

# Technical Cooperation Report for 2007

Report by the Director General



**IAEA**

International Atomic Energy Agency



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**TECHNICAL  
COOPERATION REPORT  
FOR 2007**

**REPORT BY THE DIRECTOR GENERAL**

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## PREFACE

**The Board of Governors has requested the transmission to the General Conference of the attached Technical Cooperation Report for 2007, the draft of which was considered by the Board at its June 2008 session.**

**The Director General is also hereby reporting in fulfilment of the request contained in resolution GC(51)/RES/13 on “Strengthening of the Agency’s technical cooperation activities”.**

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## Summary

Part A of this document provides an overview of technical cooperation activities from 1 April 2007 to 31 March 2008. Financial indicators show that pledges and payments to the Technical Cooperation Fund (TCF) totalled \$76.6 million or 95.8% of the \$80.0 million TCF target set for 2007. For the Technical Cooperation programme as a whole, new resources stood at \$100.3 million, down slightly from the 2006 high of \$101.0 million. The programme disbursed a total of \$93.3 million, and achieved an implementation rate of 74.9% (\$100.0 million in net new obligations), just below the rate of 75.2% in 2006. In 2007 the programme delivered support to 122 countries and territories; 3546 expert and lecturer assignments were carried out, 4149 participants attended meetings, 2287 people took part in training courses and 1661 benefited from fellowships and scientific visits.

2007 saw a range of activities to enhance the effectiveness of the Technical Cooperation (TC) programme. Further progress was made in the establishment of the results-based management approach used by the TC programme. Standardized quality criteria were introduced for project screening and design, and additional enhancements were made to the Programme Cycle Management Framework (PCMF) IT application. Factors affecting project delivery, including Member State support required for timely implementation, have been monitored and assessed as a basis for further improvements.

Strengthening Member State capacities is a key technical cooperation objective, and a range of actions were carried out in 2007 with this goal in mind. An independent evaluation of the fellowship programme for 2003 – 2004, conducted by the Agency's Office of Internal Oversight Services, saw the programme as worthwhile and producing tangible results. Technical cooperation among developing countries continued throughout 2007, building on the expanding knowledge and capacities of Member States to enhance self-reliance and sustainability. Knowledge management, an essential component in building sustainable capacities at all levels, was also addressed. In Europe, a regional project to establish policies and strategies to preserve nuclear knowledge is supporting the development of common approaches to knowledge management in nuclear technology, while IAEA support to the World Nuclear University enabled 21 participants from developing countries to attend courses at the WNU Summer Institute in the Republic of Korea. To ensure the best possible socio-economic impact of the TC programme, strategic partnerships that act as catalysts and multipliers are essential. In 2007, the Agency reached out to partners ranging from UN organizations to development banks and from regional groups to theme-based institutions.

In the Latin America region, cooperation between the IAEA and UNEP's Caribbean Regional Co-ordinating Unit (CAR/RCU) was formalized, focusing on the promotion of integrated coastal zone management in the Wider Caribbean. Other partnerships were established or are being prepared with the Pan American Health Organization (PAHO), the Ibero-American Programme of Science and Technology for Development (CYTED) and the Latin American Energy Organization (OLADE). In Africa, the outcome of a high level regional conference in Algiers on the topic of 'Nuclear Energy: Contribution to Peace and Sustainable Development', was endorsed by the Executive Council of Ministers at the African Union Summit, while Agency support to the New Partnership for Africa's Development (NEPAD) continues, mainly through regional TC mechanisms. TC projects dealing with river basins and aquifers in Africa are leading to an important partnership with the Global Environment Facility (GEF), and the partnership with the African Union's Pan African Tsetse and Trypanosomosis Eradication Campaign (AU-PATTEC) is ongoing.

New initiatives in TC during 2007 included the finalisation of Guidelines for National Liaison Officers, a more systematic approach to environmental issues, and a range of enhancements to

regional coordination efforts. In coordination with ARCAL, the Division for Latin America produced a regional strategic profile defining priority areas for regional technical cooperation, and a similar exercise by the Division for Europe has resulted in the European regional profile, which will be used as a planning tool for the development of regional programming activities for 2009 – 2013. The Africa region adopted the concept of a regional strategic cooperation framework, which was endorsed by AFRA Member States in November 2007. In Asia and the Pacific, the RCA Medium Term Strategy and Implementation Plan for 2006 – 2011, issued in 2006, continued to demonstrate its usefulness.

Part B of this document responds to the operative paragraphs of resolution GC(51)/RES/13, dealing with assistance to Member States in the peaceful, safe, secure and regulated applications of atomic energy and nuclear techniques in specific fields. This part highlights activities and achievements in technical cooperation in each of the regions in 2007, describing regional emphases and responses to national priorities. As the Millennium Development Goals remain a key area of focus, the report demonstrates how the IAEA is making a contribution to global efforts to fight poverty, hunger and disease, as well as to support environmental sustainability and the health of mothers and children. Health in Asia was addressed in 2007, for example, through regional projects to train new medical staff, while in Europe, radiotherapy services were being upgraded in the Balkans. In Africa, projects on better animal health and improved crop productivity contributed to the fight against hunger, and in Latin America, activities in food fortification and the determination of vitamin deficiency helped to improve the health of mothers and children.

Ensuring sustainable socioeconomic development in the future will depend on a reliable energy supply. Among the energy-related technical cooperation projects in Africa in 2007, support to energy planning helped to train national energy planning teams in Burkina Faso, Chad, Cote d'Ivoire, Mauritania and Niger. Assistance was also being provided to several African countries to help with the different stages of planning a nuclear power programme. In Asia and the Pacific, RCA Member States received support in the application of Agency-developed analytical tools for energy planning. In Latin America, energy security is seen as a priority issue. Support in 2007 was provided through a regional project to develop capacities for the development of sustainable energy.

In the area of safety and security, each region has different needs, and the Agency response is therefore tailored to fit. In 2007, the Agency provided assistance to the conversion of Europe's older research reactors from high to low enriched uranium. In Asia and the Pacific, the Agency provided advice on the development of nuclear power, based on the latest Agency guidelines and the document 'Milestones in the Development of a National Infrastructure for Nuclear Power'. Moves are afoot to address specific safety issues in Africa at the national level, unlike the other regions where safety support is mostly provided through regional projects.

## The Agency's Technical Cooperation Programme at a Glance (as at 31 December 2007)

The target for voluntary contributions to the Technical Cooperation Fund for 2007 was **\$80 million**.

New resources for the technical cooperation (TC) programme were **\$100.3 million**.

- Technical Cooperation Fund: **\$83.6 million**
- Extrabudgetary resources: **\$13.3 million**
- UNDP resources: **\$0.2 million**
- In-kind contributions: **\$3.2 million**

The adjusted budget for the TC programme for 2007 was **\$133.5 million**.

Disbursements for the TC programme reached **\$93.3 million**.

New net obligations during the year were **\$100.0 million**.

The implementation rate for the programme was **74.9%**.

The Rate of Attainment stood at **95.6%** at the end of 2007.

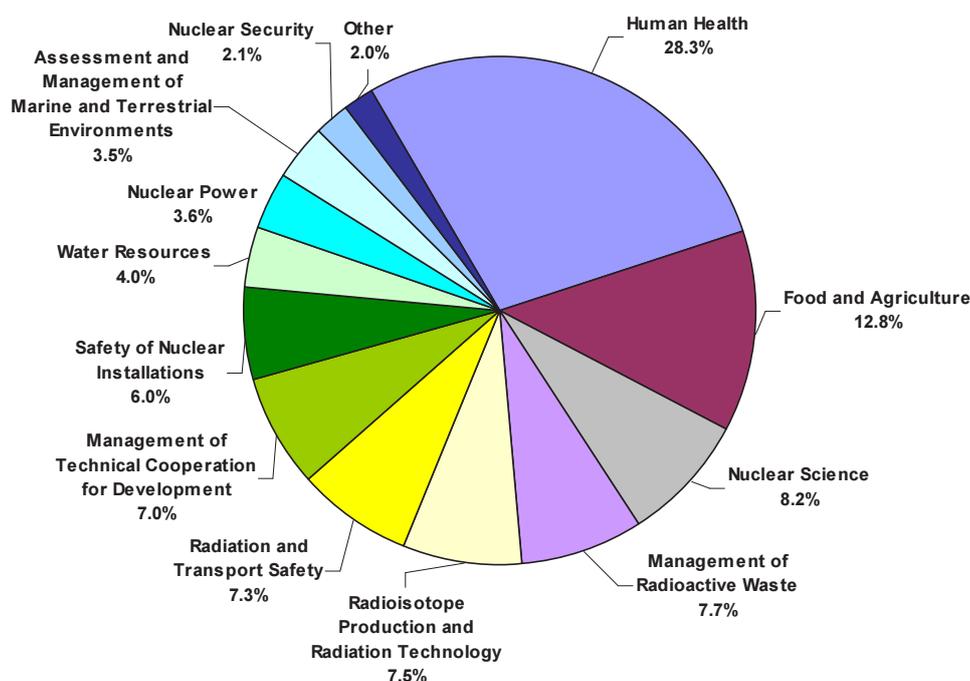
The number of countries/territories receiving support from the programme was **122**.

Project support involved **3546** expert and lecturer assignments, **4149** meeting participants, **2287** participants in training courses and **1661** fellows and scientific visitors.

**108** Member States have concluded Revised Supplementary Agreements.

**84** Country Programme Frameworks have been signed by Member States and the Agency, and **20** are in the draft stage.

### Disbursements by Agency Programme for 2007<sup>1</sup>



<sup>1</sup> Throughout this report, percentages in charts might not add up exactly to 100% due to rounding.

# Technical Cooperation Report for 2007

*Report by the Director General*

## **A. Strengthening the Agency's Technical Cooperation Activities**

1. This document responds to the request by the General Conference to the Director General to report on the implementation of resolution GC(51)/RES/13.

2. Part A of the document focuses on an overview of technical cooperation activities from 1 April 2007 to 31 March 2008. Section A.1 reviews activities to enhance the effectiveness of the Technical Cooperation (TC) programme during the period under review. It includes an update on the status of Country Programme Frameworks, and reports on TC initiatives with regards to performance indicators and improved quality management. Factors affecting project delivery are also presented. Section A.2 provides a summary of financial indicators. It reviews the mobilization of resources for TC through the Technical Cooperation Fund and extrabudgetary contributions, illustrated by charts and tables. In Section A.3, the focus is on programme delivery, concentrating largely on financial indicators. Section A.4 describes activities to strengthen Member State capacities. It reports on a recent evaluation of the fellowship programme, and offers information on efforts in Africa and Asia and the Pacific to enhance self-reliance and sustainability. It also describes recent activities in promoting technical cooperation among developing countries. Knowledge management, an essential component in building sustainable capacities at all levels, is also discussed. In Section A.5, the report looks at efforts by the Agency to gain recognition as a partner in resolving development problems through the cost effective transfer of nuclear technologies, focusing this year on efforts in Africa. Section A.5 also covers TC contributions to the Millennium Development Goals and the UN "Delivering as One" initiative. Actions to mainstream gender into TC programmes are also reviewed. New initiatives in TC are described in Section A.6, including the preparation of information documents and guidelines, enhancements to regional coordination activities, and efforts to support efforts Agency-wide with regard to the environment.

3. Part B of this document responds to the operative paragraphs of resolution GC(51)/RES/13, dealing with assistance to Member States in the peaceful, safe, secure and regulated applications of atomic energy and nuclear techniques in specific fields. It highlights activities and achievements in technical cooperation in each of the regions in 2007, describing regional emphases and responses to national priorities.

## **A.1. Towards a more effective technical cooperation programme<sup>2</sup>**

### **A.1.1. Overview**

4. In 2007, the technical cooperation programme delivered support to 122 countries and territories. 3546 expert and lecturer assignments were carried out, 4149 participants attended meetings, 2287 people took part in training courses and 1661 people benefited from fellowships and scientific visits. The programme disbursed a total of \$93.3 million, and achieved an implementation rate of 74.9%. Considerable energy was devoted to identifying and learning from experiences in the past, with initiatives focusing on programme performance indicators, knowledge management activities, an assessment of the results of the fellowship programme and an analysis of factors affecting programme delivery. New ventures to improve the effectiveness of the TC programme included further enhancements to the Programme Cycle Management Framework (PCMF) IT application, the preparation of information documents and guidelines, substantial regional coordination activities, and initiatives to support cohesion Agency-wide with regard to the environment.

### **A.1.2. Revised Supplementary Agreements and Country Programme Frameworks**

5. Revised Supplementary Agreements (RSAs) govern the provision of technical assistance to governments through the Agency. They set forth the specific conditions required under the Agency's Statute for the provision of technical assistance by the Agency to its Members. Thus far, 108 Member States have concluded RSAs.

6. Country Programme Frameworks (CPFs) improve the project selection process by placing it in the context of national priorities, thus allowing projects to be screened for consistency with these identified priorities. To date, 104 CPFs have been prepared. Of these, 84 have been signed by Member States and the Agency. An additional 6 Member States are planning to implement CPFs, which would bring the total of planned and implemented CPFs to 110. During 2007, Burkina Faso and Thailand signed CPFs, and the CPFs of Belarus, Ethiopia, Namibia, and Romania were revised and updated.

### **A.1.3. Measuring technical cooperation against agreed performance indicators**

7. In 2007, upon the request of the Department of Technical Cooperation, the Office of Internal Oversight Services (OIOS) reviewed the performance monitoring mechanisms used to monitor technical cooperation projects, with a view to improving the TC programme management cycle. The review addressed five main aspects: a review of monitoring capabilities in the field, a review of performance indicators, a review of monitoring tools (mainly reports), the standardization of performance indicators (PIs), and an assessment of options to define PIs at the programme level.

8. An analysis of ten TC projects in the United Republic of Tanzania revealed that the concept of results based monitoring is well understood at the country level. 86% of PIs reviewed were formulated at the right level, i.e. at the outcome level, and more than 90% were found to fulfil the essential criteria. However, it was found that almost 50% of PIs were not supported with baseline information, and 50% had no target values. 89% of reports were found to be consistent with the prescribed structure, 96% of reports were completed according to requirements and 85% had analytical contents regarding the progress of work in the field.

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<sup>2</sup> Section A.1 responds to operative paragraphs 7 and 15 of resolution GC(51)/RES/13 on enhancing the effectiveness and efficiency of the TC programme and on strengthening TC activities through the development of effective programmes and well defined outcomes.

9. During the process of standardizing PIs, many good PIs were identified and shared with the Department. The review concluded that while overall performance monitoring is well embedded in the results based management approach followed for the TC programme, some of its processes and components need to be further strengthened. A second phase of the project will examine the policy basis for monitoring with a view to aligning it with best practice.

#### **A.1.4. Quality management and the Programme Cycle Management Framework<sup>3</sup>**

##### **Standardized quality criteria**

10. The quality of the TC programme rests on achieving results that satisfy the priority needs and expectations of stakeholders. The Programme Cycle Management Framework (PCMF) is the accepted basis for systematic management of the technical cooperation programme in order to achieve these results.

11. In 2007, to strengthen programme quality, the Department of Technical Cooperation introduced standardized quality criteria to be used for screening all project concepts, and for designing projects in the 2009–2011 cycle. The quality criteria address:

- Relevance to national policies and development priorities.
- Demonstrated government commitment by Member States.
- Sustainability, which is ensured through the organizational, technical and managerial capacity of counterparts, including avoiding negative environmental impact and taking gender issues into account.
- Use of results based management principles, sharing responsibility between the respective government and the Agency for the implementation of TC projects.

12. The use of these criteria is expected to facilitate systematic monitoring and reporting on progress in achieving results.

##### **Enhancements to the PCMF IT application**

13. The PCMF IT application was enhanced, based on user feedback, to support the implementation of projects designed in the previous TC cycle, and to facilitate the submission and pre-qualification of project concepts, as well as the design of new projects. Specific enhancements included simplified workflows for national and regional project concepts, designs and work plan presentations, multiple technical screenings in parallel, online management reports, improved reporting by thematic area and Divisions in the Department of Technical Cooperation, and the introduction of comprehensive guidance to the IT application. System performance was improved and project team management was streamlined for all phases of the PCMF IT application. Systematic monitoring, reporting and assessment functionality are being included to facilitate the capturing of lessons learned by project stakeholders.

#### **A.1.5. An analysis to determine the factors that influence TC programme delivery<sup>4</sup>**

14. The Department of Technical Cooperation has carried out an extensive analysis of the processes involved in the delivery of the TC programme, and the actions of key players both in Member States and the Secretariat in these processes, to determine the factors that influence delivery. It is often not a

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<sup>3</sup> Section A.1.4 responds to operative paragraph 23 of resolution GC(51)/RES/13 on continuing to implement the Programme Cycle Management Framework.

<sup>4</sup> Section A.1.5 responds to operative paragraph 12 of resolution GC(51)/RES/13 on ensuring that the components of TC projects are readily available.

single action that affects delivery positively or negatively, but rather the consequences of a number of actions. The analysis not only will enable the Secretariat to address these factors, but has also highlighted areas where Member State action is essential for effective and efficient project implementation.

15. The roles, responsibilities and authorities of participants in the TC programme delivery process are not always properly clarified. In planning the TC programme for each Member State, it is important to take account of counterpart capacity, local conditions and programmes actually implemented in recent years. In addition, TC projects should support national programmes that already exist in the field. Project work plans and budgets must be realistic, and lead times to carry out activities should be taken into account. The PCMF IT application ensures that work plans are transparent and available online for all project stakeholders to plan and monitor their actions.

16. The analysis raised several issues with regard to procurement, mainly relating to denial or delay of shipment of radioactive materials, delays in customs clearance, lack of acknowledgement of receipt of equipment and failure to inform the Agency when equipment does not meet specifications. Since the Agency does not have field representation, it relies on the cooperation of Member State counterparts to provide information with regard to equipment.

17. The analysis also highlighted that many Member States have increased their security clearance requirements, which now require longer lead times and additional interaction between Agency staff, hosting institutes and participants. For example, it is becoming increasingly difficult for project participants to obtain visas for certain countries and the cost of visas has increased substantially. Member State support in these areas is essential to ensure efficient and timely project implementation.

## A.2. Mobilizing resources for the TC programme

### A.2.1. Summary of financial indicators for 2007

18. The TC programme continues to grow, and pledges and payments against the 2007 Technical Cooperation Fund (TCF) target totalled \$76.6 million or 95.8% of the \$80.0 million target. The rate of attainment at the end of 2007 stood at 95.6%, reflecting unpaid pledges of \$0.1 million. Total resources and net new obligations for 2007 remain high, but show a slight decrease from 2006 (Fig. 1).

