

TECHNICAL COOPERATION REPORT FOR 2004

REPORT BY THE DIRECTOR GENERAL

GC(49)/INF/2

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PREFACE

The Board of Governors has requested the transmission to the General Conference of the attached Technical Cooperation Report for 2004, the draft of which was considered by the Board at its June 2005 session.

The Director General is also hereby reporting in fulfilment of the request contained in resolution GC(48)/RES/12 on “Strengthening of the Agency’s technical cooperation activities.”

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Summary

The *Technical Cooperation Report for 2004* highlights activities and achievements of the technical cooperation programme for the past year.

During 2004, the Secretariat finalized the technical cooperation programme for the 2005–2006 biennium, which was approved by the Board of Governors in November 2004. A revised project appraisal process was carried out for the 2005–2006 programme, which yielded additional information regarding government commitment, national capabilities and project performance indicators and outcomes.

Included in the 2005–2006 biennium is a strengthened programme for upgrading radiation protection infrastructure. The Secretariat used the experience of the past ten years, as well as conclusions from evaluations, to create a programme that would build upon the successes and lessons learned to provide the safe use of nuclear technology with well-regulated infrastructures.

Activities carried out in 2004 built upon previous achievements through national and regional projects in many thematic areas. The programme continued to reinforce the capacity for cancer diagnosis and therapy by providing training and expertise and supporting the procurement of equipment. Consistent support for surveillance techniques using nuclear technology is helping to fight trans-boundary animal diseases, and is leading to countries becoming rinderpest-free. The Secretariat continued to provide expertise and support to assist with the repatriation of highly enriched uranium reactor fuel to the country of origin.

The development of partnerships with other United Nations organizations, as well as non-governmental organizations, continues to be of great importance to the technical cooperation programme. In 2004, for example, a memorandum of understanding was signed with the Regional Office for Africa (AFRO) of the World Health Organization (WHO) to support the improvement of health conditions and to raise standards of health in the region.

Extrabudgetary resources reached more than \$10 million for the second year in a row. This provided support to 17% of the approved footnote-a/ programme for 2004. In addition, receipt in 2004 of \$8.1 million against earlier target years allowed the Secretariat to reinstate, during the second quarter of the year, programme budgets which had been curtailed as a result of the lower than expected resources received in 2003.

During the year, the Secretariat has been heavily involved in a review of TC processes, with a view to streamline and strengthen them. The main part of the change process is planned to be completed in 2005.

While the implementation rate for the programme dropped four percentage points to 68%, compared with 2003, the total disbursements for the programme in 2004 were slightly higher than in 2003 by nearly \$120 000.

A further challenge to the programme has been the replacement of assessed programme costs with national participation costs as approved by the Board of Governors in 2004.

The Agency's Technical Cooperation Programme at a Glance (as of 31 December 2004)

The target for voluntary contributions to the TC Fund for 2004 was **\$74.75 million**.

New resources for the technical cooperation (TC) programme were **\$87.1 million**.

- Technical Cooperation Fund: \$75.6 million
- Extrabudgetary resources: \$10.9 million
- In-kind contributions: \$0.6 million

The adjusted budget for the TC programme for 2004 was **\$104.2 million**.

Disbursements for the programme reached **\$73.3 million**.

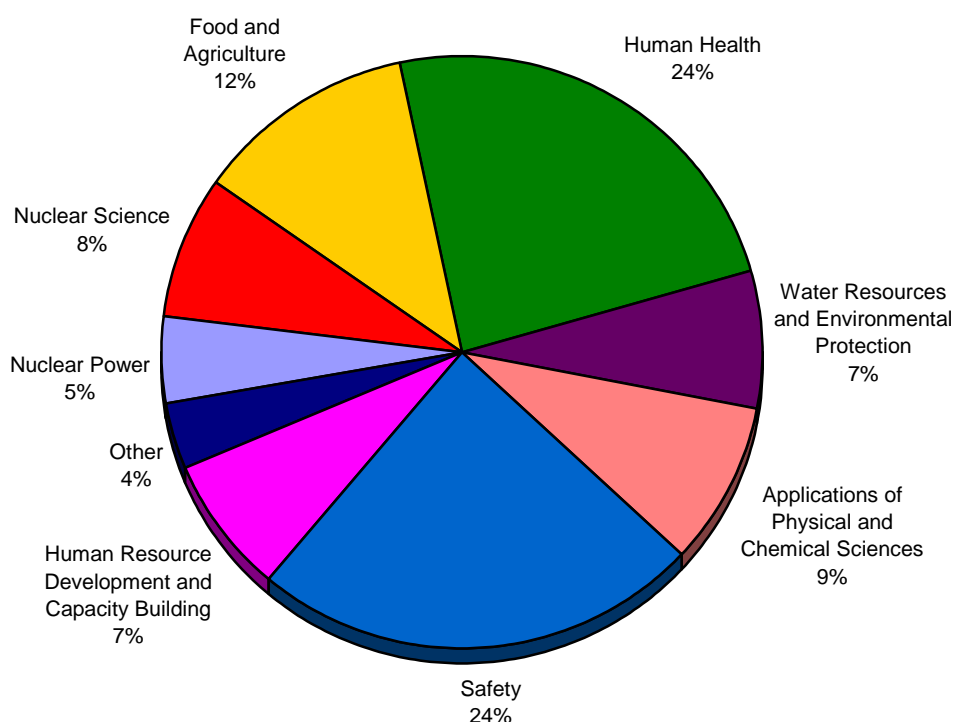
Net new obligations during the year were **\$71.0 million**.

