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# Sister Lab Program Prospective Partner Nuclear Profile: Malaysia

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# Sister Lab Program Prospective Partner Nuclear Profile: Malaysia

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## 1. Background

The Malaysian Deputy Prime Minister Tun Dr Ismail Abdul Rahman suggested in the early 1970s that Malaysia should have a role in the development of nuclear science and technology for peaceful purposes.<sup>1</sup> Accordingly, the Center for the Application of Nuclear Energy (CRANE) was established, with a focus on the development of a scientific and technical pool critical to a national nuclear power program.<sup>2</sup>



Source: University of Texas Library, [www.lib.utexas.edu/maps/cia06/malaysia\\_sm\\_2006.gif](http://www.lib.utexas.edu/maps/cia06/malaysia_sm_2006.gif)

The Malaysian Cabinet next established the

Tun Ismail Atomic Research Center (TIARC) under the Ministry of Science, Technology and the Environment on 19 September 1972, at a site in Bangi, about 35 km south of Kuala Lumpur. On 28 June 1982, the PUSPATI reactor, a 1-MW TRIGA MK-II research reactor, first reached criticality. On 10 August 1994, TIARC was officially renamed as the Malaysian Institute for Nuclear Technology Research (MINT).<sup>3</sup>

In addition to radioisotope production and neutron radiography conducted at the PUSPATI research reactor, MINT also supports numerous programs employing nuclear technology for medicine, agriculture and industry, and has been involved in both bilateral and multilateral technical cooperation to extend its capabilities.



*The PUSPATI 1-MW TRIGA reactor*

As an energy exporting country,<sup>4</sup> Malaysia has felt little incentive to develop a nuclear energy program, and high level opposition within the government discouraged it further.<sup>5</sup> A recent statement by Malaysia's Science, Technology and Innovation Minister supported this view, indicating that only a near-catastrophic jump in world oil prices might change the government's view.<sup>6</sup> However, the rate at which Malaysia is using its natural gas and oil reserves is expected to force it to reassess the role of nuclear energy in the near future.<sup>7</sup> In addition, the government does intend to construct a radioactive waste repository to dispose of naturally occurring radioactive materials (extracted during tin mining, in particular).<sup>8</sup> Also, Malaysia's growing economy could encourage expansion in Malaysia's existing nuclear-applications programs supporting the medical, agricultural, industrial and environmental fields.

## **2. Technical Capabilities and Facilities**

The following universities and laboratories have been identified by the International Atomic Energy Agency (IAEA) as being involved in nuclear research or other activities in Malaysia, though no details were listed for most:<sup>9</sup>

Department of Nuclear Science, School of Physics, Universiti Sains Malaysia (USM), (Penang).

Department of Physics, University Putra (Serdang)

Department of Nuclear Science, National University of Malaysia (Bangi)

Department of Physics, University of Technology (Johor Bahru)

National Electricity Board, Kuala Lumpur, Development Planning Dept.

Department of Physics, University of Malaya (Kuala Lumpur)

The University of Malaya's Department of Physics oversees a plasma physics research laboratory. The laboratory conducts research into fusion, using a tokamak and a plasma focus. The laboratory also conducts experiments utilizing lasers, microwaves, and electron and ion beam sources.<sup>10</sup>

Malaysian Institute of Nuclear Technology Research (MINT) Bangi

According to MINT's Web site,

"MINT was established in 1972 as the Tun Ismail Atomic Research Centre (PUSPATI). Construction began on the 27-hectare site at Bangi in January 1979, culminating in June 1982 with the commissioning of its TRIGA research reactor. PUSPATI was later renamed the Nuclear Energy Unit (UTN) in June 1983 on being placed under the auspices of the Prime Minister's Department. In October 1990, UTN was retransferred to the Ministry of Science, Technology and the Environment, and assumed its new identity as MINT in 10 August 1994. . . . To

satisfy growing needs for additional space, a second 81-hectare site--Kompleks Dengkil--was acquired in 1984. Both Bangi and Dengkil complexes, approximately 3 km. apart, are strategically located within the nation's premier research and training zone, in close proximity to two universities and three national research and development (R&D) institutes.”<sup>11</sup>

“MINT is involved in all aspects of nuclear-related activities in Malaysia, and includes the following programs and facilities working with nuclear technology and/or materials”<sup>12</sup>



*Commercial satellite image of MINT's Bangi Complex (DigitalGlobe via Google Earth)*

Facilities at MINT include the following:

*- PUSPATI TRIGA Reactor*

The PUSPATI research reactor is a 1-MW TRIGA Mk-II pool-type research reactor, used primarily for radioisotope production and neutron radiography. The reactor went critical 28 June 1982, and is subject to IAEA Safeguards under Malaysia's 1973 comprehensive safeguards agreement (INFCIRC/182).<sup>13</sup> The reactor's fuel was fabricated by General Atomics of the U.S.<sup>14</sup> The reactor uses 20% enriched fuel, and as of the end of 2004 the reactor had accumulated 14,083 MWh of operation.<sup>15</sup>

- SINAGAMA Irradiation Facility, which is equipped with a Type JS 8900 <sup>60</sup>Co gamma sterilizer supplied by Nordion.
- ALURTRON - Electron Beam Processing Service Center
- RAYMINTEX Plant, which produces latex for surgical gloves and other applications by <sup>60</sup>Co irradiation of natural rubber
- STERIFEED Plant, a pilot plant for radiation processing of agricultural waste into animal feed.
- Thermal and Renewable Energy Engineering
- Radioactive Waste Management Center
- Secondary Standard Dosimetry Laboratory
- Analytical Chemistry Laboratory
- Non-Destructive Testing Laboratory
- Non-Ionizing Radiation Laboratory
- Environmental Laboratory
- Tissue Bank and Bioproduct Laboratory
- Radioisotope Production Laboratory
- Flora Center

### **3. Nuclear Power**

A white paper produced by MINT sums up the government's position on nuclear energy in Malaysia succinctly: "Currently, there is no nuclear power generation plant in Malaysia and neither is there a plan to embark on a nuclear power programme in the foreseeable future. ... As reflected in the National Energy Policy, Malaysia is not expected to opt for nuclear power generation in the foreseeable future. Instead, the national energy mix will be based on the Four Fuel Strategy, introduced in 1979, to fulfil the objectives of the National Energy Policy. This Four-Fuel Strategy calls for the utilization of oil, hydropower, coal, and natural gas in national energy supply."<sup>16</sup>

With the caveats noted in Section 1 regarding possible extreme increases in fossil fuel costs and/or the depletion of existing energy reserves, Malaysia appears unlikely to change this position any time soon.

### **4. Nuclear Institutions**

The following governmental organizations are involved at the policy and operational levels. While there is no nuclear energy program in Malaysia, the Malaysia Institute of Nuclear Technology does stay abreast of developments regarding the state of the technology and its use internationally.