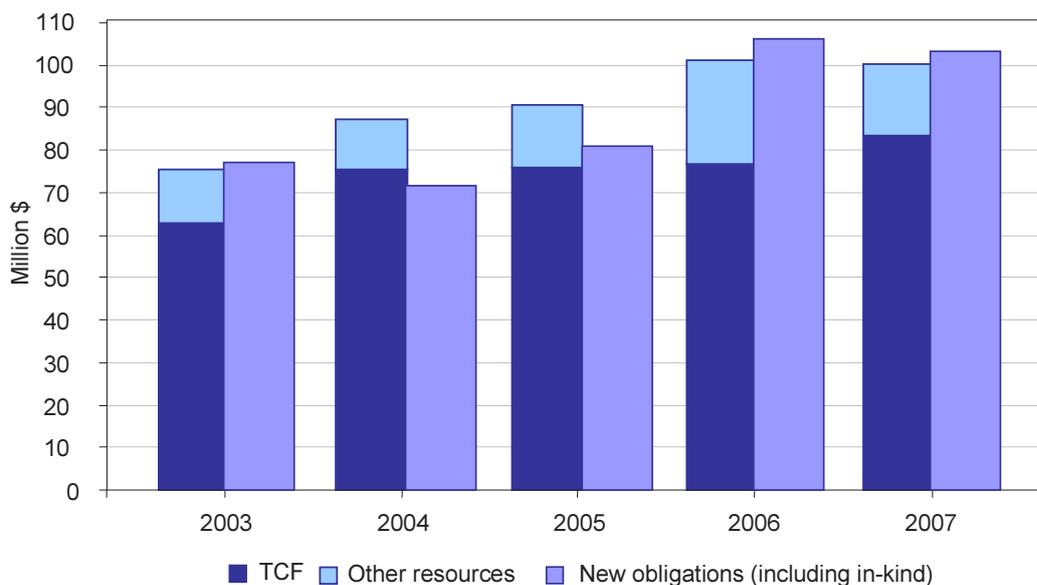


Figure 1: TCP resources and new obligations between 2003 and 2007

## **A.2.2. Technical Cooperation Fund<sup>5</sup>**

### **New resources**

19. New resources for the TCF in 2007 reached an all-time high of \$83.6 million, up from the previous high of \$76.8 million in 2006. A full report of all payments of TCF pledges, Assessed Programme Costs (APCs) and National Participation Costs (NPCs) is available in Table A.7 of the Supplement to this report. The rate of attainment also reached a new high of 95.6% as of 31 December 2007. In addition, payments made during 2007 against target years 2005 and 2006 meant that rates of 90.6% and 94.7% respectively were reached for those years. Miscellaneous income as a net result of gain/loss on exchange, interest income and bank charges totalled approximately \$2.1 million in 2007.

### **Payment of National Participation Costs**

20. Payments of National Participation Costs (NPCs) towards new projects came in more slowly during 2007 than in 2005 (the first year for payment of NPCs). By the end of the first quarter of 2007, 62% of the Member States who owed NPCs on new projects had paid at least the minimum amount required. In 2005, that number stood at 71%. However, by the end of the second quarter, the figures for the two years were approximately the same at 90%. By the end of 2007, only two Member States had not yet paid sufficient NPCs to make the new 2007 projects operational, and these payments were received early in 2008. A total of \$3.3 million was generated from NPC payments in 2007.

### **Payment of APC arrears**

21. About \$0.5 million was also received through payments of outstanding arrears in assessed programme costs (APCs). Slightly less than half of that amount was provided by six Member States who have established payment plans for these arrears.

### **Buying power of the TCF**

22. Purchases for the TC programme from TCF resources are split approximately equally between euro and US dollars, with other currencies making up just 6% of the total disbursements. The TCF target is denominated in US dollars and the vast majority (over 90%) of contributions are received in US dollars. However, the US dollar has steadily declined in value between 2002 and 2007, and as a result, the Technical Cooperation Fund has suffered a significant loss in buying power.

### **Ensuring that resources are sufficient, assured and predictable<sup>6</sup>**

23. In 2007, in response to Member State requests, a paper on sufficient, assured and predictable funding for TC, GOV/INF/2007/15, was prepared by the Secretariat, presenting, for the first time, an historical overview of the initiatives and suggestions made to ensure sufficient, assured and predictable funding for the TCF. This was offered with a view to building on past experiences, and took into account the need to review approaches to funding given the new development environment.

24. The paper recognizes that the context in which funding efforts are made has a significant influence on the approach taken to resource mobilization. Some contextual factors are unique to the Agency, others are common to the UN system. The growing recognition of the critical value of national science and technology capabilities in working towards sustainable development and in meeting the Millennium Development Goals (MDGs) is an important trend for the Agency. The UN "Delivering as One" reform initiative may affect TC financing. Almost all organizations in the UN system are facing the challenge of a growing demand for a zero real growth budget, making the issue

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<sup>5</sup> Section A.2.2 responds to operative paragraphs 5, 6 and 8 of resolution GC(51)/RES/13 on timely payment of TCF targets, payment of APC arrears and on minimum payment of NPCs.

<sup>6</sup> This section responds to operative paragraph 2 of resolution GC(51)RES/13 on establishing means, including mechanisms, that would achieve the goal of making TC resources sufficient, assured and predictable.

of sufficient, assured and predictable contributions the subject of policy debate and experimentation with new funding strategies by various agencies. The roles and responsibilities of Member States are evolving, as national financial, scientific, technical and regulatory capabilities increase. This is leading to new approaches to cooperation with the Agency. Other innovative funding mechanisms include the United Nations Environment Programme (UNEP) Environment Fund model, an example of best practice in both resource mobilization and programme delivery that shares similarities with the TCF.

25. Donor support to broad thematic priorities or geographical areas is a promising source of new funding, and recent years have brought an expansion of new funding sources, the most striking being the growth of philanthropic giving through foundations. The UN system has also systematically increased its engagement with the private sector, and global funds such as the Global Environment Facility (GEF) are becoming an important source of potential funding.

26. The paper was considered at a meeting of the Board of Governors in September 2007. Some Member States stated that the report was a good starting point for the consideration of technical cooperation and wider funding issues under the 20/20 review by the Commission of Eminent Persons on the future of the Agency.

### A.2.3. Extrabudgetary contributions<sup>7</sup>

#### Extrabudgetary funds

27. Extrabudgetary donations from Member States and bilateral or international organizations accounted for some \$6.2 million in new resources, with some \$0.9 million of that coming from Nuclear Security Fund resources used to implement activities through TC projects. An additional \$7.1 million was provided by Member States to support activities in their own country (so-called government cost sharing). Figure 2 presents the extrabudgetary resources received over the past ten years, broken down by the type of donor. Although figures for 2007 show a considerable drop in comparison to the 2006 figures, it should be noted that 2006 was an exceptional year with regard to extrabudgetary resources.

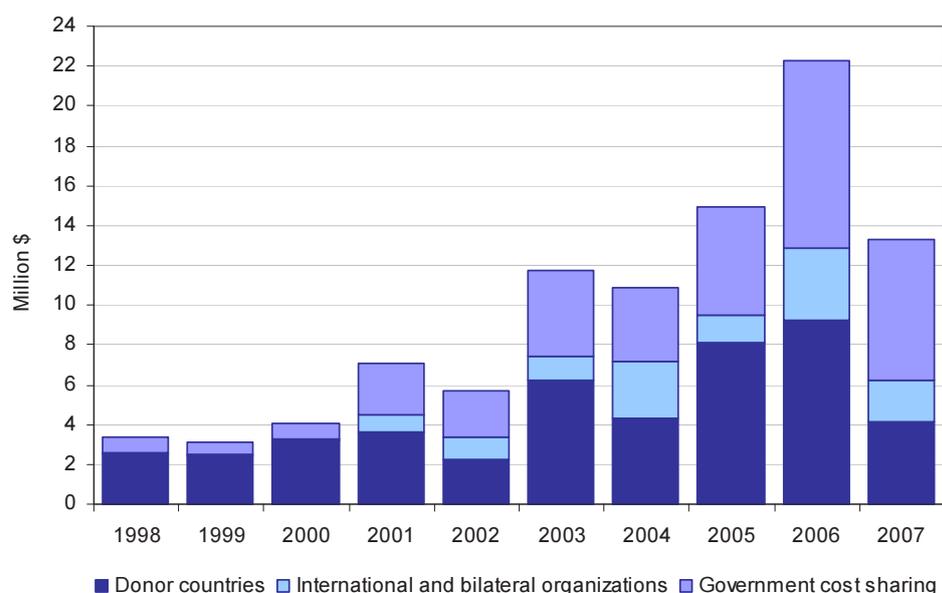


Figure 2: New extrabudgetary resources between 1998 and 2007

<sup>7</sup> Section A.2.3 responds to operative paragraphs 9 and 14 of resolution GC(51)/RES/13 on the possibility of paying NPCs in-kind and on a proactive role in seeking funding for footnote-a/ projects.

### **In-kind contributions**

28. In-kind contributions also showed a substantial increase over previous years, with a total of \$3.2 million being provided, compared to \$1.9 million in 2006. This included two teletherapy machines provided to Nicaragua and United Republic of Tanzania through the Programme of Action for Cancer Therapy (PACT) under TC projects.

### **Resource mobilization**

29. Following the recommendation of the Standing Advisory Group on Technical Assistance and Cooperation (SAGTAC) and the request of Member States to ensure sufficient funding for technical cooperation activities, a new Resource Mobilization post has been established in the Department of Technical Cooperation. Work is ongoing to establish ways to streamline and strengthen resource mobilization across all Divisions in the Department.

## **A.3. Delivering the technical cooperation programme**

### **A.3.1. Programme delivery**

30. TC programme delivery can be expressed in both financial and non-financial terms. Financial delivery is expressed in terms of disbursements and obligations. Non-financial (i.e. outputs) delivery can be expressed numerically in terms of experts deployed, training courses conducted or purchase orders placed, for example. In financial terms, the use of TCF resources was high, with a record implementation of \$83.9 million. For the programme as a whole, new resources stood at \$100.3 million, down slightly from the 2006 high of \$101.0 million. Implementation, measured against the adjusted programme for 2007, reached a rate of 74.9% (\$100.0 million), just below the rate of 75.2% attained in 2006 (Table 1).

<b>Indicator</b>	<b>2006</b>	<b>2007</b>	<b>Increase/(decrease)</b>
Adjusted programme	138 916 277	133 523 308	(5 392 969)
Net new obligations	104 486 185	100 012 964	(4 473 221)
Implementation rate	75.2%	74.9%	
Disbursements (including in-kind)	97 621 437	93 316 639	(4 304 798)

*Table 1: Delivery of outputs: financial indicators for 2006 and 2007*

### **Non-financial indicators**

31. Non-financial delivery indicators for 2007 show a slight increase in international expert and lecturer assignments, and a substantial increase in the number of participants in meetings and workshops (Table 2). Training and procurement show a slight decrease. The Supplement to this report gives a more detailed presentation of delivery in 2007, using both financial and non-financial indicators.

<b>Indicator</b>	<b>2006</b>	<b>2007</b>	<b>Increase/(decrease)</b>
Expert and lecturer assignments	3039	3546	44
Meeting/workshop participants	3225	4149	924
Fellowships and scientific visitors in the field	1682	1661	(21)
Training course participants	2494	2287	(207)
Training courses	173	160	(13)
Purchase orders placed	3191	2955	(236)
Subcontracts issued	2	6	4

*Table 2: Delivery of outputs: non-financial indicators for 2006 and 2007*

### Financial indicators: utilization of TCF resources

32. In financial terms, implementation of the TCF was very high. New obligations, the measure that most closely indicates (in financial terms) the delivery set in motion during the year, reached \$83.9 million, up from \$83.1 million in 2006. Disbursements under the TCF were down slightly in 2007, reaching a level of \$77.9 million, as compared with \$78.2 million in 2006.

### Unobligated balance

33. The unobligated balance at the end of 2007 was \$19.3 million, slightly lower than that at the end of 2006. Of this, some \$1.9 million had been added to the TCF in late 2007 based on account closure actions such as apportionment of interest income and the net effect of gain/loss on exchange. These additional resources only became available in February 2008. It should be noted that not all of the funds available to the TCF are actually fully useable. Table 3 presents a comparison of the TCF unobligated balance over the past five years. Out of the total of \$19.3 million, some \$1.1 million represents pledges which have not yet been paid. \$10.1 million represents cash held in currencies which are difficult to use in the implementation of the TC programme. While the useable unobligated balance, which stood at \$8.1 million at the end of the year, appears high, good financial management requires that cash flow be addressed. During 2007, TCF resources were obligated at the rate of approximately \$1.6 million per week. The useable unobligated balance thus represents approximately seven weeks of obligations, which is felt to be a prudent amount.

Description	2003	2004	2005	2006	2007
Total unobligated balance	6 408 000	18 865 000	25 954 000	19 626 000	19 336 711
Pledges not yet paid	(3 298 949)	(2 484 331)	(1 638 570)	(1 642 125)	(1 142 148)
Non-convertible currencies that cannot be utilized	(1 171 466)	(12 612)	(12 004)	(12 090)	(11 934)
Currencies that are difficult to convert and can only be utilized slowly	(4 280 648)	(6 179 396)	(7 442 196)	(8 681 250)	(10 125 227)
Resources that can be used for TC programme obligations	(2 343 062)	10 188 661	16 861 230	9 290 535	8 057 402

Table 3: Comparison of unobligated balance of the TCF (in US dollars)

## A.4. Strengthening Member State capacities<sup>8</sup>

### A.4.1. Building human resources for nuclear technology

#### Evaluating the fellowship programme

34. The Agency fellowship programme is designed to build the capacity of Member State professionals in nuclear science and technology. Some 1400 fellows are trained each year through various TC projects, accounting for about 15% of total annual TC disbursements. In 2007, an

<sup>8</sup> Section A.4 responds to operative paragraphs 21 and 24 of resolution GC(51)/RES/13 on technical cooperation among developing countries, and on supporting programmes such as World Nuclear University Summer Institute.

independent evaluation of the fellowship programme for 2003–2004 was carried out by the Agency's Office of Internal Oversight Services to review the operational procedures of the programme, and to assess the degree to which the fellowship programme had achieved its goals. This evaluation<sup>9</sup> was considered by the Technical Assistance and Cooperation Committee at its meeting in November 2007. Several Member States stressed the importance of the fellowship programme for capacity building in nuclear science and technology in developing countries. The issue of brain drain, however, remains a problem.

35. Using surveys and interviews, the evaluation found that those involved in the fellowship programme saw the programme as worthwhile, and as producing tangible results. The vast majority of fellows who responded indicated that their experience had been a very positive one, with 96% reporting that they would recommend participation in an Agency fellowship to their colleagues. 86% of respondents reported satisfaction with the choice of host institute. Many fellows have continued to work in relevant nuclear fields after their fellowship, thus contributing to capacity building in national nuclear-related organizations.

36. While the evaluation found that the fellowship programme was well structured and well run, it did highlight areas for improvement, including candidate selection, timely identification and confirmation of suitable host institutes and the fellow self-assessment process. It also noted that no mechanism exists to track participants who have taken part in Agency fellowships in the past. The Secretariat is undertaking several activities aimed at improving fellowship operations. These include participation in the UN-wide biennial meeting on fellowships, as well as the initiation of biennial surveys of former fellows to allow continuous assessment.

#### **A.4.2. Promoting technical cooperation among developing countries**

37. Encouraging technical cooperation among developing countries (TCDC) is one of the key objectives of the TC programme. The following paragraphs offer some TCDC examples.

38. The Agency supported the African Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (AFRA) High Level Policy Review Seminar, arranged and hosted by the Government of Egypt, which was held in Aswan in late 2007. Following the Seminar, the AFRA Member States adopted the Aswan Declaration and Plan of Action which highlights issues to be addressed in the near term. An AFRA regional strategic cooperative framework, which will guide the AFRA programme for the next six years, was also adopted. The Agency assisted in the development of this document through the arrangement of a task force meeting of African experts who drafted the framework.

39. In the Asia and the Pacific region, regional projects, including those under the Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (RCA) and the Co-operative Agreement for Arab States in Asia for Research, Development and Training related to Nuclear Science and Technology (ARASIA) continue to be the primary mechanism for TCDC. Beyond the traditional TCDC channel of hosting regional events and providing fellowship training, certain Member States have increasingly provided nuclear analytical services to Member States that lack facilities for these purposes.

40. The TC programme of ARASIA, covering a wide spectrum of nuclear applications in the fields of hydrology, energy options, food, agriculture, marine environments, health, archaeology and industrial applications, has appointed lead coordinators in all projects concerning these areas and has

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<sup>9</sup> Contained in document GOV/INF/2007/18

achieved significant progress during 2007. The Board of Representatives adopted revised Guidelines and Rules of Procedures of ARASIA to further streamline its work.

#### **A.4.3. Building nuclear infrastructure and capacity and preserving nuclear knowledge**

41. Many countries considering embarking on nuclear power programme request support from the Agency. In 2007, the Agency published an important guide as part of the IAEA Nuclear Energy Series: No. NG-G-3.1, 'Milestones in the Development of a National Infrastructure for Nuclear Power'. The Agency also organized a workshop on the 19 topical issues of infrastructure and sent many missions in support of Member States infrastructure building.

42. A solid strategy for the effective management of nuclear knowledge in order to achieve the needs and priorities of counterparts is essential for sustainable TC activities. A regional project in Europe is helping Member States to establish policies and strategies to preserve and enhance knowledge, competence and expertise and to provide practical guidance for the application of knowledge management in governmental organizations, industry and academia. In 2007, project activities supported capacity building and national infrastructure development, developing common approaches to knowledge management in nuclear technology and nuclear education and providing practical activities aimed at ensuring the sustainable development of nuclear power and non-power nuclear applications. A guidance document entitled 'Planning and Execution of Knowledge Management Assist Missions for Nuclear Organizations' has been developed. Knowledge Management Assist missions facilitate the transfer of knowledge management methodologies and tools and assist Member States considering implementation of nuclear power programmes to integrate knowledge management in their management system from the very beginning.

#### **World Nuclear University**

43. As part of its contribution to international efforts to preserve nuclear knowledge, the Agency is a sponsor of the World Nuclear University (WNU). Each summer since 2005, the WNU has held a Summer Institute to provide specialized training in nuclear technology and policies to graduate students and young professionals with the potential of becoming future leaders in the nuclear field. In 2007, the Agency funded 21 participants from 16 developing Member States to enable them to attend the WNU Summer Institute in the Republic of Korea, supported by Korea Atomic Energy Research Institute (KAERI).

### **A.5. Technical cooperation: A partner in development<sup>10</sup>**

#### **A.5.1. Building partnerships with international and regional development organizations**

44. To ensure the best possible socio-economic impact of the TC programme, strategic partnerships that act as catalysts and multipliers are essential. In 2007, the Agency reached out to partners ranging from UN organizations to development banks and from regional groups to theme-based institutions.

45. In Africa, a high level regional conference entitled 'Nuclear Energy: Contribution to Peace and Sustainable Development' (Algiers, January 2007) was supported by the Agency through AFRA. The Conference Declaration reaffirmed Africa's strategic choice for the exclusively peaceful use of the atom in accordance with Article IV of the NPT and urged African States to strengthen further inter-African cooperation in the peaceful uses of nuclear energy and technologies, particularly within the framework of AFRA. The outcomes of the Algiers Conference were subsequently endorsed by the

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<sup>10</sup> Section A.5 responds to operative paragraphs 3 and 16 of resolution GC(51)/RES/13 on facilitating cost-sharing and other sources of partnership in development and on consultations with interested States, multilateral financial institutions and regional development bodies.

Executive Council of Ministers at the African Union (AU) summit. Through this, the AU has recognized the unique role of AFRA in promoting regional cooperation in the peaceful applications of nuclear science and technology.

46. In 2007, the Agency continued to support the New Partnership for Africa's Development (NEPAD). Most Agency technical cooperation activities carried out in Africa, mainly through regional cooperation mechanisms, are directly relevant to the strategic goals and programmatic priorities of NEPAD, and address regional and national developmental problems related to NEPAD's sectoral priorities in agriculture, energy, water resources, health and human resources development.

