

**RAS 7024: Supporting Nuclear and Isotopic  
Techniques to Assess Climate Change  
Impact for Sustainable Marine Ecosystem  
Management**

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# RAS 7024: SUPPORTING NUCLEAR AND ISOTOPIC TECHNIQUES TO ASSESS CLIMATE CHANGE IMPACT FOR SUSTAINABLE MARINE ECOSYSTEM MANAGEMENT

**Objective:** To enhance regional capabilities for utilization and application of nuclear and isotopic techniques to assess climate change impacts on marine and coastal resources. The participating Government Parties (GPs), through interaction with the end-users and stakeholders will identify the issues and concerns in the marine environment resulting from the impacts of climate change and then address specific priority areas to demonstrate the use of NATs and NITs in the characterization of environmental changes and pollution trends.

**Implementation Period: 2012-2014**

2012

PMO : H. S.Lee  
TO : Thomas  
Lacoue Labarthe

2013-  
2014

PMO : M. Oulabi  
TO : Christopher  
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One year  
extension 2015

PMO : M. Malek  
TO : Marc Metian

# PARTICIPATING GOVERNMENT PARTIES

GOVERNMENT PARTY/Affiliation	National Project Counterpart
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Radioactivity Testing and Monitoring Laboratory Bangladesh Atomic Energy Commission BANGLADESH 	Masud Kamal
Third Institute of Oceanography National Bureau of Oceanography State Oceanic Administration CHINA 	Yusheng Zhang
Bhabha Atomic Research Center INDIA 	S.K Jha
Center for the Application of Isotopes & Radiation Technology National Nuclear Energy Agency INDONESIA 	Ali Arman
Malaysian Nuclear Agency MALAYSIA 	Rahman Yaccup

**GOVERNMENT  
PARTY/Affiliation**

**National Project Counterpart**

Institute of Meteorology and Hydrology  
**MONGOLIA**



D. Oyunbaatar

Department of Atomic Energy  
Ministry of Science and Technology  
**MYANMAR**



Thi Thi Oo

National Isotope Centre  
GNS Science  
**NEW ZEALAND**



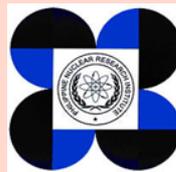
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**PHILIPPINES**



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SRI LANKA



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Thailand Institute of Nuclear Technology  
THAILAND



Kanitha Srisuksawad

Institute for Nuclear Science and Technology  
VINATOM  
VIETNAM



Trinh van Giap

Ministry of Environment  
CAMBODIA



Chea Leng

**NEW MEMBER**

AUSTRALIA and NEW ZEALAND are  
Resource GPs

# REGIONAL ACTIVITIES

Activities	Date	Venue	Participating Member States
Project Planning and Formulation Meeting	August 21-24, 2012	Vienna International Center, IAEA Vienna, Austria	AUL,PRC,BGD,IND,INS,MAL, MYA,NZL, PAK, PHI,SRL and THA
RTC1: Application of Stable Isotopes (Carbon-13, Nitrogen-15 and Oxygen-18) and trace elements as tracers of biogeochemical change in the marine environment	November 21-30, 2012	National Atomic Energy Agency Colombo,Sri Lanka	AUL,PRC, BGD,IND,INS,MAL, MYA,PAK,PHI,THA SRL and VIE
PRAWN PROJECT	January-June 2013	Australia	AUL,BGD,IND,INS,MAL ,MYA, PAK,PHI,THA SRL and VIE
RTC2- Interpretation and statistical analysis of nuclear & isotopic data in addressing climate change issues	August 26-30, 2013	Nuclear Malaysia Malaysia	AUL,BGD,PRC, ND,INS,MAL, MYA,PHI,THA SRL and VIE
Midterm Project Coordination Meeting	December 2-6, 2013	Bhabha Atomic Research Center Goa, India	AUL,BGD,IND,INS,MAL,MYA, NZL,PHI,THA SRL and VIE

