

# **Monitoring Air Pollution in Asia**

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**Air Pollution is an important problem in East Asia and the Pacific Region, especially in the **big cities** and industrial zones:**

- **Vehicles, industries, power plants “coal”, ...etc.**

**Air Pollution has been identified in several Country Programme Framework (**CPF**) as a Priority Area for TC**

# TC Projects

Although there are not many TC projects addressing specifically Air Pollution issues. There are quite a few projects related to **environmental pollution** in each country ( we are mainly concerned about radioactive pollution, radiation background).

# Role of the Agency

- 1. Issue Standards and Technical Guides (safety series, technical reports and regulations).  
Reference Materials Distribution  
Research Contracts (CRPs).**
- 2. Training of personnel a broad " HRD", Fellowships and SVs.**
- 3. Provision of equipment.**
- 4. Information exchange with the Member States and among the MSs.**
- 5. Expert missions "on the job Training".**

2-5 TC Project component

# Air Pollution Monitoring

## The Agency Involvement

- Regulatory Role and Information Dissemination
- Technology Transfer
- Human Resource Development
- One Centre of Excellence and then is the role of the Country to go to other cities.

# **A comprehensive Air Pollution Programme Include the following topics**

- **Monitoring of Air Pollution (Direct and indirect measurements).**
- **Dispersion Calculations.**
- **Control of Air Pollution.**

- 1. Participation in Better Air Quality 2004 Workshop. Vietnam, Philippines and Indonesia results to be presented.**
- 2. Regional Air Quality Initiative Meetings.**
- 3. CATNet-Asia**

# Air Pollution Monitoring

## Measuring samples of:

- Biological Materials** “Moss & Lichen”
- Air Sampling on Filter Paper and Measurement**
- Rain Water Chemistry Studies (from Meteorological stations network)**
- Soil Samples,**

# Nuclear Techniques

**XRF**

**X-ray Fluorescence Spectroscopy**

**NAA**

**Neutron Activation Analysis.**

**ICP-MS** Inducing Coupled Plasma/Mass Spectrometry

**Ion Beam Analysis (IBA), PIXE**  
**Proton Induced X-ray Emission Spectroscopy**

**Others**

# Kyoto Flexibility Mechanisms

## The Kyoto Protocol to the Convention on Climate Change, Kyoto, Japan, December 1997

### Commitment:

Annex 1 countries will reduce overall emissions of six greenhouse gases by at least 5% below 1990 levels by the years 2008-2012.

(EU 8%; USA 7%; Japan and Canada 6%)

### Clean Development Mechanism

A means for letting Annex 1 countries get certified emission reduction credit obtained from projects they sponsor in developing countries.

**Workshop in Vietnam was conducted in October 1999.**

# **PHI9021 Air Pollutant Characterization and Source Identification**

**To characterize air pollutants and their major sources for air pollution control; to develop capability for sample collection and analysis for air samples by nuclear techniques.**

- Sampling procedures, elemental analysis, Source identification, apportionment of air born particle pollution.**

1995-01-01



1998-04-30

# **PHI7007 Nuclear Analytical Techniques for Air Quality Management**

**To extend the use of nuclear analytical techniques for analyzing airborne particulate matter (APM) and identifying pollution sources, and the application of receptor modeling for pollution source apportionment in major areas with the involvement of the national environment regulatory authority.**

2003-01-01

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# **CPR1005 Nuclear Analytical Measurements of Size Fractionated APM**

**To test different types of filters suitable for monitoring elemental concentrations and composition of size fractionated (fractions: 2.5 to 10  $\mu\text{m}$  and  $< 2.5 \mu\text{m}$  of effective aerodynamic diameter) airborne particulate matter (APM); to implement an appropriate analytical quality system and to carry out the measurements; and to set up a prototype APM specimen bank of about one  $\text{m}^3$  in line with international standards at the China Institute of Atomic Energy (CIAE).**

**Beijing Municipality Requested CIAE to analyze Airborne particular matter (APM) using NA Technique.**

**1999-01-01**

**2002-08-02**



# **MON2007 Development of Nuclear Analytical Techniques**

**To strengthen nuclear analytical techniques in support of mineral exploration and environmental protection.**

**□ TXRF & EDXRF techniques were introduced for Air Pollution Studies.**

1995-01-01

2002-02-26



# VIE2005 Automation and QA-QC in Neutron Activation Analysis

**To upgrade NAA at Dalat reactor through automation of sample irradiation and to establish a national QA-QC programme for environmental sample analysis.**

1999-01-01

# **SRL9008 Nuclear Techniques in Monitoring Industrial Pollution**

**To monitor radioactive background and heavy metal pollutants in the environment by using nuclear and related analytical techniques.**