47. An important partnership is emerging with the Global Environment Facility (GEF) supported through several technical cooperation projects which include the formulation of an action programme for the integrated management of the shared Nubian aquifer (project RAF/8/041), and mainstreaming groundwater considerations into the integrated management of the Nile river basin (project RAF/8/042). Preliminary work has been carried out to work together with the GEF to support the Ethiopian Groundwater Resource Assessment Programme (EGRAP).

48. The Agency continued to foster its partnership with the AU's Pan African Tsetse and Trypanosomosis Eradication Campaign (PATTEC). The African Bank for Development (AfDB) committed an additional \$78 million for support for additional countries embarking on sub-regional tsetse and trypanosomosis (T&T) control programmes (Phase II countries), but wants to see progress in the original six Phase I countries before signing project agreements with the new countries.

49. A memorandum of understanding (MoU) was signed between the Agency and the United Nations Environment Programme's Caribbean Regional Co-ordinating Unit (CAR/RCU) in April 2007 for the promotion of integrated coastal zone management as well as the development and improvement of national and regional capacity to help reduce degradation of the coastal and marine ecosystems of the wider Caribbean region. The Agency was invited as an Observer Organization of the Ibero-American Programme of Science and Technology for Development (CYTED) during its XXVIII General Assembly, held in Managua, Nicaragua, in December 2007. The Latin American Energy Organization (OLADE) has established a partnership with the Agency for regional energy planning and signed a letter of understanding to cooperate on energy planning in the Latin America and Caribbean region. The Agency was also invited to participate as an observer at the Annual Ministerial Meeting of the Latin American and Caribbean Energy Sector in November 2007.

#### **A.5.2. Contributing to the Millennium Development Goals (MDGs)<sup>11</sup>**

50. The present portfolio of TC projects and those proposed for the next TC programme cycle (2009–2011) contribute to seven of the eight MDGs (the other goal focuses on achieving universal primary education). Under Goal 1, 'eradicate extreme poverty and hunger', work is ongoing to increase food security, focusing on improved agricultural production and yields. Under Goal 3, 'promote gender equality and empower women', the Agency has continued to support opportunities for women to benefit and contribute to nuclear science and technology. TC statistics indicate an increase in the number of female counterparts in the TC programme in 2007.

51. Goal 4, 'reduce child mortality', is supported by activities that establish guidelines on nutrient intake and utilization in babies and young children. Under Goal 5, 'improve maternal health' and Goal 6, 'combat HIV/AIDS, malaria and other diseases', the Agency is working with institutions in Asia, Africa and Latin America, including the WHO Regional Office for Africa (AFRO) and PAHO, to

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<sup>11</sup> This section responds to operative paragraph 18 of resolution GC(51)/RES/13 on the attainment of the Millennium Development Goals.

improve understanding of pathogens and surveillance of drug-resistant strains of HIV/AIDS, malaria and tuberculosis.

52. Under Goal 7, ‘ensure environmental sustainability’, the Agency supports increasing Member State needs to better plan and manage energy sources, providing analytical tools to assess national energy requirements and helping to establish optimal energy mixes to meet future requirements, which may include nuclear power. The Agency is also developing capacity for the wider use of isotope hydrology to build understanding of groundwater sources such as aquifers, dams, lakes and rivers. Lastly, Goal 8, ‘develop a global partnership for development’, is at the core of the Agency’s technical cooperation activities. The Agency supports national and regional institutions in putting science and technology to work for development, using indigenous resources. The Agency is also increasingly reaching out to non-technical institutions, including the UN system and regional banks (e.g. Asian Development Bank, African Development Bank).

### **A.5.3. Towards new strategic directions for TC**

53. The 2007 Triennial Comprehensive Policy Review (TCPR), an evaluation mechanism mandated by the General Assembly, recognized that if programme countries are to meet internationally agreed development goals, including the MDGs, they should have access to new and emerging technologies. In February 2007, the Standing Advisory Group on Technical Assistance and Cooperation (SAGTAC) recommended that the Agency should be proactive in responding to ongoing UN reform initiatives. It noted that the Agency could play a role in several ways, as nuclear technology has the capacity to support the achievement of the MDGs, and as the Agency’s Medium Term Strategy includes major goals such as enhancing the contribution of nuclear technologies for sustainable development, enhancing cooperative interaction with partners, and quality management.

54. The Agency has taken a number of steps in relation to the UN “Delivering as One” initiative. Bilateral discussions have been held with National Liaison Officers (NLOs) from pilot countries at the 51<sup>st</sup> General Conference. The Agency has also exchanged information extensively, mapped its activities in six pilot countries, and participated in capacity assessment and surveys. All NLOs and Programme Management Officers (PMOs) now have access to United Nations Development Group (UNDG) updates on the ‘One UN’ website, which has been linked to relevant TC Country Profiles.

55. The Agency was represented by the Director of the Division for Latin America at the meeting of Regional Directors of the UN system held in Montevideo, Uruguay, in July 2007. In the United Republic of Tanzania, the Agency took part in a UN Evaluation Group survey and a capacity assessment exercise. The Agency is making contact with newly established non-resident agency (NRA) officials in the six pilot countries that are Member States (Albania, Mozambique, Pakistan, Tanzania, Uruguay and Vietnam).

### **A.5.4. Incorporating a gender perspective into technical cooperation for development**

56. The Secretariat’s effort to increase the number of women in decision-making positions is reflected in the greater balance between the number of men and women participating in the TC programme as trainees, experts or counterparts (Figure 3). However, regional data suggest a general decline in the number of female experts, except in Europe where there was a noticeable increase. The gap between the number of female and male counterparts has remained constant with increases in both groups. Further statistical information on female participation in the TC programme in 2007 is provided in Table C4 of the Supplement to this report. As well as offering a website on gender in TC as a platform for information, the Department of Technical Cooperation’s upstream programming processes and project management now reflect a gender perspective, with guidance provided in the Country Programme Framework Guidelines and Project Concept Notes. The aim is to ensure greater

impact and equitable benefits for both men and women. Within the Department itself, the number of women in management and decision-making positions has increased, with women now accounting for one third of the staff in the Professional and higher categories.

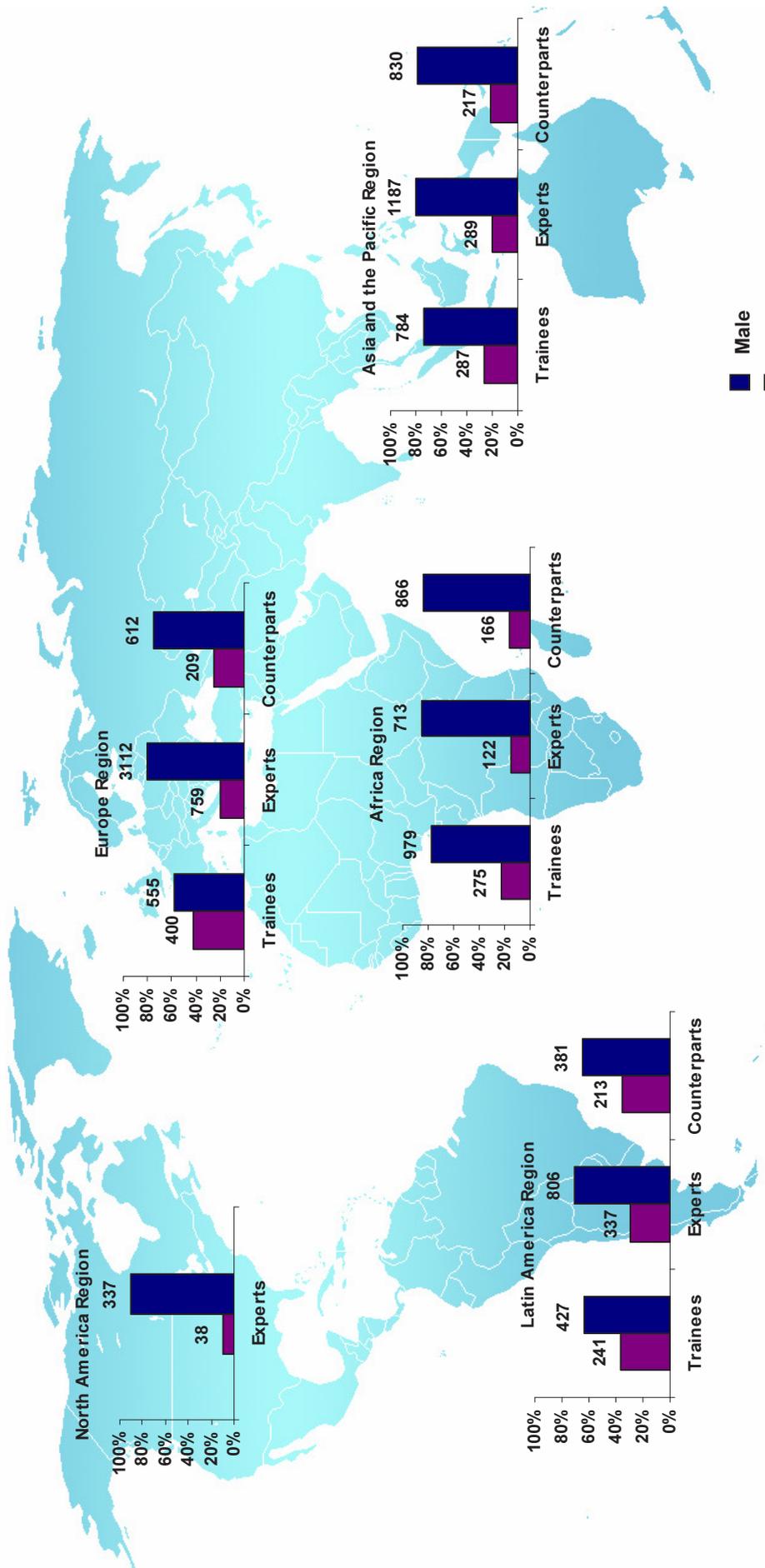


Figure 3: Participation in the TC programme of trainees<sup>12</sup>, experts<sup>13</sup> and counterparts<sup>14</sup> by gender in 2007. The figures represent the number of individual assignments carried out under the technical cooperation programme in 2007, and not the number of people carrying out those assignments as was reported in 2006.

<sup>12</sup> The term 'trainees' refers to fellows, scientific visitors and training course participants.

<sup>13</sup> The term 'experts' refers to international experts, lecturers, national consultants and meeting participants.

<sup>14</sup> Counterparts who were active in TC projects in 2007.

## **A.6. New initiatives**

57. Several new initiatives were undertaken in 2007 in response to the request of Member States, or in follow-up to recommendations by SAGTAC. These initiatives included new guidelines on the roles and responsibilities of National Liaison Officer (NLO), further developments in the enhancement of regional programming, and an exercise to articulate the scope of the Agency's involvement in the environment. Work continued on the implementation of the programme and the further development of programme management tools.

### **A.6.1. Guidelines for National Liaison Officers**

58. Following recommendations from SAGTAC, guidelines formalizing the role of NLOs have been drafted for Member States. The Guidelines offer an outline of key NLO roles and responsibilities, and were finalized at the end of 2007, following several rounds of consultations with Member States, SAGTAC members and individual NLOs. The Guidelines are available on the TC web site.<sup>15</sup>

### **A.6.2. Framework for regional programming<sup>16</sup>**

59. During 2007, SAGTAC made recommendations on the improvement of the draft regional programming framework. In parallel, the various regional Divisions moved forward in putting these recommendations into practice. The Division for Latin America, in coordination with ARCAL, produced a regional strategic profile that defines priority areas for regional technical cooperation in nuclear applications in human health, food and agriculture, the environment, radiation protection, waste safety and energy development for the period 2007–2012. This document has served as the basis for the preparation of the regional component of the 2009–2011 TCP and was formally adopted by ARCAL in June 2007.

60. The Europe Division also undertook a similar exercise, which has resulted in the European regional profile. This document will be used as a planning tool and guide for the development of regional programming activities for 2009–2013, and will enhance horizontal collaboration among Member States and cooperation with other partners such as the European Union (EU). This was particularly important for 14 EU Member States as they took the common position to focus more on regional programming and reduce national TC projects.

61. The Africa Division responded to SAGTAC's recommendations with the adoption of the concept of a regional strategic cooperation framework. The framework was endorsed by AFRA Member States at the High Level Policy Review Seminar in November 2007 to serve as the principal planning tool for setting regional cooperation priorities and developing AFRA regional cooperative programmes for the period 2008–2013. The document will also constitute a frame of reference for the formulation of AFRA regional programmes and will be used in the development of AFRA regional projects.

62. In the Asia and the Pacific Division, regional strategic planning had already begun in 2006 with the issuance of the RCA Medium Term Strategy and Implementation Plan for 2006–2011. The Medium Term Strategy provided a useful guide for formulating the 2007–2008 regional programme of the region. In 2007, ARASIA started preparation of its Medium Term Strategy along similar lines.

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<sup>15</sup> [http://tc.iaea.org/tcweb/participation/recipientcountry/nlo\\_roles/nv\\_eng\\_2008-02-28.pdf](http://tc.iaea.org/tcweb/participation/recipientcountry/nlo_roles/nv_eng_2008-02-28.pdf)

<sup>16</sup> This section responds to operative paragraph 22 of resolution GC(51)/RES/13 on the support and implementation of activities under regional cooperation agreements or arrangements.

### **A.6.3. Focus on the Environment**

63. An interdepartmental Focus Group on the Environment reviewed activities carried out by the Agency from 2005 to 2007 that related to the environment and relevant Millennium Development Goals. The Focus Group report articulated the scope of the Agency's involvement in the environment as three main objectives. These are: protecting humans and ecosystems from ionizing radiation; optimizing the environmental impact of nuclear technology; and facilitating the sustainable use and management of natural resources.

64. The report recommended that the Secretariat and Member States take a more systematic approach to environmental issues, focusing on consolidated responses to environmental issues. Noting the lack of understanding among decision-makers and the general public about the role of nuclear science and technology in development, the report suggested that greater efforts be devoted to assessing the environmental advantages and disadvantages of using nuclear applications in comparison to other non-nuclear alternatives, fostering the use of nuclear technology where appropriate, and providing guidance and assistance to Member States in the conduct of environmental impact assessments for activities related to the use of nuclear technology.

### **A.6.4. Enhancing the visibility of technical cooperation through outreach activities**

65. An exhibition showcasing some of the successful products of the technical cooperation programme and Member States was displayed in the Austria Center, Vienna, from 17 to 21 September 2007, during the 51<sup>st</sup> General Conference. The exhibition provided information on a range of TC projects, focusing on agriculture, health, the environment, water resource management, radiation technology and energy. Almost 40 projects were profiled. The exhibition also described developments in technical cooperation over the past 50 years.

## **B. Programme Activities and Accomplishments during 2007**

66. Part B highlights some of the achievements of the technical cooperation programme in 2007 in each of the four regions, as well as giving an overview of interregional projects. The TC programme covers a wide range of activities related to the safe application of nuclear technologies to promote socioeconomic development. These range from capacity building through fellowships and training courses in fields such as nuclear medicine or agricultural production, scientific visits and training in specialized fields, and advisory services to solve specific problems or as part of larger projects. Technical cooperation projects facilitate the exchange of information on regional issues such as the role of nuclear power in a global energy mix, or monitoring and controlling atmospheric pollution. The TC programme is the means by which tools and methodologies developed by the Secretariat are disseminated to Member States. It is also the vehicle by which Member States are supported in developing appropriate legislation and institutional infrastructure to adopt and enforce the safety standards that have been developed by the Agency.

67. Total disbursements under the TC programme in 2007 were \$93.3 million. Table B.3 in the Supplement to this report provides a breakdown of disbursements by Agency programme. The largest single sector of the TC programme in 2007 was human health, which accounted for \$26.4 million (28.3% of the programme). The second largest sector was food and agriculture, with \$11.9 million (12.8%), followed by nuclear science at \$7.6 million (8.2%).

68. There were considerable differences between the regions in the distribution of the 2007 TC programme, although human health accounted for the highest percentage in all regions, with 32.5% in Latin America, 32.2% in Africa, 27.0% in Europe and 23.6% in Asia and the Pacific. Food and agriculture accounted for 26.2% in Africa, 13.1% in Latin America and 10.8% in Asia and the Pacific, but just 2.1% in Europe, where the second largest sector was management of radioactive waste, at 17.5%. The third largest sector in Europe was safety of nuclear installations at 10.9%, while radiation and transport safety held this spot in Latin America with 10.4%. In Africa, the largest sector after food and agriculture was nuclear science at 8.6%, and in Asia and the Pacific radioisotope production and radiation technology sector came in second with 13.2%, followed by radiation and transport safety at 11.8%. The importance of safety in Asia and the Pacific was underlined by the fact that safety of nuclear installations was in fifth place at 8.1%. This figure, combined with the radiation and transport safety percentage, gives a total of 19.9% devoted to the safety sector in the region.

69. The largest sector in interregional projects was management of technical cooperation for development, which accounted for over 50% of programme distribution. Management of TC includes projects designed to improve the quality of the TC programme as a whole, including pre-project assistance, thematic planning, enhancing TCDC and development of CPFs. This was followed by management of radioactive waste and nuclear power, both at just under 15%. Interregional projects represent only a small portion of the overall programme. In 2007 a total of \$1.5 million was disbursed under interregional projects, out of the total of \$93.3 million.

## **B.1. Interregional projects**

### **B.1.1. Overview**

70. Interregional projects serve common needs of several Member States in different regions. Interregional projects can be trans-regional, global or joint activities. Trans-regional projects deal with issues involving countries from more than one region, but not necessarily all regions, such as, for example, coordination of national activities for the assessment of radionuclides in the Mediterranean. Global projects are used to ensure that all Member States participate equitably in the development of material and knowledge that will be used globally. Such projects may include the elaboration of guidelines, standards, curricula, teaching materials and the documentation of best practices. Joint TC activities with an international entity, formalized through a cooperation agreement, are also interregional. Projects in cooperation with ICTP Trieste (STEP), World Nuclear University (WNU), or SESAME fall into this category.

### **B.1.2. The SESAME project**

71. The Synchrotron-light for Experimental Science and Applications in the Middle East (SESAME) is an international organization based in Jordan, originally established under the umbrella of UNESCO and aimed at promoting international cooperation through the peaceful use of science in the field of synchrotron radiation.

72. Project INT/1/055, initiated in 2007 following the signature of a memorandum of understanding between SESAME and the Agency, supports human capacity building in SESAME through the training of operators and future users of the synchrotron as well as through technical assistance in the licensing process while the facilities are being completed for commissioning in 2010. In 2007, a total of some 50 person-months of training was approved, representing, to date, the main support received by SESAME outside Jordan. The training of the SESAME technical staff undertaken at some of the major synchrotron facilities in Europe will ensure, in the long term, the safe operation and maintenance of the SESAME facilities. Training provided to future users of SESAME will enable the Member States to design and use efficiently the phase I beamlines, upon commissioning of the synchrotron.

## B.2. Africa

### B.2.1. Overview

73. In 2007, the Agency provided support under the TC programme to 37 African countries, of which 20 are least developed countries. Continuing with the positive trend of previous years, a high volume of delivery was recorded, with net new obligations amounting to over \$29.6 million, compared with \$26.8 million in 2006. The financial implementation rate for 2007 was 76.3 %.