# REGIONAL ACTIVITIES

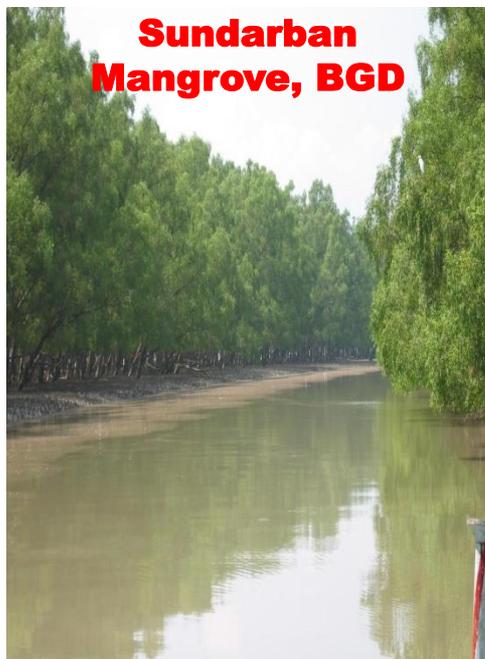
Activities	Date	Venue	ParticipatingGPs
<b>Workshop on Integration of nuclear and isotopic data on climate change and marine ecosystem regional impacts</b>	December 8-12, 2014	Environmental Laboratory Monaco	AUL,BGD,PRC,CAM, IND,INS,MAL,MYA, NZL,PHI,THA SRL and VIE

# Marine Climate Change in Australia

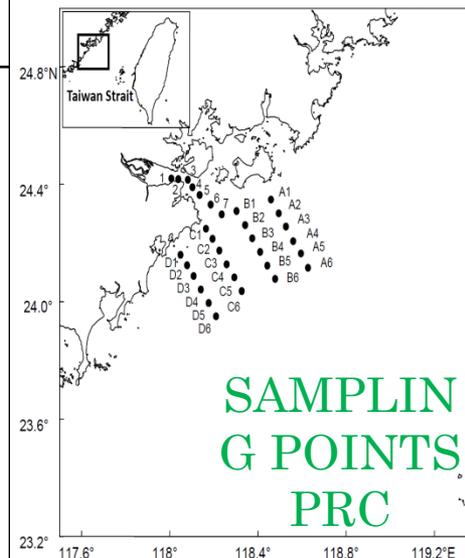
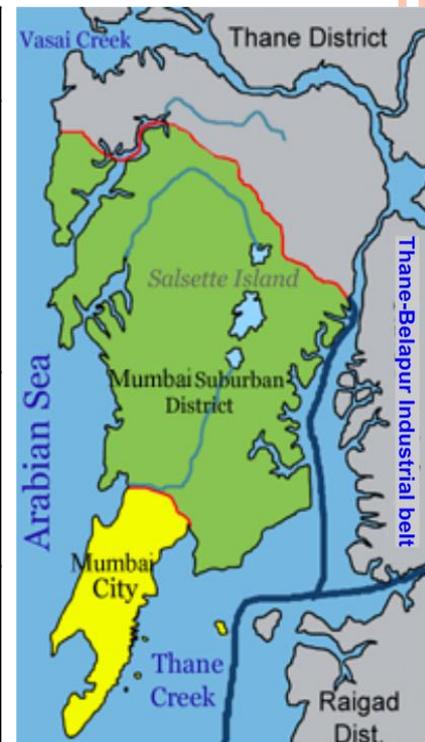
Impacts and Adaptation Responses 2009 REPORT CARD



This report card summarises our current knowledge of marine climate change impacts for Australia, highlighting key knowledge gaps and adaptation responses