#### Ministry of Science, Technology and the Environment (MSTE)

The MSTE is the senior government organization involved in the regulation, development and application of nuclear technology in Malaysia. The Malaysian Institute of Nuclear Technology (MINT) is a Department within the Ministry, as is the Atomic Energy Licensing Board (AELB).<sup>17</sup>



#### Atomic Energy Licensing Board<sup>18</sup>

In order to separate promotional and regulatory functions, the Nuclear Energy Unit (UTN) of the Ministry of Science, Technology and the Environment passed Act 304, the Atomic Energy Licensing Act of 1984, paving the way for the establishment of the Atomic Energy Licensing Board as a separate entity, in February 1985.<sup>19</sup> The AELB is a department within the Ministry of Science, Technology and the Environment, and provides the regulatory authority to license and operate nuclear activities; in conjunction with the Department of the Environment, it develops national policies and regulations pertaining to radioactive waste management and environmental protection in Malaysia.<sup>20</sup>

#### Department of the Environment

The Department of the Environment has been identified as a component of both the Ministry of Science, Technology and the Environment, and on its home page, as part of the Ministry of Natural Resources and the Environment.<sup>21</sup> Regardless of which organization it operates within, the department, in concert with the AELB, develops national policies and regulations pertaining to radioactive waste management and environmental protection in Malaysia.<sup>22</sup>

## 5. Bilateral and Multilateral Nuclear Technical Cooperation

Malaysia has no near term plans for a national nuclear energy program, but it has been involved in technical cooperation involving the development of a nuclear program, and continues to be involved in numerous projects with the IAEA and within the region to continue to utilize nuclear technology in other areas. As shown below, Malaysia is actively involved in utilizing nuclear technology for industrial processes, including the oil and gas industries, and has engaged in significant effort in exploring possible uses of nuclear technology in the public health, medical, and agricultural fields.

The Regional Co-operative Agreement (RCA) is an intergovernmental agreement for East Asia & Pacific region, under the auspices of the IAEA, in which the Government Parties undertake, in co-operation with each other and with the IAEA to promote and co-ordinate co-operative research, development (R&D) and training projects in nuclear science and technology through their appropriate national institutions.<sup>23</sup>

### 5.1 National Projects:

#### Active National Projects (6)

<i><b>Project Number</b></i>	<i><b>Title</b></i>	<i><b>Field</b></i>	<i><b>1st Year of Approval</b></i>	<i><b>Country Officer</b></i>	<i><b>Project Responsible Officer</b></i>	<i><b>Technical Officer</b></i>	<i><b>Total Budget</b></i>
MAL4008	Establishment of a Multi-Purpose National Cyclotron Facility	4H	2001	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Haji-Saeid, Seyed Mohammad (NAPC) Dondi, Maurizio (NAHU)	534160
MAL0013	Human Resource Development and Nuclear Technology Support	0A	2003	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Paranjpe, Shrinivas Krishnarao (NAPC)	551250
MAL8017	Advanced Non-destructive Testing of Structural Integrity in Components related to Oil and Gas Industries	8P	2003	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Einav, Isaac (NAPC)	203140
MAL8018	Isotope Hydrology for Groundwater Contamination Study in Industrial Sites	8M	2003	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Kulkarni, Kshitij Mahadev (NAPC)	99080
MAL9012	Conceptual Planning for National Radioactive Waste Repository	9E	2003	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Nachmilner, Lumir (NEFW)	162954
MAL8019	Development of Industrial Process Gamma-ray and X-ray Tomography	8J	2005	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Jin, Joon-Ha (NAPC)	365454



### Completed National Projects (87)

<i>Project Number</i>	<i>Title</i>	<i>Field</i>	<i>Completed on</i>	<i>Country Officer</i>	<i>Project Responsible Officer</i>	<i>Technical Officer</i>	<i>Total Budget</i>
MAL6004	Radioisotopes in Medicine	6B	1977-12-14	Sarac, Abbas Ilhan (SGOB)			11629
MAL5004	Radioisotopes in Animal Science	5E	1978-08-04	Sarac, Abbas Ilhan (SGOB)			7399
MAL5003	Radioisotopes in Agriculture	5B	1979-11-13	Sarac, Abbas Ilhan (SGOB)			116823
MAL3002	Nuclear Materials Prospection	3B	1980-01-07	Sarac, Abbas Ilhan (SGOB)		Cameron, James () Stipanivic, Pedro Nicolas (NENF)	21909
MAL9002	Environmental Protection	9G	1980-09-04	Sarac, Abbas Ilhan (SGOB)		Ahmed, Jasim Uddin (NENS)	89999
MAL6005	Radioisotopes in Medicine	6B	1980-09-18	Sarac, Abbas Ilhan (SGOB)		Dudley, Robert A. (RILS)	12081
MAL0005	Nuclear Power Planning	0B	1980-10-13	Sarac, Abbas Ilhan (SGOB)		Csik, Bela Jose (NENP)	39218
MAL6006	Radioisotopes in Medicine	6B	1981-08-27	Sarac, Abbas Ilhan (SGOB)		Dudley, Robert A. (RILS)	48964
MAL5007	Food Preservation	5H	1981-09-09	Sarac, Abbas Ilhan (SGOB)		Loaharanu, Paisan (NAFA)	8300
MAL6008	Nuclear Medicine	6B	1981-10-22	Sarac, Abbas Ilhan (SGOB)		Dudley, Robert A. (RILS)	22208
MAL1002	Neutron Physics (Kuala Lumpur)	1E	1982-01-05	Sarac, Abbas Ilhan (SGOB)		Dolnicar, Joze (NAPC)	78133
MAL1004	Nuclear Physics	1D	1982-01-13	Sarac, Abbas Ilhan (SGOB)		Dolnicar, Joze (NAPC)	0
MAL6007	Nuclear Medicine Services	6B	1982-09-06	Sarac, Abbas Ilhan (SGOB)		Dudley, Robert A. (RILS)	155882
MAL3003	Uranium Exploration	3B	1982-09-27	Sarac, Abbas Ilhan (SGOB)		Tauchid, Mohamad (NEFW) Barretto de Campos, Paulo Marcos (TCPB)	64232