74. Together with government authorities and technical counterpart institutions, special efforts were made in 2007 to further enhance programme planning during the formulation of the TC programme for the region for 2009–2011. Activities included fact-finding and programming missions to new Member States (Malawi, Mozambique), pre-project assistance, programme review missions, support to national and regional workshops and seminars, and coordination meetings.

75. Three Country Programme Framework (CPF) documents were signed in 2007 (Burkina Faso, Ethiopia and Namibia).

76. Throughout 2007, activities in Africa focused predominantly on human health and food and agriculture, with disbursements in these areas accounting for almost 60% of the total.

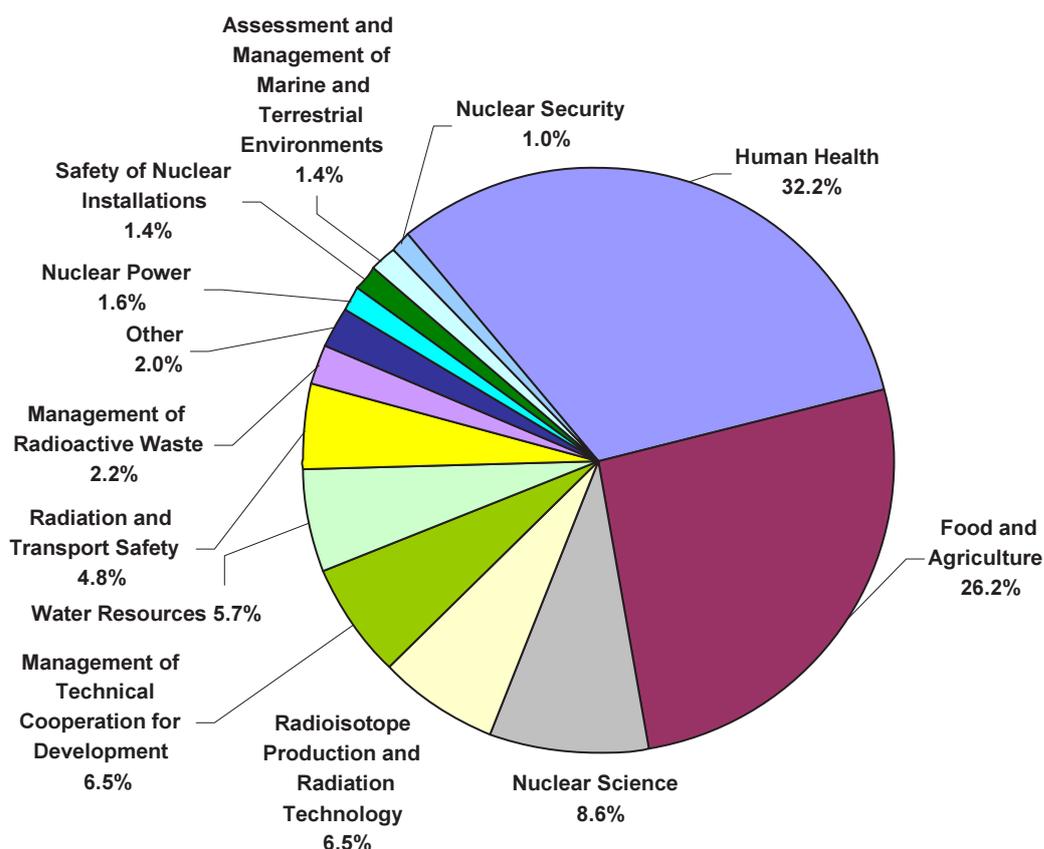


Figure 4: Disbursements by Agency Programme for 2007 — Africa

## **B.2.2. Human resources development, higher education and networking in nuclear science and technology**

77. The AFRA Member States, supported by the Agency, are currently implementing their regional strategy in human resource development and nuclear knowledge management through the AFRA Network for Education in Nuclear Science and Technology (AFRA-NEST). A harmonized curriculum for the AFRA Master's Degree in Nuclear Science and Technology has been adopted as a minimum standard for awarding such a degree in the region.

78. Building on the momentum achieved over the past years under AFRA projects RAF/0/014 and RAF/0/024, specific training and sensitization have been provided to managers of national nuclear institutions as well as academia and regional designated centres with the aim of improving national training programmes, harmonizing curricula and facilitating cooperation in the field of education through networking and exchange of training materials.

79. Under AFRA project RAF/0/020, 'ICT-based Training/Learning to Strengthen Training Capacity', the Agency continued its assistance to African Member States in establishing sustainable national and regional capabilities for using information and communication technology (ICT) for training and education in nuclear science and technology, relating to agriculture, human health, environmental monitoring, water resource management, nuclear instrumentation and other nuclear and related fields. This effort was supplemented by the provision of ICT telecentres to Botswana, Nigeria and Senegal. The Agency also played a major role in the organization, facilitation and sponsorship of the first conference on ICTs in training and learning in nuclear science and technology in Africa, which was held in November 2007 in Niamey, Niger, and attracted a large audience of African ICT experts, key speakers from Asia, Canada and the USA, as well as African decision-makers.

80. Under TC projects NER/0/005, 'Establishment of INIS Centre', and BKF/0/004, 'Establishment of a National Nuclear Information Centre', strong cooperation between the beneficiary institutions in Niger and Burkina Faso respectively is being forged to establish national International Nuclear Information System (INIS) centres through joint training of fellows in France and joint training of staff in each of the countries.

81. Support to higher education and training institutions continued in 2007 through regional project RAF/0/023 'Promoting University Teaching of Nuclear Applications for Development'. Major recipient institutions included the University of Addis Ababa, Ethiopia; Ghana Atomic Energy Commission; Moi University, Kenya; and the Sudan Atomic Energy Commission. This project is expected to sustain the development of the human resource base needed to promote wider utilization of potential nuclear techniques for socio-economic development.

82. In Ghana, the Agency has approved PhD training for several fellows from the Ghana Atomic Energy Commission (GAEC) through sandwich courses<sup>17</sup>. Many of these will become lecturers in the newly established School of Nuclear and Allied Sciences (SNAS) which is being supported under project GHA/0/010, 'Establishment of the Postgraduate School for Nuclear and Allied Sciences'. The intake for the academic year commencing in August 2007 exceeded 90 postgraduate students.

83. The Agency has been supporting a master's degree programme (MSc) in medical physics in Sudan since 2005 under TC project SUD/0/009, 'Supporting Postgraduate Teaching Programmes'. The second group of students to undergo the master's programme started in March 2007 with strong support from the Ministry of Health.

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<sup>17</sup> Sandwich courses alternate periods of formal instruction with practical experience.

### B.2.3. Providing support in human health

84. Assistance delivered to Mali through TC project MLI/6/006, 'Feasibility study for establishing a national radiotherapy centre', has resulted in the development of a comprehensive document for the purposes of planning and resource mobilization by national authorities for the establishment of the first radiotherapy centre in the country. The Government of Mali has committed national resources for the construction of the facility. In addition, the Ministry of Health has established working partnerships with two French organizations, Medical Physicists Without Borders and Oncologists Without Borders. In Botswana, TC project BOT/6/002, 'Planning for the Establishment of Radiotherapy and Nuclear Medicine Facilities', has helped the Ministry of Health to develop a plan for the establishment of the first national radiotherapy and nuclear medicine centres in Botswana.



85. In 2007, the Agency pursued its support to Zambia under TC project ZAM/6/010 to establish the Cancer Disease Hospital. Following contacts facilitated by the Agency, a qualified radiation oncologist was posted to Zambia for two years to help in setting up treatment protocols, within the framework of a bilateral agreement concluded between Egypt and Zambia. On 4 April 2007, the Cancer Disease Hospital was given its operating licence and cancer patients began receiving treatment from 10 April 2007. On 19 July 2007, the Cancer Disease Hospital was officially opened by the President of Zambia.

*Celebrating the official opening of the new Cancer Disease Hospital in Zambia*

*Credit: Angela Leuker/IAEA*

86. Strong government commitment and donor support has been secured for the establishment of the first radiotherapy centre in Niamey by the Government of Niger, which is supplying funding valued at approximately \$1 million, and the Government of Italy which is providing \$337 000. Construction started at the end of 2007 with a target completion date of 2009, by which time it is also expected that the two persons being trained in radiation oncology will have completed their training in Morocco. The Agency has already assisted Niger through TC project NER/6/005 in the preparation of a project document which will serve to mobilize the necessary funds for the centre.

87. Through project ALG/6/012, 'Expanding Technical Capabilities in Nuclear Medicine Diagnosis and Therapy', the counterpart institutes, Bab El Oued Teaching Hospital and the Army Central Hospital, have improved their capabilities in the diagnosis of cancer. As a result of the project, new therapy procedures are now available using rhenium-188 labelled radiopharmaceuticals. The quality of scintigraphic examinations has been enhanced and costs have been reduced. Health care for patients in need of isotope radiotherapy has improved, eliminating the need to seek expensive treatment abroad.

88. In United Republic of Tanzania, TC project URT/6/021, ‘Establishing a Radiotherapy Education and Training Programme’, and the Agency’s PACT initiative have significantly improved the capacities of the Ocean Road Cancer Institute (ORCI) for the management of cancer diseases at the national level. A teletherapy machine was also provided through PACT. TC project URT/6/022, ‘Establishment of Radiotherapy and Nuclear Medicine Services at the Bugando Medical Centre’, has supported the training of the staff required for the establishment of nuclear medicine services at the Bugando Medical Centre and has strengthened the human resource base of ORCI.

89. In Madagascar in 2007, under project MAG/6/003 ‘Upgrading Tele- and Brachytherapy Techniques for Increased Treatment Capacity’, Agency assistance focused on optimizing the existing equipment for teletherapy and brachytherapy, increasing the number of trained staff, improving patient treatment care, and ensuring proper radiation protection of patients and medical personnel. A joint imPACT mission visited the country in October 2007 and made a comprehensive assessment of the national cancer programme.

90. The Agency assisted the Central African Republic, within the framework of project CAF/6/002, ‘Evaluation of Anti-malaria Drugs Using Molecular and Radioisotopic Techniques’, to upgrade the National Laboratory of Clinical Biology and Public Health in Bangui. The project has strengthened the capacity of the laboratory to use molecular methods to monitor and track drug resistant malaria. In Benin, the national sickle cell disease control programme is receiving assistance through TC project BEN/6/003. The national sickle cell centre is housed at the main hospital in Cotonou and is already taking samples of every newborn from the paediatric unit. 1200 patients are already being monitored on a regular basis. The Agency is making an effort to establish collaborative links between Benin and other countries, like Gabon, with similar problems. The Cotonou centre is taking the lead in training staff from other countries. Experts from Benin are helping Gabon carry out studies for Gabon’s national programme, supported by the Agency through TC project GAB/6/004 ‘Establishment of a Neonatal Mass-screening Programme for Prevention and Control of Sickle Cell Disease’.

#### **B.2.4. Supporting tsetse free zones**

91. The Agency continues to assist the Southern Rift Valley Tsetse Eradication Project (STEP) in Ethiopia through TC project ETH/5/012, ‘Integrating Sterile Insect Technique for Tsetse Eradication’. The eradication of tsetse and trypanosomosis (T&T) is expected to enable the introduction of mixed farming in the Southern Rift Valley, and is currently focused on “Block 1”, an area of 10 000 km<sup>2</sup>. Experiments on sterile male test releases have begun at the Arba Minch field operation site.



*Identifying, counting and recording tsetse flies, Southern Rift Valley Tsetse Eradication Project, Ethiopia*

*Credit: Berisha Kapitano/Ethiopia*

92. Throughout 2007, the Agency continued to provide support to the Pan African Tsetse and Trypanosomosis Eradication Campaign (PATTEC) under regional project RAF/5/051, 'Sterile Insect Technique for Area-wide Tsetse and Trypanosomosis Management', and to ten national TC projects in Botswana, Burkina Faso, Ethiopia, Kenya, Mali, Senegal, South Africa, Uganda, United Republic of Tanzania and Zimbabwe. In all cases except Ethiopia, Agency technical support was focused on assisting the countries to carry out feasibility studies. In Senegal, project SEN/5/029, 'Feasibility Study to Create a Tsetse-free Zone Using the Sterile Insect Technique', is supporting government commitment to the elimination of the tsetse fly from the Niayes area.

93. With Agency support under TC project SAF/5/009, South Africa investigated the feasibility of creating a tsetse free zone using SIT in KwaZulu-Natal. In 2007 a high-level meeting on the topic in South Africa brought together representatives from the Agency, KwaZulu-Natal, the National Directorate for Veterinary Services of Mozambique and PATTEC. With the support of PATTEC, a sensitization campaign has been launched to increase awareness and to gain support from local civil society including environmentalists, relevant decision-makers in the provincial government and federal competent authorities. Two tsetse colonies (*G. brevipalpis* and *G. austeni*) are being maintained at the ARC-Onderstepoort Veterinary Institute in Pretoria with excellent results.

94. The assistance provided to Botswana through project BOT/5/004 has strengthened the small field insectary at Kasane which is ready for the establishment of a small colony of the local strains of *Glossina morsitans centralis*. The colony will be used to establish mating compatibility with the mass rearing adapted strain from the existing seed colonies. Two separate pupae collection missions have been successfully conducted in neighbouring Zambia. Efforts in training the project staff in rearing and related field activities are strengthening the human resource profile of the counterpart institution.

### **B.2.5. Improving animal health and promoting livestock production**

95. TC project SUD/5/029, 'Characterization and Quality-assured Production of an Attenuated *Theileria Annulata* Vaccine', aimed to establish quality-assured procedures and protocols for *Theileria annulata* cell culture vaccine production. After extensive training for the counterpart team and close monitoring by expert services, field trials demonstrated that vaccination with the attenuated *T. annulata* vaccine protected Friesian calves from fatal theileriosis.

96. In Angola, TC projects in Luanda and Lubango have contributed towards the strengthening of diagnostic capacity of the Central Veterinary Laboratories (CVLs), enabling the laboratories to monitor and control transboundary diseases, particularly contagious bovine pleuropneumonia (CBPP) and trypanosomosis. The assistance, provided through TC projects ANG/5/002 and ANG/5/007, has created capacity in using enzyme-linked immunosorbent assay (ELISA) and polymerase chain reaction (PCR) technologies for CBPP diagnosis at the CVL in Lubango and has established basic capabilities for the diagnosis and monitoring of trypanosomosis at the CVL in Luanda. The assistance has also resulted in the establishment of a new laboratory complex in the outskirts of Luanda, and has contributed to building national capacities in animal disease diagnosis and surveillance and to improvement in epidemiological knowledge of major livestock diseases.

97. In Eritrea, a molecular diagnostic facility at the Central Veterinary Laboratory, built with funds from the African Development Bank, was equipped under TC project ERI/5/003, 'Monitoring and Control of Transboundary Animal Diseases'. The laboratory can now perform molecular diagnostic techniques using polymerase chain reaction (PCR), enabling accurate diagnosis of transboundary animal diseases — in particular on CBPP and foot-and-mouth disease. A national animal disease surveillance capacity has been developed and epidemiological knowledge of major livestock diseases has improved through the availability of increased data to enable and design national disease control and prevention strategies on transboundary animal diseases. This has resulted in a visible reduction of

losses due to animal disease mortality and morbidity, which will translate into improved food security, and will also increase income from livestock productivity and trade at all levels.

### **B.2.6. Improving crop productivity and combating agricultural pests**

98. The first coordination meeting for AFRA project RAF/5/056, 'Field Evaluation and Dissemination of Improved Crop Varieties Using Mutation Breeding and Biotechnology Techniques', reported on progress in several countries with the release of improved varieties of rice (two in United Republic of Tanzania) and bean (two in Zambia). Other promising varieties include safflower (Egypt) and rice and barley (United Republic of Tanzania).

99. Under TC project LIB/5/010, 'Establishing a Drip Irrigation-fertigation System Using Nuclear Techniques', drip irrigation and fertigation were introduced on the light-textured soils of the coastal belt in Libyan Arab Jamahiriya. The aim was to contribute to reducing water use and nitrogen fertilizer outlay by farmers, reducing nitrogen pollution and preventing groundwater depletion. This project has resulted in higher crop yields using less water and fertilizer. Food security has improved, and the problem of nitrate pollution has diminished.

100. The Agency is assisting Morocco to assess the feasibility of integrating the sterile insect technique (SIT) into area-wide control of the Mediterranean fruit fly (medfly) in selected areas. A preliminary assessment was carried out by the Agency under TC project MOR/5/028, 'Assessing the Feasibility of Medfly Suppression through the Sterile Insect Technique'.

101. In Tunisia, under project TUN/5/023, 'Radiation-induced Mutations for Improvement of Cactus', the National Agricultural Research Institute of Tunisia (INRAT) has carried out molecular, morphological and nutritive characterizations of the national germ plasm for various traits such as spininess, forage potential and fruit production. Some of the recommended cultivars have been provided to farmers. Leaflets on cactus establishment and monitoring have been prepared for distribution at field days. The initial results of the project will be validated during 2008–2009.

102. Human induced soil erosion is a serious environmental problem in Madagascar. Through TC project MAG/5/014, 'Use of Environmental Radioisotopes for the Assessment of Soil Erosion and Sedimentation and for Supporting Land Management in the Province of Antananarivo, Madagascar', the Agency is helping to improve land management by quantifying soil erosion and sedimentation, and proposing land use and land management strategies to minimize the negative effects of soil erosion. Expert assistance has been provided to estimate local capacity and limitations in using fallout radionuclides in soil erosion and sedimentation investigations, and to identify equipment and human resource requirements. Two pilot sites have been selected for the introduction of nuclear techniques.

### **B.2.7. Developing sustainable water resources**

103. The Agency is working in partnership with the United Nations Development Programme (UNDP) and the Global Environment Facility (GEF) on TC project RAF/8/041, 'Formulation of an Action Programme for the Integrated Management of the Shared Nubian Aquifer (UNDP/GEF)'. In 2007, a training course on shared aquifer diagnosis analysis was held, which aimed to develop the skills and strengthen the capabilities of the Member States to effectively implement the strategy and procedures set up by the GEF at both the local and regional levels. A modelling meeting took place to determine the most appropriate approach and relevant activities to enhance the Nubian conceptual model, and the first project steering committee meeting was held in December 2007. A project manager was recruited to oversee day-to-day implementation of the project activities.

104. Building on the achievements of TC project RAF/8/037, 'Sustainable Development and Equitable Utilization of the Common Nile Basin Water Resources', a medium-sized project (MSP) on

‘Mainstreaming Groundwater Considerations into the Integrated Management of the Nile River Basin’ for Burundi, Democratic Republic of the Congo, Egypt, Ethiopia, Kenya, Sudan, Uganda, and United Republic of Tanzania was approved in late 2007 by the GEF with funds of \$1 million. The GEF-funded MSP has also been endorsed by the Nile Basin Initiative. The contribution of the Agency to the MSP through TC project RAF/8/042, ‘Adding the Groundwater Dimension to the Nile Basin’, amounts to \$1 million.

105. Under TC project UGA/8/005, ‘Isotope Hydrology for Exploring Geothermal Resources, Phase II’, further investigations to enable the characterization of three potential geothermal sites in Uganda (Katwe, Kibiru and Buranga) have been carried out. It has been possible to establish the recharge sources of the three sites and to identify whether the geothermal waters are interacting with surface waters. Using a sulphate-water geothermometer, the subsurface temperature of the areas could be calculated. This information has served to fill in various knowledge gaps associated with these sites.