1995-03-27

2000-04-28

# **RAS8082 Isotopic and Related Techniques to Assess Air Pollution - Joint UNDP/RCA (RCA)**

**To assess and compare air pollution levels in strategically chosen areas in the East Asia and the Pacific region through the use of nuclear and complementary analytical techniques; to identify and quantify critical air pollution sources; and to accumulate accurate air pollution data for future work on Transboundary movement of airborne particulate matter (APM).**

1999-01-01

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# **RAS7013 Improved Information about Urban Air Quality Management (RCA)**

**To obtain a sufficiently large set of high-quality regional data characterizing **airborne particulate matter** (APM) in the fine and coarse breathable modes such that (i) a regional database can be developed that contains selected data characterizing the aerosols in the region; (ii) advanced receptor models can be employed to provide more detailed and accurate descriptions of the types and locations of pollution sources; and (iii) the effectiveness of actions taken by participating countries to reduce the concentrations and impact of particulate pollution can be assessed.**

2003-01-01

# **CPR5012 Nuclear Techniques to Enhance Use of Ammonium Bicarbonate**

**To increase nitrogen uptake by wheat,  
rice and corn from ammonium  
bicarbonate in order to enhance yields  
and reduce environmental pollution.  
Less emission of the nitrogen to the air  
from urea fertilizer.**

1996-04-09

1997-12-11

# **MAL8012 Utilization of Electron Beam Machine**

**To upgrade the technology of electron beam (EB) machines for industrial, medical, biomedical and environmental purposes for future transfer to industry.**

**Experience on utilizing the EBM encouraged Malaysia to consider installing EBM in their Power Plants to reduce emission of NO**

1991-01-01

1998-07-14

# **CPR7003 Radio nuclides in Food and Environmental Samples**

**To organize a national training course on the determination of radio nuclides in food and environmental samples.**

- ☐ Training course on the determination of radionuclides in food and environmental samples was organized.**
- ☐ Environmental surveillance in the area surrounding nuclear power plants has been improved.**

1991-07-02

1992-12-30



# INS2013 Instrumental Chemical Analysis

**To establish a multifunctional analytical and chemical reference laboratory for reference analysis of toxic trace elements, pesticides, and organic and inorganic pollutants in environmental samples.**

- CAIR is now capable of providing scientific information on environmental pollution and advising the Government on appropriate health and environmental regulations.**

1993-01-01

1997-02-28



# THA1009 Application of Low Energy Accelerator to Material Analysis

**To introduce Rutherford backscattering spectrometry (RBS) and proton induced X-ray emission (PIXE) techniques at the low energy accelerator centre at Chiang Mai University for application to material and environmental studies.**

1999-07-29

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# INS9016 Environmental Radioactivity Measurements (Phase II)

To upgrade the **environmental radioactivity** laboratory in order to improve the reliability of low level radioactivity measurements of environmental samples. Cs-137, Sr-90 and Ra-226 concentration in sea water selected sites and around the Research Reactor

Exposure Rate Measurement by NA I Detector of Ionization Chamber

- Background radiation
- Gamma Spectrometry for environmental samples (soil).

1991-01-01

1994-05-25

# INS9020 Environmental Monitoring System Development

To design and develop a **low level counting** system for monitoring radioactive contaminants in food, agriculture and **environmental** samples.

## Around Nuclear Facilities

- Alpha Spectrometry
- Liquid Scintillation Counter
- Ge (Li) Detector

1993-01-01

2000-08-30

# PAK9024 Development of Country Profile of Environmental Radiation Levels

**To develop a country profile of environmental radiation levels; and to survey natural and human-made radioactive pollutants and development methodologies for their analysis.**

2001-01-01

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# PHI3008 Gamma-Ray Spectrometric Survey

**To establish environmental baseline information on natural radioactivity and to prepare radioelement maps for geological study and mineral resource assessment.**

1993-01-01

1997-12-23



# INS9015 Regulatory Aspect of Radiation Protection

**To review and update regulations on radiation protection for the safety of workers, the public and the environment.**

**☐ Strengthening Regulatory Side on Environmental Pollution.**

1991-01-01

1995-05-25

# **RAS0033 Role of Nuclear Power and Other Energy Options in Mitigating Greenhouse Gas Emissions (RCA)**

**The overall objective is to help Regional Co-operative Agreement (RCA) Member States develop improved capacities for assessing the role of nuclear power and other energy options in addressing priority environmental issues in the region, e.g. cost of effects on human health, environment, and air-pollution mitigation. The current extension will focus on assisting RCA Member States in conducting greenhouse gas (GHG) abatement cost studies.**