MAL4004	Non-Destructive Testing	4M 8C	1982-09-30	Sarac, Abbas Ilhan (SGOB)	Sevastyanov, Yuri Grigorievich (NAPC)	25332
MAL5012	Soil Moisture Studies	5B	1982-09-30	Sarac, Abbas Ilhan (SGOB)	Bole, James Bertrand (NAFA)	16058
MAL5013	Radioisotopes in Animal Science	5E	1982-11-24	Sarac, Abbas Ilhan (SGOB)	Dargie, James Donald (NAFA)	14930
MAL3004	Radioactive Minerals Survey	3B	1983-09-12	Sarac, Abbas Ilhan (SGOB)	Smith, Arthur Young Jr. Y. (NENF) Tauchid, Mohamad (NEFW)	51476
MAL5009	Radioisotopes in Animal Science	5E	1983-09-19	Sarac, Abbas Ilhan (SGOB)	Dargie, James Donald (NAFA)	45279
MAL5006	Radioisotopes in Agriculture	5A	1984-07-16	Sarac, Abbas Ilhan (SGOB)	Hassan, Aladin (NAFA) Dargie, James Donald (NAFA)	52641
MAL5008	Plant Mutation Breeding	5C	1984-07-16	Sarac, Abbas Ilhan (SGOB)	Micke, Alexander ()	30424
MAL6009	Nuclear Medicine	6B	1984-07-23	Sarac, Abbas Ilhan (SGOB)	Dudley, Robert A. (RILS)	36318
MAL5010	Nitrogen-15 Fertilizer Studies	5B	1984-10-19	Sarac, Abbas Ilhan (SGOB)	Danso, Seth Kofi Akyea Kofi (NAFA)	86335
MAL1007	Neutron Activation Analysis for Tin	1L	1985-10-14	Bautista, Eumelia R.B. (SGCP)	Dolnicar, Joze (NAPC)	27920
MAL4003	Research Reactor Centre	4B	1985-10-14	Bautista, Eumelia R.B. (SGCP)	Dolnicar, Joze (NAPC)	66654
MAL5011	Food Preservation	5H	1985-10-14	Bautista, Eumelia R.B. (SGCP)	Loaharanu, Paisan (NAFA)	12212
MAL7002	Radioisotopes in Microbiology	7A	1985-10-14	Bautista, Eumelia R.B. (SGCP)	Mukherjee, Ramendra Nath (NAHU)	52401
MAL5005	Radioisotopes in Animal Science	5E	1986-11-10	Bautista, Eumelia R.B. (SGCP)	Jayasuriya, Marshall C. Noble (NAFA)	81519
MAL6012	Radiation Therapy	6B	1986-11-10	Bautista, Eumelia R.B. (SGCP)	Skoropad, Yuriy Dmitrievich (NAHU) Schultze-Kraft, Peter (TCIM)	18935

MAL9003	Environmental Monitoring	9Q	1987-10-30	Bautista, Eumelia R.B. (SGCP)	Ahmed, Jasim Uddin (NENS)	160969
MAL9005	Personnel Monitoring	9I	1987-10-30	Bautista, Eumelia R.B. (SGCP)	Flakus, Franz-Nikolaus (NSRW)	131132
MAL5017	Nitrogen-15 Fertilizer Studies	5B	1987-11-02	Bautista, Eumelia R.B. (SGCP)	Danso, Seth Kofi Akyea Kofi (NAFA)	38317
MAL1003	Secondary Standards Dosimetry Laboratory	1K	1989-09-19	Bautista, Eumelia R.B. (SGCP)	Haider, Johann Georg (TCPM)	388696
MAL3006	Radioactive Minerals Survey	3B	1989-09-19	Bautista, Eumelia R.B. (SGCP)	Smith, Arthur Young Jr. Y. (NENF) Tauchid, Mohamad (NEFW)	186003
MAL5014	Pesticide Residues	5G	1989-09-19	Bautista, Eumelia R.B. (SGCP)	Hassan, Aladin (NAFA)	57573
MAL6010	Radioisotopes in Biochemistry	6D	1989-09-25	Bautista, Eumelia R.B. (SGCP)	Ganatra, Ramanik D. (NAHU)	0
MAL1008	Research Reactor Utilization	1L 1G 1E	1990-12-19	Kamel, Reyad Sherif (TCAP)	Muranaka, Richard George G. (NAPC)	50970
MAL8008	Tracers in Hydrology	8M	1990-12-19	Kamel, Reyad Sherif (TCAP)	Yurtsever, Yuecel (NAPC)	30716
MAL8011	Radiation Technology	8C 8I	1990-12-19	Kamel, Reyad Sherif (TCAP)	Markovic, Vitomir M. (NAPC)	56035
MAL1006	Fast-Neutron Activation Analysis	1L	1991-01-15	Kamel, Reyad Sherif (TCAP)	Vera Ruiz, Hernan Guido (NAPC)	44915
MAL2003	Latex Maturation Studies	2E 8J	1991-01-15	Kamel, Reyad Sherif (TCAP)	Vera Ruiz, Hernan Guido (NAPC)	77535
MAL9006	Nuclear Licensing and Regulations	9C 0D	1991-01-15	Kamel, Reyad Sherif (TCAP)	Rames, John (SGTS) Ahmed, Jasim Uddin (NENS)	9771
MAL0007	Nuclear Power Planning	0E 0A	1991-12-31	Kamel, Reyad Sherif (TCAP)	Molina, Pablo (NENP)	171785
MAL2002	Radioisotope Production	2G 4H	1991-12-31	Kamel, Reyad Sherif (TCAP)	Vera Ruiz, Hernan Guido (NAPC)	468424

MAL5018	Nitrogen-15 Fertilizer Studies	5B	1991-12-31	Kamel, Reyad Sherif (TCAP)	Kumarasinghe, Kumarasinghe Saliya (NAFA)	428323
MAL5019	Radiation-Induced Mutation Breeding	5C	1991-12-31	Kamel, Reyad Sherif (TCAP)	Maluszynski, Miroslav (NAFA)	41903
MAL8003	Nuclear Applications in Industry	8C 4M	1991-12-31	Kamel, Reyad Sherif (TCAP)	Mani, Raghunath Subra (NAPC)	325621
MAL8004	Radiation Processing Facility	8H	1991-12-31	Kamel, Reyad Sherif (TCAP)	Markovic, Vitomir M. (NAPC)	306253
MAL8007	Food Irradiation	8I 5H	1991-12-31	Kamel, Reyad Sherif (TCAP)	Loaharanu, Paisan (NAFA)	101973
MAL1009	Neutron Activation Analysis	1L 2C	1992-12-30	Kamel, Reyad Sherif (TCAP)	Mani, Raghunath Subra (NAPC)	170826
MAL6011	Radioimmunoassay in Medicine	6B 6G	1992-12-30	Kamel, Reyad Sherif (TCAP)	Piyasena, Rienzi Dodwell (NAHU)	115420
MAL8005	Tracers in Sedimentology	8N	1992-12-30	Kamel, Reyad Sherif (TCAP)	Plata-Bedmar, Antonio (NAPC) Yurtsever, Yucel (NAPC)	183820
MAL9007	Radiation Protection Programme	9C	1994-05-30	Kita, Tomohiko (TCPA)	Griffith, Richard V. (NSRW) Mrabit, Khammar (NSRW)	163145
MAL3007	Uranium Exploration	3B 3C	1995-03-31	Kita, Tomohiko (TCPA)	Underhill, Douglas ()	207769
MAL9009	Nuclear Power Plant Siting	9F	1995-03-31	Kita, Tomohiko (TCPA)	Guerpinar, Aybars (NSNI) Godoy, Antonio Ramon (NSNI)	80942
MAL9010	Conditioning, Storage and Disposal of Radioactive Waste	4O	1995-03-31	Kita, Tomohiko (TCPA)	Rastogi, Ramesh Chandra (NSRW)	39806
MAL9008	Emergency Planning and Preparedness	9L	1995-05-25	Kita, Tomohiko (TCPA)	Litai, Dan (NSNI) Mrabit, Khammar (NSRW)	61225
MAL6014	Nuclear Cardiology Services, Kuala Lumpur	6A 6B	1995-11-30	Kita, Tomohiko (TCPA)	Yamasaki, Toshiro (NAHU)	101797