106. The Agency is assisting Madagascar to establish sustained potable water delivery and better sanitation facilities through TC project MAG/8/006, ‘Use of Isotope Techniques in Studies for the National Programme for Borehole Drilling in the Provinces of Fianarantsoa and Tuliar’. Agency assistance has enabled the country to gradually develop national capabilities in assessing the recharge and flow regimes of groundwater systems. A new tritium line has been delivered to the counterpart institution in order to improve isotope analysis capabilities. The expertise acquired in isotope hydrology is being utilized by the Government to ensure sustainable water delivery in the Androy region in the southern part of the island.

### **B.2.8. Sustainable energy development and support to the introduction of nuclear energy**

107. In the area of energy planning, important efforts have been made to complete the training of the national energy planning teams through more hands-on training for selected countries, especially for francophone countries (Burkina Faso, Chad, Côte d’Ivoire, Mauritania and Niger) through the organization of two training events on energy demand (using the Model for Analysis of Energy Demand (MAED)). With this hands-on approach, Member States will be in a better position to finalize the national energy demand reports. The support for this programme has come both through national projects (in each of the five countries) as well as regional projects RAF/0/016 and RAF/0/028.

108. Egypt plans to build a nuclear power plant at El-Dabaa by 2015. Agency assistance to the introduction of nuclear power is provided under an agreed comprehensive work plan which includes overall project management, energy planning, legal and legislative framework, site evaluation, safety, human resources development and public communication. Two Agency missions have been undertaken to review the energy planning study. A draft nuclear law has been prepared and is undergoing reviews at the national level. An Agency mission provided technical advice on site evaluation with respect to the acceptability of the El-Dabaa site and characterization of the site in accordance with Agency safety standards. Furthermore, the Agency is providing advice on the establishment of a fully independent nuclear safety regulatory body.

109. The Agency is supporting energy assessments in Algeria, Morocco, Nigeria and Tunisia and is helping with key aspects at different stages of the planning of a nuclear power programme. Special emphasis is being given to the requirements in terms of the legal and regulatory framework, human resources, optimal siting conditions, safety and public acceptance. Under project MOR/4/017, the Agency provided assistance to Morocco in 2007 in the finalization of bid invitation specifications for the first nuclear power plant at Sidi Boulbra.

### **B.2.9. Raising capabilities in industrial applications**

110. Under AFRA project RAF/4/018, ‘Quality Management and Control Using Nuclear and related Technologies’, Agency support in 2007 continued to strengthen the capacity and to enhance the competence of nuclear and related institutions in participating Member States, particularly the new institutions that have joined the project in recent years. The project provided training to managers and decision-makers, facilitated regional networking and promoted the certification of nuclear laboratories in several countries. In addition to this effort, the Agency has played a key role in the organization, facilitation and sponsorship of the second regional conference on quality management in AFRA Countries, aimed at augmenting International Organization for Standardization (ISO) standard implementation and its benefits for international trade and communication in Africa and abroad.

111. In 2007, Agency assistance to African Member States under regional TC project RAF/8/040, ‘Radioisotope Applications for Troubleshooting and Optimizing Industrial Processes’, focused on human capacity building in key radioisotope technologies as well as on the conversion of conventional training material into ICT-based training/learning material.

112. Through project ZAI/4/010, ‘Improvement of Maintenance, Repair and Quality Assurance of Nuclear Instrumentation’, the Agency is helping the Democratic Republic of the Congo to establish national capabilities and skills in nuclear instrumentation. A national training course has been set up to improve the quality in nuclear instrumentation maintenance services to comply with related ISO 9001 and ISO 17025 standards. Participants learned the basic concepts and the practical implementation of the ISO 9001 and ISO 17025 standards in nuclear instrumentation maintenance services.

### **B.2.10. Upgrading radiation protection infrastructure**

113. In 2007, extensive assistance for upgrading radiation protection infrastructure has been provided to participating Member States through the frameworks of regional projects RAF/9/031 and RAF/9/032 which aim, respectively, to support the development and strengthening of regulatory infrastructure and occupational exposure control programmes. Some Member States participating in these regional projects achieved considerable progress in developing the key elements of their national regulatory infrastructure. Accordingly, Botswana has promulgated a radiation protection law, establishing the National Radiation Protection Board as an effectively independent regulatory body and the Radiation Protection Inspectorate as the executive arm to the Board. The Democratic Republic of the Congo has established the National Committee for Protection against Ionizing Radiation (CNPRI) as an effectively independent body and Senegal has taken positive steps for the formation of a national regulatory authority. Angola also promulgated a National Atomic Energy Law in June 2007, which is a considerable step towards establishing a national radiation protection institute. Through regional project RAF/0/015 on legislative assistance, Member States including Chad, Gabon and Sierra Leone received assistance in drafting a set of laws and regulations in conformance with international standards. The assistance provided through the framework of project RAF/9/032 contributed to the strengthening of the national systems of radiological protection of occupational exposure in Botswana, Ghana, Nigeria, and Zambia.

### **B.2.11. Enhancing capability in nuclear security**

114. Under AFRA project RAF/0/021, with funding from the Nuclear Security Fund, the Agency increased its assistance to Africa in 2007 in the field of nuclear security, covering many new areas of high relevance to the region. These included training of law enforcement agencies in aspects of illicit trafficking, physical protection of nuclear installations, detection and prevention of malevolent acts and management of radioactive sources. The final coordination meeting of the project in Tunis, November 2007, was attended by representatives of 18 African countries. There has been a significant

improvement in the region in terms of increased awareness about nuclear security issues, enhanced capacity building in nuclear security through regional and national training courses, improved understanding and identification of nuclear security weaknesses and necessary improvements through International Nuclear Security Advisory Service (INSServ) missions to eight African Member States, international team of experts (ITE) missions to seven countries, Radiation Safety and Security of Radioactive Sources Infrastructure Appraisal (RaSSIA) missions to 15 countries, International Physical Protection Advisory Service (IPPAS) missions to two countries, and inventory verification and orphan sources missions to six countries, as well as several other technical missions.

### B.3. Asia and the Pacific

#### B.3.1. Overview

115. In 2007, the Agency provided support under the TC programme to 30 countries in Asia and the Pacific, four of which were least developed countries. Net new obligations amounted to \$19.1 million, compared with \$22.7 million in 2006. The financial implementation rate for 2007 was 69.4%, slightly less than the 2006 figure of 70.9%.

116. One Country Programme Framework (CPF) document was signed in 2007 (Thailand).

117. Throughout 2007, key areas of activity in Asia and the Pacific were human health, radioisotope production and radiation technology, radiation and transport safety, and food and agriculture. Disbursements in these four areas accounted for almost 60% of the total.

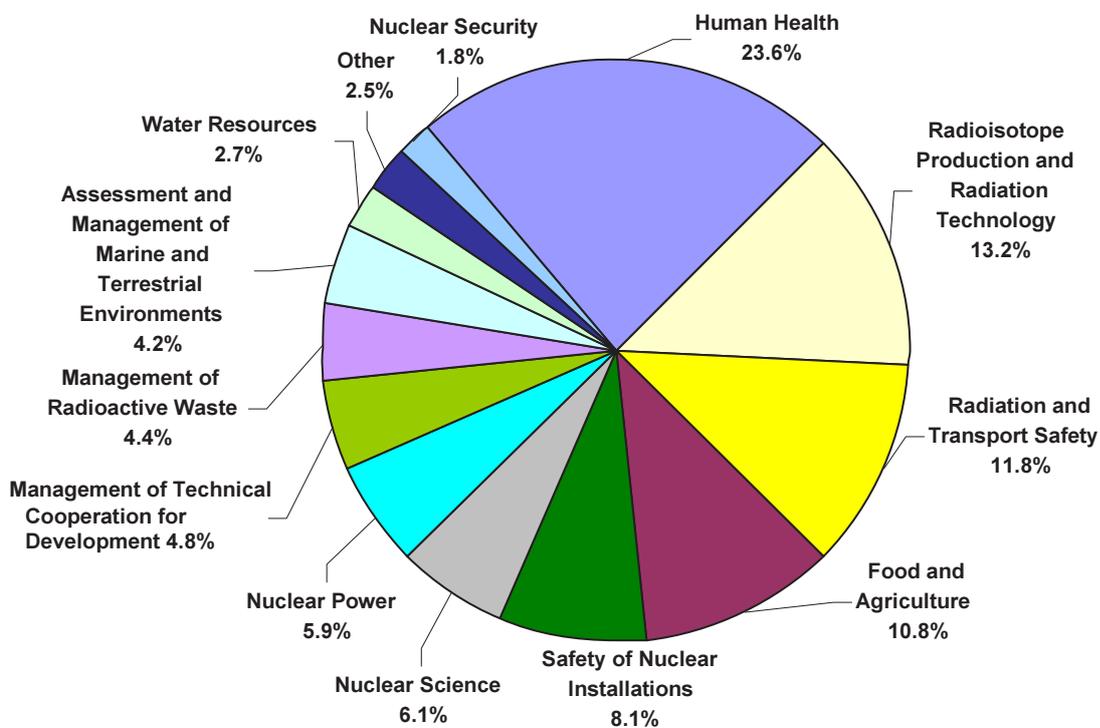


Figure 5: Disbursements by Agency Programme for 2007 — Asia and the Pacific

#### B.3.2. Improving the quality of health services and combating malnutrition

118. Many Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (RCA) Member States lack sufficient clinically trained medical physicists, due to the lack of training programmes. In 2007, a training package for clinical training of medical physicists was developed under RCA project RAS/6/038. This is now being pilot tested. Under ARASIA project RAS/6/052, a master's degree in medical physics was established at the University of Jordan to address the existing shortage and need for professional clinical medical physicists in the field of radiation oncology in the region. A distance learning programme to train radiation oncologists was prepared under RCA project RAS/6/033 and distributed to Member States

after pilot testing in seven RCA, AFRA and ARCAL Member States. The material comprises 71 teaching modules on eight specialist topics, and is designed to support trainee radiation oncologists who may not have access to local qualified experts

119. In Sri Lanka, TC project SRL/6/029 has improved quality assurance and quality control in radiotherapy. In 2007, Galle Teaching Hospital started services to patients in its new building, which was equipped by the Agency with the latest simulator and treatment planning system. In Thailand, under TC project THA/6/033, three positron emission tomography (PET) centres were established in Bangkok as well as a cyclotron facility with its related laboratories. Agency support focused on human resource development and supply of a hot cell for fluorodeoxyglucose (FDG) production.



*PET tracer production system, Thailand*

*Credit: Rujaporn Chanachai/Thailand*

120. Assistance continued to be provided to Yemen in the field of cancer detection and treatment. Seven staff members of the first nuclear medicine centre received long term training in 2007 through TC project YEM/6/004.

121. Efforts to improve radiopharmaceutical production continued in 2007. Under TC project IRA/2/007, the Islamic Republic of Iran enhanced production of radiopharmaceuticals using both reactor and cyclotron produced isotopes, and promoted good manufacturing practices (GMP). In Syrian Arab Republic under project SYR/2/005, the establishment of GMP in cyclotron production of radiopharmaceuticals supported the safe use of radiopharmaceuticals in the nuclear medicine sector.

122. Under TC project SRL/6/028, Sri Lanka has been able to establish molecular diagnostic facilities for the diagnosis and monitoring of major infectious diseases, including dengue, hepatitis, malaria and drug-resistant malaria and tuberculosis (TB), and to establish a corresponding quality assurance programme. A total of 5045 diagnostic tests were carried out for dengue, malaria, hepatitis and TB. Radiation safety, quality assurance and quality control manuals have been prepared.

123. Through project MON/5/014, Mongolia was assisted to carry out comparative studies on soil organic matter dynamics and plant nutrient uptake from soil and fertilizer through the application of labelled tracers and using conventional soil conservation technologies on major soil types used for crop production. Training to the counterpart institutes was provided in the application of the N-15 isotope techniques in soil and plant studies.

124. Under project RAS/6/047, 'Human Resource Development in Childhood Nutrition' a regional event in Asia and the Pacific was organized by the Agency in collaboration with the Government of Bangladesh through the Bangladesh Atomic Energy Commission (BAEC) and with the Centre for Health and Population Research (ICDDR,B). The event raised awareness of the Agency's activities in human nutrition and disseminated information about the usefulness of stable isotope techniques in the development and monitoring of nutrition programmes to combat malnutrition, in particular in infants and children.

### **B.3.3. Increasing agricultural productivity and the export of commodities**

125. A 2007 assessment of sterile insect technique (SIT) projects in Israel, Jordan and the Territories under the jurisdiction of the Palestinian Authority has revealed that in addition to higher productivity and greater export of high value agricultural commodities, there is stronger regional cooperation among the national plant protection authorities on combating other insect pests. Project ISR/5/012 was also launched in 2007 to assess the feasibility for integrating the sterile insect technique as part of area-wide integrated olive fruit fly (*Bactrocera oleae* Gmelin) management, leading to the establishment of a rearing unit which could be used by other Member States in the region. A standardized approach providing guidance for Member States who are considering using SIT against fruit flies was designed in 2007 under project RAS/5/049, 'Sharing Regional Knowledge on the Use of the Sterile Insect Technique within Integrated Area-Wide Fruit Fly Pest Management Programmes'.

126. Under project RAS/5/048, ARASIA States are cooperating in radiation induced mutation activities to produce improved varieties of wheat, barley, lentil, chickpea and sesame adapted to local conditions. In 2007, the participating countries (Iraq, Jordan, Lebanon, Qatar, Saudi Arabia, Syrian Arab Republic and United Arab Emirates) signed a memorandum of understanding to facilitate the exchange of plant genetic resources among them.

127. In China, irradiation facilities in Nanjing, Chengdu and Yangzhou were helped to improve their quality assurance systems and safety control under TC project CPR/5/016. A national workshop on quality assurance systems for irradiated food and medical products was organized for about 100 participants from irradiation companies. This covered quality assurance and safety control, as well as the newly revised ISO 11137 standard and EU requirements for irradiation facilities.

### **B.3.4. Advancing the sustainability of radiation protection infrastructure**

128. Significant progress was made in 2007 in strengthening national regulatory infrastructures in the region, largely through projects RAS/9/045, RAS/9/046, RAS/9/047, RAS/9/048, RAS/9/049, RAS/9/050 and RAS/3/009. Thailand established an independent regulatory authority and is now developing a new atomic law. Jordan passed a new radiation safety law to establish an independent regulatory authority. Afghanistan and Yemen drafted new laws to achieve effective separation between users and regulators. Vietnam has strengthened its regulatory capacity by promulgating a number of important legal documents including the final draft of its Atomic Energy Law, which is now ready for submission to the National Assembly. The Philippines finalized a comprehensive nuclear law (which will establish its independent regulatory authority). Malaysia started revising its current Atomic Energy Licensing Act with a view to have a comprehensive nuclear law.

129. A regional field exercise in the Chernobyl exclusion zone for extended response by radiological assessors was conducted under project RAS/9/042 to test the capacity of RCA Member States to respond to radiological emergencies. This project is designed to assist RCA Member States in sustaining established radiation protection infrastructures.

130. Human capacity building continued to be a focus of attention in 2007. A total of 159 specialists were trained. In Malaysia, 25 professionals from various Member States in the region graduated from

the fifth post graduate education course (PGEC). Similarly, 20 professionals graduated from the PGEC conducted in Syrian Arab Republic. In 2007, the University of Damascus fully integrated the PGEC into a university MSc programme under which 11 Agency sponsored trainees are being trained.

### **B.3.5. Enhancing the performance and safety of nuclear power plants and other nuclear installations**

131. In 2007, support to Member States with nuclear power plants was provided through two regional projects, RAS/4/028 and RAS/9/044, which aimed to improve nuclear power plant (NPP) management systems to integrate safety, quality, security, health, production, human resources and environmental needs in a coherent way and thus ensure long term success in the implementation of nuclear power.

132. In China, the Agency provided assistance to Qinshan-II NPP management with the aim of improving the operation and safety of the power plant. Two group visits were organized, one to Exelon NPP in USA, for the operational management staff, and the other to Sizewell B NPP in UK, for the staff of the maintenance department. Working closely with world class NPPs has been of great benefit in improving management of NPPs in China.

133. The Dalat research reactor in Vietnam has been safely and effectively used for radioisotope production, neutron activation analysis, scientific research and training for the past 23 years. Under TC project VIE/4/014, the old instrumentation and control system was replaced. The new system was installed and put into operation in April 2007, and since then the reactor has operated under much safer conditions.

134. In 2007, efforts continued through project RAS/9/043 to promote the sustainable sharing of knowledge and experience for mutual learning and continuous improvement of the safety of nuclear installations through the use of the Asian Nuclear Safety Network (ANSN). The ANSN was established to share safety knowledge among Asian countries in the following areas: operational safety of nuclear power plants and research reactors, enhancement of regulatory infrastructure, sustainable education and training, safety of decommissioning and radioactive waste management, and emergency preparedness and response. Project RAS/9/043 assisted Member States to ensure sustainable operation of their national centres.



*Nuclear power plant  
rehabilitation,  
Philippines*

*Credit: Jing  
Zhang/IAEA*

### **B.3.6. Supporting energy planning and nuclear power development**

135. In 2007, the Agency provided advice and training in energy planning and nuclear power development through regional project RAS/4/029. Jordan, Philippines, Thailand, Vietnam and the Gulf Cooperation Council (GCC) countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates) received advice on the steps necessary to launch a nuclear power programme, based on the latest Agency guidelines contained in document GOV/INF/2007/2 'Considerations to Launch a Nuclear Power Programme' and the 'Milestones in the Development of a National Infrastructure for Nuclear Power' document, (No. NG-G-3.1). Agency guidelines were also disseminated through a regional Asia and the Pacific Seminar on 'Facts of Nuclear Power and Considerations for Launching a Nuclear Power Programme' held in Seoul, Republic of Korea, in July 2007.

136. RCA Member States received assistance through a series of projects on energy planning to apply the analytical tools developed by the Agency for this purpose. These analytical tools are being used for developing strategies for meeting the future demand for electrical energy in the most optimum manner. RCA project RAS/0/045 initiated in 2007 focuses on assessing the role of nuclear and other energy options and evaluating the resources for energy-related activities and environmental concerns, with reference to the Kyoto Protocol of the United Nations Framework Convention on Climate Change. The members of the projects teams of the RCA Member States participating in this project received training on the Agency's analytical tool, Model for Energy Supply System Alternatives and their General Environment Impacts (MESSAGE), for formulation and evaluation of sustainable energy strategies for addressing climate change issues.

137. During 2007, on the request of the Member States of the GCC, the Agency conducted a study on the feasibility of introducing nuclear power for electricity generation and seawater desalination. The study report was submitted to the GCC Secretariat. It identified scenarios for the economic feasibility of nuclear power in the future electricity generation and desalination mix in the GCC region based on data and information obtained from the GCC. It also contained guidelines, recommendations and necessary steps on infrastructure requirements.

138. In 2007, assistance was also provided to ARASIA countries on the comparative assessment of electricity generation options through project RAS/0/043, with the primary objectives of training staff and harmonizing national data inputs for consistent modelling frameworks of regional scale analysis.