MEMBER STATES	MAIN ACCCOMPLISHMENTS
AUSTRALIA	<p>Expansion of membership of the National Project Team to cover broader range of specialists.</p> <p>Provision of lectures and training modules in training courses.</p> <p>Technical Advises to interested MS in their capacity as Resource Country.</p>
BANGLADESH	<p>Technical Assistance to students of marine studies</p> <p>Conduct of a national seminar for awareness in climate change.</p> <p>Implementation of national research project.</p>
CHINA	<p>Measurement of three radium isotopes of all the collected water samples from the two cruises made in 2012.</p> <p>Estimation of upwelling rates and the vertical diffusion coefficients of the Minnan-Taiwan Bank Fishing Ground. Determination of nutrients fluxes in the above study area.</p>
INDIA	<p>Investigation on bio-geochemistry and cycling of trace elements in biota clam, bivalve and crab is in progress.</p> <p>Standardization of C-14 measurement in different environmental matrices.</p> <p>Procurement of IRMS.</p> <p>Measurement of hydrographic elemental concentration in Arabian sea during pre-monsoon and post monsoon.</p> <p>Assessment of behaviour and migration of fish using isotopic ratio of radium in Mumbai coast</p> <p>Analysis of sea water chemistry for environmentally sensitive elements.</p>





**INDONESIA**

- Identification of sampling sites.
- Collection of Coral cores.
- Xray Radiography Studies in Corals.
- Establishment of age control in the corals.
- Preliminary analysis of data sets acquired.

**MALAYSIA**

- Research collaboration with the Forestry Department of Malaysia. Identification of Laut Matang Mangrove Forest Reserve at Taiping Perak as the research site.
- Research proposal submitted for funding
- Hosting of Malaysia of the 2<sup>nd</sup> RTC on the “Interpretation and Statistical Analysis of Nuclear and Isotopic Data in Addressing Climate Change Issues” to be held in Kuala Lumpur on 26 – 30 August 2013.
- Conduct of sampling and analysis of samples for Pb210 and stable isotope .

**MYANMAR**

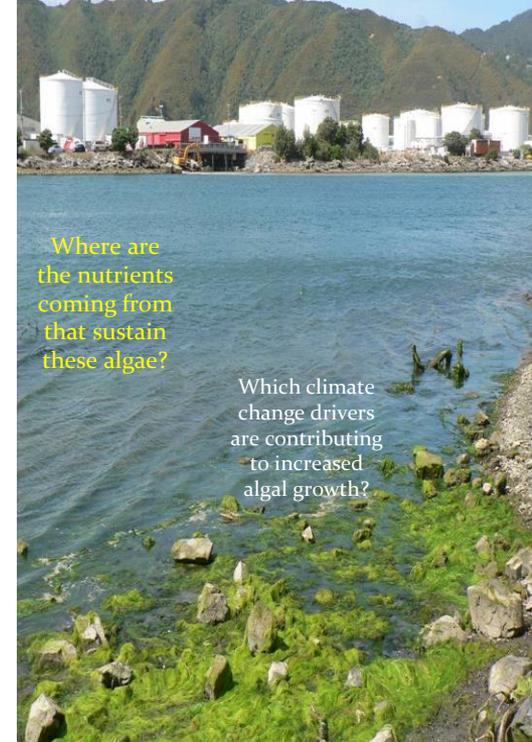
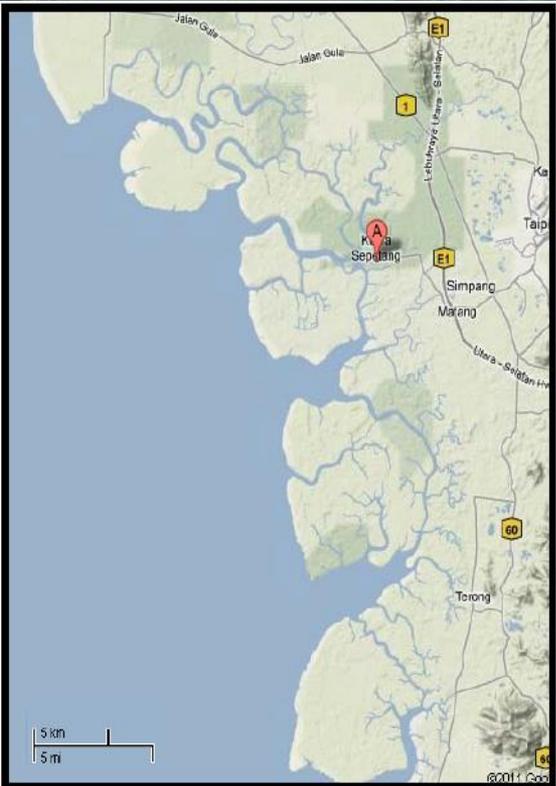
- Gamma spectrometry and radionuclide analysis in some marine fishes.
- Trace Element analysis also conducted by the collaborating agency , the Dept of Fisheries.