MAL0009	Public Acceptance of Nuclear Technology	0K	1995-12-22	Kita, Tomohiko (TCPA)	Swaton, Elisabeth (NSNI) Mrabit, Khammar (NSRW)	44978
MAL8006	Non-Destructive Testing Certification	8C	1995-12-22	Kita, Tomohiko (TCPA)	Dobrowolski, Marek Krzysztof (NAPC)	291838
MAL8010	Radiation and Isotope Applications in Industry	8A 8C 8J	1995-12-22	Kita, Tomohiko (TCPA)	Thereska, Jovan (NAPC)	141245
MAL8013	Contribution of Nuclear Technology to the Industrial Sector	8C 8H 8J 8N 4G	1995-12-22	Aslam, Javed (TCPA)	Bermudez de Samiei, Maria Eugenia Bea. (EXPO)	57613
MAL5020	Nuclear Techniques to Improve Agricultural Production	5A 5B 5E	1996-04-30	Kita, Tomohiko (TCPA)	Hendrichs, Jorge Pedro (NAFA) Maluszynski, Miroslav (NAFA) Hance, Raymond John (NAFA)	1108807
MAL4006	Nuclear Instrumentation Centre	4G	1996-08-31	Lee, Han-Myung (TCPA)	Walsh, Robin L. (NAPC)	262050
MAL4007	Pusapati TRIGA Reactor: Power Upgrading Project	4A 4D 4G	1997-02-28	Lee, Han-Myung (TCPA)	Dolan, Thomas (NSRW)	137466
MAL9011	Radiation Protection Programme (Phase II)	9C 9I 9J 9K	1997-02-28	Lee, Han-Myung (TCPA)	Griffith, Richard V. (NSRW) Mrabit, Khammar (NSRW)	68322
MAL7004	Marine Contaminants and Sediment Transport	7A 7F	1997-04-30	Lee, Han-Myung (TCPA)	Hamilton, Terry F. (NSRW)	174530
MAL8014	Environmental Impact Assessment on Dumping Grounds	8G 8M 8N	1997-04-30	Lee, Han-Myung (TCPA)	Yurtsever, Yucel (NAPC)	30378
MAL6013	Upgrading Nuclear Medicine Services	6B	1997-05-30	Lee, Han-Myung (TCPA)	Yamasaki, Toshiro (NAHU)	331086
MAL7003	Sterilization of Tissue Grafts	7E	1997-05-30	Lee, Han-Myung (TCPA)	Tatsuzaki, Hideo (NAHU)	253829

MAL0010	Manpower Development	0A	1997-07-30	Lee, Han-Myung (TCPA)			532782
MAL5022	Behaviour and Fate of Pesticides in Vegetables	5G	1997-12-23	Lee, Han-Myung (TCPA)		Hance, Raymond John (NAFA)	88252
MAL6015	Monoclonal Antibody Production and RIA Development	6A 6G 7H	1998-06-30	Lee, Han-Myung (TCPA)		Ch'Ng, Soo Ling (NAHU)	76679
MAL8012	Utilization of Electron Beam Machine	8A 8C 8H	1998-07-14	Lee, Han-Myung (TCPA)		Gueven, Olgun (NAPC)	379167
MAL5021	Mutation Breeding and Biotechnology for Plant Improvement	5C 7C	1999-11-30	Xu, Naicheng (TCAP)		Jain, Shri Mohan (NAFA)	129564
MAL0011	Human Resource Development and Nuclear Technology Support	0A	2001-07-09	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)		551694
MAL2004	National Facilities for Monoclonal Antibody Production	2G	2001-07-09	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Narasimhan, Dananaicken V.S. (NAPC)	200849
MAL6017	Optimal Utilization of HDR Brachytherapy Facility	6C 6F	2001-11-12	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Pernicka, Frantisek (NAHU) Tatsuzaki, Hideo (NAHU)	70067
MAL8015	Industrial Applications of Radiation Technologies	8A	2001-12-04	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Gueven, Olgun (NAPC)	150456
MAL6016	Quality Assurance & Radiation Safety in Diagnostic Radiology	6F 9C	2002-03-28	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Oresegun, Modupe Olusola (NSRW) Pernicka, Frantisek (NAHU)	224665
MAL8016	Advanced Nucleonic Gauges for Oil and Gas Industry	8C	2002-03-28	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Thereska, Jovan (NAPC)	122789
MAL5023	Eradication of Old World Screwworm Through SIT	5D	2003-01-30	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Feldmann, Udo (NAFA)	98343
MAL5026	QA/QC Programme in Residue Analysis of Agricultural Samples	5G	2004-04-30	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Ambrus, Arpad (NAFA)	124794
MAL0012	Human Resource Development and Nuclear Technology Support	0A	2004-05-20	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Dias, Mahendra Prinath (TCAP)	298610
MAL5024	in Vitro Mutagenesis for Horticultural Crop Plants (Phase I)	5C	2005-03-29	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Jain, Shri Mohan (NAFA)	130709



MAL5025	Food Safety Monitoring Programme for Livestock Products	5G	2005-03-29	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Cannavan, Andrew (NAAL)	137417
MAL6018	Expansion of Nuclear Medicine Services in Penang Hospital	6B	2005-03-29	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Watanabe, Naoyuki (NAHU) Dondi, Maurizio (NAHU)	78226