139. Under CPR/3/009, the Agency assisted China to explore the possibility of In-Situ Leach (ISL) uranium mining. The Bureau of Geology completed eight activities for uranium exploration in 2007 in Erdos Basin, including a detailed survey, three reconnaissance, two appraisals and one landform mapping project. Industrial test of ISL uranium was completed in the mineralized area, and eight boreholes were completed in Zhunger Basin.

### **B.3.7. Improving the management of nuclear waste**

140. Through project CPR/9/038, the capacity of counterpart institutions has been enhanced to carry out searches for orphan radioactive sources. In Nanning city, the local environmental protection agency was able to collect or recover seven sources from three bankrupt cement manufacturers. In Shanxi, the local environmental protection agency recovered six sources used in nuclear gauges from a bankrupt fertilizer manufacturer.

141. In the Republic of Korea, project ROK/4/031 contributed significantly towards quality improvement of vitrified radioactive waste. This is necessary for meeting the licensing requirements to operate an industrial vitrification plant for processing the low and intermediate level waste (LILW) generated by nuclear power plants. The project also enhanced the capability of the staff of the counterpart institute in the operation of an industrial vitrification plant, commissioned in 2007.

142. Assistance was provided to Pakistan through TC project PAK/3/011 on strengthening Infrastructure for the management of radioactive waste. In 2007, Agency support focused on assisting the Pakistan Nuclear Regulatory Authority (PNRA) in the formulation of national policy and strategy documents. A draft National Radiation Waste Management Policy was prepared and approved, and a waste management strategy was drafted. Important training activities were also carried out within the framework of regional project RAS/3/009 on the development of regional waste management policies and strategies.

### **B.3.8. Protecting the environment**

143. RCA Member States made progress in developing their capabilities for monitoring and assessing marine radioactivity through project RAS/7/016, initiated in 2007. The project also aims to establish a documented quality management system for regional marine radioactivity monitoring programmes. In 2007, 4300 data records on radioactivity levels in seawater, sediment and biota were generated and placed in the Global Marine Radioactivity Database (GLOMARD). The database identified large-scale oceanographic circulation processes and established better-defined benchmarks on radionuclide concentrations in the marine environment. Under ARASIA project RAS/7/018, 'Upgrading Regional Capability to Assess Marine Contaminants in the ARASIA Member States', a regional training course was held on sampling, sample preparation and analysis for the measurement of radionuclides in the marine environment.

144. In 2007, TC projects were established in Kuwait (KUW/2/004), Saudi Arabia (SAU/7/002) and the United Arab Emirates (UAE/7/002) to improve national infrastructure for monitoring and assessing the levels, isotopic composition and dynamic behaviour of radionuclides in marine environments. These projects aim to set up national databases on radionuclide levels in the marine environment, develop the national expertise and human resources needed for an effective marine monitoring programme, and establish the necessary survey, data analysis and interpretation protocols as an integral part of the programme. During 2007, expert missions to the counterpart institutes assessed the situation on the ground and identified gaps for Agency input. Actions were initiated in training (through fellowships), expert advice and infrastructure improvement.

145. Under KUW/9/003, the Agency continued to provide support to Kuwait in order to monitor and assess the distribution of naturally occurring radioactive material (NORM) waste generated by the oil industry and its impact on the environment. In July 2007, an Agency mission provided advice on monitoring and assessing radon in the oil industry. Following a field visit where in-situ measurement techniques were demonstrated, the mission recommended that radon issues should be treated as an integral part of the overall NORM issue and highlighted the need for developing a regulatory framework for NORM management commensurate with the analytical findings and results and the concerns and contributions of other national stakeholders.

### **B.3.9. Industrial use of nuclear technology**

146. In 2007, assistance was provided to Member States through RCA project RAS/8/106 to improve capabilities in pilot testing and commercializing healthcare products developed using radiation technology, such as hydrogels and growth promoters. Under TC project RAS/8/102, 'Application of Radiation Technology for Materials Development for West Asian Countries', the Syrian Arab Republic hosted a regional training course in Damascus on healthcare radiation processed materials in 2007.

147. Through RCA regional training and related activities under project RAS/8/107, nucleonic gauges for coal characterization and processing were demonstrated and training was implemented for

nucleonic gauge design, data processing and interpretation, as well as potential applications of the nuclear technique in coal industry.

148. In 2007, under project RAS/4/026, RCA Member States started developing the technological capability to use neutron irradiation to dope silicon to produce semiconductor materials, enhance the colour of low semi-precious gem stones to increase their value and produce track-etched membranes for medical applications. China, India, Indonesia and the Republic of Korea have already developed facilities for neutron transmutation doping (NTD) of silicon, and India plans production on a commercial scale. Indonesia and Thailand started commercial operations in gem colouration, while Pakistan and Vietnam began trials to develop their capabilities. Some of the participating Member States were engaged in initial studies on producing track etched membranes by neutron irradiation.

149. Through TC project KUW/8/004, Kuwait initiated the building of necessary national competences in inter-well tracer technology to support the national effort for enhanced oil recovery schemes. In 2007, training was provided in oil-field inter-well tracer technology, as well as other tracers and sealed source techniques for petroleum industries.

### **B.3.10. Enhancing nuclear security**

150. During 2007, efforts to increase awareness in the Asia and Pacific Member States about the Agency's Nuclear Security Plan (2006–2009) continued through project RAS/9/051, financed through the Nuclear Security Fund. Assistance was also provided to improve nuclear security infrastructure and implement effective mechanisms to prevent and respond to malicious acts and illicit trafficking of nuclear and radioactive materials. Five training courses involving 100 participants from 12 Member States in the region were held in China, Kuwait and Malaysia.

### **B.3.11. Technical cooperation with Iran**

151. The Agency's technical cooperation with Iran has continued in accordance with document GOV/2007/7 as approved by the Board on 8 March 2007. In addition, the Secretariat has put mechanisms in place to ensure that all Agency cooperation with Iran is in compliance with UN Security Council resolutions 1737(2006), 1747(2007) and 1803(2008). As such, TC projects and activities have proceeded only where they fall within the exceptions specified in operative paragraph 16 of resolution 1737 (2006).

152. Outside the TC programme, the Secretariat also has procedures in place to ensure that technical assistance provided to Iran by the Agency or under its auspices does not contribute to enrichment-related, reprocessing or heavy water related activities or to the development of nuclear weapon delivery systems or to the supply, sale, transfer, manufacture or use of the prohibited items, materials, equipment, goods and technology mentioned in UN Security Council resolutions 1737(2006), 1747(2007) and 1803(2008). Moreover, all Iranian participants in the Agency's TC and technical assistance activities are checked against the lists of persons, and where relevant the lists of entities, mentioned in the Annexes to the afore-mentioned resolutions.

153. The Secretariat has periodically reported to the UN Security Council Committee established pursuant to resolution 1737(2006) and Member States of the Agency have been duly informed of these reports.

## B.4. Europe

### B.4.1. Overview

154. In 2007, the TC programme was delivered to 32 Member States in Europe through national and regional projects. Net new obligations in the first year of the new cycle reached \$33.1 million in 2007, showing an implementation rate of 81.3%, one of the highest ever achieved in the region. The distribution of disbursements in Europe for 2007 by areas of activity is shown in Figure 6.

155. Europe has the highest percentage of approved Country Programme Frameworks (CPF) at 96.9%. One CPF is in the planning stage.

156. In 2007, key areas of activity in Europe were human health, management of radioactive waste and safety of nuclear installations. Disbursements in these areas accounted for over 55% of the total.

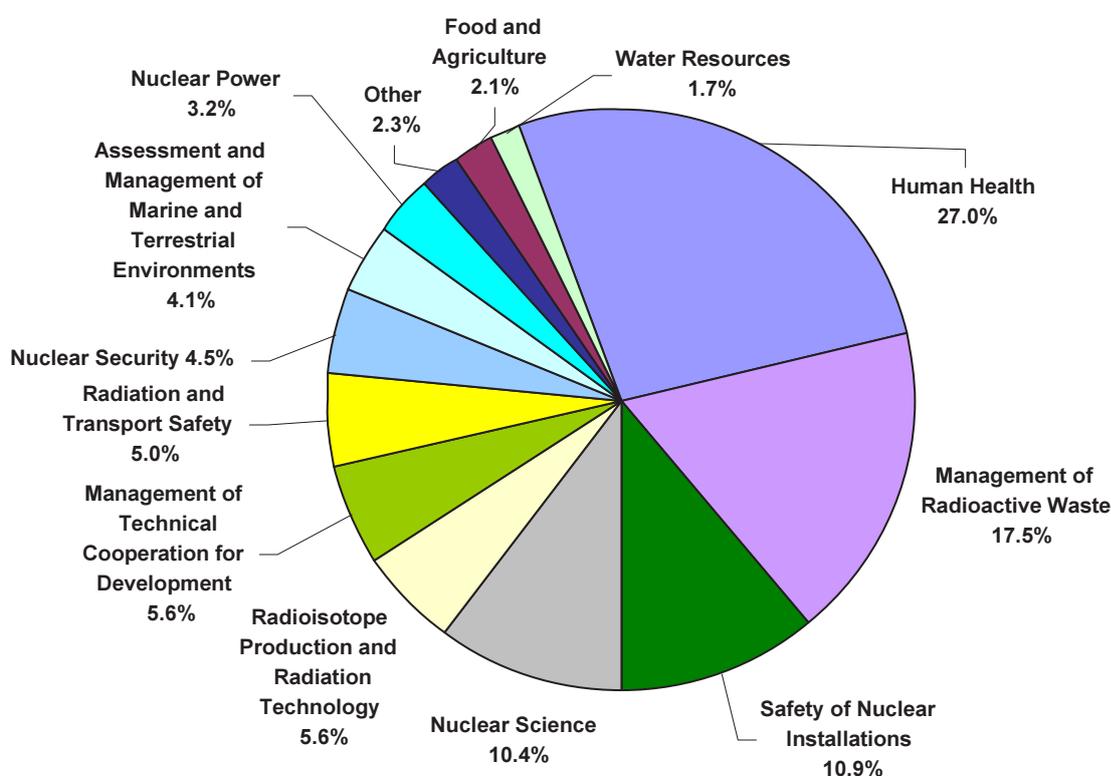


Figure 6: Disbursements by Agency Programme for 2007 — Europe

### B.4.2. Regional programming: an EU Member States initiative

157. In April 2004, ten Member States, newly acceded to the European Union, together with Greece and Portugal, met in Vienna and produced a common position paper on their changing roles regarding the TC programme. They firmly stated that all new EU Member States wished to stay within the TC programme, with the intention of reaching net contributing status. Following the accession of Bulgaria and Romania in 2007, the 14 EU Member States participating in the Europe TC programme met again to reconfirm their changing role within the TC programme. This resulted in the organization of the EU Member States Common Strategy Coordination Workshop, which was held in April 2007 in Vienna with the participation of Bulgaria, Cyprus, Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. The candidate countries Croatia, The Former Yugoslav Republic of Macedonia and Turkey also participated in the Workshop.

158. Based on the recommendations made by the Standing Advisory Group on Technical Assistance and Cooperation (SAGTAC), the proposals of the EU Member States participating in the TC programme, and the SAGTAC report on regional programming, Member States and the Secretariat adopted by consensus the Europe regional profile document which will be used as a planning tool for the development of regional programming strategies for 2009–2013. The regional programme aims to enhance horizontal collaboration among Member States as well as cooperation with other partners such as the EU. The regional profile focuses on four strategic areas for regional cooperation: nuclear and radiation safety, nuclear energy, human health and isotope and radiation technology applications.

159. With the new strategic vision, a decrease in requests for national programmes financed by the Technical Cooperation Fund core budget is already noticeable in the new project concepts submitted by Member States for the 2009 – 2011 cycle. These clearly signal a trend shift from national to regional programmes, particularly among EU Member States. In addition, many Member States are providing government cost sharing to their TC programmes. Several Member States have volunteered to support other Member States' TC programmes in the region with extrabudgetary contributions

#### **B.4.3. A new approach to sustainability of national nuclear institutions**

160. In June 2007, the Agency hosted a conference to examine how recent global changes in the science and technology sector affect the way national nuclear research and development (R&D) institutes are funded and managed. The meeting, 'Science & Technology and Nuclear Research in the 21<sup>st</sup> Century: Strategies for Research Institutes in a Changing Paradigm of Science Policy and Funding', was attended by high level policymakers, as well as by managers of research institutes and representatives of the diplomatic community from Central and Eastern Europe. The initiative that led to this meeting began four years ago with TC project RER/0/023, 'Strategic Planning for Management, Self-reliance, and Sustainability of National Nuclear Institutions'. The project objective is to help nuclear R&D institutes optimize their potential and react positively to market economy oriented changes.

161. The meeting with a combination of speakers from international organizations, government and private sector — provided clear information on best practices in managing R&D institutes. The leading international organizations in the field, such as the OECD, World Bank, European Commission and World Intellectual Property Organization, presented key lessons learned in the nuclear sector and highlighted funding opportunities for research projects. Keynote speaker Esko Aho, former Prime Minister of Finland, who also served as the chairman of the EU Working Group on Innovation, delivered an inspirational presentation on 'Innovation in Europe', with practical policy guidelines and a vision of how to create a knowledge-based economy.

#### **B.4.4. Towards the introduction of new nuclear energy**

162. A number of countries in the Europe region are considering the possibility of expanding their nuclear power programme or introducing nuclear energy for the first time. A nuclear power programme involves technological, safety and security issues associated with nuclear material and ionizing radiation. The time scale for such a project is of the order of hundreds of years, as the project needs to consider decommissioning and waste management after the plant has completed its life. A nuclear power plant project is a major undertaking requiring careful planning, preparation and investment within a sustainable infrastructure that provides legal, regulatory, technological and human resources to ensure the project is successful and the NPP is operated in a safe and secure manner.

163. In response to increasing interest in several MSs, TC Europe started a new regional project RER/0/026, 'Support for the Introduction of Nuclear Energy', in 2007. The project aims to strengthen national and regional capabilities and to ensure that any Member State planning the introduction of

nuclear energy starts off with a comprehensive understanding of the range of issues and activities that must be addressed before a nuclear power project can be implemented. The regional project is mainly targeted at countries in Eastern Europe and Central Asia who are at an advanced stage of planning for the introduction of nuclear power. Representatives of countries that already have nuclear power programmes have participated in the project, often at their own expense, sharing their own experiences and contributing to the discussion. Even countries which already have some nuclear power infrastructure have requested IAEA assistance in order to receive advice and share best practices: in the aftermath of the Chernobyl accident, most countries stopped building new NPPs, and as a result, much national experience in new NPP establishment is 20 years old.

164. Under the project, a team of IAEA experts conducted several fact-finding missions and provided advice on the considerations to be taken into account before launching a nuclear power programme. The advice was largely drawn from the Agency guidelines, 'Considerations to Launch a Nuclear Power Programme' and the 'Milestones in the Development of a National Infrastructure for Nuclear Power' document. In addition, several regional and sub-regional meetings and workshops provided information and offered an opportunity to build common understanding and develop mutual confidence. The regional workshop 'Regulatory Practices for Introducing Nuclear Power: Roles, Responsibilities and Functions of the Government and Regulatory Body' presented the legal and regulatory framework necessary for the establishment of nuclear power programmes, collected information about Member States' existing regulatory infrastructure and contributed towards the creation of a regional network to share experience, technical knowledge and organizational support.

165. In Lithuania, the second unit of the Ignalina NPP is expected to close soon, following the agreement reached before Lithuania joined the EU. This will cause a shortage of electricity in the country and throughout the whole Baltic region. A consortium formed by Lithuania, Latvia and Estonia, and later joined by Poland, has started to explore the possibility of a joint project to build a new NPP on Lithuanian soil to replace the electricity output lost with the Ignalina shutdown. This is one of the first projects worldwide that involves several states in building a new NPP. Following requests from the countries, TC organized a sub-regional workshop to discuss challenges related to international co-ownership of new NPPs, stakeholder cooperation, regulation, legislation, responsibilities and other relevant issues.

#### **B.4.5. International scientific cruise on the Adriatic Sea for marine environment assessment**

166. Regional project RER/7/003, 'Marine Environmental Assessment of the Mediterranean Sea', aims to coordinate, on the sub-regional level, national activities for the assessment of radionuclides in the marine environment and the application of nuclear and tracer techniques to marine pollution studies. Within the scope of this project, eight Member States with a Mediterranean coastline (Albania, Bosnia and Herzegovina, Croatia, Cyprus, Greece, Malta, Montenegro and Slovenia) participated in an international scientific cruise to the Adriatic and Ionian Seas, from 24 September to 5 October 2007. Two planning and technical meetings plus two regional training courses consolidated the methodological and practical basis for the cruise, which focused on using acquired capacities and harmonized methodologies for coordinated monitoring of radionuclides in the coastal Mediterranean marine environment, and for studying marine pollution by applying nuclear analytical and radiotracer techniques.

167. The cruise, organized by the Agency and supported by the Croatian Government, was carried out on the Croatian research vessel Polarize. Twenty-four participants from the Member States took part, with three experts conducting hands-on training in sampling and sample processing. The cruise was conducted with the full technical support of the IAEA Marine Environment Laboratories, Monaco, together with UNEP's Mediterranean Action Plan (MAP) in Athens, Greece.



*Water and sediment sampling during an international scientific cruise on the Adriatic Sea.*

*Credit: Iolanda Osvath/IAEA*

#### **B.4.6. Upgrading radiotherapy in the Balkans with major government cost sharing**

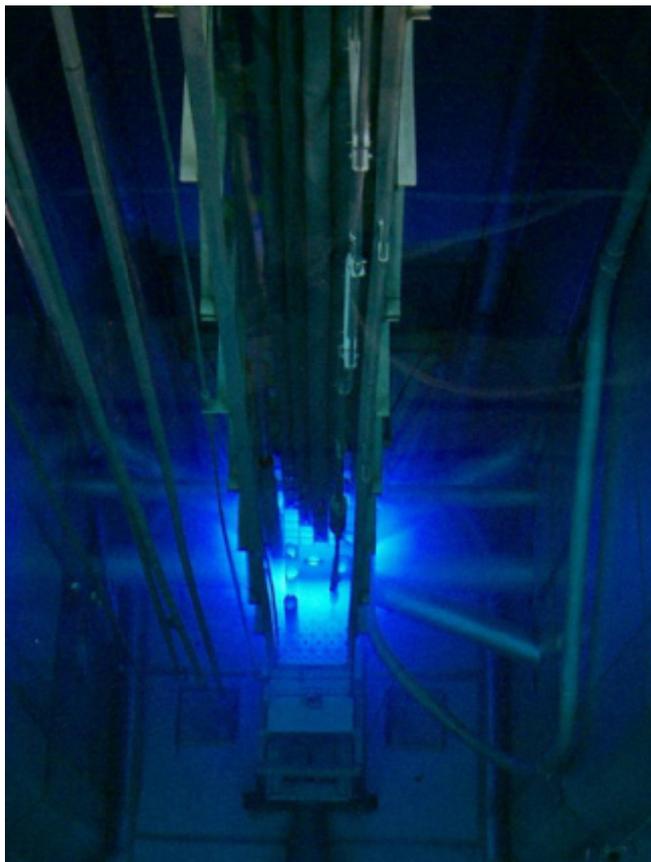
168. In Serbia, under project SRB/6/002, ‘Upgrading High Dose Brachytherapy’, new equipment was ordered for the brachytherapy unit of the Institute of Oncology and Radiology to bring treatment services up to international standards. The Institute of Oncology and Radiology is being renovated to accept the new equipment, and additional equipment is being paid for with extrabudgetary funds from the Serbian Government.

