

Technical Cooperation Report for 2006

Report by the Director General

50 years



IAEA

Atoms for Peace: The First Half Century

1957-2007

**TECHNICAL
COOPERATION REPORT
FOR 2006**

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 2006, the draft of which was considered by the Board at its June 2007 session.

The Director General is also hereby reporting in fulfilment of the request contained in resolution GC(50)/RES/12 on “Strengthening of the Agency’s technical cooperation activities”.

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Summary

The period under review was one of considerable satisfaction for the TC programme. New resources reached a record high of \$101.0 million with \$76.8 million for the Technical Cooperation Fund, \$22.3 million in extrabudgetary resources and \$1.9 million in in-kind contributions. Net new obligations during the year were \$104.5 million, which represented an increase of more than 30% over 2005.

The year 2007 marks the 50th anniversary of the IAEA and provides an opportunity to look back on the history of TC activities. In its early days, the “technical assistance” programme, as it was then called, was modest: in 1960 the Board of Governors approved 28 projects in 16 Member States. Over time, the demand for Agency assistance and expertise has grown steadily: the TC programme that was approved by the Board of Governors in 2006 featured more than 780 projects in 115 Member States.

In recent years, there has been shift in attitudes towards nuclear power in a number of countries around the world. This trend can be traced to a fast growing global energy demand, increased emphasis on energy security and a heightened awareness of the risks of climate change. This has led to a rising number of requests for energy planning projects, which may include nuclear power as an option.

In 2006, the Secretariat developed and finalized the TC programme for the 2007–2008 biennium using the Programme Cycle Management Framework (PCMF) in close collaboration with national authorities. The PCMF is supported by a dedicated website, which facilitates collaboration among stakeholders in the Member States and the Secretariat.

In line with the TC Strategy, the Secretariat concentrated on building partnerships with national, regional and international development organizations. This includes, inter alia, support for the New Partnership for Africa’s Development and partnership with the United Nations Environment Programme. A new challenge which could have an impact on the TC programme in the areas of resource mobilization, representation at the country level and technical specialization is the process of fostering greater integration of UN system-wide activities at the country level, in accordance with the Report of the High-level Panel on United Nations System-wide Coherence. The Agency is responding with initiatives centred on strengthening country level coherence, better defining and reporting programme results, promoting more predictable funding and strengthening partnerships.

As shown in Part B to this report, the TC programme contributes to five of the eight Millennium Development Goals in the areas of environmental sustainability, combating disease, hunger and poverty, maternal health and child health. A related area of endeavour is incorporating a gender perspective into the TC programme: this aspect features in the new project concepts to be submitted by Member States in 2007 and in the criteria to be used by the Secretariat in assessing them.

A major thrust of the TC programme is strengthening the capacity of national nuclear institutions to become more self-reliant, thus enhancing the sustainability of results achieved through TC efforts. Technical cooperation among developing countries, in particular through projects in the framework of regional agreements, plays a vital role in this mechanism. Building human resources for nuclear technology and preserving nuclear knowledge continue to be important areas for the TC programme.

A progress report on strategic objectives prepared for the 2007 meeting of the Standing Advisory Group on Technical Assistance and Cooperation measured the performance of the TC programme between 2002 and 2006 against agreed performance indicators. This report showed that the programme had met or frequently exceeded the targets set under these performance indicators in the areas of meeting the central criterion of strong government commitment, establishing strategic partnerships, mobilizing financial resources and promoting sustainability of TC programme results.

The lessons learned from this review will be essential for assessing the challenges and opportunities that the TC programme will likely encounter in the next five years.

The Agency's Technical Cooperation Programme at a Glance (as at 31 December 2006)

The target for voluntary contributions to the Technical Cooperation Fund for 2006 was **\$77.5 million**.

New resources for the technical cooperation (TC) programme were **\$101.0 million**.

- Technical Cooperation Fund: **\$76.8 million**
- Extrabudgetary resources: **\$22.3 million**
- In-kind contributions: **\$1.9 million**

The adjusted budget for the TC programme for 2006 was **\$138.9 million**.

Disbursements for the TC programme reached **\$97.6 million**.

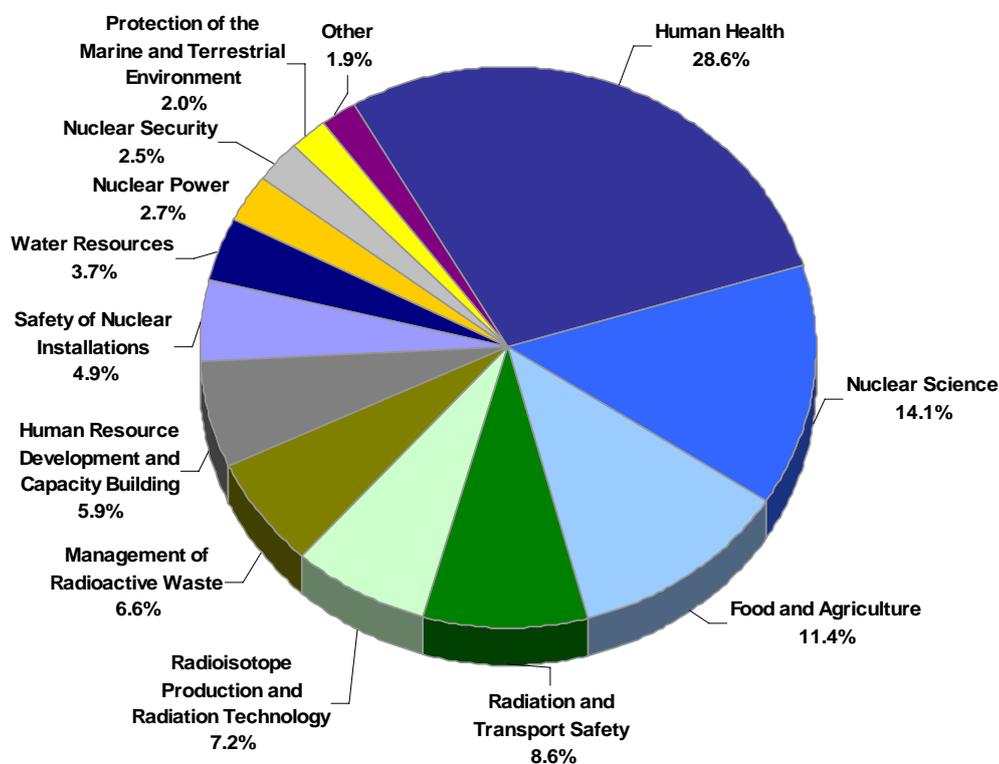
Net new obligations during the year were **\$104.5 million**.

The implementation rate for the programme was **75.2%**.

The number of countries/territories receiving support from the programme was **115**.

Project support involved **3041** expert and lecturer assignments, **3229** meeting and workshop participants, **2477** participants in training courses and **1697** fellows and scientific visitors.

Disbursements by Agency Programme for 2006¹



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

Technical Cooperation Report for 2006

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(50)/RES/12.

2. Section A.1 reviews five decades in the delivery of the technical cooperation (TC) programme. Section A.2 discusses gaining recognition as a partner in resolving development problems through the cost effective transfer of nuclear technologies. This includes interactions with the UN system and other international organizations that deal with development. Section A.3 addresses strengthening the capacity of nuclear institutions to become technically and financially self-reliant. This includes activities in the framework of regional agreements, identifying regional resource centres and furthering technical cooperation among developing countries. Section A.4 reports on the Technical Cooperation Fund and extrabudgetary resources mobilized in 2006. Section A.5 addresses enhancing the effectiveness and efficiency of the TC programme. This part reports on measuring the TC programme against agreed performance indicators and reviews the experience with the new and improved Programme Cycle Management Framework.

3. Part B, which highlights some of the achievements of the programme during 2006 in each of the four regions, also responds to the operative paragraphs of resolution GC(50)/RES/12 concerning assistance to Member States in the peaceful, safe, secure and regulated applications of atomic energy and nuclear techniques in specific fields.

A.1. 1957-2007, Fifty Years of Technical Cooperation

4. This year marks the 50th anniversary of the IAEA. At the time the Agency was established, the creation of a nuclear power infrastructure was beyond the reach of many Member States. Nonetheless, the civilian applications of nuclear science and technology were beginning to take hold around the world on a wide social and economic scale. The TC programme's focus during the early years was to help developing Member States build up human capabilities and create the institutions and facilities that would enable them to introduce or enlarge the role of nuclear technology or apply nuclear techniques in a safe and effective manner.

5. The early "technical assistance" programme (as it was called at that time) was a collection of relatively small projects with a duration of no more than twelve months. These involved providing expert advisory services and specialized equipment. Comparatively speaking, the scale was much smaller then: in 1960 the Board of Governors approved 28 projects with assured funding in 16

Member States² (GOV/635, Annex I, (1960)). These projects involved cooperation inter alia in the use of radioisotopes in medicine and agriculture, health physics, solid state physics, neutron physics, radiobiology, radiochemistry, reactor design, nuclear geology, nuclear electronics and radiation dosimetry. From the start of the TC programme, fellowships were seen by the Agency and Member States as an effective way to share specialized knowledge in nuclear applications. In 1958, for example, the Agency awarded 20 fellowships. In 1959, this figure climbed to 245 — roughly one seventh of the fellows placed in 2006.

6. As contributions to the TC Fund increased and the benefits of larger projects became evident, the Board of Governors approved INFCIRC/267³, which laid the foundations for integrated, multi-year projects. The principles and rules spelled out in INFCIRC/267 still provide the basis for the design and management of the programme. By the end of the 1980s, it was clear that the phase of focusing solely on capacity and infrastructure building had largely been completed and that the time was ripe to shift the focus of the programme. A review of the technical cooperation activities ensued in the 1990s, which sought to ensure that the programme would have a cost efficient, direct and measurable impact on the high priority development needs of Member States. This development matured into the TC Strategy⁴, which defines the programme's strategic goal, expected results and management tools necessary to achieve these results.

7. In 1995, the Agency initiated the Country Programme Framework (CPF) to bring focus to its country programmes. The CPF process led to several important gains for Member States. These were: increased recognition of the Agency by national authorities, a higher level of engagement with top decision makers in Member States, more frequent interaction with national authorities on the conduct of the programme and finally, a more focused approach toward programme delivery. In 2002, the Board of Governors reconfirmed the value of the TC Strategy and its major goal⁵. Following the review of the TC Strategy, programme design and planning would focus on sustainability, partnerships, funding and self-reliance.

8. Today, the TC programme delivers nuclear based solutions to development problems to 115 Member States in 51 areas of activity⁶. These range from nuclear power to investigating the nutritional health of women and children. What has evolved over five decades is a partnership of interests, priorities and responsibilities that hinges on cooperation — the sharing of nuclear science and technology to address specific development needs.

² In 2006 the Board approved more than 780 projects with funding in 115 Member States.

³ INFCIRC/267, The Revised Guiding Principles and General Operating Rules to Govern the Provision of Technical Assistance by the Agency (1979).

⁴ GOV/INF/824, Technical Cooperation Strategy (1997).

⁵ GOV/INF/2002/8/Mod.1, Technical Cooperation Strategy, the 2002 Review.

⁶ GOV/2006/59/Add.1/Rev.1, Technical Cooperation Project Listings for 2007–2008, Revised, as Approved by the Board of Governors.

A.2. Gaining Recognition as a Partner in Resolving Development Problems through the Cost Effective Transfer of Nuclear Technologies⁷

A.2.1. Building Partnerships with International and Regional Development Organizations

9. Developing partnerships that contribute to the sharing of nuclear science and technology for socioeconomic development is an ongoing priority for the TC programme. Whether they are fostered regionally, through technical cooperation among developing countries (TCDC) or through collaboration with large donor organizations, partnerships are crucial in obtaining strategic, financial and technical advantages in development efforts.

10. As a related organization of the UN system and a partner in development, the Agency strongly supports the New Partnership for Africa's Development (NEPAD). The Agency's support to NEPAD and the African Union (AU) was strengthened in 2006 by its decision to participate in a cluster system in which groups of UN Agencies work together under a lead agency to support specific NEPAD priority areas, such as science and technology or the development of human resources, through joint projects. Most of the Agency-supported projects and initiatives carried out in Africa in 2006 harmonize well with NEPAD's action plan. Agency-supported projects contributed towards the attainment of NEPAD's objectives in specific fields including agriculture, human resource development, information and communication technologies, infrastructure building, environment, and sustainability of national and regional institutions through AFRA.

11. Working under the auspices of the Barcelona Convention for the Protection of the Mediterranean Sea against pollution and the UNEP Mediterranean Action Plan, which develop and coordinate national research programmes relating to all types of marine pollution in the Mediterranean Sea basin, has created a sound basis for sustainable application of the Agency's transfer of technology in the field of environmental management. The Agency's efforts in this domain consist in establishing national marine monitoring programmes that are aimed at analysing marine samples for all significant radionuclides and applying nuclear analytical and radiotracer techniques to study the role of pollutants in the marine environment.

A.2.2. Contributing to the Millennium Development Goals

12. The present portfolio of TC projects demonstrates that the TC programme addresses six of the eight Millennium Development Goals (MDGs)⁸ in the areas of combating poverty and hunger; promoting gender equality and empowering women; reducing child mortality; improving maternal health; combating disease; and ensuring environmental sustainability.

13. Many of the projects described in Part B, Programme Accomplishments and Impact during 2006, contribute to the achievement of the MDGs. In the area of eradicating hunger, examples include the food fortification intervention and food security programmes in the Asia and the Pacific region. In improving child health, examples include 'Regional Screening Network for Neonatal Hypothyroidism' and the projects of the Co-operation Agreement for the Promotion of Nuclear Science and Technology

⁷ Section A.2 responds to operative paragraphs 3, 16 and 18 of GC(50)/RES/12 on: facilitating cost sharing and other sources of partnership in development; consultations with multilateral financial institutions and regional development bodies; and ensuring attainment of the United Nations Millennium Development Goals.

⁸ The eight MDGs, agreed upon by 189 countries at the Millennium Summit of the United Nations in September 2000, are: eradicating extreme poverty and hunger; achieving universal primary education; promoting gender equality and empowering women; reducing child mortality; improving maternal health; combating HIV/AIDS, malaria and other diseases; ensuring environmental sustainability; and establishing a global partnership that favours development.

in Latin America and the Caribbean (ARCAL) on the prevention and control of anaemia in children. In the area of maternal health, an example is the project on understanding the impact of food supplementation on the health of pregnant women and birth outcomes. Examples of TC work in the area of combating disease include the regional projects entitled 'Improvement of the Radiation Treatment of Uterine Cervix Cancer' and 'Detection of Drug-resistant Malaria and Tuberculosis'. Agency support for the monitoring of air pollution in Mexico City and 'Contamination Assessment of the South Mediterranean Sea' highlights the efforts of TC in the area of environmental sustainability. Finally, the TC programme promotes gender equality and empowerment of women by providing training to women scientists, experts and technicians in a wide range of nuclear related fields.

