhance regional cooperation:*

TCDC strategies will be addressed more efficiently through the sharing of experience, expertise and resources among participating Member States and utilizing the Regional Resource Units.
The project successfully will promote the TCDC concept for networking within the RCA region.

- *Will the project design feature partnering arrangements between those advanced and those less advanced in the technology?*
  Yes
- *If so, list those expected partnerships.*

Partnership between scientific and other relevant organizations:

1. Regional partnership for sharing expertise, data and technologies in the area of marine pollution and climate change
2. Partnership between Government and non-government organizations for effective implementation of project
3. Partnership with technologically advanced countries like Australia, China, Japan, New Zealand with less advanced countries. These countries may play role as Regional Resource Unit (RRU) for organizing training on sampling, sample analysis, data analysis as well as data interpretation and creation of a regional database.
4. Participating countries will be benefited not only from the technical support provided by the project, but also from the effective interaction between more advanced countries and less experienced ones.

Analysis of gaps / problems / needs as applied to the RCA region:

- *Outline the major gaps / problems/specific needs to be addressed by the project (~ 300 words):*

Over recent years marine and coastal zones have become the focus of much attention at the global level as the ocean is one of Earth's most valuable natural resources. 2.6 billion people rely on seafood as their main source of protein and fisheries contributes significantly to global food security, livelihood and the economy. Unfortunately, the resources are being deteriorated due to climate change, increased human activities i.e. over exploitation of resources, aquaculture & industry at the coastal zone even at the deep sea area etc. In recent years, due to massive deterioration of marine resources, scientists and policymakers recognize the urgent need to strengthen the capacity building to monitor effect of climate change and human activities for sound decision making and action. Thus work to address the threat, require cooperation and coordination at the international, national, regional, and collaboration among scientists and researchers in a wide range of disciplines.

Recent studies show, due to rapid industrialization, increased human activities and climate change in developing countries like Bangladesh, Myanmar, Thailand, Vietnam, Sri Lanka, Pakistan, Philippine, Cambodia, Maldives, etc. marine and coastal areas are being polluted. Review on the past RCA projects on marine environment reveals that all most all projects have focused on the marine radioactivity and radioactive pollutants as well as database on marine radioactivity and radioactive pollutant (Asia Pacific Marine Radioactivity database (ASPAMARD) have been created but there is no baseline data available on marine non-radioactive and organic pollutants to assess the impact of human activities and climate change in this region except few countries. So, it is emergent to develop manpower and methodology to create "Regional Marine Pollutants Database" and also for setting regional "Maximum Limits" (MLs) for marine biota for decision making purpose to protect marine ecosystem & to meet the SDG goal no. 14. Under this project, capacity will be built up through proper training of manpower and installing necessary equipment used in marine pollution research. Capacity will also be developed for monitoring chemical contaminants, organic pollutants and radio-nuclides trend to study the impact of human activities and climate change on

marine and coastal environment.

- *Review the resource documentation and list any past RCA projects that have addressed similar problems/needs in this area of technology.*

The following projects related to MTS priorities C.2.4 Environment- Coastal and Marine Resources have been conducted except Sl. No.6 which is on going:

1. RAS7011-Enhancing the Sustainability of the Marine Coastal Environment (RCA)
2. RAS7016-Establishing a Benchmark for Assessing the Radiological Impact of Nuclear Power Activities on the Marine Environment in the Asia-Pacific region (RCA)
3. RAS7019-Harmonizing Nuclear and Isotopic Techniques for Marine Pollution Management at the Regional Level (RCA)
4. RAS8083-Management of Marine Coastal Environmental Pollution (RCA)
5. RAS/7/021-Marine benchmark study on the possible impact of the Fukushima radioactive releases in the Asia-Pacific Region
6. RAS7028-Enhancing Regional Capabilities for Marine Radioactivity Monitoring and Assessment of the Potential Impact of Radioactive Releases from Nuclear Facilities in Asia-Pacific Marine Ecosystems (RCA)- ongoing