169. In Bosnia and Herzegovina, a new project on upgrading radionuclide therapy (BOH/6/010) was initiated in 2007 to support the establishment of nuclear medicine therapy and to upgrade nuclear medicine services in the country. Five nuclear medicine departments collaborate under the scope of the project and a very successful national training course on paediatric nuclear medicine was organized in 2007 at the Clinical Centre in Banja Luka, in which nuclear medicine practitioners from all departments participated. Within this project, Bosnia and Herzegovina cost shared the procurement of a dual head gamma camera for the centre in Banja Luka, which was delivered at the end of 2007.

170. In 2007, with TC assistance, The Former Yugoslav Republic of Macedonia completed the preliminary feasibility study for introducing the first positron emission tomography (PET) unit in the country. The feasibility study clearly showed that diagnostic capabilities would greatly increase with the introduction of this technique, which could benefit 2000 cardiovascular and oncology patients per year. In Western Europe there is on average one PET centre per million inhabitants. Currently, The Former Yugoslav Republic of Macedonia, which has a population of 2 million, has no PET-equipped hospital.

#### **B.4.7. Repatriation of HEU fuel to the country of origin**

171. A continuing challenge in 2007 was the repatriation of highly enriched uranium (HEU) fuel to the country of origin. For those research reactors which will continue to operate, a secondary challenge is to convert their reactor cores to operate as efficiently using low enriched uranium (LEU) fuel. This combination of projects is at the leading edge of activities to reduce worldwide nuclear proliferation and ensure the positive application and sustainability of research reactors. In the past year alone, the Agency coordinated fuel repatriation and core conversion projects for Kazakhstan, Libyan Arab Jamahiriya, Poland, Portugal, Uzbekistan and Vietnam. The first repatriation of spent HEU fuel from research reactors in the Czech Republic was also carried out in December 2007. The objective of each project continues to be non-proliferation and enhanced utilization of research reactors.



172. In Poland, core conversion has been undertaken for the Maria Research Reactor in Swierk. This high-flux, multipurpose reactor is in high demand for research and isotope production. The original core in the Maria reactor consisted of HEU fuel assemblies. The unirradiated fresh HEU fuel was returned to Russia under project RER/4/028. In a separate national project, work began during 2007 on conversion of the Maria reactor core to use LEU fuel, which is expected to take up to three years to complete. The irradiated nuclear fuel will cool sufficiently over the next year to allow it to be repatriated to Russia under project RER/4/028.

*A view of the Research Reactor at the Nuclear and Technological Institute (ITN) in Portugal, following conversion of the core from highly enriched uranium to low enriched uranium.*

*Credit: John Kelly/IAEA*

#### **B.4.8. UN General Assembly recognizes Agency efforts on Chernobyl**

173. In line with the UN ‘Strategy for Recovery’ report and the recommendations of the UN Chernobyl Forum, support for the mitigation of consequences of the Chernobyl accident has been one of the priority areas for the TC programme in countries affected by the accident. Since 1990, a range of national and regional TC projects have been carried out to reduce the impact of the disaster and to address its ‘human dimension’ where possible. Practical solutions have been proposed in Belarus and Ukraine to mitigate some of the effects of the Chernobyl fallout affected zones.

174. Agency assistance has been recognized and appreciated by the governments of the Chernobyl affected countries as well as by the United Nations in November 2007. In its resolution 62/9 of 20 November 2007, on *Strengthening of international cooperation and coordination of efforts to study, mitigate and minimize the consequences of the Chernobyl disaster*, the General Assembly “note[d] with satisfaction assistance rendered by the International Atomic Energy Agency to Belarus, the Russian Federation and Ukraine on remediation of agricultural and urban environments, cost-effective agricultural countermeasures and monitoring of human exposure in areas affected by the Chernobyl disaster”.

175. The resolution has welcomed the proposal to draft a UN Action Plan on Chernobyl in order to implement the ‘Decade of Recovery and Sustainable Development of the Affected Regions’. This plan would provide a concise outline of the activities which UN agencies intend to pursue in order to contribute to the goal of ensuring that by 2016, the end of the third decade after the Chernobyl nuclear accident, normalcy becomes a real prospect for the region, people take control of their lives, and the area overcomes stigma associated with the nuclear accident. It will allow maximization of limited resources, avoid duplication of effort, and build on recognized agency mandates and competencies.

The IAEA has confirmed its agreement to participate in the design and implementation of the UN Action Plan.

#### **B.4.9. Management of radioactive waste and decommissioning**

176. Radioactive waste management is important for countries with nuclear power plants as well as for countries with nuclear research and medical activities. The regional TC project RER/3/002, 'Quality Management of Radioactive Waste in Central and Eastern Europe', provides support for the management of institutional (non-NPP) waste, covering retrieval and processing of legacy waste, waste characterization and conditioning of liquid waste, as well as assistance in the design and/or operation of centralized waste processing and storage facilities. The project also supports the design of national facilities for low and intermediate level waste as well as upgrading the operational and long-term safety level of existing ones. An important international workshop was hosted by PURAM, Hungary, in June 2007, on upgrading storage and disposal facilities.

177. Decommissioning activities require technical support as well as support for planning and managing the decommissioning waste streams. In Georgia, activities were completed in 2007 to dismantle the peripheral systems of the reactor building. Eventually the only remaining radioactivity will be that confined within the concreted reactor monolith. Radiological characterization of the reactor site remains the most important step towards closure of the project. In Latvia assistance is being provided to dismantle the reactor interiors and the biological shield, as well as for related support activities. In 2007, significant steps were made toward the definition of operating procedures for the dismantling of the reactor. TC projects for Lithuania, Slovakia and Ukraine deal with pre-disposal management of the different waste streams, with an emphasis on the problematic ones resulting from nuclear accidents (Bohunice A1 and Chernobyl Unit 4). As decommissioning activities will become more important, the regional TC project RER/3/005, 'Support in Planning the Decommissioning of Nuclear Power Plants and Research Reactors', which started in 2007, provides a two-way mechanism whereby the participating institutions submit their decommissioning plans (or parts thereof) to the Agency. Expert missions are then organized to review those submissions and make recommendations.

## B.5. Latin America

### B.5.1. Overview

178. In 2007, the TC programme provided support to 22 Member States in Latin America. Net new obligations in 2007, the first year of the TC programme cycle, reached \$15.9 million, compared with \$16.5 million in 2006. The financial implementation rate for the TC programme in the Latin America region was 69.9%, compared with 81% in 2006. The distribution of disbursements in the region for 2007 by area of activity is shown in Figure 7.

179. During 2007, the largest area of activity in Latin America was human health at 32.5%. Food and agriculture and radiation and transport safety were also important. Disbursements in these three areas accounted for 56% of the total.

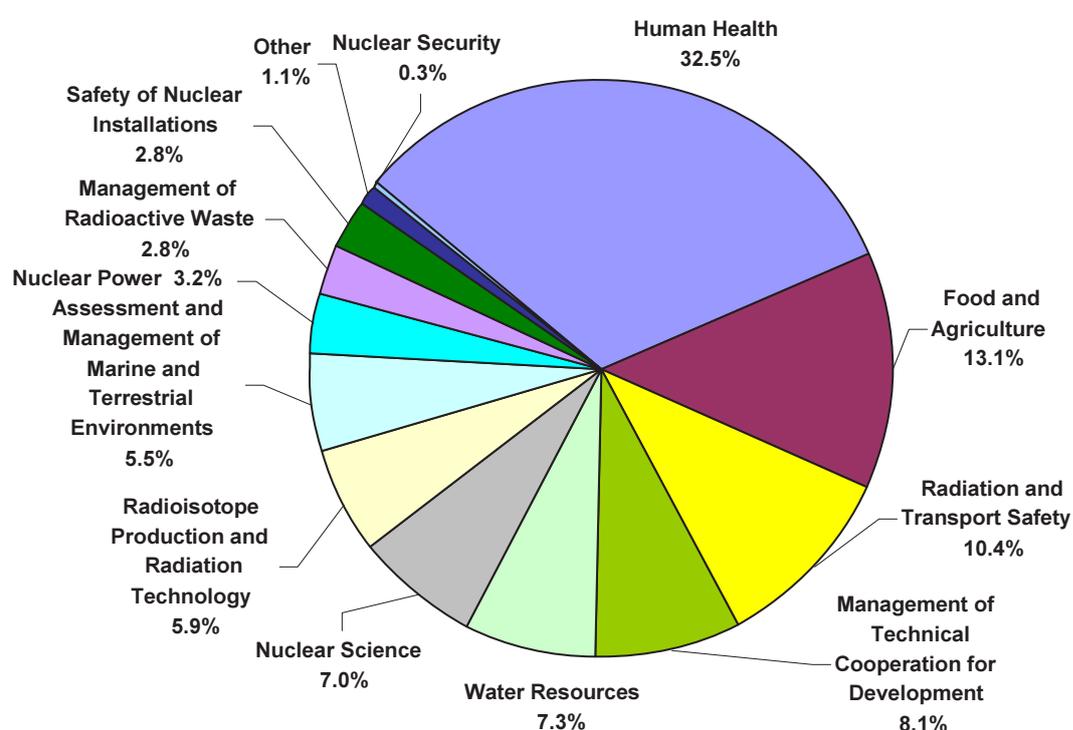


Figure 7: Disbursements by Agency Programme for 2007 — Latin America

180. In 2007, although no new Country Programme Frameworks (CPFs) were completed or signed, Colombia, El Salvador, Honduras, Mexico and Panama made progress in preparing final drafts and field missions were sent to Belize, Dominican Republic and Peru to support preparations.

181. Uruguay ratified the Co-operation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL) in 2007. Colombia, Dominican Republic, Guatemala, Nicaragua and Paraguay have not yet ratified.

182. Regional workshops to train counterparts, National Liaison Officers (NLOs) and National Liaison Assistants (NLAs) in project management, the Programme Cycle Management Framework (PCMF) and other management issues included a training workshop for TC National Liaison Officers and Assistants, held in Vienna in June 2007 with 23 participants and a regional workshop for counterparts of TC projects in Colombia, Haiti, Jamaica and Nicaragua held in Bogota, Colombia, from 29 January to 2 February 2007, with 18 participants.

### **B.5.2. Adoption of regional strategic profile for Latin America and the Caribbean**

183. Within the framework of the strategic alliance between ARCAL and the Agency, a regional strategic profile for Latin America and the Caribbean was prepared. The profile provides technical cooperation priorities of the region with regard to available and cost-effective nuclear techniques. A sectoral approach was used for the development of the profile, considering the needs of the Latin America and the Caribbean region, including the study of trends and prospective scenarios in:

- Food safety (agriculture, nutrition, animal husbandry),
- Human health (nuclear medicine, radiotherapy, medical physics, radiopharmacy, nutrition, radiation protection of patients),
- Environment (atmosphere, water resources, terrestrial environment, marine environment),
- Energy and industry (nuclear energy, experimental reactors and applications in industry), and
- Radiation safety (regulatory infrastructure, occupational radiation protection, regulatory aspects in medical exposure, radiation protection of the public, awareness and response to radiation emergencies and education and training).

184. The profile was formally adopted by ARCAL and the Agency in September 2007, and is currently providing the basis for the elaboration of the regional programme and supporting the process of designing and selecting projects in accordance with specific procedures.

### **B.5.3. Strengthening capacities in energy assessment and planning**

185. TC project RLA/0/029, 'Capacity Building for the Development of Sustainable Energy' aims to contribute to the sustainable development of countries through the diversified supply and rational use of energy, strengthening national capabilities in the energy sector. Five countries were initially considered under this project: Bolivia, Dominican Republic, Mexico, Uruguay and Bolivarian Republic of Venezuela. However, due to the importance the region is giving to energy security, this project has been expanded to include 19 countries for a duration of five years. After launching the project in Quito, a training course on modelling the energy demand using Agency tools (Model for Analysis of Energy Demand (MAED)) was held in Caracas, Bolivarian Republic of Venezuela, with excellent results. Teams in the country have developed their energy scenarios, and regular reviewing missions have been organized to exchange experience and lessons learned among teams. The project is being implemented with the partnership of the Latin American Energy Organization (OLADE).

186. Technical cooperation activities in Haiti under TC project HAI/0/004, 'Strengthening the Management and Development of Energy Sources in Haiti', helped develop a national energy plan to guide actions to reduce biomass consumption and increase electricity coverage within the country. The strategy seeks to better manage demand-side requirements by developing local resources, including wind and hydroelectric, ethanol and biodiesel enhancement activities; to improve energy efficiency in homes and industry; to introduce inter-fuel substitution practices and new regulation systems. In 2007, a national team was formed and trained in Haiti. With the assistance of Agency experts in energy planning the national team produced a first draft of a proposal for restructuring the Haitian energy sector. The success of the project has led to potential bilateral collaboration between Haiti and Spain, whereby additional investments by potential donors for development of the energy sector may increase. The Agency is playing an active role to promote this important collaboration.

#### **B.5.4. Enhancing fuel cycle and waste management activities**

187. TC project RLA/3/006, 'Regional Upgrading of Uranium Exploration, Exploitation and Yellowcake Production Techniques taking Environmental Problems into Account', was proposed by Argentina, Brazil and Peru. As the project became active over the second semester of 2007, Chile, Nicaragua, Paraguay, Uruguay and Bolivarian Republic of Venezuela indicated interest in taking part. At the end of 2007, upon the request of Argentina, a training programme took place in Mendoza that considered environmental problems in the field of uranium geology, deposit and exploration.

188. TC project BRA/3/012, 'Nuclear Fuel for Research Reactors: Improving Fabrication and Performance Evaluation in Brazil', aims to meet public demand for medical treatment and diagnosis using adequate technologies including nuclear techniques. To meet the growing demand for the production of radioisotopes for medical purposes, the Brazilian Research and Material Test Reactor IEA-R1 has been upgraded to increase its operating hours and power. To deal with this power increase and resulting fuel demand, domestic fuel fabrication technology has been under development for many years. As a result, fuel elements for reloading this reactor are being produced locally using natural uranium hexafluoride to manufacture enriched silicide plate fuel. This upgrade in the production of reactor fuel has brought new challenges in effluent treatment, which needs to comply with increasingly stringent environmental regulations. The second issue to be addressed was the development of post-irradiation examination (PIE) and modelling procedures for fuel performance evaluation, especially for the plate-like fuel. At present, fuel PIE in hot cells is not performed in Brazil.

189. The present waste storage site at the Colombian Institute of Geology and Mining (INGEOMINAS) was not designed for this purpose. Its capacity has been exhausted and it cannot cope with the 285 units of waste waiting for treatment, conditioning and storage. Through project COL/3/010, 'Design and Development of a Plan for the Integral Management of Radioactive Waste', the Agency is assisting in the development of a comprehensive radioactive waste management system. This includes regulation according to international standards, establishment of a national repository with safety and security systems and a national radioactive waste database.

#### **B.5.5. Supporting nuclear engineering and technology**

190. TC project RLA/4/020, 'Engineering of Casks for the Transport of Spent Fuel from Research Reactors', aims to contribute to the protection of the environment by means of safe and cost effective management of spent fuel and associated by-products, from the discharge of the reactor to its final disposition. Different scenarios are envisaged by each participating country for the management of spent fuel from research reactors. Argentina, which has research reactors at different sites, is currently building a centralized interim spent fuel storage facility. Brazil and Chile, where the storage capacity of the respective research reactors will be completed by the beginning of the next decade, intend to store the spent fuel in on-site dry storage facilities. In the long term, one of the countries could host spent fuel conditioning services for the region. In every situation, casks for the transport and storage of this material are an integral part of the proposed solutions. In 2007, the project counterparts and end users, together with the regulators, prepared a prototype cask which will be tested in June 2008 in Belo Horizonte, Brazil.

191. The long term structural integrity of the components of pressurized reactors is essential for the safe and reliable operation of nuclear power plants (NPPs). Integrity, ageing and lifetime management of primary circuit components and other main equipment remain fundamental issues for NPPs to ensure long term safe and reliable operation. The three countries in the region with operational NPPs have exchanged international experience and knowledge on the study of cracking and the structural integrity of components in light water reactors. In 2007, under TC project RLA/4/021, 'Cracking and

Structural Integrity of components in Light Water Reactors', several meetings were held to transfer experience concerning the integrated plant life management (PLiM) and life extension for operating nuclear power plants. Emphasis was placed on the practical application of PLiM in operating nuclear power plants.

192. In Argentina, TC project ARG/4/091, 'Plant Life Management Programme for Critical Systems, Structures and Components of Embalse Nuclear Power Plant' aims to strengthen capabilities to operate the NPP safely and economically up to the end of its design life in 2012. The project also aims to extend the plant life by means of a reliable structural integrity assessment, a key issue in lifetime evaluation. Embalse NPP's power generation of 600 MW(e) is a major factor in the central region of the country. The NPP can be extended beyond the designed plant life, as long as relevant safety and performance requirements are met. A conference was held in Moscow to exchange information on research results and achievements and plant operational experiences, and to discuss tendencies, issues and R&D needs of water chemistry and related issues of water cooled water moderated power reactors (WWERs) and pressurized water reactors (PWRs). Other expert missions were organized in Argentina with international experts from Canada, France, Republic of Korea, Romania and Spain.

#### **B.5.6. Using nuclear techniques to monitor the effects of pesticide use**

193. Regional project RLA/5/050, 'Strengthening Laboratory Capacity to Assess the Implementation of Good Agricultural Practices in the Production of Fruit and Vegetables in Latin America', is taking place to improve the assessment of good agricultural practice (GAP), with the support of analytical laboratories, in the following basins where relevant crops for export and consumption are produced: Alto Valle del Rio Negro and Neuquén in Argentina, the valleys of the Ribeira river in Brazil and the Apalta river in Chile, Lake Tota in Colombia, the Machuca-Jesús María river in Costa Rica, Ariguanabo in Cuba, Guayas in Ecuador and Salto in Uruguay. The project uses a step-by-step approach to build regional capacities to address pesticide issues, focusing on the prevention of pesticide problems and on the improvement of laboratory capabilities, and feeding back results to stakeholders. Two regional training courses were carried out in 2007, one on integrated analytical approaches to assess the implementation of good agricultural practices and another on pesticide risk assessment, sampling and analytical methodology for pesticides in water. The results of the first year of the project show a greater understanding of environmental indicators and their relation to GAP. The provision of equipment has contributed to networking among laboratories.