### Cancelled National Projects (11)

<i>Project Number</i>	<i>Title</i>	<i>Field</i>	<i>Cancelled On</i>	<i>Country Officer</i>	<i>Project Responsible Officer</i>	<i>Technical Officer</i>	<i>Total Budget</i>
MAL0004	Nuclear Power Adviser	0E	1979-11-19	Sarac, Abbas Ilhan (SGOB)			0
MAL8002	Radioisotopes in Industry	8C	1980-09-30	Sarac, Abbas Ilhan (SGOB)		Fowler, Emil Eugene Eugene ()	0
MAL0006	Nuclear Power Planning	0B	1982-09-30	Sarac, Abbas Ilhan (SGOB)		Csik, Bela Jose (NENP) Tiren, Lars Ingemar (NENS)	0
MAL3005	Uranium Exploration	3B	1985-07-26	Bautista, Eumelia R.B. (SGCP)		Smith, Arthur Young Jr. Y. (NENF) Tauchid, Mohamad (NEFW)	0
MAL0008	TC on Nuclear Law*	0D	1986-01-01	Nethsinghe, Douglas A. (TCPM)			0
MAL5015	Radioisotopes in Animal Science	5E	1987-01-01	Bautista, Eumelia R.B. (SGCP)		Jayasuriya, Marshall C. Noble (NAFA)	0
MAL5016	Physiology of the Cacao Tree	5I 5C	1987-01-01	Bautista, Eumelia R.B. (SGCP)		Eskew, David (NAFA)	0
MAL4005	Microprocessor Technology	4G 8C	1987-10-31	Bautista, Eumelia R.B. (SGCP)		Leiser, Manfred (NAPC)	0
MAL9004	Radiation Protection in Nuclear Medicine	9J 6B	1987-10-31	Bautista, Eumelia R.B. (SGCP)		Van Herk, Gerard (NAHU)	0
MAL1005	Neutron Activation Analysis	1L 2C	1991-12-31	Kamel, Reyad Sherif (TCAP)		Mani, Raghunath Subra (NAPC)	0
MAL5027	Irradiation Treatment of Food, Herbs, and Cosmetics	5H	2003-11-01	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Matin, Muhammed Abdul (TCPB)	0

## 5.2 Regional/Interregional Projects:

### Active Regional/Interregional Projects (53)

<i>Project Number</i>	<i>Title</i>	<i>Field</i>	<i>1st Year of Approval</i>	<i>Country Officer</i>	<i>Project Responsible Officer</i>	<i>Technical Officer</i>	<i>Total Budget</i>
INT0060	Technical Co-operation Between Developing Countries	0A	1995	Salema, Manase Peter (TCAP)		Salema, Manase Peter (TCAP)	946144
INT4131	Sustainable Technologies for Managing Radioactive Wastes	3H	1997	Kurghinyan, Vladimir (TCEU)	Kurghinyan, Vladimir (TCEU)	Al-Mughrabi, Mohamed (NEFW) Balla, Janos (NEFW) Kahraman, Alper (NEFW)	2565864
RAS6029	Distance-assisted Training for Nuclear Medicine Technicians (RCA)	6B	1997	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Dondi, Maurizio (NAHU) Watanabe, Naoyuki (NAHU)	636688
INT5145	Insect Pest Control Using the Sterile Insect Technique	5D	1999	Salema, Manase Peter (TCAP)		Hendrichs, Jorge Pedro (NAFA)	1936300
RAS5035	Improving Animal Productivity and Reproductive Efficiency (RCA)	5E	1999	Dias, Mahendra Prinath (TCAP)		Boettcher, Paul John (NAFA) Vercoe, Philip Edward (NAFA)	1052981
RAS6033	Distance Education in Radiation Oncology (RCA)	6C	1999	Dias, Mahendra Prinath (TCAP)		Hendry, Jolyon Hindson (NAHU)	715200
RAS8084	Isotope Use in Managing and Protecting Drinking Water (RCA)	8M	1999	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Kulkarni, Kshitij Mahadev (NAPC)	589625
RAS9023	Legislation for Safe and Peaceful Nuclear Applications	0D 9C	1999	Lutfi, Nabil (TCAP)	Lutfi, Nabil (TCAP)	Vez Carmona, Maria de Lourdes (EXPO) Djermouni, Belkacem (NSRW)	327847
INT0074	Pre-Project Assistance (Africa and East Asia and the Pacific)	0A	2001	Salema, Manase Peter (TCAP)	Salema, Manase Peter (TCAP)	Salema, Manase Peter (TCAP)	539136
INT0076	Country Programme Review (Africa and East Asia and the Pacific)	0A	2001	Salema, Manase Peter (TCAP)	Salema, Manase Peter (TCAP)	Salema, Manase Peter (TCAP)	109200

RAS0032	Support Towards Self-Reliance and Sustainability of National Nuclear Institutions	0A	2001	Lutfi, Nabil (TCAP)	Lutfi, Nabil (TCAP)	Dias, Mahendra Prinath (TCAP) Lutfi, Nabil (TCAP)	660166
RAS5039	Restoration of Soil Fertility and Sustenance of Agricultural Productivity (RCA)	5B	2001	Dias, Mahendra Prinath (TCAP)		Zapata, Felipe (NAFA)	619203
RAS5040	Enhancement of Genetic Diversity in Food, Pulses, and Oil Crops and Establishment of Mutant Germplasm Network (RCA)	5C	2001	Dias, Mahendra Prinath (TCAP) Kim, Myung Ro (TCAP)		Shu, Qingyao (NAFA) Lokko, Yvonne Rosaline Naa (NAFA) Lagoda, Pierre Jean Laurent (NAFA)	607540
RAS5041	Production of Foot and Mouth Disease Antigen and Antibody ELISA Reagent Kit (RCA)	5F	2001	Dias, Mahendra Prinath (TCAP)		Crowther, John Richard (NAFA)	191210
RAS6034	Quality Assurance Programme for Molecular-Based Diagnosis of Infectious Diseases	6B	2001	Kamel, Reyad Sherif (TCAP)	Kamel, Reyad Sherif (TCAP)	Khan, Baldip Kaur (NAHU)	863110
RAS8091	Process Diagnostics and Optimization in Petrochemical Industry (RCA)	8J	2001	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Jin, Joon-Ha (NAPC) Einav, Isaac (NAPC)	723375
RAS8092	Investigating Environment and Water Resources in Geothermal Areas (RCA)	8M	2001	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Kulkarni, Kshitij Mahadev (NAPC)	287826
RAS8093	Use of Isotopes in Dam Safety and Dam Sustainability (RCA)	8N	2001	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Araguas Araguas, Luis Jesus (NAPC) Kurtas, Tuerker (NAPC)	307631
RAS9026	National Regulatory Control and Occupational Radiation Protection Programmes	9C	2001	Dey, Sujit (TCAP)	Dey, Sujit (TCAP)	Mrabit, Khammar (NSRW) O'Donnell Torroba, Patricio Alfonso (NSRW)	1719895
RAS9027	Development of Technical Capabilities for Sustainable Radiation and Waste Safety Infrastructure	9E 9C	2001	Dey, Sujit (TCAP)	Dey, Sujit (TCAP)	Mrabit, Khammar (NSRW) O'Donnell Torroba, Patricio Alfonso (NSRW)	2277735
INT6052	Improving the Quality of Production and Uses of Radiation Sterilized Tissue Grafts	6B	2002	Salema, Manase Peter (TCAP)		Hendry, Jolyon Hindson (NAHU)	844860
INT7015	Transfer of Receptor Binding Assay for Harmful Algal Toxins	7F	2003	Salema, Manase Peter (TCAP)		Boisson, Florence (NAML)	203061