A.2.3. Delivering as One

14. Pursuant to the Report of the High-level Panel on United Nations System-wide Coherence, the United Nations (UN) is embarking on a reform that may have far-reaching implications for the delivery of its programmes. The reform aims at establishing a "one UN" approach for the development, financing and delivery of country programmes by all UN system organizations. While the full extent of the impact of the reform process remains to be assessed, areas in which it could affect the Agency may include resource mobilization, representation at the country level and technical specialization. The Secretariat has been involved in discussions internally and with other UN organizations to assess how the Agency needs to adjust to this changing environment. In the meantime, to align its country programmes with the evolving context while preserving the specificity of its technical services, the Secretariat has started its own reform initiatives. These are centred on strengthening country level coherence, better defining and reporting programme results, promoting funding that is more predictable and strengthening partnerships that are highly relevant to the development activities of TC at the country and regional levels.

A.2.4. Incorporating a Gender Perspective into Technical Cooperation for Development

15. The Agency is currently working towards the establishment of an agency-wide policy on gender. The TC programme will serve as a pilot entry point for bringing a gender perspective into the Agency's substantive programmes. The TC Department adopted in July 2006 an interim gender policy to this effect and is currently implementing an action plan aimed at including gender considerations in the planning, implementation and formulation of the TC programme.

16. Another important element of the gender mainstreaming process is to increase the participation of women in the design and delivery of the TC programme. A cursory analysis of data on gender from each region shows that, when considering the total number of participants in all areas of technical cooperation, the levels for women are significantly lower (see Fig. 1). Beyond the role of women as end users and beneficiaries of the Agency's programmes and services, mainstreaming gender into the substantive work of the Agency will require an important effort on the part of the Secretariat and Member States to increase the opportunities for women to contribute to the TC programme. Further statistical information on female participation in the TC programme in 2006 is provided in Table C.4 of the Supplement to the present annual report.

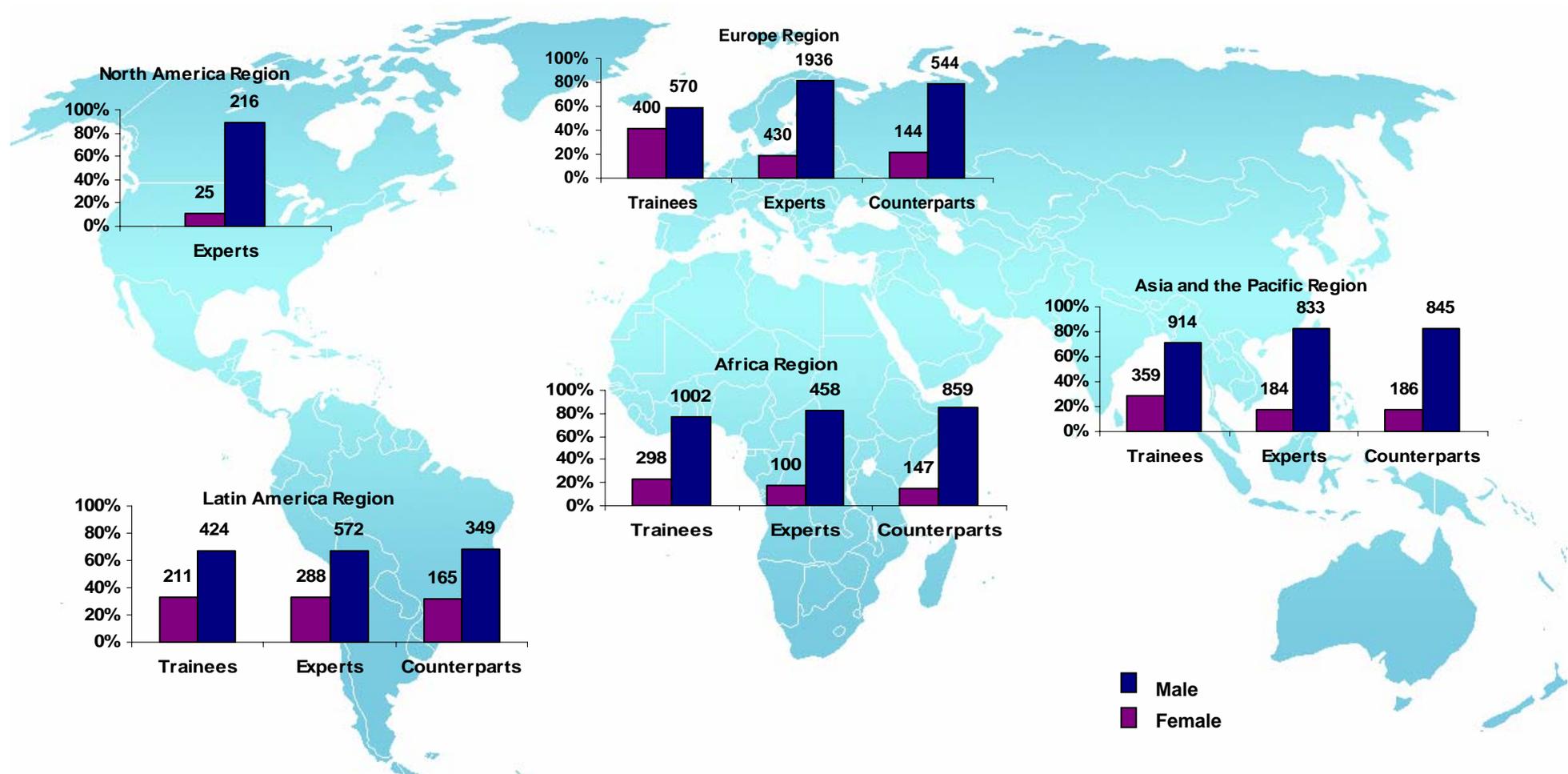


FIG. 1. Participation in the TC programme of trainees¹, experts² and counterparts³ by gender in 2006.

¹ The term 'trainees' refers to fellows, scientific visitors, and training course participants.

² The term 'experts' refers to international experts, lecturers, national consultants and meeting participants.

³ Counterparts who were active in TC projects in 2006.

A.3. Strengthening the Capacity of Institutions Using Nuclear Technology to Become Self-Reliant⁹

17. The Agency has continued to promote self-reliance and sustainability of national nuclear institutions (NNIs) in order to, inter alia, reduce overall dependence upon central government funding by increasing self-generated revenue from services and products.

18. In Africa, to support capacity building efforts across the region, emphasis was placed on the use of AFRA¹⁰ Regional Designated Centres, especially to help NNIs in promoting peaceful applications of nuclear techniques in the areas of non-destructive testing, mutation breeding and biotechnology, radiation oncology and medical physics, radioactive waste management, radioisotope technology, radiation processing and maintenance of scientific equipment.

19. In Latin America, efforts continued in 2006 to strengthen the use of the 35 ARCAL Designated Centres with a view to utilizing the institutional capacity of the region and to furthering the sustainability of these centres. This included: the Instituto de Nutrición y Tecnología de Alimentos – INTA, in Santiago, Chile, which provided training under ARCAL projects in the application of stable isotope methods to determine the body composition and energy expenditure of children and in the prevention and control of iron deficiency anaemia; the Environmental Monitoring Laboratory at the National Nuclear Research Institute, in Mexico, which provided support for training and the installation of equipment in several Central American countries on assessment of atmospheric pollution; and in Havana, Cuba, the Centro de Reparación, Mantenimiento e Instalación de Instrumentación Nuclear, which provided support for the repair and maintenance of nuclear instrumentation in the region.

20. In Asia and the Pacific, the NNIs have started developing strategic plans for sustainability on the basis of the recommendations and guidelines drawn up by the Expert Advisory Group Meeting on Strategic Planning for Sustainable National Nuclear Institutions, that was held in Sydney, Australia in May 2006. For example, within the context of project RAS0032, several NNIs in the region carried out structural changes in their organization to enhance sustainability, including the Malaysian Institute of Nuclear Technology Research, the recently established Thailand Institute of Nuclear Technology and the Vietnam Atomic Energy Commission. Training in business planning provided in the framework of this project has helped gain support for new facilities and projects in several countries, such as in the Philippines Nuclear Research Institute and the Atomic Energy Authority of Sri Lanka.

21. During 2006, significant activities took place in Central and Eastern Europe through RER0023 to help NNIs improve their management practices and increase their capacity to generate revenues. As a result of the project, there is increased awareness of the challenges facing NNIs. For the first time, a training course on basic business skills for managers and senior scientists of nuclear NNIs from Kazakhstan, Ukraine and Uzbekistan was held in Astana, Kazakhstan. Under the project, the Institute for Nuclear Research and Nuclear Energy (Bulgaria) enhanced the business development unit and signed a cooperation agreement with the Nuclear Physics Institute, Rez (Czech Republic) in July 2006. Another training course was organized in Montenegro to improve the capability of accredited laboratories to generate income by enlarging their market segment by highlighting the service

⁹ Section A.3 responds to operative paragraphs 4, 17, 21 and 24 of GC(50)/RES/12 on: supporting regional resource centres, specific, measurable, achievable, realistic and timely regional partnership mechanisms (SMART); technical cooperation among developing countries (TCDC); managing agricultural and industrial wastes and improving water security with the use of isotopes; promoting self-reliance and sustainability; and supporting programmes such as the WNU Summer Institute.

¹⁰ African Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology.

provider-customer relationship. The project provided support to the Commercial Department of the Rudjer Boskovic Institute of Croatia on enhancing their intellectual property rights policy. In Albania, a first strategic plan and a policy on pricing for services for the private sector were prepared at the Institute of Nuclear Physics.

22. Of the 32 Member States in the Europe region that have national TC programmes, 14 are members of the European Union (EU). The 10 Member States that joined the EU in 2004 made a unanimous declaration to the Secretariat that they intended to continue participating in the Agency TC programme, with a view to becoming net contributors to this programme. This voluntary action resulted in a reduction of about 20% in national projects for EU States, thus increasing significantly the funding amount available for programme purposes in the other countries of the Europe region. A trend which is emerging clearly is that the primary role of these Member States in the TC programme is shifting from national projects to regional projects in which these countries serve as Lead Country Coordinators. These EU Member States also provide experts, supply equipment and host fellowships. As they are located in the same region and have undergone similar national transformations in recent years, these contributor Member States can represent a model for building specific, measurable, achievable, realistic and timely regional partnerships.

A.3.1. Building Human Resources for Nuclear Technology

23. In 2006, the issues of human resource development and knowledge management received particular attention, notably under the AFRA programme. African specialists and consultants prepared guidelines to help Member States develop and implement national strategies for the development of human resources and management of nuclear knowledge, including a higher education network (AFRA-NEST) in nuclear science and technology. This initiative included the design and approval of an African master's degree curriculum in the field of nuclear science and technology, which will be promoted through the AFRA-NEST network.

24. The focus of the AFRA project RAF0020, 'ICT-based Training/learning to Strengthen Training Capacity', was on training nuclear engineers, computer scientists and technicians in nuclear science and technology to be applied in agriculture, human health, environmental monitoring, management of water resources, nuclear instrumentation and other nuclear and related fields. This effort was supplemented by the provision of ICT telecentres to Ethiopia, Mali, United Republic of Tanzania and Uganda.

A.3.2. Promoting Technical Cooperation among Developing Countries

25. Further to the Strategic Alliance that was established between the Agency and ARCAL in 2005, the Agency and Member States prepared an Action Plan with two primary objectives: to optimize the management and strengthen the institutional framework of ARCAL. In the area of management, the Board of ARCAL Representatives initiated the preparation of a Regional Strategic Profile for Latin America and the Caribbean to be drawn up jointly with the Agency in 2007. The sectors that were prioritized by the Agency and the Member States in the region include food safety, human health, environment, energy and industry and radiation safety.

26. The coordination meeting that was held in October in Vienna for Member States in Latin America and the Caribbean provided for the first time a forum for discussion among National Liaison Officers, ARCAL National Coordinators, regional governmental organizations and representatives of the Permanent Missions of the region's Member States. The main objective of this gathering was to harmonize the vision of the Member States and the Secretariat concerning the Agency TC Strategy and to establish a strategic action plan for improving the effectiveness of the Agency's TC programme in the region.

27. In Africa, the TC programme continued to support a strong component of TCDC. Two additional Regional Designated Centres have been recognized by AFRA Member States in 2006 in the fields of cancer management and dosimetry. To date, ten Regional Centres have been designated and empowered by AFRA Member States to support capacity building in the region and to help NNIs in promoting peaceful applications of nuclear techniques in the areas of industrial quality control, crop improvement, cancer management, radioactive waste management, radiation processing and maintenance of scientific equipment.

28. In the Asia and the Pacific region, regional projects, including those under the Co-operative Agreement for Arab States in Asia for Research, Development and Training related to Nuclear Science and Technology (ARASIA) and Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (RCA), continued to be the primary mechanism for TCDC. Beyond the traditional TCDC channel of hosting regional events and providing fellowship training, certain Member States increasingly provided nuclear analytical services to Member States that did not have facilities for these purposes.

A.3.3. Building Capacity and Preserving Nuclear Knowledge

29. Nuclear power and non-power nuclear applications play an important role in the socioeconomic development of the European region. At the same time, the loss of employees (due to retirement and other reasons) who possess knowledge that is critical to operations or safety poses an internal threat to the safety and operation of nuclear power plants and other nuclear facilities. In this context, nuclear knowledge management aims to preserve and enhance the scientific, technical and legal knowledge, competence and skills that are required for the efficient application of nuclear energy and nuclear technologies. Regional Project RER0027 is helping Member States to establish policies and strategies to preserve and further enhance knowledge, competence and expertise and to provide practical guidance for the application of knowledge management in governmental organizations, industry and academia.

30. A further contribution of the Agency to international efforts aimed at preserving nuclear knowledge is its sponsorship of the World Nuclear University (WNU). The Agency is one of four leading international nuclear institutions that supported the founding of the WNU in September 2003¹¹. An important WNU activity that is relevant to the Agency's work is the Summer Institute, which was held for the first time in 2005. The purpose of the Summer Institute is to provide specialized training in a broad range of topics in nuclear technology and policies to graduate students and young professionals with the potential of becoming future leaders in the nuclear field. In 2006 the Agency funded 21 participants from 15 Member States in all regions to enable them to attend courses at the WNU Summer Institute in Sweden and France. An important outcome of this programme of courses is the establishment of an international network of junior specialists who are committed to contributing to the peaceful uses of nuclear technology.

¹¹ The other organizations are the Nuclear Energy Agency of the OECD, World Nuclear Association and World Association of Nuclear Operators.

A.4. Mobilizing Resources for the TC Programme

A.4.1. Summary of Financial Indicators for 2006

31. The resources made available to the TC programme and the delivery of this programme both showed significant upward trends in 2006. As can be seen in Fig. 2, financially the implementation of the programme exceeded new resources for the first time since 2003, although the new resources were also the highest ever.