**2001-01-01**

**2003-02-26**



# **RAS2004 TC on Determination of Radionuclides**

**To update knowledge on environmental radioactivity analysis, practical techniques & procedures on sample preparation, radiation measurements and data processing applicable to routine analysis of radioactivity in food & environmental samples.**

1991-01-01

1992-03-31



# **RAS2006 Training in Nuclear Techniques for Environmental Pollution**

**To conduct training in nuclear analytical techniques for trace determination of toxic elements in sediment, soil and surface water in the environment and in effluents from industrial facilities.**

- Sample collection, preparation for trace element determination of environmental pollution, such as Cr, As, Cd, Pb, Hg,.....etc.**

1995-01-01

1995-05-25

# **RAS8068 Isotopes and Radiation in Industry and Environment (RCA)**

**To promote the use of isotope and radiation technology for environmentally sustainable development.**

**1993-01-01**

**1998-08-31**



# **RAS8069 Isotopes and Radiation in Industry and the Environment (RCA)**

**To contribute to sustainable national  
development through the application of  
modern isotope and radiation technology to  
industry and the environment.**

1993-06-02

1999-11-30



# **RAS8070 Isotopes and Radiation in Industry and the Environment (RCA)**

**To promote the use of isotope and radiation  
technology for environmentally sustainable  
development.**

1993-06-04

1998-08-31



# **RAS8072 TC on Nuclear Tech. in Soil & Related Environmental Studies**

**To provide training on nuclear and related techniques for the measurement of soil erosion and deposition, fluvial and marine sediment transport, and other related environmental problems.**

1994-01-01

1995-10-27

# RAS8076 Better Management of Environment and Industrial Growth - Joint UNDP/RCA (RCA)

To promote routine use of radiation and isotopic techniques to meet regional needs in **environmental management** and enhance industrial performance and competitiveness, with particular emphasis on **cleaner** and more energy-efficient production processes and on reducing marine and air pollution. To produce, test, and disseminate distance learning material suitable for end users on radiation safety practices and to identify and train a core of specialists from emergency response agencies throughout the region in radiological emergency procedures and mitigation. To develop a sustainable institutional network comprising the national nuclear research institutes in the region and the end users of the technology in the environmental and industrial sectors, including the use of modern information technology and the support of Regional Resource Units (RRUs).

1997-01-01



# **RAS8083 Management of Marine Coastal Environmental Pollution (RCA)**

**To promote the routine use of radiation and isotopic techniques to meet regional needs in environmental management and in industrial performance and competitiveness, with particular emphasis on reducing marine pollution; to apply integrated numerical modeling and tracer techniques which are well established in developed countries to priority areas of sustainable development in the coastal zone.**

1999-01-02

2003-02-26

# **RAS8092 Investigating Environment and Water Resources in Geothermal Areas (RCA**

**To strengthen the mechanism which has been established under RAS/8/075 for promoting technology transfer and to sustain collaborative efforts on the use of isotope and geochemical techniques in investigating the impact of geothermal development on the environment and water resources.**

2001-01-01

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# **RAS8095 Improving Regional Capacity for Assessment, Planning, and Response to Aquatic Environmental Emergencies (RCA)**

**To improve the regional capacity for the  
management of aquatic environmental risks and  
to develop capacity in the RCA countries to  
assess, plan, and respond to pollution in coastal  
aquatic environments.**

2003-04-08



# **RAS9024 Environmental Radiation Monitoring and Regional Database (RCA)**

**To strengthen environmental radiation  
monitoring capability and to establish a  
regional environmental radiation monitoring  
database.**

2000-02-24

# ROK9034 Monitoring of Environmental Radiation

**To standardize procedures for environmental radiation monitoring and to establish baseline environmental radioactivity data for the country.**

1991-01-01

1995-12-22

# ROK9038 Monitoring Environmental Radiation (Phase II)

**To standardize procedures for monitoring environmental and marine radioactivity.**

1995-01-01

1998-03-12

# **SIN9015 Environmental Radioactivity Monitoring**

**To set up a comprehensive environmental  
radioactivity monitoring programme with  
routine sampling, capable of handling  
emergency measurements.**

1991-01-01

1993-07-26

# **VIE2006 Nuclear Analysis of Food and Environmental Samples**

**To strengthen national capabilities in nuclear analytical techniques for studies of environmental pollution and of contaminants in food for export.**

1999-01-01

2003-02-26

# **VIE2007 QA/QC of Mineral and Environmental Sample Measurements Using Nuclear Analytical Techniques**

**To develop accurate, inexpensive, and  
reliable methodology for quality  
assurance/quality control (QA/QC) of  
mineral and environmental samples  
analysis.**

2001-01-01