RAS0035	Management of Technical Cooperation among Developing Countries (RCA)	0A	2003	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	997867
RAS0036	Country and Regional Programme Review	0A	2003	Salema, Manase Peter (TCAP)	Salema, Manase Peter (TCAP)	Salema, Manase Peter (TCAP)	481900
RAS4022	Improvement of Research Reactor Operation and Utilization, Phase II (RCA)	4B	2003	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Paranjpe, Shrinivas Krishnarao (NAPC)	209975
RAS4023	Repair and Refurbishment of Nuclear Instruments, Phase II	4G	2003	Lutfi, Nabil (TCAP)	Lutfi, Nabil (TCAP)	Kaufmann, Herbert (NAPC)	316670
RAS6036	Management of Liver Cancer Using Transarterial Radioconjugate Therapy (RCA)	6B	2003	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Dondi, Maurizio (NAHU) Watanabe, Naoyuki (NAHU)	217210
RAS6038	Strengthening Medical Physics through Education and Training (RCA)	6F	2003	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	McLean, Ian Donald (NAHU)	477264
RAS7011	Enhancing the Sustainability of the Marine Coastal Environment (RCA)	7F	2003	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Boisson, Florence (NAML) Jeffree, Ross A. (NAML)	305888
RAS7013	Improved Information about Urban Air Quality Management (RCA)	7L	2003	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Trinidad, Trinidad Palad (NAHU) Markowicz, Andrzej (NAAL)	810946
RAS8094	Optimization of Materials in Industry Using Online Bulk Analysis Techniques (RCA)	8A	2003	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Jin, Joon-Ha (NAPC)	327934
RAS8095	Improving Regional Capacity for Assessment, Planning, and Response to Aquatic Environmental Emergencies (RCA)	8G	2003	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Scholten, Jan Christoph (NAML)	370400
RAS8097	Isotope Techniques for Groundwater Contamination Studies in Urbanized and Industrial Areas (RCA)	8M	2003	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Kulkarni, Kshitij Mahadev (NAPC)	462337
RAS9028	Development of an Asian Nuclear Safety Network	9A	2003	Lutfi, Nabil (TCAP)	Lutfi, Nabil (TCAP)	Lederman, Luis (NS)	219490
RAS9029	Harmonization of Radiation Protection, Phase IV (RCA)	9C	2003	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	O'Donnell Torroba, Patricio Alfonso (NSRW) Mrabit, Khammar (NSRW)	779884

RAS9031	Assessment of Radiological Risks (RCA)	9L 9C	2004	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Telleria, Diego Miguel (NSRW) Berkovskyy, Volodymyr (NSRW) O'Donnell Torroba, Patricio Alfonso (NSRW)	224709
RAS9032	Radiological Emergency Response (RCA)	9L 9C	2004	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Zombori, Peter (NS) Mc Kenna, Thomas (NSRW) O'Donnell Torroba, Patricio Alfonso (NSRW)	204647
INT5149	Training Course on the Use of the Sterile Insect and Related Techniques	5D	2005	Boussaha, Ali (TCAF)	Boussaha, Ali (TCAF)	Hendrichs, Jorge Pedro (NAFA)	225000
RAS0041	Tracing Future Sustainable Paths through Nuclear and Other Energy Options (RCA)	0E	2005	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Jalal, Ahmed Irej (NE)	274590
RAS4024	Radioisotope Production and Neutron Beam Applications (RCA)	4B	2005	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Paranjpe, Shrinivas Krishnarao (NAPC) Pillai, Maroor Raghavan Ambikalmajan (NAPC)	335763
RAS5043	Sustainable Land Use and Management Strategies for Controlling Soil Erosion and Improving Soil and Water Quality (RCA)	5B	2005	Dias, Mahendra Prinath (TCAP) Kim, Myung Ro (TCAP)		Fulajtar, Emil (NAFA)	227440
RAS5044	Integrated Approach for Improving Livestock Production Using Indigenous Resources and Conserving the Environment (RCA)	5E	2005	Dias, Mahendra Prinath (TCAP) Kim, Myung Ro (TCAP)		Boettcher, Paul John (NAFA) Vercoe, Philip Edward (NAFA)	441200
RAS6040	Improvement in Quality of Radiotherapy for Frequent Cancers in the Region (RCA)	6C	2005	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Rosenblatt, Eduardo (NAHU) McLean, Ian Donald (NAHU)	893346
RAS6041	Preventing Osteoporosis and Promoting Bone Mass in Asian Populations Using a Food-based Approach (RCA)	6J	2005	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Davidsson, Lena Margareta (NAHU)	398180

RAS6042	Tumour Imaging Using Radioisotopes (RCA)	6B	2005	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Watanabe, Naoyuki (NAHU)	400020
RAS8098	Radiation Technology for Development of Advanced Materials and for Protection of Health and the Environment (RCA)	8J	2005	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Sampa, Maria Helena de O. (NAPC)	275560
RAS8099	Radioisotope Technology for Natural Resource Exploration and Exploitation (RCA)	8J	2005	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Jin, Joon-Ha (NAPC)	323350
RAS8100	Advanced Industrial Radiography (RCA)	8P	2005	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Einav, Isaac (NAPC)	243530
RAS9033	Developing Technical Capabilities for the Protection of Health and Safety of Workers Exposed to Ionizing Radiation	9I 9C 9J	2005	Dey, Sujit (TCAP)	Dey, Sujit (TCAP)	Deboodt, Pascal P. A. (NSRW) O'Donnell Torroba, Patricio Alfonso (NSRW) Mrabit, Khammar (NSRW)	197650
RAS9034	Strengthening Radiological Protection of Patients and Medical Exposure Control	9J	2005	Dey, Sujit (TCAP)	Dey, Sujit (TCAP)	Rehani, Madan Mohan (NSRW) O'Donnell Torroba, Patricio Alfonso (NSRW) Mrabit, Khammar (NSRW)	338993
RAS9035	Establishment of National Capabilities for Response to a Radiological and Nuclear Emergency	9L	2005	Dey, Sujit (TCAP)	Dey, Sujit (TCAP)	Zombori, Peter (NS) O'Donnell Torroba, Patricio Alfonso (NSRW)	251900
RAS9036	Strengthening National Regulatory Infrastructure for the Control of Radiation Sources	9T 9C	2005	Dey, Sujit (TCAP)	Dey, Sujit (TCAP)	Djermouni, Belkacem (NSRW) O'Donnell Torroba, Patricio Alfonso (NSRW) Mrabit, Khammar (NSRW)	674600



RAS9037	Education and Training in Support of Radiation Protection Infrastructure	9X 9C	2005	Dey, Sujit (TCAP)	Dey, Sujit (TCAP)	Sadagopan, Geetha (NSRW) O'Donnell Torroba, Patricio Alfonso (NSRW) Mrabit, Khammar (NSRW)	992933
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### Completed Regional/Interregional Projects (53)