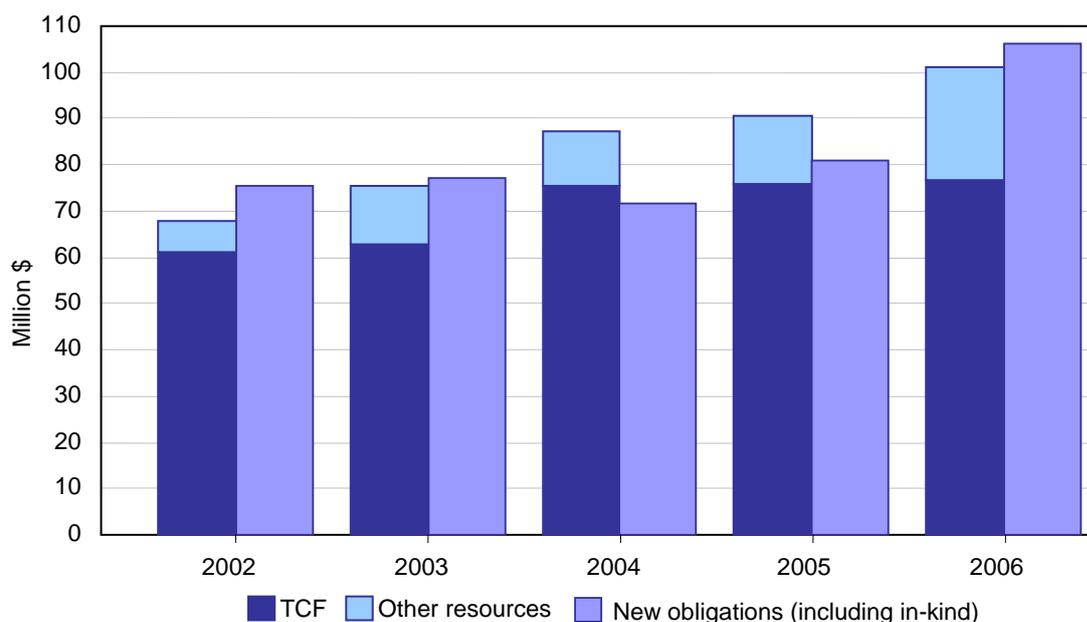


FIG. 2. New TC resources and new obligations between 2002 and 2006.

A.4.2. Technical Cooperation Fund¹²

32. Contributions to the Technical Cooperation Fund (TCF) reached a record level in 2006. The rate of attainment¹³ (currently set at 90%) was exceeded prior to the end of the year, reaching 93% by 31 December 2006. The rate of attainment has also been reached with regard to payments against the 2005 TCF target, but this was only accomplished in 2006. This demonstrates an increased commitment on the part of a larger number of Member States to pay their full share of the TCF target. While a number of factors appear to be playing a role in this increased willingness on the part of Member States to contribute to the TC programme, it can be seen as evidence of the importance that Member States place on applying nuclear techniques to solve development problems and the role of the TC programme in promoting the use of these techniques.

¹² Section A.4.2 responds to operative paragraphs 2, 5, 6 and 10 of GC(50)/RES/12 on timely payment of TCF targets, payment of APC arrears, ensuring that resources are sufficient, assured and predictable, and application of due account.

¹³ In 2000, the General Conference established the rate of attainment as a mechanism designed to encourage payment by Member States of their contributions to the Technical Cooperation Fund (TCF) (GC/44/RES/8). The rate of attainment is the portion of the TCF target that has been paid. As payments can continue to be made after the year in question, the rate of attainment for a specific target year can increase over time.

Ensuring that Resources are Sufficient, Assured and Predictable

33. While financial resources to support the TC programme have been growing, it must also be pointed out that there still remains considerable uncertainty as to the level of funding that will be available for the implementation of the TC programme in any year. General Conference resolution GC(50)RES/12 requested the Secretariat to explore means to ensure that resources for the TC programme were sufficient, assured and predictable. The fact that a number of Footnote-a/ projects must be approved each year indicates that additional resources would be required to implement all approved projects. The terms “assured” and “predictable” highlight the problems which the Secretariat continually faces in planning and implementing a programme of multi-year projects that is based on expected resources from voluntary contributions. A number of suggestions have been put forward in an attempt to make the TCF more predictable and assured, and over the years, the Board of Governors has established various working groups to review these issues, including the advantages and disadvantages of incorporating the TCF into the Regular Budget¹⁴.

34. In the final analysis, resources only become more assured and predictable when Member States pledge and pay their contributions to the TCF regularly and on time. As noted above, the total amount of contributions has been increasing steadily for the past several years. Every year Secretariat staff meet during the General Conference with representatives of those Member States that do not regularly pay their full TCF target share. It appears that these efforts are contributing to the more substantial share of payments that have been observed in recent years, and the Secretariat will continue arranging these consultations.

Payment of APC Arrears and Application of Due Account

35. As of the end of 2006, a total of \$3.8 million in arrears of Assessed Programme Costs (APCs) remained unpaid, some of which date back to 1984. This amount was reduced from \$4.5 million at the end of 2005. Of the amount left, just over \$1.1 million will be paid through payment plans established by six Member States. The remaining \$2.7 million is due from 22 Member States. While the payment of arrears by some Member States is encouraging, those Member States that have not yet set up payment plans have consistently been urged to do so in order to finally eliminate all of these unpaid obligations.

36. The purpose of due account, as outlined in document GOV/INF/2005/5, is: “to increase the level of contributions to the Technical Co-operation Fund (TCF) and to improve the record of payment of Assessed Programme Costs (APC) by according preference in terms of TCF allocations and procurement to those Member States with a good record of financial support to the TC programme.” In General Conference resolution GC(50)/RES/12, Member States requested information from the Secretariat on its “efforts to apply [the due account] mechanism to all Member States equally and efficiently”.

37. As mandated by the Board of Governors, the Secretariat applies this mechanism judiciously and cautiously, as well as in a fair and equitable manner, to all Member States. Member States with excellent payment records have had their core programmes increased, while Member States with poor payment records have had their programmes reduced through the application of the due account mechanism. In applying due account to procurement, however, the Secretariat must comply with the Agency’s Financial Rules and Regulations, including the requirement for international competitive bidding. Moreover, care is taken that the application of due account to procurement does not disadvantage the country where a TC project is being carried out.

¹⁴ See GOV/2940, The Financing of Technical Assistance, Report by the Chairman of the Informal Working Group (1997). This report contains an opinion of the Legal Division, which states that it would require an amendment to Article XIV of the Statute to include the TCF or part of the TCF in the Regular Budget of the Agency.

38. For the past several biennia, the calculation and application of “due account” has been based on the payment of the TCF target share and the outstanding APCs for the preceding five years¹⁵. Following the suspension of APCs in 2004 and replacement by National Participation Costs (NPCs), the APC arrears would not be part of the next due account calculations. Thus, the Secretariat may have to modify the application of the mechanism in order to ensure payment of the outstanding APCs. This is particularly important in light of the External Auditors’ repeated recommendations, reiterated in this year’s Audit Report that “the Secretariat should intensify its efforts to call on Member States to meet their [APC] obligations.”¹⁶

A.4.3. Payment of National Participation Costs¹⁷

39. In 2006 the Secretariat reported to the Board on its review of the initial implementation of NPCs, which had been applied for the first time to the 2005–2006 TC programme¹⁸. As that review showed, 83 countries had national programmes with new projects that were scheduled to start in January 2005 but could only begin implementation after payment of the minimum NPCs (2.5% of the total core budget of new projects). At the end of the first quarter, 29 countries had still not paid the minimum; at the end of the second quarter 11 countries had still not paid; at the end of the third quarter four countries had not paid; and at the end of 2005 three countries had still not paid the minimum amount. These three countries paid the minimum NPCs in 2006. The delays in NPC payments held up the commencement of the programmes for those countries and meant that the funds earmarked for those projects could not be utilized, which has a negative impact on the implementation of the entire programme.

40. In December 2006 the Secretariat sent letters of invoice for NPCs to 89 Member States with reference to the TC programme for the 2007–2008 biennium. The Secretariat makes every effort to confirm deposits of NPC payments as quickly as possible — as soon as the minimum NPC payments are received, the projects are made operational. Until the new projects are operational, the Secretariat takes whatever actions it can to begin planning the implementation of the project in accordance with the agreed work plan. However, in accordance with the rules applicable to NPCs, contracts that result in financial obligations may only be signed when the project is fully funded. Thus, the Secretariat must exercise caution to assure that these guidelines are followed strictly.

41. The rate of payment of minimum NPCs in 2007 shows that Member States are evidently experiencing the same difficulties in making timely payments as in 2005. By the end of the first quarter, 34 Member States had not paid the minimum amount required to begin implementing their new national programmes. This meant that projects with 2007 TCF budgets totalling \$9.5 million had not been started at that time. The fact that significantly more countries had not paid the minimum in 2007 than in 2005 is a cause for concern.

¹⁵ The due account mechanism was established to encourage Member State contributions to the TC Fund by rewarding countries that are excellent payers. See GOV/OR.881; GC(39)/RES/14; GC(39)/DEC/12; GOV/OR.1097 and GOV/INF/2005/5.

¹⁶ See GOV/2007/13, The Agency’s Accounts for 2006, paragraphs 230–232.

¹⁷ Section A.4.3 responds to operative paragraph 8 of GC(50)/RES/12.

¹⁸ See GOV/INF/2006/8, Review of the Initial Implementation of National Participation Costs.

A.4.4. Extrabudgetary Contributions¹⁹

42. Extrabudgetary contributions again reached a new high in 2006, with a total of \$22.3 million made available by Member States, international organizations, and other UN system entities to support projects under the TC programme. One of the main reasons for the increase was the growth in Government Cost Sharing funds, given by Member States to support projects in their own countries. These amounted to \$9.4 million, up from \$5.4 million in 2005. Other major contributions were provided for the conversion of research reactors from high enriched to low enriched uranium fuel (\$5.5 million) and research reactor decommissioning (\$2.2 million). The total also included some \$2.2 million from the Nuclear Security Fund (NSF), provided to support nuclear security activities implemented under the TC programme, compared with \$0.9 million from the NSF in 2005.

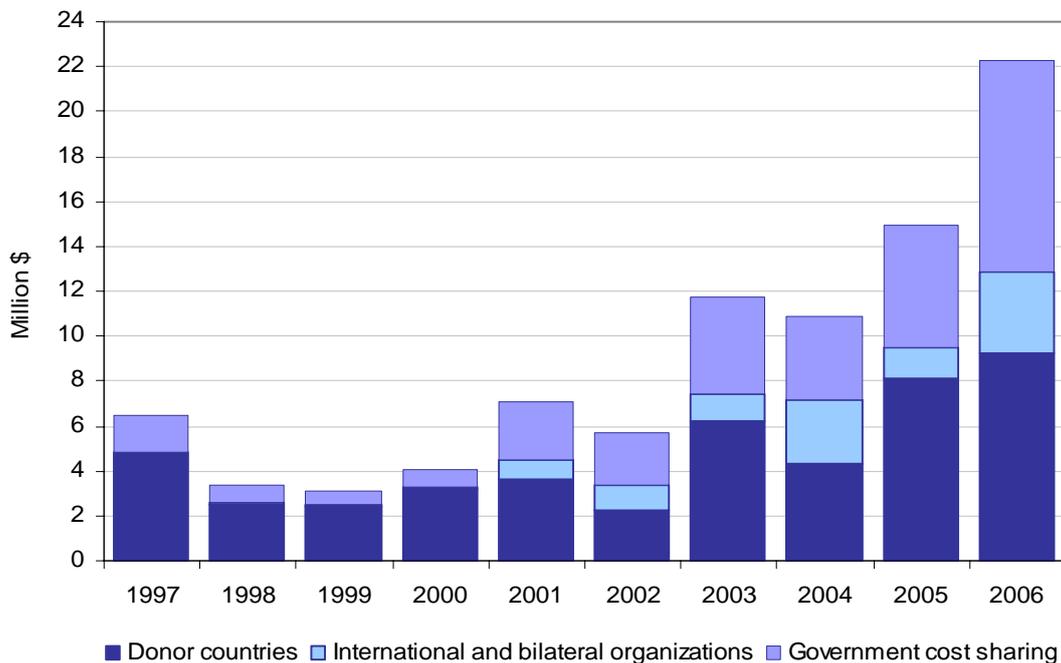


FIG. 3. New extrabudgetary resources between 1997 and 2006.

In-kind Contributions

43. In-kind contributions to the TC Programme totalling \$1.9 million were provided by 74 Member States and 8 international organizations in 2006. The contributions represent the following types of support:

- expert and training course lecturer services fully or partially cost-free in countries other than their own;
- meeting and training course participants from countries other than their own;
- fully or partially cost-free fellowship training (Type II fellowships); and
- equipment that is received by another Member State.

¹⁹ Section A.4.4 responds to operative paragraphs 9 and 14 of GC(50)/RES/12 on a proactive role in seeking funding for Footnote-a/ projects and the possibility of paying NPCs in kind.

44. The assistance included in this report as in-kind contributions represents to a large extent “savings” to TC programme funds. Costs that normally would need to be paid from TC financial resources (such as an expert’s fee, a lecturer’s daily subsistence allowance, or a fellow’s travel costs) can be identified and valued with some certainty. However, it has been frequently pointed out that Member States make a number of other non-cash contributions to facilitate and support the TC programme, without which the programme would suffer. Therefore, some Member States have requested that these other types of support also be recorded as “in-kind contributions”. This raises the problem of fairly assessing their value. The issue of in-kind contributions is being addressed in the discussions currently under way throughout the UN system on the International Public Sector Accounting Standards (IPSAS). The Secretariat will remain seized of the issue and continue to look for efficient and cost effective ways of accurately valuing in-kind contributions.

Resource Mobilization

45. The continuing growth of the TC programme, both in terms of new Member States and the increasing demand for technical cooperation activities, calls for new and proactive approaches to resource mobilization. Successful resource mobilization depends on high quality projects that are relevant to donor interests along with expert knowledge and skills. The quality of the TC programme has greatly benefited from the new Programme Cycle Management Framework (PCMF) approach to project design and planning, and the new CPF guidelines call for identification of funding opportunities as part of project conceptualization. Thus, the elements for systematic and successful resource mobilization are in place.

A.5. Enhancing the Effectiveness and Efficiency of the TC Programme²⁰

A.5.1. Programme Delivery

46. In terms of financial and non-financial indicators, delivery of the TC programme grew significantly over 2005 levels. Net new obligations, which measure in financial terms the amount of assistance put in motion during the year, rose to \$104.5 million, up more than 30% over the 2005 level of \$79.6 million. Disbursements in 2006 rose to \$97.6 million, compared with \$73.6 million in 2005.

47. In the “Programme at a Glance” section of this report and the regional summaries included in Part B, graphic presentations of financial delivery as measured by disbursements relating to the Agency’s Programme are included. These clearly reflect the diversity of the TC programme as a whole and the varying areas of emphasis in the individual regions.

48. With specific reference to the TCF, disbursements totalled \$78.2 million, (compared with \$64.7 million in 2005) and net new obligations were \$83.1 million, up from \$68.7 million in 2005. These record net new obligations, despite the record new resources, led to a decrease in the unobligated balance at 31 December. Table 1 below provides a breakdown of the types of resources making up the unobligated balance of the TCF as well as a comparison with the previous four years.