Achievements of the past projects are as follows:

RAS 7011: Global Marine Radioactivity Database (GLOMARD) and Asia Pacific Marine Radioactivity database (ASPAMARD) have been expanded and updated by this project. In addition a number of participating Member States have successfully applied isotope techniques to identify sources of pollutants (domestic, agricultural and industrial) in highly contaminated areas. The project established and/or enhanced capabilities to monitor PSP toxins in some Asian countries. Expertise in Receptor Binding Assays (RBA) applications and marine environmental studies was expanded significantly in the region, The project also established and/or enhanced capabilities in lead-210 dating and reconstruction of HAB histories in the region.

RAS 7019: All participating Member States have enhanced their national capabilities in identifying and assessing land-based sources of marine pollutants using nuclear and isotopic technique in order to address management and/or remediation action plans

RAS 8083: Participating RCA Member States capability in using numerical modelling codes to address problems related with harbor or estuary development and offshore effluent dispersion has been enhanced. Networking between end users and the nuclear institute in each country in the region has also been established.

RAS 7016, RAS, RAS 7021 and RAS 7028: These three projects have mainly focused on radioactivity and nuclear contaminates monitoring in marine environment and have been significantly enhanced national

capacity and capabilities in marine and coastal zone pollution studies related to radioactivity and radioactive contaminants. In addition, these projects have also contributed to enrich the data in the Asia Pacific Marine Radioactivity Database (ASPAMARD).

However, to the best of our knowledge, none of the projects addressed regional monitoring of non radioactive pollutants i.e. toxic trace elements and organic pollutants and their impact on marine ecosystem have not been addressed detail yet by the RCA projects. Therefore, the proposed project will focus on these pollutants studies to create a "Regional Marine Pollutant Database" as a reference in future studies, analysing the trend and useful tool for regulatory bodies to protect marine environment.

- *What are the major additional capabilities/skills in this area of technology that will be provided through this project (~ 200 words).*

There is no RCA project in the region running or previously run to address the human activity and climate change impact on marine environment. Therefore, the followings additional capabilities will be provided by the present project:

1. MS capability will be developed in analysing marine samples (water, biota and sediment) for trace toxic elements, radio-nuclides and organic pollutant using ICP-MS, LC-MS-MS, IRMS and GC–MS through RTC and expert sharing
2. MS capability will also be developed to produce/generate quality assured analytical data by establishing validated and accredited test methods using above technologies as per ISO standard
3. Development of standardized protocol(s) as per ISO for measurement of contaminates in the marine samples
4. Enhancing regional capability as well as facility development to assess the impact of human activities and climate change on marine environment.

Requirements for participation:

- *Indicate the minimum requirements that the counterpart institutions in Government Parties would need to meet in order to participate in this project.*

1. LC-MS/MS, ICP-MS, IRMS and GC-MS would be required for this project, so participating GPs might have access to them.
2. Participating GPs should have capabilities or capacities to undertake quality marine sampling, sample storage and preparation arrangement.

The participating GPs having lack of the above mentioned facilities will have the opportunity to utilise the RRU's facility.

- *Indicate the status of expected participating Government Parties as "Resource" or "Recipient".*

It is expected that total 19 (nineteen) countries will be participating in this project namely Australia, Bangladesh, China, Cambodia, Fiji, India, Indonesia, Japan, Malaysia, Myanmar, Marshal Island, New Zealand, Pakistan, Palau, Philippines, Srilanka, South Korea, Thailand, Vietnam, Among the participating

countries Australia, China, Japan and New Zealand might be act as “Resource Country” and rest of the 15 countries may act as “Recipient Country”.