**NEW ZEALAND**

- Implementation of project titled : Assessing impacts of marine nutrient loading using a New Zealand coastal bio-indicator

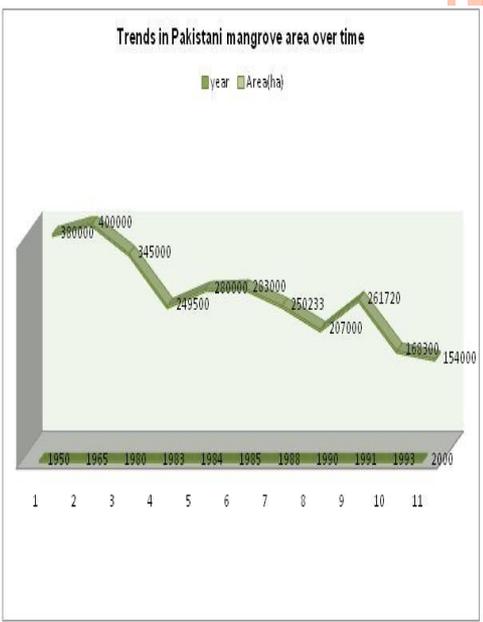
**PAKISTAN**

- Collection of sediment cores in two sampling sites.
- Processing of biota and sediment samples
- Isotopic analysis of Biota and sediment Samples



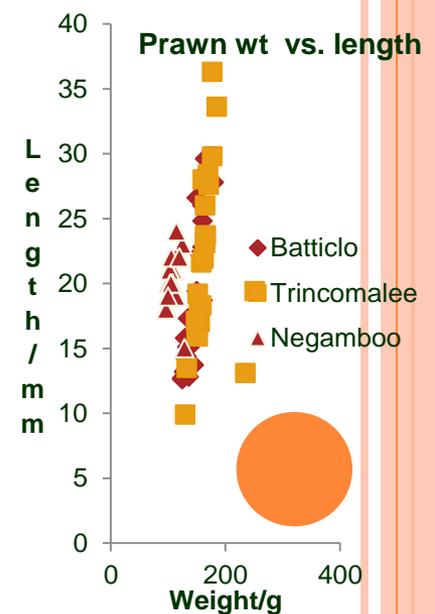
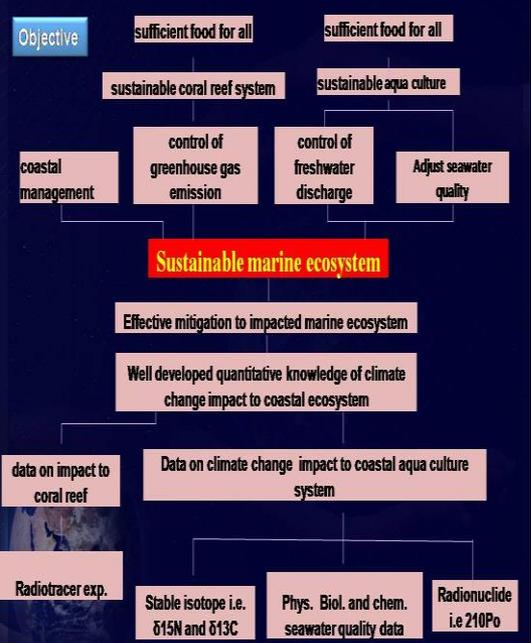
Where are the nutrients coming from that sustain these algae?

Which climate change drivers are contributing to increased algal growth?