²⁰ Section A.5 responds to operative paragraphs 7 and 15 of GC(50)/RES/12 on: enhancing the effectiveness and efficiency of the TC programme; and strengthening TC activities through the development of effective programmes with well defined outcomes.

Table 1. Unobligated Balance of the Technical Cooperation Fund and Comparison with Previous Years (in US dollars)

Description	2002	2003	2004	2005	2006
Total unobligated balance	9 968 000	6 408 000	18 865 000	25 954 000	19 626 000
Pledges not yet paid	(2 882 000)	(3 298 949)	(2 484 331)	(1 638 570)	(1 642 125)
Non-convertible currencies that cannot be utilized	(1 162 000)	(1 171 466)	(12 612)	(12 004)	(12 090)
Currencies that are difficult to convert and can only be utilized slowly	(4 382 000)	(4 280 648)	(6 179 396)	(7 442 196)	(8 681 250)
Resources that can be used for TC programme obligations	1 542 000	(2 343 062)	10 188 661	16 861 230	9 290 535

49. As can be seen, the useable unobligated balance for the TCF is down from the record high level reached in 2005. While this would still appear to be a significant amount, the Secretariat considers it prudent to have on hand at year end an amount equivalent to six to eight weeks of new obligations to ensure that there are no cash flow difficulties. This mechanism is similar to the Working Capital Fund for the Regular Budget. With new obligations for the TCF in excess of \$83 million during 2006, this level is quite appropriate.

Non-financial Indicators

50. There are many non-financial statistical indicators by which the programme can be measured and almost all of those show an increase over 2005 levels. Table 2, which highlights some of the financial information provided above, also provides a summary of these indicators. A more detailed presentation of the delivery during 2006, as shown by both financial and non-financial indicators, can be found in the Supplement to this annual report.

Table 2. Delivery of Outputs: 2005 and 2006 (in US dollars)

Indicator	2005	2006	Increment over 2005
Adjusted Programme	115 976 213	138 896 860	22 920 647
Net New Obligations	79 590 436	104 469 699	24 879 263
Implementation Rate	68.6%	75.2%	
Disbursements (including In-kind)	73 556 997	97 621 437	24 064 440
International Expert and Lecturer Assignments	2784	3041	257
Meeting/Workshop Participants	3202	3229	27
Fellowships and Scientific Visitors in the Field	1436	1697	261
Training Course Participants	1574	2477	903
Training Courses	104	172	68
Purchase Orders Placed	2991	3185	262
Subcontracts Issued	8	2	-6

A.5.2. Measuring TC against Agreed Performance Indicators

51. The Board of Governors report on the TC Strategy that was issued in 2002²¹ provided, inter alia, that the performance of the TC Programme would be assessed for the period between 2002 and 2007. This report spelled out which strategic objectives would be relevant for planning the future of the TC Programme. These were: the ‘central criterion’, strategic partnerships, funding Technical Cooperation, and sustainability.

52. The Secretariat carried out a review of the TC programme in relation to the performance indicators that are provided in the TC Strategy²², which was submitted to the Standing Advisory Group on Technical Assistance and Cooperation. The lessons learned from this review will be essential for assessing the challenges and opportunities that the TC programme will likely encounter in the next five years. Progress against the performance indicators is summarized below.

Central Criterion

53. The objective of the ‘central criterion’ is to produce sustainable benefits within the framework of national development plans. The ‘central criterion’ seeks to establish strong government commitment as a means of sustaining project benefits — it has been very well accepted by Member States. Performance Indicator 1 required that at least 70% of the TC projects meet the ‘central criterion’. Analysis of the available data shows that almost all approved projects from the TC cycle 2005–2006 onwards meet this indicator. The percentages of approved projects that met the central criterion for the

²¹ See Footnote 4.

²² Third Meeting of the Fourth Standing Advisory Group on Technical Assistance and Cooperation (SAGTAC): Agenda Item 1, Developing a Vision for the TCP: New Challenges and Opportunities, A Progress Report on Strategic Objectives, 19–23 February 2007.

2007–2008 cycle are: Africa, 94.0%; Asia and the Pacific, 100.0%; Europe, 75.0% fully and 25.0% partially and Latin America, 94.8%. This performance indicator has thus been exceeded.

54. Performance Indicator 2 required that at least 80% of recipient States have signed Country Programme Frameworks (CPFs) by 2007. The CPF has emerged as a principal planning tool for identifying Member State priorities and for enhancing the impact of the TC Programme. The number of States that have CPFs that have been signed is 78, while another 22 are at the draft stage, bringing the total to 100. Once these CPFs have been signed, the target will have been met.

Strategic Partnerships

55. The Agency acknowledges the vital tenets for forging mutually beneficial, workable partnerships. In its efforts to cultivate these relationships, the major considerations have been to build partnerships that contribute to elevating the profile of the TC programme and to achieve cost effective synergy by combining nuclear and non-nuclear technologies.

56. Performance Indicator 1 required that the Agency conclude new partnerships with development organizations by 2007. Between 2002 and 2006, 20 new agreements with traditional partners (extension of previous agreements and new partnerships) and with non-traditional partners including Intergovernmental Organizations, Non-Governmental Organizations and private sector were concluded. Therefore, this performance indicator has been met. For additional information on partnerships, see subsection A.2.1.

Funding of Technical Cooperation

57. For this aspect, the objective of the TC Strategy is to increase the level of funding for technical cooperation activities, particularly from non-traditional sources, and to increase the number of opportunities for “parallel funding” to help resolve development problems.

58. Performance Indicator 1 required that an increasing number of countries meet their target share of the TCF. As illustrated in Section A.4.1, funding levels have risen consistently over the past five years, and in particular in 2006. As shown in the review done in 2006, 87 Member States had improved their payments to the TC Fund (TCF) target share. It is difficult to ascribe the increased willingness of Member States to pay their TCF target to a single cause. Some of the factors that contribute to the increased commitment would seem to be: the continuing dialogue of the Secretariat with Member States on the importance of paying in full and on time, the efforts of the Board of Governors Working Group on the TCF in 2006 to encourage Member States to increase their level of payments, the effects of the introduction of the rate of attainment mechanism in 2000 and the impact of due account.

59. Performance Indicator 2 required an increase of 25% in extrabudgetary funding for the TC programme by 2007. Extrabudgetary contributions have grown significantly in the period — from \$5.7 million in 2002 to \$22.3 million in 2006. Thus, this performance indicator has been dramatically exceeded. Performance Indicator 3 required leveraged parallel funding for an increased number of projects. Owing to data collection limitations, there are very few recorded cases of parallel funding. The Secretariat considers that it is more realistic to pursue this aim as part of the strategic objective on partnership mentioned above, rather than as a distinct activity.

60. Performance Indicator 4 required that agreements be concluded with at least three non-traditional partners by 2007. Partnerships have been developed with a number of organizations, including the European Bank for Reconstruction and Development, Asian Development Bank, Global Environment Facility, the United Nations Trust Fund for Human Security, the UN Fund for International Partnership and the Global Threat Reduction Initiative, resulting in increased funding for the programme. This performance indicator has also been met, and efforts are continuing to expand partnerships with similar funding sources.

Sustainability

61. This aspect is understood as strengthening the capacity of institutions in Member States that use nuclear techniques to become technically and financially self-reliant. The expected outcomes are that an increasing number of Member State institutions (i) provide services nationally and regionally after having benefited from the Agency's TC programme and (ii) have strategies and actions in place for revenue generation.

62. Facilitating self-reliance by national nuclear institutions in Member States is a fundamental and ongoing priority of the TC programme. Performance Indicator 1 for sustainability required that at least 10% of the NNIs achieve significant revenue generation from providing goods and services to both the public and private sectors. Section A.3 above, Strengthening the Capacity of Institutions Using Nuclear Technology to Become Self-Reliant, describes the progress made by NNIs in becoming more self-reliant and generating revenues. The results of the performance review showed that 60 countries had institutions with significant revenue generation; thus the performance indicator has been exceeded.

63. Revenue generation is only one indicator of sustainability. Sustainability means that activities can continue to contribute to achieving developmental goals without Agency support. In order to adequately monitor and report on programme sustainability, performance indicators need to be developed that consider not only financial aspects, but also the extent to which the results have reached the intended beneficiaries and continue after project completion.

A.5.3. The Programme Cycle Management Framework²³

64. The TC programme for the 2007–2008 cycle was developed and finalized using the Programme Cycle Management Framework (PCMF). The Framework is supported by a dedicated website, which facilitates real-time collaboration among stakeholders in the Member States and the Secretariat through online interaction.

65. In 2005, Member States submitted their project ideas for inclusion into the TC programme as national and regional project concepts using the PCMF website. These project concepts were assessed in the Secretariat by both the TC Department and the technical departments to determine their technical feasibility, their consistency with national development priorities, the commitment of the Government and the capability of the proposed counterparts, thus ensuring their suitability for inclusion in the TC programme. Project concepts that had been pre-qualified on the basis of these criteria were developed into projects in 2006.

66. During the project design and approval phase, project stakeholders used the PCMF website to define all project elements, in accordance with the Logical Framework Matrix methodology. Complete individual project designs were created collaboratively on the website, with all project team members (Counterparts, National Liaison Officers, and Secretariat staff) having access to their projects. This interactive cooperation by all members of the project team facilitated the development of high quality projects.

67. After the project designs were agreed by the project teams, they were approved electronically by the designated authorities. The Member State programmes were reviewed within the Secretariat, and due account applied to the TC programme. Thereafter, the TC programme was submitted in November 2006 to the Technical Assistance and Cooperation Committee for review and recommendation to the Board of Governors for approval.

²³ Section A.5.3 responds to operative paragraph 23 of GC(50)/RES/12 on implementation of the PCMF.

68. In order to expand the capabilities of the PCMF tool and render it more user friendly, the PCMF website is being continually enhanced in the light of experience gained and user feedback. In particular, Phase I, which is used to submit and assess project concepts, has been thoroughly revised and an online user manual has been created, which is accessible in the form of “Help” files. The new version of Phase I was released at the beginning of April 2007 for Member States to submit concepts for the 2009–2011 TC programme cycle, which will exceptionally span three years instead of two.

A.5.4. Problems Encountered in the Provision of Specialized Equipment to Member States

69. The supply to Member States of specialized equipment that contained radioactive sources for industrial or medical applications continued to present challenges to the Agency in 2006. At times this was due to difficulties in arranging the transport of radioactive material. In one case, the national authorities of a Member State with a large TC programme banned the entry of radioactive material through any of this country’s ports. In another country, unforeseen obstacles for the supply of radioactive sources led to a steep rise in transport and delivery costs. Additional reasons for increased delays in the delivery of equipment to Member States were tightened safety requirements in the handling of radioactive sources and specialized nuclear equipment, which multiplied project costs and unravelled schedules, and shifts in commercial practices, which sometimes drastically affected the availability of specific products or lines of equipment. These logistical and financial hurdles have called for additional efforts by the Secretariat in finding alternative and satisfactory solutions for the delivery of the TC programme.

B. Programme Accomplishments during 2006

70. Part B highlights some of the achievements of the TC programme in 2006 in each of the four regions. As the regional descriptions show, the TC programme covers a wide spectrum of activities related to the safe application of nuclear technologies to promote socioeconomic development. These range from long term capacity building through fellowships and training courses in fields such as nuclear medicine or agricultural production, shorter term capacity building through 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.

71. Total disbursements under the TC programme in 2006 were \$97.6 million. Table B.3 in the Supplement to this report provides a breakdown of disbursements by Agency programme. In order to illustrate trends in Member State priorities over the past five years, the TC programme disbursements for 2006 are contrasted against those for 2002. By far the largest single sector of the TC programme in 2006 was human health, which accounted for \$27.9 million (28.6% of the programme). This follows the pattern of recent years, during which the share of human health has grown continually from \$15.8 million in 2002 (21.1%).

72. The second largest sector was nuclear science, with \$13.7 million (14.1%). This sector has grown dramatically from \$5.6 million in 2002 (7.5%). This growth can be attributed primarily to the projects for research reactor decommissioning and converting research reactors from high enriched uranium to low enriched uranium, which are financed to a large extent from extrabudgetary contributions.

73. The third largest sector was food and agriculture, with \$11.2 million (11.4%), which has decreased somewhat in financial terms over the past five years while other sectors have grown. Total disbursements in 2002 were \$12.4 million (16.6%).

74. The fourth largest sector was radiation and transport safety, with \$8.4 million. Total disbursements have grown from \$7.2 million in 2002, while the share of the programme, at 8.6%, is slightly less than 9.6%, which it was in 2002.

75. As described in the next four sections and as shown in Table B.3 in the Supplement to this report, there were considerable differences between the regions in the distribution of the 2006 TC programme. While human health represented the largest share in all four regions, the percentage varied from over 35.0% in Latin America and Africa, to 26.8% in Europe and 20.1% in Asia and the Pacific. Food and agriculture accounted for the second largest share in Africa, with 22.4%, in the Asia and the Pacific region, with 14.4%, and in Latin America with 12.6%. In Europe however, the second largest sector was nuclear science, with 25.7%. The third and fourth largest sectors were different in the four regions. In Africa, nuclear science and water resources each accounted for about 8%; in Asia and the Pacific, radiation and transport safety represented 13.8% and radioisotope production and radiation technology was 12.6%; in Europe, management of radioactive waste accounted for 12.4% and safety of nuclear installations for 7.9%; while in Latin America radioisotope production and radiation technology represented 10.2% and radiation and transport safety 8.4%.

B.1. Africa

76. In 2006, the TC programme provided support to 35 Member States in Africa. Net new obligations in 2006 reached \$26.8 million, compared with \$20.7 million in 2005. The financial implementation rate for the TC programme in the Africa region was 78.7%, compared with 77.6% in 2005. The distribution of disbursements in the region for 2006 by area of activity is shown in Fig. 4.

77. Three Country Programme Framework (CPF) documents were signed in 2006 (Botswana, Mauritius and South Africa).

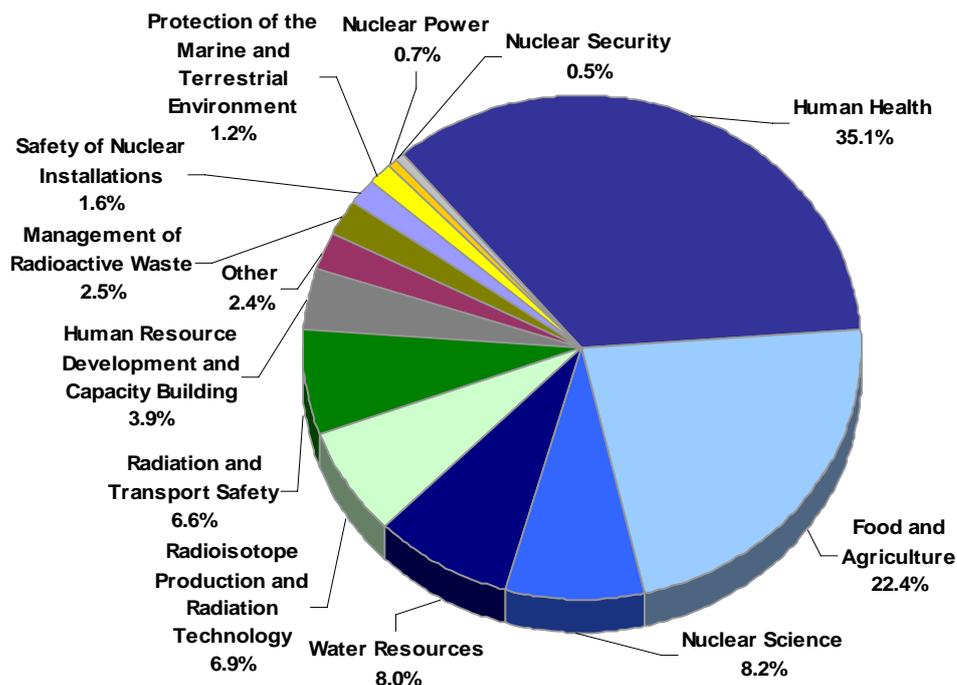


FIG. 4. Disbursements by area of activity in the Africa region for 2006.