Stakeholder analysis and partnerships:

- *Briefly describe who are expected to be the principal beneficiaries of this project and any role that will be defined for them in the project.*

The beneficiaries will be the marine research organizations, regional and international marine programs, seafood industries and public in general through better protected environment. These end-users are expected to provide feedback information to decision and policymakers for determining legislation, regulations, standards and guidelines on sustainable environmental management to lessen the negative impact of climate change and human activities. The national environmental department, national marine resource department, national fisheries department, national water resources department, marine specialists, local government and environment civic groups will be involved in the project for disseminating the outcome of the project, educating coastal communities on conservation and protection of valued coastal resources through awareness programs locally and regionally. The national department of environment or national marine resource department is expected to agree and implement an integrated programme for marine monitoring.

- *Have any extrabudgetary funding possibilities, sponsors and partners been identified?*

It is expected that in-kind contribution of financial, logistic, infrastructure and human resources support will be provided by the participating Member States to the project.

- *Have any sponsors/partners been involved at the concept stage? Not yet*
- *Have any sponsors/partners made firm commitments of support at this stage? Not yet*
- *Have any sponsors/partners expressed firm commitments to extra budgetary support? Not yet*

Role of nuclear technology:

- *Indicate the essential nuclear technique that is planned be used in this project.*

Inductively Coupled Plasma-Mass Spectrometry (ICP-MS), Liquid Chromatography-Mass Spectrometry/Mass spectrometry (LC-MS/MS), Isotope Ratio Mass Spectrometry (IRMS) and Gas Chromatography-Mass Spectrometry (GC-MS) techniques would be used for addressing the project objectives.

- *Outline why it is suitable for addressing the problems/needs in question.*

ICP-MS is ideal for multi-elements quantification, extremely sensitive, can achieve a very low level detection limit of parts-per-trillion (ppt)/ng/L, can detect most elements including radio nuclides, isotopic

ratios in marine environmental samples, and the main advantage of ICP-MS is that it is suitable for water, sediment & marine biota sample analysis at very low level. Other mass spectrometry techniques such as LC-MS/MS, GC-MS are suitable for quantification of organic pollutants such as Polychlorinated Benzenes (PCBs), Polycyclic Aromatic Hydrocarbons (PAHs), Normal chain Hydrocarbons (NHs), etc.

- *Is this the only available technique?*

For multi-elemental analysis, Neutron Activation Analysis (NAA) and Proton Induced X-ray Fluorescence (PIXE) can be deployed but these are mainly suitable for solid samples not for water. On the other hand detection capability (sensitivity) is poorer than the ICP-MS; in addition, some important toxic elements like Cd, Pb, Hg cannot be measured or measured with poor accuracy and precision where Mass technique is very much appropriate to measure these elements at ppb (µg/L) or ppt (ng/L) level with high accuracy and precision. For isotope ratio measurement, IRMS is the most suitable technique.

- *Does it have a comparative advantage over non-nuclear techniques?*

Three/four main advantages of nuclear technique over the non-nuclear techniques are multi analyser, higher sensitivity, faster in some cases and can quantify many important radio-nuclides. ICP-MS, LC-MS-MS, GC-MS all are the multi-elements/multi-analyte techniques; wide range of radio-nuclides and analytes can be detected and quantified at parts per billion (ppb)/ parts per trillion (ppt) level. Therefore, by these Mass techniques, 10-50 analytes/radio nuclides would be possible to measure in a single run at ultra trace level. On the other hand, non-nuclear technique like Atomic Absorption/Atomic Emission Spectrometry etc. is suitable for selective elemental analysis not for radio-nuclides like U, Th etc. Moreover, these techniques are the single element analyser and detection limit is higher than Mass techniques. Similarly, HPLC or GC would be alternative option for organic contaminants however, for ultra trace level quantification of wide range of organic contaminants; MS technology appears to be the method of choice among present-day technologies.

Duration of the project:

- *Indicate the number of years estimated to be required to complete the project.*

3-4 years

Part 3: National Representative Endorsement for Project Concept

I have endorsed the proposer to have access to the RCARO web page for the resource documentation necessary to complete the attached concept document.

This 2nd Round Concept meets the RCA project requirements and I endorse it as a priority for the RCA Programme 2020/2021.

Signed: 

Date: 15.01.2018