

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. |
| 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.*

Assessment of radioactivity in marine biota along the southeast coast of China and its marine radioecology application in Asia-Pacific Marine Ecosystems

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.*
- *How will these be achieved?*

The project comply with all the priorities in the coastal and marine resources sector of the RCA MTS for 2018/2023. “i) Enhance the capability to assess the impact of human activities and climate change on marine and coastal ecosystems; ii) Facilitate the use of regional database on marine radioactivity and pollutants by the end-users for decision making purposes; iii) Assist the relevant regulatory authorities to adopt nuclear based analytical techniques to improve decision making related to marine pollution, including Harmful Algal Blooms (HAB).”

The project will provide the radioactivity information of marine biotas, it can build database on marine radioactivity for decision making purposes. The project will developed the transfer and exposure models that incorporate physical, chemical and biological interactions, and the models and results would also enhance the capability to assess the impact of human activities on marine and coastal ecosystems. The project’s final purpose is to assist the relevant regulatory authorities to improve decision making related to potential marine pollution.

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)*

To quantitatively estimate the radioactivity of marine biota (more than 50 marine biotas, including shrimp, fish, shellfish and alga) in the Asia and Pacific ocean. And the indicator species of Southeast-Asia coastal ecosystem can be ascertain in the project. Besides, a database will be built to help to estimate the potential risks of radionuclides to humans. The research will investigated the biogeochemical and ecological processes that control the fate and transfer of radionuclides in the marine environment.

Proposed Participating Government Parties:

- *List the Government Parties expected to participate in the project.*
- *Indicate each of those where you have baseline information on their requirements and needs:*

The expected advanced partners:

China: marine biota database investigation, marine radioecology experiment

Australia: marine radioecology experiment

Korea: marine biota database investigation, marine radioecology experiment
Bangladesh: marine biota database investigation
Japan: marine biota database investigation
Malaysia: marine biota database investigation
Vietnam: marine biota database investigation
Thailand: marine biota database investigation

The expected less advanced partners:

Cambodia, Laos, Pakistan, Philippines, Indonesia, Myanmar, Sri Lanka

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:*

The project will assess the radioactivity and estimate the potential risks of radionuclides on marine environment along the southeast coast of China. The result will then be compared with studies in other regions. This will be helpful for the assessment of the potential impact of radioactivity releases in Asia-Pacific marine ecosystems.

And the project will find out the indicator species of Southeast-Asia coastal ecosystem, that would be very useful information for the Southeast-Asia developing countries (such as Bangladesh, Vietnam, Thailand and Fiji).

- *Will the project design feature partnering arrangements between those advanced and those less advanced in the technology?*

The project will update the database of radioactivity in biotas, which can be used to help to build the model of marine biota's uptake of radionuclides through the food web in marine ecosystems especially Southeast-Asia marine ecosystems. The technology can help to largely improve the understanding of the radionuclides' enrichment process and its potential influence on marine system. In the project, we want to design partnering arrangements with some ASEAN countries (Vietnam, Thailand) based the past China-ASEAN projects we had.

- *If so, list those expected partnerships.*

We would conduct some proficiency test, share investigation and marine radioecology experiments.

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):*

Nuclear power is one of the clean energy, which plays an important role in the development of sustainable economy. "Asia is one of the regions where nuclear energy is "high on the agenda" and could be one of the drivers for global nuclear power deployment". Most of the nuclear power reactors are built along the coast of the countries. The liquid effluent discharged into the coast by the normal operation of the nuclear power plant may have a potential cumulative effect on the habitat of the surrounding marine biotas. The Fukushima Dai-ichi nuclear power plant accident in 2011 release artificial radionuclides to the asia-pacific ocean, radionuclides with long half-lives will remain in the marine environment.

The environmental radioactive pollution is one of the major issues in utilizing nuclear energy. Radionuclides can be rapidly incorporated into marine organisms either by uptake from seawater or by

food ingestion once they are released to the environment. The study of the adsorption behaviour, the transport and the fate of radionuclides in marine environment can help to better evaluate the potential nuclear pollution to the environmental and human health. Asia accounted for 70.8% of global fish production (88.9% of aquaculture and 56.5% of capture production), excluding aquatic plants. China alone produced 37.5% and consumed 37.1% of the world's food fish, South Asia and Southeast Asia accounted for 27.6% of global fish supply. The marine flora and fauna of the Southeast-Asia seas are characterized by high biodiversity, which are mainly dominated by many subtropical species. The rich resources of these species have supported a strong captive fisheries and mariculture. Some endemic ones like fishes, crustaceans, mollusca, seaweed made great contributions to local economies. Human-induced regional environmental change modifies the structures and functions of coastal systems dramatically, which would then, in turn, significantly affect the livelihoods of the population. There was an ongoing need to obtain reliable data to assess and follow the radiological state of the local environment, there is no baseline data available on marine biotas radioactivity to assess the potential risks of radionuclides to humans.

The project will provide marine biotas radioactivity baseline database of the Aisa and Pacific ocean, which can develop the capacity for assessing the impact of human activities on marine and coastal ecosystems.

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

The project may be some overlap with the approved project RAS/7/028, "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)". But our project are more focused on the Southeast-Asia coastal ecosystem and the marine biotas, that can give more regional characteristic and significance.

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

1、The current methods for processing biota samples require more than 15 kg of each sample. The project will optimize the processing method, and the new methods will reduce the sample amount to less than 1 kg.

2、One software will be designed in the project for the database. And the database can be input, modified and output by using the software.