B.1.1. Providing Support in Human Health

78. The assistance delivered to Eritrea through TC project ERI6002, 'Planning for the Establishment of a Radiotherapy Service', has resulted in the development by the Ministry of Health of a comprehensive planning blueprint for the purpose of mobilizing funding for the establishment of a national radiotherapy centre in Asmara. The OPEC Fund approved a loan agreement in the amount of \$1 million for this project. An additional loan aggregating \$4.5 million has been approved by the Arab Bank for Economic Development in Africa. Construction is expected to be under way in 2007.

79. Agency assistance delivered in the framework of TC project RAF6025, 'Detection of Drug-resistant Malaria and Tuberculosis', contributed to the upgrading of laboratory facilities and the establishment or strengthening of capacity to apply molecular techniques for the detection of disease in the participating countries (Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, Madagascar, Mali, Nigeria, South Africa, Sudan, Uganda, United Republic of Tanzania, and Zambia). The molecular techniques acquired, which relied on the use of isotopes, were central to the description and control of outbreaks of drug and multidrug resistant tuberculosis (MDR TB). They were also key to the detection and monitoring of emerging MDR TB strains. Results of these studies were used directly to influence national policies and strategies on changes in first line malarial drug use.

80. Significant progress was made in 2006 in Niger through project NER6005, which aims at establishing a radiotherapy centre in Niamey. The Government has released the required funds for the construction of the radiotherapy centre. Training of human resources is under way. Additional funding has also been secured from the Italian Government to help meet critical funding gaps.

81. As part of the activities planned under the IAEA Nobel Cancer and Nutrition Fund, a special regional event was organized in December 2006 in cooperation with the Government of South Africa and a number of regional and international organizations. The event provided an appropriate forum to address the issue of the development of human resources in radiation oncology and to lay the groundwork for an enhanced effort in training across the region of Africa. This effort will rely on the Regional Cancer Training Networks of the Programme of Action for Cancer Therapy, which are aimed at promoting comprehensive and multidisciplinary training for all the relevant professionals that are needed for an effective and sustainable cancer control programme. Collaborative efforts are under way to establish a regional model demonstration site for the control of cancer in the United Republic of Tanzania.

B.1.2. Improving Animal Health and Promoting Livestock Production

82. The Agency provided assistance in the area of animal diseases to the Democratic Republic of Congo through TC project ZAI5014, 'Upgrading Laboratory Services for Diagnosis of Animal Diseases'. The project focused on improving the capacity of the Central Veterinary Laboratory in Kinshasa to use enzyme-linked immunosorbent assay and polymerase chain reaction technologies in a quality assured manner. These methods were applied in particular to diagnose and monitor the occurrence of African swine fever (ASF), trypanosomiasis, rift valley fever, tick-borne disease and contagious bovine pleuropneumonia (CBPP) and ruminant pests.

83. The Agency assisted Cameroon through TC project CMR5012, 'Diagnosis and Surveillance of Major Animal Diseases Using Molecular Biology Techniques', in establishing the use of molecular biology based techniques for the development of diagnostic tools and vaccines for the control of CBPP and ASF. The project contributed to the establishment of local capabilities for the production of newer diagnostics and vaccines, resulting in a markedly increased production of livestock and livestock products in Cameroon and in the subregion.

B.1.3. Improving Crop Productivity and Combating Agricultural Pests

84. Under the national project TUN5021, 'Fodder Shrubs as Feed Resources to Improve Livestock Productivity', the Agency assisted Tunisia in developing appropriate feeding strategies based on fodder shrubs and other non-conventional sources to meet feeding requirements of sheep and goats under harsh environments. The project contributed towards elucidating interactions between nutrition, reproduction and parasites in local varieties of fodder such as *Acacia cataphyll*. The results are expected to be transferred to poor farmers in arid and semi-arid regions so as to improve livestock productivity.

85. In Mauritius, the outcome of the project MAR5009, 'Integrated Diamondback Moth Control', has been a decrease in insecticide sprays in crucifer crops from an average of 15 applications per season to only four. This excellent achievement is based on an approach that involves the participation of farmers, the progressive release of parasitoids produced in greenhouse-reared moths and the restricted use of selective insecticides.

86. For several years running, the Agency has supported collaborative projects at the counterpart institution of Kenya, the Kenya Agriculture Research Institute (KARI), Njoro, which is now recognized as a national centre of competence in plant breeding. Significant progress has been achieved in Project, KEN5024, 'Crop Improvement and Management through Application of Nuclear

Biotechnology Techniques'. The mutant variety Njoro BW1 which was released in 2001 is being multiplied and distributed to farmers by KARI and its partners. The variety is also gaining significant popularity in drought prone areas. Furthermore, KARI is continually utilizing mutants (KM10, KM15 and KM21) with drought tolerance in its wheat breeding programme in order to satisfy the increasing demand for more improved wheat varieties. In addition, a new double haploid derived wheat variety (DH4) that has also been developed through Agency support is in the process of being released to farmers. National tests on this variety, which is tolerant to drought and produces high yields in dry areas of low altitude, are described as "outstanding".

B.1.4. Supporting Tsetse-Free Zones

87. A major ongoing undertaking in the region is the Southern Tsetse Eradication Project (STEP) in Ethiopia, which aims at eradicating tsetse in an area of 25 000 km². Agency assistance in support of STEP is provided under a TC project. The first two of six fly rearing insectaries of the Kaliti Tsetse Rearing and Irradiation Centre have been completed and equipped with one line of Tsetse Production Units (TPUs) each. Thanks to an extrabudgetary contribution of \$1.5 million by the USA, a further 14 lines of TPUs are being manufactured. This gives the project space to eventually increase the colony to over two million females. These will enable to breed male flies that will be sterilized with the aid of nuclear techniques and later released as part of the eradication campaign. It is foreseen that most of the remaining equipment for this facility will be purchased with a loan by the African Development Bank.

88. South Africa is investigating the feasibility of integrating the sterile insect technique (SIT) in an area-wide, integrated pest management programme in northern South Africa and a small area in southern Mozambique to create a zone free of the *Glossina brevipalpis* and *Glossina austeni* species of tsetse flies. A comprehensive technical and economic study on the various components and prerequisites for an area-wide integrated pest management approach has been implemented through TC project SAF5009.

B.1.5. Developing Sustainable Water Resources

89. In the framework of TC Project RAF8037, 'Sustainable Development and Equitable Utilization of the Common Nile Basin Water Resources', an important contribution to the understanding of the water balance of Lake Victoria has been achieved through a cooperative approach initiated by Kenya, Uganda and the United Republic of Tanzania. From 2003 to 2006, the three countries carried out several sampling campaigns on this Lake and in the surrounding areas. On the basis of the interim results of this initiative, six Nile Basin countries (Egypt, Ethiopia, Kenya, Sudan, Uganda and the United Republic of Tanzania) are working on upscaling this project: for several key areas of the Nile basin, the participating Member States seek to refine their studies further by adding groundwater aspects to planning and management activities.

90. The United Nations Development Programme Medium Sized Project on the Formulation of an Action Programme for the Integrated Management of the Shared Nubian Aquifer was officially launched in 2006, with the Agency as its Executing Agency. An implementation plan was agreed that maps out the activities to be carried out over the 30 month life of this project.

91. The Project MAG8004, 'Integration of Isotope Techniques for Ground Water Exploitation, Phase II', applied environmental isotope tracers within the framework of hydrogeological investigations in the Fianarantsoa and Toliara provinces of Madagascar in order to determine the replenishment rate and flow regime of groundwater, the quality and origin of contamination, and the vulnerability of the aquifers in these regions. This project greatly improved the capacity for efficient groundwater resource management and related policy development for the southern part of Madagascar. Building on these

achievements, the counterpart institution initiated in collaboration with the Agency a new programme for expansion of water resource management activities to the southern half of the island.

B.1.6. Raising Capabilities in Non-Destructive Testing

92. Member States in the region of Africa have embraced a regional approach to maximize scarce resources in non-destructive testing (NDT) and in this way avoid the multiplication of facilities with low national demand. Currently, on the basis of an agreement between all Member States of AFRA, a majority of Member States rely on training and certification of NDT personnel at the following regional designated centres: (1) Southern African Institute of Welding (SAIW), South Africa and (2) Technical Centre for the Mechanical and Electrical Industries (CETIME), Tunisia. The Agency provided support for several regional training courses leading to certification at Level III in which NDT practitioners from 14 Member States participated. By mid-2006, 79 new Level III certifications were awarded. As a result, the capability to train and certify NDT practitioners to Level III has been firmly established within the region.

93. With respect to achievements in NDT at the national level, assistance was granted to the Cameroon Hydrocarbon Analysis and Control Company (Hydrac) through Project CMR/8/006, 'Sustainability and Institutional Self-reliance in Non-destructive Testing Capability'. Training and certification were achieved in the five main NDT methods, and this institution is qualified as a national certification centre. The upgraded commercial and training capability in NDT has expanded the scope and magnitude of income generating activities, thereby enhancing the sustainability and self-reliance of Hydrac.

B.1.7. Upgrading Radiation Protection Infrastructure

94. In 2006, major progress was reported by several countries, including new Member States, in establishing their legislative framework, as well as in setting up or significantly strengthening regulatory bodies for the control of radiation sources. These countries include Botswana, Burkina Faso, Cameroon, Gabon, Mauritius, Niger, Nigeria, Sierra Leone and Zambia. Regulatory safety assessment, leading to the authorization of radiotherapy facilities, is in progress in Botswana, Cameroon, Nigeria and Zambia. Progress in the use of dose saving screens has been reported, in particular in the principal medical institutions in Algeria, Democratic Republic of the Congo, Morocco, Tanzania and Zimbabwe. Significant progress has been made in Algeria, Egypt, Nigeria and Tunisia in preparing national plans for response to a radiological or nuclear emergency as well as in developing practical skills and upgrading the technical capabilities of first responder teams.

B.1.8. Protecting the Marine and Terrestrial Environments

95. The regional TC project RAF7004, 'Contamination Assessment of the South Mediterranean Sea', focused on the development of a regional capability to assess radioactive and non-radioactive contamination, water and sediment dynamics in relation to the behaviour of contaminants, processes that affect the productivity of fisheries and the estimation of spatial and temporal trends in contamination of the sea. National capabilities of participating countries to assess marine pollution have been improved, as well as the monitoring capabilities and skills for assessing radioactive and non-radioactive contaminants in the marine ecosystems.

96. Under a new AFRA project entitled 'Developing Urban Zone Air Pollution Monitoring' (RAF4019), the Agency is contributing support to 17 countries in the area of harmonization of analytical procedures and methodologies. Agency assistance also focuses on training in procedures and techniques and on the provision of dedicated equipment for the collection of samples from specialized aerosol monitoring filters.

B.1.9. Enhancing Capability in Nuclear Security

97. In line with a regional strategy endorsed in July 2005 by participating Member States and the Agency, the Agency continued its assistance in the consolidation of the region's capability in nuclear security, including fostering cross-border cooperation on nuclear security issues, developing training packages for Member States, drafting legislation to help Member States build national regulatory capability in the field and strengthening coordination between the various sources of assistance. Activities undertaken jointly by the TC Department and the Office of Nuclear Security have led to the safe storage of several orphan sources and improved local conditions for handling radioactive material in a safe manner. Particular emphasis was accorded to the training of national teams that consisted of representatives of law enforcement agencies and regulatory bodies. Specific missions were fielded to help some African Member States develop national plans for handling nuclear security issues. The Nuclear Security Fund provided the financial resources for these activities.



FIG. 5. Signature of the Country Programme Framework for Botswana. From left to right: H.E. Ms. Pelonomi Venson-Moitoi, Minister of Communications, Science and Technology, H.E. Mr. Boometswe Mokgothu, Ambassador and Resident Representative, Mr. A. Boussaha, Director, Division for Africa and Dr. A.M. Cetto, Deputy Director General, Head of the Department of Technical Cooperation. (Photo: IAEA.)

B.1.10. Support for Sustainable Energy Planning and Development

98. Despite considerably large endowments of natural energy resources, energy supplies in Africa are extremely poor. Most of the population, particularly in rural areas, have little access to modern energy amenities. The Agency has been supporting interested Member States in Africa in building local capabilities for conducting energy studies for evaluating various energy options and developing national energy plans. During 2006, several countries from Africa — Algeria, Botswana, Democratic

Republic of Congo, Eritrea, Ghana, Libya, Niger, Nigeria, Sudan, United Republic of Tanzania, Zimbabwe — received support in this field under national or regional TC projects, or both.

99. Projects in support of establishing the infrastructure needed for the introduction of nuclear power for electricity or desalination purposes have been established for Algeria, Egypt, Ghana, Morocco, Nigeria and Sudan.

B.2. Asia and the Pacific

100. In 2006, the TC programme provided support to 27 Member States and one territory in Asia and the Pacific. Net new obligations in 2006 reached \$22.7 million, compared with \$18.1 million in 2005. The financial implementation rate for the TC programme in the Asia and the Pacific region was 70.9%, compared with 54.8% in 2005. The distribution of disbursements in the region for 2006 by area of activity is shown in Fig. 6.

101. Significant progress was also noted in the preparation or updating of CPFs for Bangladesh, Jordan, Saudi Arabia, Singapore, Thailand and Yemen. The CPFs for Israel and the Republic of Korea were endorsed by the Member States and the Agency.