<p><b>PHILIPPINES</b></p>	<p>Collection and analysis of sediment samples in connection with Manila Bay Project and its habilitation efforts.          Participation in the Project on the use of Nuclear and isotopic techniques to establish the age profile and trace element profile for use in the setting-up of sediment standard criteria          Collection of samples in the Haiyan -Typhoon devastated areas in order to assess pollutant concentration, transfer, movement and dispersal due to extreme weathers.</p>
<p><b>SRI LANKA</b></p>	<p>Hosting of the first RTC.          Participation in the Prawn Project as all MSs have.          Collection of samples and preliminary preparation for stable isotopes analysis thru analytical services support.</p>
<p><b>THAILAND</b></p>	<p>Implementation of two research Projects:          1. Feasibility study of the Potential use of <math>^{210}\text{Po}</math> in Bivalves for Monitoring of Climate Change Impact in Coastal Aquaculture          2. Potential Impact of Rising Seawater Temperature on Calcifications of Scleractinian Corals in Tropical Areas          Participation in the regional activities.</p>
<p><b>VIETNAM</b></p>	<p>Collection of sediment core samples in Binh Huong estuary in two points: one, near Tuan Chau Island and the other, near Think town in both bottom and deep sea. Sea animal samples were also collected.          Po-210 and Pb-210 analysis in the sediment cores to estimate age of sediment core and heavy metal element and other tracer elements.</p>



**WOKSHOP  
OUTPUT**

Assess Climate Change Impact for Sustainable  
Marine Ecosystem Management

**ASIA-PACIFIC REGION CLIMATE CHANGE REPORT CARD**

Report card summarizes our current knowledge of marine climate change impacts for the Asia-Pacific region, highlighting issues, observations, predictions, key knowledge gaps, nuclear and isotopic applications, accomplishments and recommendations for response and/or future studies.

**REGIONAL CLIMATE CHANGE STATEMENT**

Increasing concentration of greenhouse gases in the atmosphere change the Earth's radiative balance (the balance between incoming solar radiation and outgoing radiated energy) and lead to global warming. Atmospheric concentrations of carbon dioxide have increased markedly since the Industrial Revolution (circa 1750) from 280 ppm to 387 ppm in 2009, as a result of human activities based on fossil fuel use. Air and ocean warming observed since the 1950s, both globally and across the Asia-Pacific (RCA) region, are attributable to increases in atmospheric greenhouse gas concentrations. For marine ecosystems, rising atmospheric greenhouse gases warm the atmosphere and oceans altering circulation patterns and bringing the additional threat of ocean acidification. Links between human activities and physical, chemical and biological ocean processes are complex and widespread, affecting the coastal, deep and open oceans.

**PARTICIPATING COUNTRIES**

Australia, Bangladesh, People's Republic of China, India, Indonesia, Malaysia, Mongolia, Myanmar, Philippines, Sri Lanka, Thailand and Vietnam. Details of individual country activities and outcomes are available in National Project reports provided as annexes to the Report Card.



**CONTRIBUTORS**

Charles Gregory Skelbeck (AUL), Ronald Szymczak (AUL), TsermaFabisChoudhury (BGD), Masud Kamal (BGD), LengChea (CAM), Jianhua He (CPR), Yusheng Zhang (CPR), YindanaPalhani (IND), Ali Arman (INS), RahmatYacoub (M.L.Y), Thu Ka Thi Ra (MYM), Karyne Rogers (NZE), AdhimalaDas (PHI), VajiraArjyaramaWadhuge (SRL), KamthaSissakawad (THL), Linh Nguyen (VIE), Giap Trinh Van (VIE)