3、Time-dependent predictions of radionuclide concentration to biota will be made, and the transfer and exposure models that incorporate physical, chemical and biological interactions will be developed.

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

The counterpart institutions in Government Parties should have the basic facilities such as marine biotas treatment and radionuclides analysis. The institutions should have funds to support their research works. "Resource Government Parties": Those institutions have the capacities of field investigation, radionuclides analysis or marine radioecology experiment.

Recipient Government Parties: Those institutions without any contribution.

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.*

- 1、The results of the project can provide useful information for fisheries and aquaculture.
- 2、The database built by the project can help to estimate the potential risks of radionuclides to humans, which can be used in the coastal regions that have nuclear power plants in China and other countries.
- 3、Base the database and experiment result, indicator species of Southeast-Asia coastal ecosystem can be ascertain. That's the important for the marine environment.

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

Our institute have been investigating many baseline researches in the past decade based other projects, and have got some data.

- *Have any sponsors/partners been involved at the concept stage?*

No.

- *Have any sponsors/partners made firm commitments of support at this stage?*

Third Institute of Oceanography, State Oceanic Administration will provide support.

- *Have any sponsors/partners expressed firm commitments to extrabudgetary support?*

No.

Role of nuclear technology:

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

The radioactivity (^3H , ^{90}Sr , ^{40}K , $^{110\text{m}}\text{Ag}$, ^{134}Cs , ^{137}Cs , ^{226}Ra , ^{238}U) of marine biotas will be determined using nuclear analysis technique (γ -ray detector, Liquid scintillation spectrometer, α/β counter).

Develop transfer and exposure models that incorporate physical, chemical and biological interactions, enabling time-dependent predictions of radionuclide concentration to biota to be made.

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

The project will assess the nuclides radioactivity and radio risk in the marine biotas. Overall, the nuclear technology is the main technology in the project.

- *Is this the only available technique?*

Yes.

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

The methods of the project can directly investigate the fate and transfer of radionuclides in the marine environment, the can be used to investigate the potential radio risks. All of that can not be achieved using non-nuclear techniques.

Duration of the project:

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

The project required three 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:

**Mr. LIU Yongde
Secretary General
CAEA**

A handwritten signature in black ink, appearing to read 'Liu Yongde', is written over a faint, light-colored rectangular stamp or watermark.

Date:

Jan.12, 2018

Part 4: RCA PAC 2nd Round Concept Review Template

| RCA Project Concept Template Questions | Comment | Acceptable | Revise | Reject |
|--|---------|------------|--------|--------|
| Title: <ul style="list-style-type: none"> <i>The title should be as concise as possible and should summarize the objective of the project.</i> | | | | |
| Compliance with the RCA Medium Term Strategy for 2018/2023: <i>All RCA projects have to comply with the RCA MTS for 2018/2023 - please refer to the MTS document.</i> <ul style="list-style-type: none"> <i>Briefly indicate to which specific MTS priorities this project proposal contribute.</i> <i>How will these be achieved?</i> | | | | |
| Overall Objective: <ul style="list-style-type: none"> <i>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)</i> | | | | |
| Participating Government Parties: <ul style="list-style-type: none"> <i>List the Government Parties expected to participate in the project.</i> <i>Indicate each of those where you have baseline information on their requirements and needs:</i> | | | | |

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|---|--|--|--|--|
| <p>Technical Cooperation among Developing Countries (TCDC) Project Component: <i>Review the documentation on-line - www.rcaro.org/ ???</i></p> <ul style="list-style-type: none"> <i>Outline the TCDC strategies to be used in the project to enhance regional cooperation:</i> <i>Will the project design feature partnering arrangements between those advanced and those less advanced in the technology?</i> <i>If so, list those expected partnerships.</i> | | | | |
| <p>Analysis of gaps / problems / needs:</p> <ul style="list-style-type: none"> <i>Outline the major gaps / problems/specific needs to be addressed by the project (~ 300 words):</i> <i>Review the resource documentation and list any past RCA projects that have addressed similar problems/needs in this area of technology.</i> <i>What are the major additional capabilities/skills in this area of technology that will be provided through this project (~ 200 words).</i> | | | | |
| <p>Requirements for participation:</p> <ul style="list-style-type: none"> <i>Indicate the minimum requirements that the counterpart institutions in Government Parties would need to meet in order to participate in this project.</i> <i>Indicate the status of expected participating Government Parties as “Resource” or “Recipient”.</i> | | | | |

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|---|--|--|--|--|
| <p>Stakeholder analysis and partnerships:</p> <ul style="list-style-type: none"> <i>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.</i> <i>Have any extrabudgetary funding possibilities, sponsors and partners been identified?</i> <i>Have any sponsors/partners been involved at the concept stage?</i> <i>Have any sponsors/partners made firm commitments of support at this stage?</i> <i>Have any sponsors/partners expressed firm commitments to extrabudgetary support?</i> | | | | |
| <p>Role of nuclear technology:</p> <ul style="list-style-type: none"> <i>Indicate the essential nuclear technique that is planned be used in this project.</i> <i>Outline why it is suitable for addressing the problems/needs in question.</i> <i>Is this the only available technique?</i> <i>Does it have a comparative advantage over non-nuclear techniques?</i> | | | | |
| <p>Duration of the project:</p> <ul style="list-style-type: none"> <i>Indicate the number of years required to complete the project.</i> | | | | |

| RCA PAC Assessment | |
|---|--|
| Is the concept recommended for further development? YES/NO If not recommended, what are the major reasons? | |
| RCA PAC Committee Member: | |