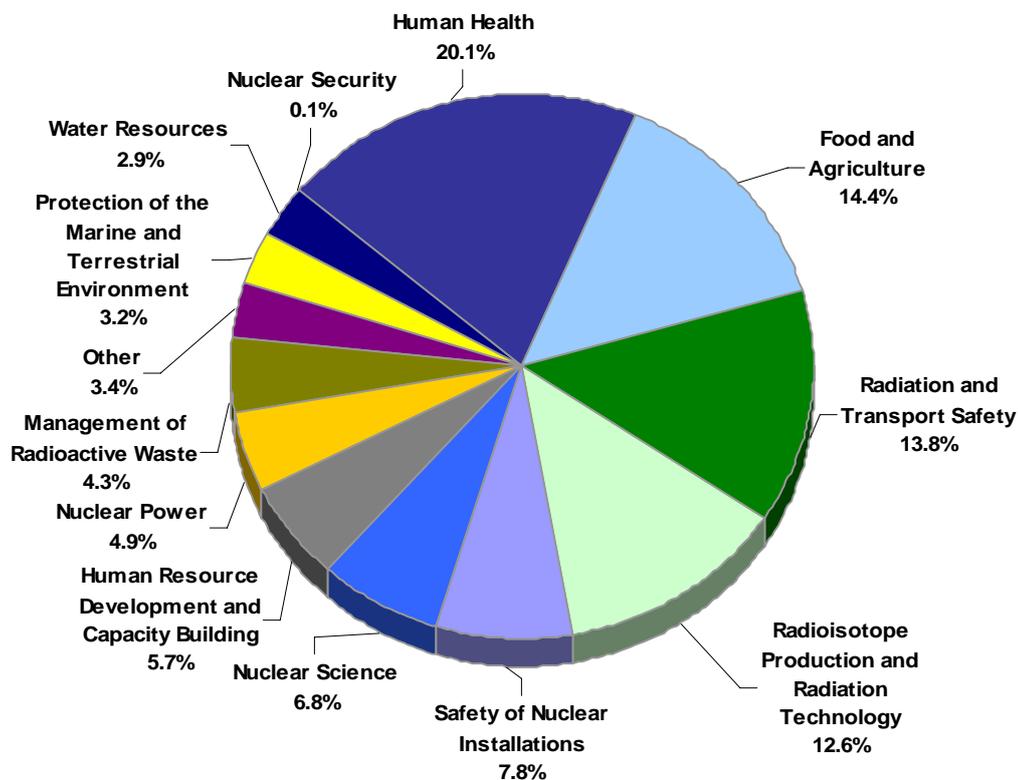


FIG. 6. Disbursements by area of activity in the Asia and the Pacific region for 2006.

B.2.1. Planning of Future Activities

102. Significant improvements were made to the design of the TC projects in the Asia and Pacific region through extensive upstream work and project formulation meetings in 2005 and 2006. The selection of national projects was based on the national priorities as defined in Country Programme Frameworks (CPF). Regional projects for Asia and the Pacific were designed following extensive consultations with Member States through regional expert meetings, with the final prioritization decided at a meeting of National Liaison Officers (NLOs). For projects conducted under the ARASIA and RCA regional agreements, priority setting was done by the relevant annual meetings of the respective national representatives. In designing the national and regional programme for 2007–2008, the Agency and Member States made efforts to ensure project quality and synergy. Both parties also

made sure that complementary aspects would be highlighted between national and regional programmes, including those under cooperative arrangements (ARASIA and RCA).

103. A special feature of the TC programme for 2007–2008 for the Asia and the Pacific region was the response to the expressed interest of several Member States in starting nuclear power programmes or in strengthening their current programmes. Several national and regional projects were formulated to address the varied needs of Member States to ensure that appropriate advice and information were provided by the Agency in all aspects and stages in the development of a nuclear power programme. This included a regional project through which the Member States received assistance that would enable them to decide on the viability of the nuclear option and would outline the key considerations and important milestones for moving towards the design and construction of the first nuclear power plant.

B.2.2. Improving the Quality of Health Services and Combating Malnutrition

104. In 2006, the Agency supported training and manpower development in the Republic of Korea, Malaysia, Thailand and Vietnam in Positron Emitting Tomography (PET). PET is an established technique for measuring important physiological and biochemical parameters in a non-invasive manner, which several countries in Asia and the Pacific have introduced in parallel with a cyclotron facility to produce the isotopes needed for PET applications.

105. Like vaccination, the screening of newborn babies for congenital defects is considered an essential part of child health care. However, many countries do not have this programme at the national level. Under the regional project RAS6043, ‘Regional Screening Network for Neonatal Hypothyroidism’, several countries have moved from pilot programmes to national programmes, with significant support from their Governments. In the Philippines, newborn screening is now covered by the national health insurance. Under this project, over a thousand babies have been diagnosed within the critical period for detection of potential hypothyroidism and saved from lifelong suffering.

106. Through an RCA project, comprehensive audits were carried out in four RCA Member States (China, Indonesia, Malaysia and Vietnam) in 2006 by Quality Assurance Teams for Radiation Oncology (QUATRO) comprising a radiation oncologist, a medical physicist, and a radiotherapy technologist. These audits were conducted according to IAEA guidelines that are aimed at assisting Member States to improve the quality of their radiotherapy services.

107. In Bangladesh, nuclear techniques were used to better understand the influence of the nutritional status of pregnant and lactating women on the weight of their infants at birth, infant growth and reproductive health. This was achieved in a community study by relating measurements of maternal body composition, such as fat mass and lean mass, to pregnancy outcomes and infant growth among women in rural areas. These TC activities were carried out in the framework of the JiVitA Project of the Bangladesh Ministry of Family Health and Welfare. JiVitA, which is funded by the U.S. Agency for International Development (USAID), is an ongoing, large scale maternal health and nutrition project under which a controlled food supplementation programme is being conducted for pregnant women and mothers of young infants. The data gathered in the TC activities were aimed at assessing the impact of nutritional interventions on maternal mortality and birth outcomes. This study was undertaken in collaboration with Johns Hopkins University (USA) and USAID.

108. Under a regional project to address micronutrient deficiencies (e.g. insufficient iron and vitamin A) study protocols for the application of isotopic techniques in different food fortification intervention programmes in China, Indonesia, Pakistan, Thailand and Vietnam were completed. Implementation work, which included the collection and analysis of samples, has started. Similar progress was also made in the cultivation of promising breeding lines of rice with a low phytic acid content, and hence, an improved micronutrient bioavailability.

B.2.3. Increasing Agricultural Productivity and the Export of Commodities

109. Further progress was made in the programme for the control of the Mediterranean fruit fly using the SIT in Israel, Jordan and the Territories under the jurisdiction of the Palestinian Authority through TC projects which benefited from the financial support of the United States Agency for International Development – Middle East Regional Cooperation. In the Arava Valley of Israel, the exports of high value vegetable commodities have increased from an estimated \$700 000 in 1999 to over \$80 million in 2006. The private sector has invested in the establishment of the first commercial facility for the mass rearing of Mediterranean fruit flies in Kibbutz Sde Eliyahu in the Bet She'an region, serving the sterile fly needs of the three parties to the venture. In the Palestinian Territories, several laboratories for the rearing of fruit flies were established in the West Bank and the Gaza Strip and local teams were trained in the implementation of area-wide Mediterranean fruit fly pest control operations that are carried out with an SIT component. Efforts in the framework of this project have allowed the region to remain free of other exotic fruit fly species, thereby protecting the local fruit and vegetable industries.

110. Food security is a high priority for developing countries: for several years, increasing crop and livestock production has been an important focus of the technical programme in the region of Asia and the Pacific. Mutation induction is one of the nuclear techniques that is widely used in increasing genetic diversity and crop improvement. Through a regional project implemented under the RCA Programme, several Member States of the region were engaged in developing new varieties of crops through radiation induced mutation breeding and through the establishment of a mutant germplasm network of promising genotypes of selected crops. New varieties of crops that were developed as a result of this project were released to farmers in 2006. These new varieties included: soybean (in India, Indonesia and Thailand), peanut (in Bangladesh), mung bean (in China and Pakistan) and sesame (in the Republic of Korea).

111. In Thailand, the assistance provided by the Agency to the Department of Agriculture in the framework of project THA5047 led to the establishment of a certification system for fruits that are irradiated for quarantine purposes. This system resulted in facilitating the export of Thai tropical fruits to international markets. As a result of this development, Thailand has submitted pest risk analyses for six Thai fruits — mango, mangosteen, litchi, longan, pineapple and rambutan — to the USA for review and approval, with a view to obtaining access to the USA market for its tropical fruits.

B.2.4. Advancing the Sustainability of Radiation Protection Infrastructure

112. Member States in the Asia and the Pacific region continued to receive support through national and regional projects aimed at establishing or upgrading radiation protection infrastructure under the five thematic safety areas. Some countries in the region, originally with no or limited infrastructure, have attained a satisfactory level in enhancing the quality and sustainability of their infrastructure to meet the major requirements of the IAEA International Basic Safety Standards for Protection Against Ionizing Radiation and for the Safety of Radiation Sources and the guidelines of the IAEA Code of Conduct on the Safety and Security of Radioactive Sources.

113. Missions that focused on appraising radiation safety and security infrastructure (RaSSIA missions) were fielded in Bangladesh, United Arab Emirates and Vietnam. In Vietnam, the mission confirmed that the regulatory programme is now at an advanced stage of development. Afghanistan initiated the process of establishing an independent regulatory infrastructure at the National Environmental Protection Agency. In 2006, the United Arab Emirates promulgated a new radiation protection law and transferred the seat of the regulatory authority from the Ministry of Energy to the Federal Environmental Agency in order to achieve administrative and executive independence.

114. In 2006, capacity building in radiation protection and the safety of radiation sources continued through two university based postgraduate educational courses (PGECs), one given in English in Malaysia and the other in Arabic in Syria. Every year, these PGECs enable some 50 junior trained graduates and professionals to be further specialized through national and regional training activities. Also in 2006, a two week regional training seminar on radiation protection in diagnostic and interventional radiology in Kuwait provided specialized training to more than 100 radiologists, technologists, interventionists and other medical technicians. Through this seminar, Kuwait also enhanced its capabilities as a centre of excellence for such activities.

B.2.5. Enhancing the Performance and Safety of Nuclear Power Plants and Other Nuclear Installations

115. In China, various TC projects have helped in improving the safety, safety culture and performance of nuclear installations and NPPs. For example, under CPR9031, guidelines on the utility requirements and on fire safety for nuclear power plants have been finalized. Under project CPR4026, a programme to manage the ageing of NPPs has been prepared. Under project CPR9030, China has been assisted in the development of a national operational assessment programme to review the operational safety of NPPs.

116. The Dalat Research reactor is the only research reactor in Vietnam — it was built in the 1970s. The control system of the reactor was put into operation in 1983. After more than 23 years of operation, there has been an observed increase in failure frequency. In the framework of Project VIE4014, the instrumentation and control system was replaced with a newer and safer module.

B.2.6. Supporting Energy Planning and Nuclear Power Development

117. Interest in the introduction of nuclear power to meet energy needs for the Asia and the Pacific region continued to grow. In 2006, the Agency organized a regional seminar in Thailand that was aimed at facilitating exchange of information on the various issues relating to the development of nuclear power for the generation of electricity and providing a platform for discussions on the future role of nuclear power. The seminar was attended by over 400 international experts and participants from the Asia and the Pacific Member States. The issues covered included costs and benefits, feasibility, safety and security, proliferation considerations and public acceptance.

118. In response to Indonesia's interest in the development of an NPP to meet the increasing electricity demands in the country, technical assistance was provided to enhance the national capacity for preparation and introduction of the first NPP. During the reporting period, efforts were focused on development of the organization structure, completion of the specification for the invitation to bid, feasibility study update and site confirmation. Progress was made for preparation and improvement of legislation that included the regulations for the licensing of nuclear reactors and guidelines for evaluating possible sites for nuclear installations.

119. In 2006, the Agency continued to assist the Atomic Energy Organization of Iran in further strengthening its owner capabilities and enhancing nuclear safety in order to meet the target dates for the commissioning and start-up, followed by safe and reliable operation of the country's first reactor in the Bushehr nuclear power plant. Agency assistance was rendered through the provision of technical advice, based on international safety codes, standards and proven practices, for the purpose of reviewing the different chapters of the facility's final safety analysis report as well as by conducting technical workshops to improve the capabilities of the counterparts in the fields of neutronic analysis, containment leakage test, implementation, commissioning, startup, and monitoring of the instrumentation and control systems in nuclear power plants (NPPs).

120. Under an RCA regional project, the Agency supported Member States in the region in conducting studies on tracing future sustainable energy paths. Likewise, ARASIA Member States received training in the use of IAEA energy planning tools.

B.2.7. Improving the Management of Nuclear Waste

121. Good progress was made in enhancing national capacities for proper management of radioactive waste. In Bangladesh, it is expected that a central radioactive waste processing and storage facility establishment will become operational as soon as it receives a licence to operate from the regulatory body. Preparation for the establishment of a near surface disposal facility in the Philippines is at an advanced stage. Candidate sites were selected and initial characterization activities were performed on one of them. A preliminary safety assessment of the facility was completed based on generic design. Regulation Part 23 of the Philippines Nuclear Research Institute, entitled Licensing Requirements for Land Disposal of Radioactive Waste, has been completed and promulgated.

122. Under project CPR4024, 'Site Characterization and Performance Assessment for Disposal of High Level Radioactive Waste', China received assistance for the development of know-how for selection of site in the Gansu Province for a geological repository for high level waste. The Agency assisted the Beijing Research Institute of Uranium Geology, in performing tasks such as site screening and hydrogeological investigations. Under project CPR4025, assistance was provided for retrieving and reconditioning of miscellaneous items of radioactive waste, which included small quantities of spent fuel from research reactors that had been stored in old facilities that did not meet current safety standards. In the framework of project CPR9032, 'Safety Criteria and Guidelines for Radioactive Waste Management' supporting regulations were developed for waste management activities, decommissioning, and disposal of radioactive waste.

B.2.8. Managing Groundwater and Environmental Pollution

123. The capabilities of applying stable isotope techniques to quantify levels of pollution and to identify the sources of pollution have been developed in the Member States through an RCA project. Through the studies that rely on the application of isotope techniques, it has been possible to confirm that the upper Dupi Tila aquifer in Bangladesh is being contaminated by the overexploitation of the Buriganga, Turag and Sitalakhya rivers. It has also been possible to establish that the arsenic enrichment of the groundwater in Datong basin in China is due to the combined effect of decomposition of organic matters in the water-soil system; dissolution, reduction and precipitation of minerals; and transformation of arsenic species in sediments and groundwater. In the Republic of Korea, the flow paths of fluoride-bearing water have been characterized on the basis of the integrated interpretation of hydrological, hydrochemical and isotopic data. In other water resource management tasks, Pakistan has completed studies in three urban areas, Lahore, Rawalpindi/Islamabad and Multan which focus primarily on the recharge mechanism and pollution of the aquifers.

124. Under a project that was carried out with extrabudgetary funds provided by Australia, Member States of the RCA received assistance for improving the capacity for the management of risks to the aquatic environment and for developing the capacity to assess, plan, and respond to pollution in coastal aquatic environments. A hydrodynamic software model for the dispersion of pollutants was developed under this project. This tool was validated in 2006 through a study carried out in Muara Karang, Jakarta Bay, Indonesia that used the technetium-99m radioisotope. Capability has been developed in the RCA Member States to use this model for the state-of-the-art probabilistic assessment of the ecological risk that is posed by radioactive and non-radioactive contaminants.



FIG. 7. Through a TC project funded in part by the United States Agency for International Development, the fruit orchards and vegetable gardens of Israel, Jordan and the Territories under the jurisdiction of the Palestinian Authority have greatly benefited from the control of the Mediterranean fruit fly by applying the sterile insect technique. In this picture, citrus workers enjoy a lighter moment outside an orange grove in the North Shuna Municipality, Jordan. (Photo: Ilan Mizrahi for the IAEA.)