*"Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level"*

Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report 2007

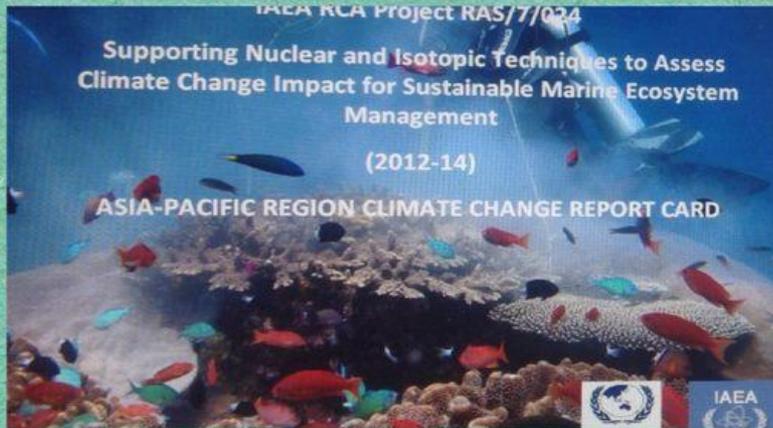


IAEA RCA Project RAS/7/024

**Supporting Nuclear and Isotopic Techniques to Assess Climate Change Impact for Sustainable Marine Ecosystem Management**

(2012-14)

**ASIA-PACIFIC REGION CLIMATE CHANGE REPORT CARD**

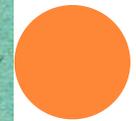


**ASIA-PACIFIC OCEAN-PROCESS & ECOSYSTEM-BASED ANALYSES TEMPLATE**

i.	Coral Reefs	5
ii.	Aquaculture & river discharge	6
iii.	Ocean currents & upwellings	7
iv.	Near-shore & estuarine (saltmarsh, intertidal mangroves to sub-tidal estuary basin)	8
v.	Oceanic Particulate Organic Carbon (POC) Flux	9
vi.	El Niño / Southern Oscillation	10
vii.	Capability Development	11
viii.	Baselines for Coastal Marine Sediments and Biota	12

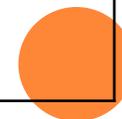
**GOVERNMENT PARTIES TEMPLATE**

i.	Australia (AUL)	14
ii.	Bangladesh (BGD)	18
iii.	Cambodia (CAM)	19
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vi.	Indonesia (INS)	22
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ix.	New Zealand (NZE)	26
x.	Pakistan (PAK)	27
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xii.	Sri Lanka (SRL)	29
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xiv.	Vietnam (VIE)	33

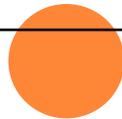


The requested one year extension will have the following Output/Activity:

	<b>Design Element</b>	<b>Indicator</b>	<b>Means of Verification</b>	<b>Assumptions</b>
<b>OUTPUT</b>	Science-based information on possible climate change impacts in the marine ecosystems of the region available for key stakeholders and decision makers	National data integrated into a regional data for the production of information packages by 2 <sup>nd</sup> qtr 2015	Hard and soft copies of the information packages	Expert service available to prepare the information package
<b>ACTIVITY</b>	Conduct of executive management seminars with national and regional end-users and stakeholders on national and regional issues related to climate change	Information packages, possibly info graphics, to disseminate project results to end-user agencies and regional organizations. Seminar Proceedings	Reports	RCA /GPs support



# REGIONAL ACTION PLAN 2015

	Q1	Q2	Q3	Q4	Status
<b>Implementation of national project</b>					
<b>Expert mission</b>					
<b>Malaysia</b>	Expert mission for Data Interpretation & Selection of samples for analysis				
<b>Thailand</b>		Expert mission for coral radiotracer experiments			
<b>Myanmar</b>	Experts Assistance for sample collection, preparation and analysis				
<b>Sri Lanka</b>		Expert mission for data interpretation on stable isotopes and trace elements for CC			
<b>Bangladesh</b>	Expert assistance in elemental analysis using AAS and data analysis March, 2014				
<b>Vietnam</b>			Expert Mission in Data analysis & interpretation Sept., 2015		
<b>Submission of progress report</b>		June, 2015		Dec., 2015	
<b>Information package</b>			Template provided by LCC (PHI)		
<b>Final Meeting and Raise Awareness of stakeholders and policy makers</b>				Nov., 2015 Indonesia Vietnam Philippines	



Thank you for your attention !!