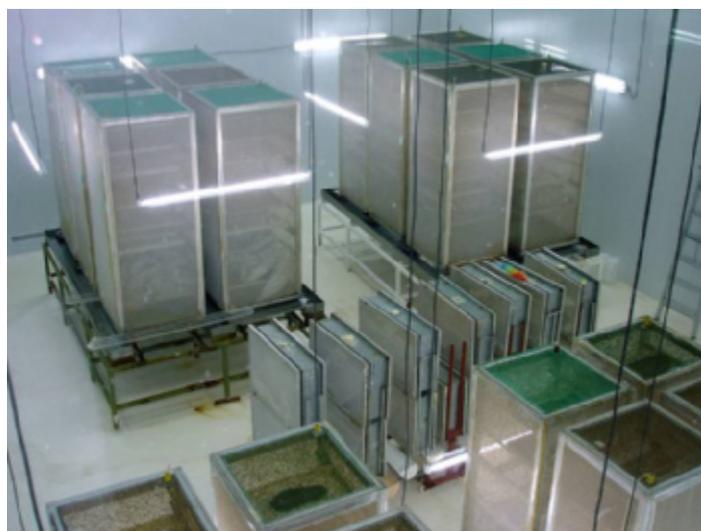
194. In Costa Rica, TC project COS/5/026, 'Management and Appropriate Use of Insecticide-nematicides', helps reduce the adverse impact of insecticide-nematicides on food and the environment through improved methods of application, rotation of the insecticide-nematicides and water management. Radiotracer techniques helped to understand and predict their behaviour under local farming practices. Eight months of training have been provided to counterparts to develop capabilities for determining the rate of pesticide degradation, quality assurance and control for food safety, mass spectrometry for pesticide residue detection/characterization and integrated assessment of pesticide management practices and mitigation strategies. Likewise, analytical capabilities have been developed for routine quantitative detection of several pesticide residues in food and environment samples. To date, insecticide-nematicide application techniques have been assessed for banana, coffee and potato and the physical, chemical and biological characteristics of soil have been defined. A pesticide impact assessment programme has been evaluated and is in use at the Environmental Pollution Research Centre (CICA) of the University of Costa Rica for first-tier pesticide impact rating. The upgrading of the accreditation status of the CICA laboratories from ISO/IEC 2000 17025 standard to ISO/IEC 2005 17025 standard brings CICA up to the current international standard.

### B.5.7. Improving agricultural output

195. In Honduras, TC project HON/5/002, ‘Improving the Nutritional and Sanitary Conditions of Cattle through Nuclear Methods’, aims to improve the nutrition and health conditions of dual-purpose livestock by implementing food supplementation strategies which draw on resources available in the region, and by developing a programme to identify and treat livestock diseases. Using nuclear and related techniques, the project team obtained new data on the nutritional quality of locally available feed resources, in particular forages. With the aid of this information, low-cost feeding strategies are being developed on farms using locally available resources. In addition, contagious diseases have been diagnosed for prevention and cure. Well-equipped laboratories have been established to evaluate feeds and to perform ultrasound diagnosis and radioimmunological tests. The information and technology generated by the project is being transferred to technicians and producers to ensure its implementation on farms. Honduran agriculture experts have applied technologies, including progesterone testing with radioimmunoassay, that allow them to monitor the reproductive efficiency of cows and improve the effectiveness of artificial insemination.

196. Quinoa (*Chenopodium quinoa Willd.*) and kiwicha (*Amaranthus sp*) are highly valuable crops in Peru. Increasing their productivity is a primary food-security issue, particularly in the Andean region. The objective of TC project PER/5/030, ‘Genetic Improvement of Quinoa and Kiwicha using Mutation Induction and Biotechnology’, is to develop improved quinoa and kiwicha cultivars using mutation induction and biotechnology, with resistance to shattering (kiwicha), reduction of saponin (quinoa), and reduction of life cycle and plant height. Equipment has been provided to strengthen the laboratory facilities at La Molina National Agricultural University for the characterization and evaluation of mutants. Training through fellowships and scientific visits is being provided. Expert assistance has contributed to training national scientists in crop improvement and the double haploid technique in cereal breeding.

197. In Panama, the Ministry of Agricultural Development is benefiting from Agency assistance to enhance its capability for effective fruit fly control using area-wide sterile insect technique under TC project PAN/5/016, ‘Capacity Building for Suppression of Fruit Flies of the Genus *Anastrepha* from the Azuero Peninsula using an Area-Wide Pest Management Approach’. The main goal is to establish conditions in Azuero Peninsula conducive to the development of a fruit fly low prevalence or free area. The Azuero Peninsula has been identified as the main area suitable for the production and export of fresh fruit and vegetables, especially mango, which is a very sensitive culture for the target fly *Anastrepha obliqua*. The Agency is transferring technology for effective fruit fly control through training, expert missions and the provision of specialized equipment and materials.



*Insect breeding facility, Argentina*

*Credit: Alain Cardoso Cabazon/IAEA*

### **B.5.8. Providing support in human health**

198. In South America, approximately 370 centres are delivering external radiotherapy with about 120 clinical accelerators and more than 200 cobalt-60 teletherapy and orthovoltage units. Brachytherapy is the most common method of treating gynaecological patients. However, most of the radiotherapy centres do not have sufficient qualified medical physicists and lack some of the basic equipment required for implementing and running a quality assurance programme in radiation therapy that would guarantee appropriate planning and the safe delivery of radiotherapy treatments. Under TC project RLA/6/046, 'Improved Quality Assurance in Radiation Therapy (ARCAL LVIII)', training was provided to medical physicists who work in radiotherapy centres, as well as specialized equipment with a view to implementing quality assurance programmes on the physical aspects of radiotherapy.

199. As a result of this project, 24 hospitals have received equipment for the positioning and immobilization of patients and a number of centres in each of the participating countries have been provided with updated reference material and guidance on the physical aspects of radiotherapy. The project focused particularly on quality assurance in radiation therapy, machine calibration and the calculation of patient doses.

200. In Nicaragua, TC activities are improving cancer care through support for radiotherapy services and the adoption of HDR brachytherapy as well as ensuring adequate quality practices for cancer control. Ongoing project NIC/6/012 on improving the quality of radiotherapy focuses on human resource development especially for quality assurance in radiotherapy, medical physics and treatment planning. In the National Radiotherapy Centre (CNR), manual low dose rate brachytherapy with caesium-137 sources has been replaced with HDR brachytherapy, reducing treatment intervals and allowing treatment of 345 patients in the first year, with 1380 applications.

201. TC project MEX/6/007, 'Strengthening the Use of Medical Physics for National Health Services', supported the medical physics graduate programme of the National Autonomous University of Mexico (UNAM), providing laboratory equipment, together with expert and scientific visits. This has resulted in new and better equipped practical activities for students as well as continuing education for alumni. During the two year long project, 16 students completed their master's degree. Twelve of these graduates now work as clinical medical physicists in Mexican radiotherapy, nuclear medicine and magnetic resonance health services, while two are pursuing doctoral degrees in a related field.

202. TC project CUB/6/016, 'Strengthening Nuclear Cardiology in the Diagnosis and Treatment of Coronary Patients in Cuba', is helping to improve the diagnosis of coronary heart disease patients, using nuclear cardiology methods, at the Institute for Cardiology and Cardiovascular Surgery. Several activities took place in 2007, including a national workshop on the production and quality control of radiopharmaceuticals used in nuclear medicine, two scientific visits for updating nuclear medicine techniques used in coronary heart disease patient assessment and procedures for interventional cardiology, and two fellowships focused on understanding the basic principles of physics in nuclear medicine. The project also procured key equipment for the counterpart institution.

203. In Argentina, TC project ARG/2/012, 'Production and Application of new PET Tracers for Cancer Detection', aims to implement a new diagnostic tool for the detection of certain types of cancer and for prognostic and therapeutic response assessment, thereby extending the applications of clinical PET in oncology. The project aims to develop and implement a technique to produce carbon-11

tracers<sup>18</sup> and to explore their application in oncological PET. The project got off the ground in 2007 with several fellowships, scientific visits and equipment procurement.

204. In El Salvador, the Agency is assisting the Ministry of Health under TC project ELS/6/016, 'Determination of Vitamin A Deficiency in Women and Children', to develop a national capability to monitor vitamin A deficiency in the Salvadoran population through the establishment of an analytical laboratory and staff training. The Agency project of transferring technology to assess vitamin A status plays a critical part in supporting the country's current focus on improving information on the topic.

205. In the Dominican Republic TC project DOM/6/005, 'Evaluation of Fortified Foods Using Nuclear Techniques', is contributing to identifying and reporting the nutritional status of school children aged from six to ten, evaluated using nuclear techniques. During 2007, the project focused on providing the training and equipment needed to ensure that the counterpart institutions had the capacities to analyse and interpret saliva and blood samples to determine the nutritional status of children.

### B.5.9. Using isotopic techniques to study the environment

206. Regional project RLA/7/012 'Use of Nuclear Techniques to Address Management Problems of Coastal Zones in the Caribbean Region', is taking place with 12 Member States of the wider Caribbean in collaboration with UNEP's Caribbean Regional Co-ordinating Unit (CAR/RCU), France, Italy and Spain. The project supports the development and improvement of capabilities to reduce the degradation, due to anthropogenic and natural impacts, of the coastal ecosystems of the wider Caribbean region. A *Guide for sampling, preparation and analysis of sediment cores for the historical reconstruction of contamination in the coast zones of the Caribbean* has been drafted, which includes standardized procedures for sampling of surface sediments and profiles as well as prescribed laboratory methods developed in the region for their analysis. While methods for field investigations



are developed to enable baseline and retrospective reconstruction of pollution levels, efforts continue to enhance the capabilities in the laboratories for sustainable investigation, monitoring and management of the Caribbean Sea. Synergies with related regional projects and activities are achieved through a memorandum of understanding between the Agency and CAR/RCU. The technical aspects of the project are coordinated by the IAEA Marine Environment Laboratories, Monaco.

*Sampling marine sediments, Haiti*

*Credit: Misael Diaz/Cuba*

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<sup>18</sup> Carbon-11 is a positron emitter with a half-life of 20 minutes, and is generated with a cyclotron by accelerating a proton beam into a nitrogen gas target. As a result, compounds such as acetate, choline or methionine can be labelled with carbon-11. These are unpaired PET tracers used to monitor certain diseases, such as prostate cancer and tumours of the central nervous system.

207. Project CHI/7/011, 'Development of Nuclear Technologies and Information Technologies for an Early Warning Environmental Observatory Centre for Red Tide', builds on the results of the completed TC projects with Chile on harmful algal blooms. The Laboratory of Marine Toxins of the University of Chile has adapted receptor binding assays (RBAs) for the detection of paralytic shellfish toxins (saxitoxins) in shellfish and water samples that enables early warning of levels of toxicity to regulatory authorities and shellfish producers. This Laboratory has teamed up with the Institute of Geosciences of the Southern University of Chile to consolidate long-term and sustainable RBA technology transfer to end users at other health service laboratories in the country where harmful algal blooms have been detected. A field mission was undertaken to support the ecotoxicological evaluation of relevant shellfish growing areas and marine sediments.

208. At Puerto Quetzal, Guatemala, the Agency has contributed to strengthening the national environmental monitoring system and to survey the impact of port activities on coastal areas through project GUA/7/002, 'Strengthening the National Environmental Monitoring System in the Marine Ecosystem'. A laboratory employing nuclear instrumentation to monitor the state of environmental pollution in coastal areas was established. Expert assistance was provided and equipment installed including a low background gamma spectrometer using a high purity germanium (HPGe) detector to monitor the level of radioactivity in the coastal sediments and an X-ray fluorescence (XRF) system with the aim of providing an analytical tool for monitoring the concentration of heavy metals and other toxic elements in marine sediments. Both laboratory and managerial staff have been trained.

#### **B.5.10. Ensuring the sustainability and quality of water resources**

209. Regional project RLA/8/038, 'Sustainable Development of the Environment and Water Resources in the Upper Lempa River Basin', addresses the crucial issue of improving knowledge of the water systems in the Trifinio region. This region, located at the border of El Salvador, Guatemala and Honduras, is a preservation area where the most important watersheds of the three countries are located. The objective was to ensure the sustainability and quality of water resources and to support the establishment of a management plan for an integrated watershed management programme in the Trifinio region using isotopic techniques. The project enhanced expertise in all countries, providing laboratory equipment and training on data interpretation and numerical modelling.

210. Regional project RLA/8/041, 'Application of Isotopic Tools for Integrated Management of Coastal Aquifers', aims to improve the evaluation of coastal aquifers for the sustainable management of water resources in Latin America. It focuses on selected coastal aquifers in Argentina, Costa Rica, Cuba, Ecuador, Peru and Uruguay. To date, the hydrogeological characterization of the La Paloma and Guanacaste aquifers of Uruguay and Costa Rica, respectively, have been completed to enable a focused isotopic investigation.

211. In Mexico, isotopic techniques are also a central component of project MEX/8/025 'Isotope and Hydrogeochemical Characterization of Drinking Water Wells that Supply the León Valley, Guanajuato'. This area contains 25% of the wells drilled in the country, supplying a population of 1 200 000 inhabitants. The project has made it possible to obtain integral knowledge of the behaviour and evolution of the aquifer system in response to anthropogenic activities, and to integrate a conceptual model of hydrological functioning, which will enable better use of the aquifer system.

212. In Ecuador isotopic techniques are a key tool in project ECU/8/026, 'Characterization of Coastal Aquifers on the Santa Elena Peninsula', which focuses on solving the water availability problem in the Peninsula. This area corresponds to the hydrographic system of Zapotal in the southwest of Ecuador. Once a tropical forest and today a semiarid region where evapotranspiration is greater than precipitation, rivers are seasonable, and the sea is intruding in the aquifers. As a result, salinity in the subsoil is increasing in some areas, which has a detrimental effect on the availability of water for

human consumption. Expert assistance, equipment and training are being provided to the main counterpart, the Coastal Advanced Polytechnic Academy (ESPOL), which is interacting with the relevant institutions and stakeholders to solve the water supply problem.

#### **B.5.11. Strengthening national regulatory infrastructure**

213. In Latin America, efforts to help Member States with operational national regulatory infrastructure for the control of radiation sources are implemented through TC project RLA/9/053, 'Strengthening National Regulatory Infrastructures for the Control of Radiation Sources (TSA1)'. Bolivia, Colombia, Cuba, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Bolivarian Republic of Venezuela are participating. During 2007, two training courses were conducted to develop the competencies and practical skills of lawyers and customs officers for the control of radiation sources. A regional meeting was also conducted targeting high-level officers involved in the safe transport of radioactive material to ensure implementation and compliance with Agency regulations. Efforts at the national level included visits to Colombia, Cuba, Mexico and Nicaragua to assess the safety and security of their radioactive sources infrastructure.

## Glossary

**adjusted programme** - the total value of all technical cooperation activities approved and funded for a given calendar year plus all approved assistance brought forward from previous years but not yet implemented. It is against this figure — which is not identical with resources actually available — that the implementation rate is measured.

**AFRA** - African Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology.

**ARASIA** - Co-operative Agreement for Arab States in Asia for Research, Development and Training Related to Nuclear Science and Technology.

**ARCAL** - Co-operation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean.

**assessed programme costs (APCs)** - the cost charged to Member States receiving technical assistance, amounting to 8% of the assistance actually provided from both the Technical Cooperation Fund and extrabudgetary contributions (but excluding UNDP-financed assistance). This mechanism was suspended in 2004, and replaced by National Participation Costs (see document GOV/2004/46).

**central criterion** - a project meets the central criterion if it can be shown that it is in an area of national priority that enjoys strong government support. This means that:

- it is in an area where there is a national programme enjoying strong government commitment with evidence of significant financial support; or
- it is clearly related to a core competency of the Agency (i.e. it is safety related or deals with nuclear power operations or radioactive waste management) and it has a good chance of achieving its expected result.

**Country Programme Framework (CPF)** - a descriptive planning process that provides a concise frame of reference for future technical cooperation with Member States agreed in a document between the concerned State and the Agency.

**disbursements** - actual cash outlays for goods provided and services rendered.

**due account** - the mechanism by which the Agency accords preference in terms of Technical Cooperation Fund allocations and procurement to those Member States with a good record of financial support to the technical cooperation programme. The objective is to increase the level of contributions to the Technical Cooperation Fund. Previously, it was also intended to improve the record of payment of assessed programme costs.

**earmarkings** - amounts allotted for funding approved assistance awaiting implementation.

**extrabudgetary funds** - funds provided by Member States or organizations for financing specific projects or activities. They also include funds received from Member States to finance assistance for themselves. These funds are separate from voluntary contributions to the Technical Cooperation Fund.

**footnote-a/ projects** - projects approved by the Board for which no immediate funding is available.

**government cost sharing** - funds provided by Member States to augment projects in their own country.

**implementation (in financial terms)** - the volume of funds obligated (new obligations) in a given period.

**implementation rate** - a ratio obtained by dividing implementation by the adjusted programme (expressed as a percentage), reflecting the financial rate of implementation.

**in-kind** - the value assigned to non-cash contributions from a Member State that represent savings to the Agency, such as an expert's fee, the daily subsistence allowance for a lecturer, or the travel costs for a fellow.

**National Participation Costs (NPCs)** - Member States receiving technical assistance are assessed a charge of 5% of their national programme, including national projects and fellows and scientific visitors funded under regional or interregional activities. At least half of the assessed amount for the programme must be paid before contractual arrangements for the projects may be made. This mechanism replaces assessed programme costs, which were suspended in 2004 (see document GOV/2004/46).

**new obligations** - the sum of disbursements during the year plus year-end unliquidated obligations minus unliquidated obligations carried over from the previous year.

**new resources** - the total value of not previously reported funds received in a calendar year.

**overprogramming** - the establishment of programming levels that exceed available resources.

**programme commitments** - total disbursements plus unliquidated obligations for the current year plus earmarkings.

**Programme Cycle Management Framework (PCMF)** - an approach to the technical cooperation programme, facilitated by an IT platform for registered users to develop and manage technical cooperation projects from project concept submission through project design, approval, implementation and evaluation. It provides all stakeholders (in Member States and the Secretariat) with access to their projects and facilitates real-time interaction between members of the project team.

**programme year** - the year in which a technical cooperation project is planned to start.

**Programme Reserve** - an amount set aside by the Board each year for financing assistance of an urgent nature requested after the Board has approved the technical cooperation programme for the year in question.

**rate of attainment** - a percentage arrived at by taking the total voluntary contributions paid to the Technical Cooperation Fund by Member States for a particular year and dividing them by the Technical Cooperation Fund target for the same year. As payments can be made after the year in question, the rate of attainment can increase over time.

**RCA** - Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology.

**rephasing** - a reallocation of project funds approved for inputs which were planned for a given programme year and which cannot be implemented as scheduled. Rephasing does not change total inputs approved for a project; rather, it serves to keep project planning realistic.

**Technical Cooperation Fund (TCF)** - the main fund for the financing of the Agency's technical cooperation activities; it is supported by voluntary contributions from Member States, assessed programme cost arrears and National Participation Costs paid by Member States and miscellaneous income.

**thematic plan** - a prescriptive planning process that focuses on the technology-problem link where TC projects have successfully demonstrated a significant contribution to national socio-economic development, or where solid evidence exists to predict such a contribution.

**type II fellowships** - fellowships provided by Member States at little or no cost to the Agency.

**usable unobligated balance** - the unobligated balance of the Technical Cooperation Fund less the sum of pledges not yet paid and the dollar equivalent of currencies that can only be used with great difficulty. The purpose is to measure the amount of money that is readily available for technical cooperation programme obligations.

**unliquidated obligations** - obligations incurred for which no cash outlays have yet been made.





Department of Technical Cooperation  
International Atomic Energy Agency  
P.O. Box 100, Wagramer Strasse 5  
1400 Vienna, Austria  
Tel.: (+43-1) 2600-0  
Fax: (+43-1) 2600-7  
E-mail: [Official.Mail@iaea.org](mailto:Official.Mail@iaea.org)