B.3. Europe

125. In 2006, the TC programme provided support to 32 Member States in Europe. Net new obligations in 2006 reached \$35.6 million, compared with \$26.4 million in 2005. The financial implementation rate for the TC programme in the Europe region was 74.9%, compared with 77.1% in 2005. The distribution of disbursements in the region for 2006 by area of activity is shown in Fig. 8.

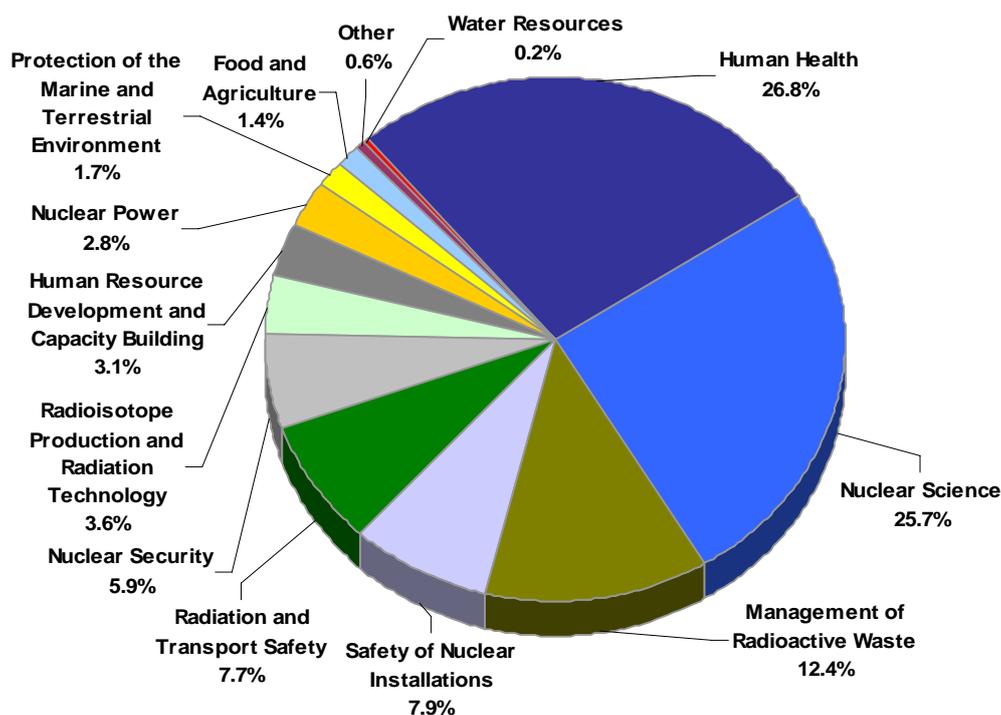


FIG. 8. Disbursements by area of activity in the Europe region for 2006.

B.3.1. Ensuring Quality in Radiation Oncology Centres: QUATRO

126. In 2005, the Agency introduced a new modality for conducting peer reviews of radiotherapy departments in Member States that participate in the TC programme: the audit missions of the Quality Assurance Team in Radiation Oncology (QUATRO). The QUATRO framework allows peer evaluation of radiation oncology centres through a comprehensive assessment of the radiotherapy programme. Any gap in the radiotherapy treatment chain or area for improvement is identified by a multidisciplinary team of experts who provide recommendations for improvements that are in line with internationally accepted standards. These recommendations are highly regarded by Member States who report back to the Agency on their implementation. In 2006, the Agency organized six QUATRO audits in the Europe region. These were conducted in Armenia, Cyprus, the Former Yugoslav Republic of Macedonia, Poland, Serbia and Slovenia. Member States may request follow-up missions as needed. For the 2007–2008 biennium, a new regional project was initiated that will be exclusively dedicated to QUATRO activities in response to the needs of Member States. This project will include the organization of advisory missions to individual oncology centres to assist in implementing specific recommendations of QUATRO audits.

B.3.2. Strengthening Capacity in Nuclear Medicine

127. In the framework of Project MOL6005, 'Development of Quality Assurance Programmes for Nuclear Medicine', Agency efforts in the Republic of Moldova centred on developing legislation for quality assurance and quality control of diagnostic equipment, staff training and the upgrading of three nuclear medicine centres. Under this project, a new gamma camera was purchased for the Scientific Institute for the Protection of Maternal and Child Health. Similarly, following a special request by the authorities, a digital gamma camera that will be used for diagnostic purposes was acquired for the Medical Diagnostic Centre of the Republic. The Government of the Republic of Moldova contributed \$100 000 toward the purchase of this machine. These steps have allowed this country to reduce the collective effective radioactive dose to the population that arises from nuclear medicine examinations and to strengthen services in national diagnostic centres.

B.3.3. Milestone Contract Awarded for Vinča Project

128. The TC project for decommissioning the Vinča research reactor in Serbia (SRB4002) passed a major milestone in Sept. 2006 with the signing of the single largest contract in the history of the TC Department. The \$9.95 million contract, that was awarded to an all-Russian consortium composed of the Sosny, Tenex, and Mayak companies, covered the repackaging and the transport back to Russia of spent fuel from the Vinča Institute of Nuclear Sciences, near Belgrade. More than 2.5 tonnes of spent research reactor fuel resides in the storage pool. Early examinations indicated that more than 30% of the fuel was leaking fission products into the spent fuel pool, posing an immediate environmental threat to Serbia and its surrounding region. The work schedule calls for completion of the shipment of fuel to Russia by June 2009.

129. Other tasks were accomplished in parallel with the preparations for repackaging. Two older storage facilities at the Vinča site had been used for collecting the radioactive waste that arose in the laboratory of the Institute. Both are more than 30 years old and in need of repair or replacement. Efforts began in 2006 to design and construct three new facilities for the storage of radioactive waste. The design effort is nearing completion. Building is planned to start soon, with the end of construction expected in 2008. Once completed, these buildings will represent the first new nuclear facilities at Vinča in over 20 years of operation. Efforts will then turn to decommissioning the older hangars.

B.3.4. Continuing the Return of HEU Fuel from Research Reactors

130. In a project that started in 2005 and is ongoing, Member States received Agency assistance in securing research reactors through a project entitled Repatriation, Management and Disposition of Fresh and/or Spent Nuclear Fuel from Research Reactors (RER4028). In support of the tripartite initiative known as the Russian Research Reactor Fuel Return programme, the main objective of this project was to help Member States in repatriating, managing or disposing of their fuel, whether fresh or irradiated. Toward this aim, the project served to facilitate the return back to the country of origin of fresh or irradiated high enriched uranium (HEU) or spent low enriched uranium (LEU) that could be misused in radioactive dispersal devices. Funding for this programme was provided by the U.S. Department of Energy, which contributed \$9 million, government cost sharing contributions from Agency Member States in the amount of \$1.5 million and Agency contributions in the amount of \$1 million.

131. Other efforts focused on securing civilian research reactors in Germany, Libya and Poland by returning back to the Russian Federation HEU fuel from these reactors. Under this project, expert teams prepared for shipment and dispatched fuel from the Tajoura research reactor in Libya (July 2006), the Maria Reactor in Poland (Aug. 2006), and the largest batch of HEU from Germany (Dec. 2006). With extrabudgetary funding from Germany and the U.S. Department of Energy, the Agency

has so far facilitated 12 shipments, bringing the total amount of fresh HEU that has been repatriated to the Russian Federation to a record of 433 kg. In a classified mission in Central Asia that was completed in the first six months of 2006, a team of specialists safely returned spent nuclear fuel from Uzbekistan to the Russian Federation. This was the first time that spent fuel that had been used in a nuclear research reactor was repatriated to the Russian Federation since the break-up of the Soviet Union. This operation, six years in the planning, was a joint undertaking between the Agency, Kazakhstan, the Russian Federation, the USA and Uzbekistan, within the framework of the Global Threat Reduction Initiative.

B.3.5. Addressing the Uranium Mining and Milling Legacy

132. In 2006, activities continued under regional TC project RER9086 that dealt with the consequences of past uranium mining and milling practices. The countries that participated in these efforts were Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan. These Member States, which used to operate together a unified uranium mining and production complex in the Soviet Union, are facing the legacy of vast areas that are filled with tailings of the uranium milling process and waste rock. Uranium tailings pits such as, for instance, the Mailuu-Suu area in Kyrgyzstan, have been found to be among the world's most polluted sites. These pits are potentially unstable due to their environmental and geological conditions and pose a threat for the entire region because of their proximity to common waterways. Securing such areas would require substantial investments from financial institutions at the implementation stage. An important step in this direction was the establishment of proper monitoring and surveillance systems to improve characterization capabilities and enhance the regulatory infrastructure of the Member States concerned.

133. In 2006, the Agency provided these four Member States with the necessary monitoring tools and laboratory equipment for the analysis of environmental samples. Specialists of these countries were led through the characterization methodology recommended by the Agency, which was mastered through a series of workshops, case studies and practical assignments that focused on real sites. Technical tours to representative tailings sites in Kyrgyzstan and Tajikistan were organized and the counterparts, both operators and regulators, continued to be exposed to modern remediation technologies, in particular to the proven remediation approach of the Wismut uranium mining and milling sites in Germany. The various activities carried out in the framework of the project allowed Member States to re-establish dialogue and the exchange of experience. It is expected that, after more than decade of interruption, this improved communication will help to address both national and regional challenges that are associated with the tailings issue. In 2007–2008, the regional project will continue to examine remediation action plans, bearing in mind the specificities of each participating country.

B.3.6. Responding to Rising Expectations in Nuclear Power Programmes

134. Over the past few years, there has been a significant shift in attitudes towards nuclear power in a number of countries around the world. This can be traced to a fast growing global energy demand, increased emphasis on energy security and a heightened awareness of the risks of climate change. In the Europe region, where sustained improvements in the availability of nuclear power plants (NPPs) and safety performance have made plant operating costs increasingly attractive, the trend has been to focus increasingly on extending the life of existing plants and on building new plants.

135. In parallel with the commissioning activities at the Olkiluoto NPP in Finland, several other projects for the construction of new power plants were moving forward at a steady pace in 2006 in the Europe region. For instance, work was progressing at the Belene plant in Bulgaria, the Cernavoda plant in Romania and the Khmel'nitski and Rovno plants in Ukraine. In addition, important decisions by national governments on the possible start of new NPP projects were made in the three Baltic

States — Estonia, Latvia and Lithuania — as well as in Kazakhstan, the Russian Federation, Slovakia, Turkey and Ukraine. Jointly with Member States, the Agency has prepared several national and regional projects in response to the rising expectations of Member States in nuclear power and the need for strengthened international cooperation. These focus on enhancing (a) national regulatory infrastructures for nuclear safety, (b) capabilities in safety assessment and (c) national capabilities in the planning and development of nuclear power programmes.

B.3.7. Unlocking Secrets of Cultural Heritage

136. In 1999, a team of divers raised from the seabed off the small island of Vele Orjule, Croatia, an ancient bronze statue of a young athlete, colloquially baptized “Apoxyomenos”. It had rested at a depth of 45 m for some 20 centuries. This was an archaeological find of incalculable value. The Croatian Conservation Institute (CCI) was involved from the very beginning in the investigations and restoration of this discovery. With a number of nuclear and related techniques that were supported through TC projects, teams of experts performed analyses of the basic alloys, soldering materials and corrosion products to determine the origins of the find and how best to undertake restoration. These studies were conducted in cooperation with, inter alia, the Opificio delle Pietre Dure in Florence, the University of Parma and the Rudjer Boskovic Institute in Zagreb. Some of the analyses performed relied on gamma radiography and particle induced X ray emission. The accelerator used for these efforts was upgraded and special training activities were conducted through TC Project CRO1005 in 2006. After several years of restoration, this statue can now be viewed by the public as one of the finest examples of ancient Greek sculpture, comparable to the famous Charioteer of Delphi. In 2006, Apoxyomenos was exhibited for the first time at the Uffizi Palace in Florence and will be displayed at the National Museum in Zagreb. The discovery, excavation, investigation and restoration of this historical piece have been chronicled in a publication by the CCI entitled *The Athlete of Croatia, Apoxyomenos*.

137. In 2004, the Agency started regional project RER1006, ‘Nuclear Techniques for the Protection of Cultural Heritage Artefacts in the Mediterranean Region’. The purpose of this project was to provide assistance to the existing laboratories in the Mediterranean region that use nuclear techniques for applications in the field of cultural heritage and to promote the role that these techniques can play for the study, restoration and protection of historical artefacts. As a result of this project, Albania, Croatia, Greece, Serbia, Slovenia and Turkey have established an interdisciplinary team of analytical scientists and conservators. Croatia established a formal cooperation between the Rudjer Boskovic Institute and the Croatian Conservation Institute by signing in May 2006 a memorandum of understanding between the Ministry of Science and the Ministry of Culture. It is expected that this memorandum will help in securing funds for cooperation between the two institutes.



FIG. 9. Two views of the head of the statue colloquially named “Apoxyomenos” that was raised from the bed of the north Adriatic Sea in 1999 and will be displayed at the National Museum in Zagreb. On the left, shown after recovery with several layers of encrustation, on the right, following state of the art restoration efforts. (Photos courtesy of the Croatian Conservation Institute.)

B.4. Latin America

138. In 2006, the TC programme provided support to 22 Member States in Latin America. Net new obligations in 2006 reached \$16.5 million, compared with \$11.9 million in 2005. The financial implementation rate for the TC programme in the Latin America region was 78.0%, compared with 66.5% in 2005. The distribution of disbursements in the region for 2006 by area of activity is shown in Fig. 10.

139. In 2006, Paraguay and Uruguay completed and signed their CPFs. For Mexico and Colombia, the Frameworks were in the drafting stage and were making good progress. The Agency fielded missions to El Salvador, Panama and Venezuela that were aimed at laying the groundwork for CPFs.

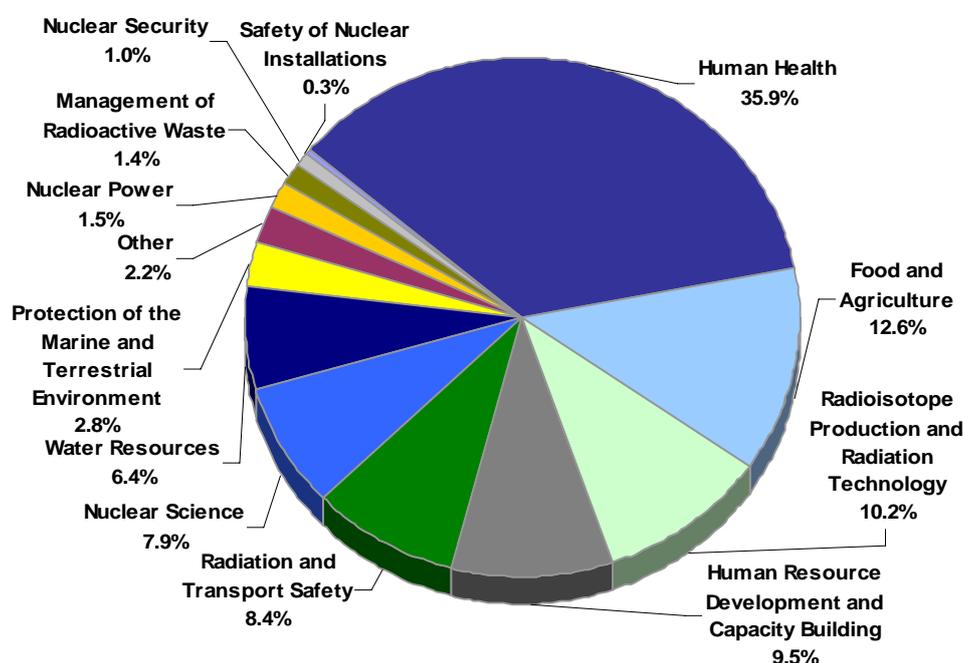


FIG. 10. Disbursements by area of activity in the Latin America region for 2006.