<i><b>Project Number</b></i>	<i><b>Title</b></i>	<i><b>Field</b></i>	<i><b>Completed on</b></i>	<i><b>Country Officer</b></i>	<i><b>Project Responsible Officer</b></i>	<i><b>Technical Officer</b></i>	<i><b>Total Budget</b></i>
RAS5015	Mutation Breeding of Food Legumes	5C	1993-06-15	Aslam, Javed (TCPA)		Amano, Etsuo (NAFA)	216321
RAS4012	Nuclear Instrument Maintenance	4G	1995-10-31	Easey, John Frederick (TCPM)		Walsh, Robin L. (NAPC)	210615
RAS5020	Food Irradiation Process Control and Acceptance (RCA)	5H	1996-05-13	Easey, John Frederick (TCPM)		Loaharanu, Paisan (NAFA)	523847
RAS8071	Isotopes & Rad. for Tech. & Environ. Sustainable Devp. (RCA)	8H 8J	1998-04-17	Aleta, Carlito Ronguillo (TCPA)		Thereska, Jovan (NAPC) Gueven, Olgun (NAPC) Walsh, Michael A.R. (NAPC)	2549371
RAS5021	Increasing the Capabilities of Common Grain Legumes (RCA)	5B 5C	1998-05-07	Aleta, Carlito Ronguillo (TCPA)		Serraj, Rachid (NAFA)	918530
RAS7003	Radiation Sterilization of Tissue Grafts (RCA)	7E	1998-08-28	Aleta, Carlito Ronguillo (TCPA)		Tatsuzaki, Hideo (NAHU)	1050580
RAS4011	Research Reactor Utilization (RCA)	4B	1998-08-31	Aleta, Carlito Ronguillo (TCPA)		Dimic, Viktor (NAPC)	368146
RAS6022	Strengthening Nuclear Medicine in RCA Member States (RCA)	6B	1998-08-31	Aleta, Carlito Ronguillo (TCPA)		Padhy, Ajit Kumar (NAHU)	326653
RAS8068	Isotopes and Radiation in Industry and Environment (RCA)	8C 8J 8H 8E	1998-08-31	Aleta, Carlito Ronguillo (TCPA)		Thereska, Jovan (NAPC)	780874
RAS8070	Isotopes and Radiation in Industry and the Environment (RCA)	8C 8H 8G	1998-08-31	Aleta, Carlito Ronguillo (TCPA)		Thereska, Jovan (NAPC)	1006110

RAS4008	Nuclear Instrument Maintenance (RCA)	4G	1998-09-30	Aleta, Carlito Ronguillo (TCPA)		Xie, Yanfeng (NAHU)	1198709
RAS0022	Public Acceptance and Trade in Irradiated Food (RCA)	0K 5H	1998-12-11	Aleta, Carlito Ronguillo (TCPA)		Loaharanu, Paisan (NAFA)	86048
RAS6018	Radioimmunoassay for Hepatitis B Diagnosis (RCA)	6B	1998-12-23	Aleta, Carlito Ronguillo (TCPA)		Ch'Ng, Soo Ling (NAHU)	922575
RAS0021	Nuclear Power Planning (RCA)	0A 0B 0J	1999-11-30	Aleta, Carlito Ronguillo (TCPA)		Mazour, Thomas Joseph (NENP)	165258
RAS8069	Isotopes and Radiation in Industry and the Environment (RCA)	8G 8J 8H 8N	1999-11-30	Aleta, Carlito Ronguillo (TCPA)		Thereska, Jovan (NAPC)	466434
RAS0023	Energy, Electricity and Nuclear Power Planning (RCA)	0A 0B 0J	1999-12-21	Aleta, Carlito Ronguillo (TCPA)		Mazour, Thomas Joseph (NENP) Hamilton, Bruce (NE)	410427
RAS9006	Strengthening of Radiation Protection Infrastructures (RCA)	9C	1999-12-21	Aleta, Carlito Ronguillo (TCPA)		Oresegun, Modupe Olusola (NSRW) Mrabit, Khammar (NSRW)	1597518
INT2010	Quality Assurance in Analytical/Diagnostic Laboratories	2C	2000-07-13	Haddad, Ibrahim (TC)	Haddad, Ibrahim (TC)	Hardarson, Gudni (NAAL) Colling, Axel (NAAL)	233371
RAS5030	Feed Supplementation and Animal Production Strategies	5E	2000-11-29	Xu, Naicheng (TCAP)	Xu, Naicheng (TCAP)	Perera, Buthgamu Mudiyansele Amithral Oswin (NAFA)	402890
RAS0024	Project Formulation Meetings (RCA)	0B	2001-05-31	Aleta, Carlito Ronguillo (TCPA)	Aleta, Carlito Ronguillo (TCPA)	Aleta, Carlito Ronguillo (TCPA)	384759
RAS5034	Irradiation As Sanitary & Phytosanitary Food Treatment (RCA)	5H	2001-08-27	Aleta, Carlito Ronguillo (TCPA)	Aleta, Carlito Ronguillo (TCPA)	Loaharanu, Paisan (NAFA)	175852
RAS4019	Improving Research Reactor Operation and Utilization (RCA)	4B	2001-09-13	Aleta, Carlito Ronguillo (TCPA)	Aleta, Carlito Ronguillo (TCPA)	Basu, Saibal (NAPC)	192778
RAS8078	Nucleonic Control Systems and Tracers in Industry (RCA)	8C	2002-05-31	Aleta, Carlito Ronguillo (TCPA)	Aleta, Carlito Ronguillo (TCPA)	Thereska, Jovan (NAPC)	391643
RAS8080	Better Mgt of Envir & Industry Thru Isotope & Rad Tech (RCA)	8A 7J 0J	2002-07-15	Aleta, Carlito Ronguillo (TCPA)	Aleta, Carlito Ronguillo (TCPA)	Turner, Jeffrey Vaughan Vaughan (NAPC)	811067