140. In 2006, two Central American countries, Belize and Honduras, signed the Revised Supplementary Agreement for the Provision of Technical Cooperation, thereby becoming fully eligible to benefit from Agency cooperation. Authorities in Bolivia and Brazil ratified the Co-operation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean, also known by its acronym ARCAL.

141. In order to update the work plans of the approved national projects, the Division for Latin America organized three regional workshops that were held in the last quarter of 2006. These workshops served to train some 74 project counterparts and National Liaison Officers (NLOs) in project implementation and management, the use of the PCMF and enhancing national capabilities in the managerial field.

142. In October 2006, a meeting of NLOs, ARCAL National Coordinators and Directors of International Cooperation, altogether 84 individuals, was held in Vienna that was aimed at improving coordination, communication and joint planning with Member States. Agency officials at the meeting presented a broad overview of the work of the organization and the TC department. The meeting discussed topics of interest in relation to national and regional development priorities and the application of nuclear techniques. At its conclusion, the meeting presented a set of recommendations to the Agency.

143. Needs for coordination and synergy have been identified between the TC programme and development programmes of other international organizations such as the Latin American Energy Organization, Pan American Health Organization, United Nations Environment Programme and United Nations Industrial Development Organization. The Agency has established first contacts with these organizations which it intends to follow up.

144. The Secretariat published the report entitled The ARCAL Programme – Over Two Decades of Cooperation in Science and Technology, INFCIRC/686, which summarizes the work accomplished since 1984 in the framework of this regional agreement, and distributed it in time for the Technical Assistance and Cooperation Committee meeting of November 2006.

B.4.1. Reducing the Exposure of Patients to Ionizing Radiation

145. The countries that participated in project RLA9048 ‘Determination of Guidance Levels for Conventional and Interventional Radiology (ARCAL LXXV)’ were Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Mexico, Nicaragua, Peru, Uruguay and Venezuela. At the national level, experienced professionals provided training to some 180 skilled workers and technicians. The Agency provided the equipment that was necessary for surveying patient exposure and diagnostic image quality, along with the main tools for establishing guidance levels on patient exposure. Although the emphasis of the project was on human performance rather than quality control of the radiological equipment, basic instruments for quality control were delivered to identify problems with radiological equipment when it was felt that this equipment needed to be verified. A pilot study was carried out, which provided initial results for patient doses in conventional examinations and mammography. Although the results were not fully representative of the region because of the limited number of participating hospitals per country, they provided a basis for optimization of exposures in participating hospitals and for systematic dissemination to radiological professionals in the participating countries.

B.4.2. Improving Infrastructure in Medical Diagnostics

146. The aims of Project RLA4017 (ARCAL LIII) were to enhance the infrastructure of the national and regional centres in medical diagnostics and to train technical staff in the maintenance and repair of X ray diagnostic equipment. Seventeen Latin American countries participated in this project, which included training in LabVIEW®, a computer program for measurement and automation that is used for the modernization of nuclear equipment. Assistance concentrated on developing maintenance procedures on the basis of quality control (QC) guidelines. Diagnostic and technical staff followed dedicated training courses: as a result, they are now able to maintain and repair nuclear medicine equipment with the aid of low-cost QC instruments. The regional centres of Brazil, Cuba, Mexico and Peru were used to train close to 60 regional specialists in equipment repair. Altogether, five low-cost test instruments were designed in the region in this effort. More than 190 specialists underwent training and over 1000 instruments were repaired under this project.

B.4.3. Speeding up the Diagnosis of the Helicobacter Pylori Bacterium

147. Project RLA6042, ‘Early Diagnosis of Helicobacter Pylori (Hp) Infection Through the Use of Nuclear Techniques’ (ARCAL LIV), provided the means for determining the incidence of Hp

infection in different regions of Latin America with the aid of a non-invasive methodology. *Helicobacter pylori* lives in mucous membrane and is responsible for the development of ulcers. The analytical technique used carbon-13 and carbon-14 urea breath tests (UBTs). Three laboratories were fully equipped with the support of the national authorities in Argentina, Chile and Mexico to provide analytical services and training to all participating countries for diagnosis of this illness. Carbon-13 UBT was standardized in all participating countries: over 15 000 breath samples were analysed in the course of the project. This effort made possible the use of isotope techniques in the diagnosis of this infection for the participating countries in the project. It also showed the potential for false results that may arise from conventional diagnosis techniques in some population groups. Additionally, knowledge of the relationship between the Hp infection and its possible extragastric manifestations, some of which stem from widespread nutritional problems in the Latin America region, was enhanced. This regional project was an excellent example of TCDC, as significant contributions by each country were shared with other countries.

B.4.4. Ensuring Safety, QA and QC in Radiation Oncology

148. The regional Project RLA6049 'Improvement of the Radiation Treatment of Uterine Cervix Cancer (ARCAL LXXIV)' aimed to identify safety needs in the radiation oncology services for cervical cancer in all Member States within the region. A further objective of this project was to determine and set safety standards for personnel, quality assurance (QA) and quality control (QC) that would be realistically achievable in light of national commitments to the management of cancer. Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Guatemala, Haití, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela were the participating countries. In the framework of this project, training on a large scale was provided to radiation oncologists, medical physicists and radiation therapy technologists. Courses focused inter alia on radiobiology, evidence based radiotherapy and high dose rate brachytherapy for cervix and prostate cancer. Upon completion of the training courses, some 60% of the cancer centres in the region had adopted the techniques taught during the seminars. In summary, this project achieved the following objectives: (a) the status of the radiation oncology services for the treatment of cervical cancer was established in all Member States of the region in terms of safety for personnel, adequacy of equipment and quality assurance; (b) new technology was provided to treatment centres along with an upgrade of the gynaecological devices that will allow to treat a larger number of patients and (c) the impact of the project will be reflected in a higher level of survival of patients suffering from these kinds of cancer owing to the improved use of available resources, enhanced quality in treatment and increased competence of clinical management.

B.4.5. Improving Food Security and Boosting Vegetable Exports

149. Through continuous Agency support in Peru, two recently introduced mutant varieties of barley that are adapted to the harsh and extreme climatic conditions up to 5000 m above sea level in the Andes have brought about a sustainable improvement in the food security of the Andean population in Peru and increased their income from the sale of harvest surplus. In recognition of the socioeconomic impact of the improved barley mutant varieties, in 2006 the Peruvian government awarded the "Good Governmental Practices" prize to the project counterpart, The Agrarian University of La Molina, in Lima, Peru.

150. In Central America, the regional project RLA5045 'Preparation for Pilot Fruit Fly Free Areas Using the Sterile Insect Technique' aimed at controlling fruit flies by way of an integrated approach which includes the sterile insect technique. The ultimate goal of this effort was to export fruits and vegetables to high value markets such as the USA. The Member States in the region, Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama had strongly committed to this project, which benefited from extrabudgetary contributions, both financial and in kind, from other

national and international organizations such as the Food and Agriculture Organization, Inter-American Institute for Cooperation on Agriculture, International Regional Organization for Plant and Animal Health and United States Department of Agriculture, in what has been called a regional inter-institutional project alliance. Substantial results have been achieved, as an area that is free of the fruit fly pest has been officially declared in each of the participating countries. Member States have developed the human and physical infrastructure to maintain the areas free or with a low prevalence of fruit flies. Vegetables such as bell peppers and tomatoes are already being exported to the USA and papayas to Mexico and the USA from these areas in El Salvador, Guatemala and Nicaragua. In 2006, these exports have already generated significant revenues for these countries. In October 2006, Honduras signed a protocol to export bell peppers to the USA and Costa Rica has invested in infrastructure to start horticultural exports to the USA in 2007. Belize has expanded its range of horticultural products in the international market by retaining its sanitary status as a country that is not affected by the Medfly. Projections indicate that in the medium term, as exports of fruits and vegetables from these areas realize their full potential, the expected socioeconomic impact will be substantial throughout Central America.

B.4.6. Harmonizing Safety Regulations for the Transport of Radioactive Material

151. The aim of project 'RLA9042 Regulatory Harmonization and Quality Assurance Programmes for the Safe Transport of Nuclear Materials (ARCAL LXV)' was to ensure that national institutions which are involved in the transport of radioactive material in countries in the region had the appropriate regulatory and quality assurance mechanisms at their disposal and were sufficiently prepared to carry out the tasks involved in this kind of transport. The participating countries were Argentina, Brazil, Chile, Cuba, Mexico, Peru, Uruguay and Venezuela. The Dominican Republic and Paraguay also benefited from this project. It was agreed by all counterparts that it was necessary: (i) to harmonize the regulatory documents on safe transport of radioactive material at the national and regional level in compliance with international regulations, (ii) to establish the requirements for the development of quality management programmes for regulatory authorities, carriers and shippers, except for the design and manufacture of packaging, and (iii) to carry out the necessary training activities to harmonize levels of expertise at the regional level. Project teams compiled inter alia a manual of terminology in English, Portuguese and Spanish on the transport of radioactive material for parties involved in the transport of radioactive material (competent authorities, consignors, consignees and carriers). This manual is already used by carriers and shippers in some participating countries. In short, as a result of the project, the transport of radioactive material is now carried out with an improved level of safety and all participating countries now have a complete set of documents with which to harmonize transport activities in the region. Moreover, trained staff are able to apply the regulations and to communicate the requirements for transport safety and related guidance.

B.4.7. Detecting Leakage at the Cajón Dam

152. Through project HON8003, 'Investigation of Filtrations from the Francisco Morazán Power Plant Using Isotopic Methods' the Agency's know-how in the use of environmental isotope techniques was applied in Honduras for the detection of leaks in the dam of a hydroelectric power plant. The objective of the project was to investigate the origin and preferential pathways of the seepage water at the area of the Cajón Dam. This study was one of the initiatives aimed at assessing potential structural and hydrogeological risks to the dam with a view to enhancing the operational safety of the plant, which satisfies close to 40% of the national electricity demand. Isotope techniques proved to be a useful tool to systematically determine the hydrogeological characteristics of the area and to pinpoint the origin of leaks from the reservoir to the river downstream from the dam. As a result of the project, the counterpart organization has incorporated isotope and tracer techniques as a routine work tool in its monitoring programmes and diagnostics for leakage at the dam. The counterpart is drawing up a map

that shows the pathways of leaks through the foundations and shoulders of the dam, which is expected to lead to the design of a grouting programme that will control leakage and therefore increase the safety of the power plant.

B.4.8. Monitoring Particulates for the Control of Atmospheric Pollution

153. The population of the greater metropolitan area of Mexico City is estimated to exceed 20 million. In spite of Government efforts, it has not been possible to reach acceptable levels of air quality, and air pollution is considered as a very serious public health issue. Two Agency projects, ‘Application of Biomonitoring through Nuclear and Related Techniques in Atmospheric Pollution Studies (ARCAL LX)’ (RLA7010) and ‘Evaluation of Airborne Fine Particles in Mexico City’ (MEX1021) were set up to focus on this problem. Through the use of nuclear techniques, Mexico took steps to identify the sources of emissions and to formulate policy recommendations for industrial and transport operations, bearing in mind the need for environmental protection. Project teams set up sampling stations at different locations for the collection and characterization of aerosol samples. Additional assistance was provided to laboratories that participated in the regional project ‘Assessment of Atmospheric Pollution Due to Particles’ (RLA7011). Owing to the installation of sophisticated monitoring stations, the data available to the National Nuclear Research Institute (ININ) are now more comprehensive and reliable: These provide the authorities and decision makers with better tools to assess the specific properties of fine airborne pollutants.

B.4.9. Improving Know-How in Chilean Copper Mines

154. With the aid of nuclear techniques, the Agency supported the development of the capabilities of the Institute for Innovation in Mining and Metallurgy, the Chilean Nuclear Energy Commission and the National Copper Corporation of Chile for extracting remnant copper ores in underground mines. Technology for mineral characterization that uses mining sensors allows for rapid in situ and online analysis: detailed information on the quality of the ores can be obtained in a process that is faster and more efficient than the measurement systems currently used in the mining industry. Not only does this technology save time and costs: it also makes it possible to characterize the copper ore around the mining sensors, so that the extraction of samples is not needed. The Agency supported the establishment of prompt gamma neutron activation analysis techniques for copper evaluation in boreholes at the El Teniente underground mine. The method implied the drilling of holes of a length of at least 100 m from the ceilings of the shafts upwards towards the surface of the mine. As no equipment was available in the market that could be attached to the ceiling of the tunnels, the project team developed an apparatus that could solve this challenge. In this way, measurements could be taken to determine the quality of the ore available in large sections of the formation. Ore evaluation systems that use this technology are working efficiently and have allowed for the first time to improve the valuation of the copper content in material that had been considered “waste material” until now. By the same token, better exploitation of ore has increased revenues at the mines.

B.4.10. Conserving the Environment in the Mining Sector

155. In Peru, the Peruvian Institute of Nuclear Energy (IPEN) carried out Project PER2015, ‘Radiotracer Technology Applied to Conservation of the Environment in the Mining and Mineral Sector’. This project was aimed at applying isotopic tracer techniques to determine contamination levels that stemmed from mining activities. This was a first step in achieving clean operating practices in the mining and mineral sector. The specific objective was to establish the technical tool needed for the characterization of environmental pollution caused by mining activities in order to adhere to the national policy for the management of naturally occurring radioactive materials. The main outcomes of the project were: the evaluation of arsenic and other pollutants in sediments of the Rimac and Aruri rivers that are located in the mining zone of the central uplands around Lima; two reports on the

hydrodynamics of underground waters of two mines in Lima and Puno and the characterization of effluent filtration from two mines in Arequipa and Cajamarca. On the basis of these outcomes, the decision makers at IPEN have drawn up an environmental conservation plan.

B.4.11. Supporting the Development of National Energy Plans

156. Member States Colombia, Guatemala, Haiti and Nicaragua have requested technical assistance by the Agency in developing their long term master plans for the energy sector. The Agency provided training and analytical tools for conducting national energy studies. Expert guidance was also arranged for the development of national energy plans.



FIG. 11. A technician collects current operational data from the fine particle air sampler at the atmospheric sampling site at Coyoacán, in the greater metropolitan area of Mexico City. (Photo courtesy of the National Nuclear Research Institute, Mexico.)

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.