RAS8077	Thematic Programme on Advanced Techniques for Industry (RCA)	8C	2002-07-30	Aleta, Carlito Ronguillo (TCPA)	Aleta, Carlito Ronguillo (TCPA)	Einav, Isaac (NAPC)	364835
RAS0031	Strategies/Approaches Towards Self Reliance & Sustainability	0B	2002-08-12	Razley, Mohd. Nordin (TCPA)	Razley, Mohd. Nordin (TCPA)	Razley, Mohd. Nordin (TCPA)	137626
RAS0028	Comparative Assessmt of Electricity Generation Options (RCA)	0E	2003-01-30	Aleta, Carlito Ronguillo (TCPA)	Kim, Kyoung-Pyo (TCPA)	Bui, Duy Thanh (NE)	436979
RAS4016	Disposal of Radioactive Waste from Non-Power Sources (RCA)	4O	2003-01-30	Aleta, Carlito Ronguillo (TCPA)	Kim, Kyoung-Pyo (TCPA)	Dayal, Ramesh (NEFW)	156601
RAS8089	Optimization of Mineral Resources Recovery Using Low Radioactivity Portable Nucleonic Gauges (RCA)	8C	2003-01-30	Aleta, Carlito Ronguillo (TCPA)	Aleta, Carlito Ronguillo (TCPA)	Thereska, Jovan (NAPC)	312352
RAS0033	Role of Nuclear Power and Other Energy Options in Mitigating Greenhouse Gas Emissions (RCA)	0E	2003-02-26	Aleta, Carlito Ronguillo (TCPA)	Kim, Kyoung-Pyo (TCPA)	Bui, Duy Thanh (NE)	202399
RAS4020	Improvement of Research Reactor Operation and Utilization (RCA)	4B	2003-02-26	Aleta, Carlito Ronguillo (TCPA)	Kim, Kyoung-Pyo (TCPA)	Paranjpe, Shrinivas Krishnarao (NAPC)	238067
RAS8083	Management of Marine Coastal Environmental Pollution (RCA)	8G	2003-02-26	Aleta, Carlito Ronguillo (TCPA)	Aleta, Carlito Ronguillo (TCPA)	Fowler, Scott W. (NAML) Boisson, Florence (NAML) Turner, Jeffrey Vaughan Vaughan (NAPC)	201587
RAS8086	Radiotracers/Sealed Sources/Nucleonic Gauges in Indust.(RCA)	8J	2003-02-26	Aleta, Carlito Ronguillo (TCPA)	Aleta, Carlito Ronguillo (TCPA)	Thereska, Jovan (NAPC)	532451
RAS8087	Radiation Processing Application for Agrowaste (RCA)	8H	2003-02-26	Aleta, Carlito Ronguillo (TCPA)	Aleta, Carlito Ronguillo (TCPA)	Chmielewski, Andrzej Grzegorz (NAPC)	78907
RAS7008	Quality Assurance in Radiation Sterilization of Tissue Graft (RCA)	7E	2003-04-29	Aleta, Carlito Ronguillo (TCPA)	Aleta, Carlito Ronguillo (TCPA)	Hendry, Jolyon Hindson (NAHU)	920506
RAS5029	Nuclear Techniques for the Promotion of Agroforestry Systems	5B	2003-05-30	Lutfi, Nabil (TCAP)	Lutfi, Nabil (TCAP)	Keerthisinghe, Deegala Gamini (NAFA)	390965
RAS0030	Design and Formulation of Project Proposals	0B	2003-06-25	Lutfi, Nabil (TCAP)	Lutfi, Nabil (TCAP)	Razley, Mohd. Nordin (TCPA)	667493
RAS7010	Measuring the Effectiveness of Multinutrient Supplementation	7J	2003-12-31	Lutfi, Nabil (TCAP)	Lutfi, Nabil (TCAP)	Iyengar, Govindaraja Venkatesha (NAHU)	475399
RAS0025	Technical Co-operation Among Developing Countries (RCA)	0A	2004-04-30	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	490260

RAS5037	Mutational Enhancement for Genetic Diversity in Rice (RCA)	5C	2004-04-30	Dias, Mahendra Prinath (TCAP)	Kim, Kyoung-Pyo (TCPA)	Shu, Qingyao (NAFA)	335110
RAS6035	LDR and HDR Brachytherapy in Treating Cervical Cancer (RCA)	6C	2004-04-30	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Vikram, Bhadrasain (NA) Shortt, Kenneth Robert (NAHU) Pernicka, Frantisek (NAHU)	241489
RAS0029	Radiation Protection and Networking (RCA)	0F	2004-05-20	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Sadagopan, Geetha (NSRW)	176735
RAS2009	Quality Assurance and Good Manufacturing Practice for Radiopharmaceuticals	2G	2004-05-20	Lutfi, Nabil (TCAP)	Lutfi, Nabil (TCAP)	Pillai, Maroor Raghavan Ambikalmajan (NAPC)	322754
RAS4017	Maintenance and Repair of Nuclear Instruments	4G	2004-05-20	Lutfi, Nabil (TCAP)	Lutfi, Nabil (TCAP)	Kaufmann, Herbert (NAPC)	596355
RAS6028	Nuclear Medicine Applications (RCA)	6B	2004-05-20	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Padhy, Ajit Kumar (NAHU) Solanki, Kishor K. (NAHU)	1932912
RAS6027	Quality Assurance in Radiation Therapy (RCA)	6C	2004-08-27	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Vikram, Bhadrasain (NA) Shortt, Kenneth Robert (NAHU) Pernicka, Frantisek (NAHU)	774115

RAS8076	Better Management of Environment and Industrial Growth - Joint UNDP/RCA (RCA)	8A	2004-08-27	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Yonezawa, Chushiro (NAHU) Boisson, Florence (NAML) Markowicz, Andrzej (NAAL) Pang, Zhonghe (NAPC) Kemppainen, Markku (TCPC) Chmielewski, Andrzej Grzegorz (NAPC) Jin, Joon-Ha (NAPC)	1045640
RAS8082	Isotopic and Related Techniques to Assess Air Pollution - Joint UNDP/RCA (RCA)	8G	2004-08-27	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Markowicz, Andrzej (NAAL) Yonezawa, Chushiro (NAHU)	573112
RAS9018	Harmonization of Radiation Protection (RCA)	9C	2004-10-29	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Djermouni, Belkacem (NSRW) Mrabit, Khammar (NSRW)	1805756
RAS7012	Diagnosing Osteoporosis Using Nuclear Techniques (RCA)	7J	2004-12-30	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Mokhtar, Najat (NAHU)	29106
RAS2010	Quality Assurance and Quality Control of Nuclear Analytical Techniques	2C	2005-02-28	Lutfi, Nabil (TCAP)	Lutfi, Nabil (TCAP)	Rosbach, Matthias H. (NAPC)	420013
RAS8085	Non-Destructive Testing and Evaluation (RCA)	8C	2005-06-30	Dias, Mahendra Prinath (TCAP)	Dias, Mahendra Prinath (TCAP)	Einav, Isaac (NAPC)	229418
RAS6032	Regional Screening Network for Neonatal Hypothyroidism	6B	2005-12-28	Kamel, Reyad Sherif (TCAP)	Kamel, Reyad Sherif (TCAP)	Solanki, Kishor K. (NAHU)	619108

#### Cancelled Regional/Interregional Projects (1)

<i>Project Number</i>	<i>Title</i>	<i>Field</i>	<i>Cancelled On</i>	<i>Country Officer</i>	<i>Project Responsible Officer</i>	<i>Technical Officer</i>	<i>Total Budget</i>
RAS0034	Graduate Training and Education in Nuclear Sciences	0I	2006-02-24	Lutfi, Nabil (TCAP)	Lutfi, Nabil (TCAP)	Salema, Manase Peter (TCAP) Lutfi, Nabil (TCAP)	0

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