The implementation rate for the programme was **68.1%**.

The number of countries/territories receiving support from the programme was **114**.

Project support involved **2618** expert and lecturer assignments, **2296** meeting and workshop participants, **2041** participants in training courses and **1444** fellows and visiting scientists.

Disbursements by Area of Activity for 2004



Technical Cooperation Report for 2004

Report by the Director General

A. Strengthening of the Agency's Technical Cooperation Activities

1. This document responds to the General Conference's request to the Director General to report on the implementation of resolution GC(48)/RES/12. The following section reviews highlights from 2004 covering programme improvements based on evaluation and audit recommendations, as well as challenges facing the technical cooperation (TC) programme.

A.1. Building Partnerships with International and Regional Development Organizations

2. As noted in *The Technical Cooperation Strategy: the 2002 Review* (document GOV/INF/2002/8/Mod.1), financial partnerships provide a cost-effective means for achieving greater impact; strategic partnerships can raise the profile of the TC programme, thus attracting additional partners; and technical partnerships can achieve a synergy by combining complementary nuclear and non-nuclear technologies. The Secretariat continues to build partnerships with other United Nations (UN) organizations, as well as governmental and non-governmental development organizations.

3. UN agencies working in Africa, including the Agency, have established various thematic clusters around the priority areas of the New Partnership for Africa's Development (NEPAD) to serve as an operational framework to support NEPAD. Agency projects supporting NEPAD goals address regional and national developmental problems mainly in the following clusters: agriculture, trade and market access; human resource development, employment and HIV/AIDS; science and technology; and infrastructure development. To continue the support given in the past, the Agency participated in the Sixth Regional Consultations Meeting on UN System Support to NEPAD at the Regional Level held in Addis Ababa, Ethiopia, in July 2004.

4. A memorandum of understanding (MOU) was signed with the WHO Regional Office for Africa (AFRO) to provide an expanded framework of cooperation between the Agency and AFRO for supporting relevant programmes in countries of common membership for the improvement of health conditions and for raising their standards of health. Collaboration areas include (i) detection of drug resistance in malaria and tuberculosis, (ii) evaluation and monitoring of nutrition intervention programmes, with special emphasis on those targeting the most vulnerable groups, including those infected with HIV/AIDS; and (iii) establishment of molecular epidemiology, including drug resistance surveillance, and immunology techniques in support of the UNAIDS/WHO African AIDS Vaccine Programme (AAVP).

5. Through the efforts of the African Union's (AU's) Pan African Tsetse and Trypanosomosis Eradication Campaign (PATTEC) Coordination Office, the major partner of the Agency in this field, the African Development Bank (ADB) has approved a loan and grant totalling \$15 million to Ethiopia for the Agency-supported Southern Rift Valley Tsetse Eradication Project (STEP). This is an important development in that Ethiopia and the Agency have now secured a partner willing to commit substantial funding to the project.

6. During the past year, the Agency continued developing a partnership with the United Nations Development Programme (UNDP) and the Global Environment Facility (GEF) for the benefit of the countries that share the Nubian Sandstone Aquifer System (NSAS). As part of this effort, representatives from the four countries concerned (Chad, Egypt, Libyan Arab Jamahiriya and Sudan) as well as representatives from GEF, United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Centre for Environment and Development for the Arab Region and Europe (CEDARE) took part in a meeting on the trans-boundary management of the Nubian aquifer, in March 2004 at the Agency's Headquarters. The Agency is being considered as the executing agency for a project to be eventually funded by GEF.

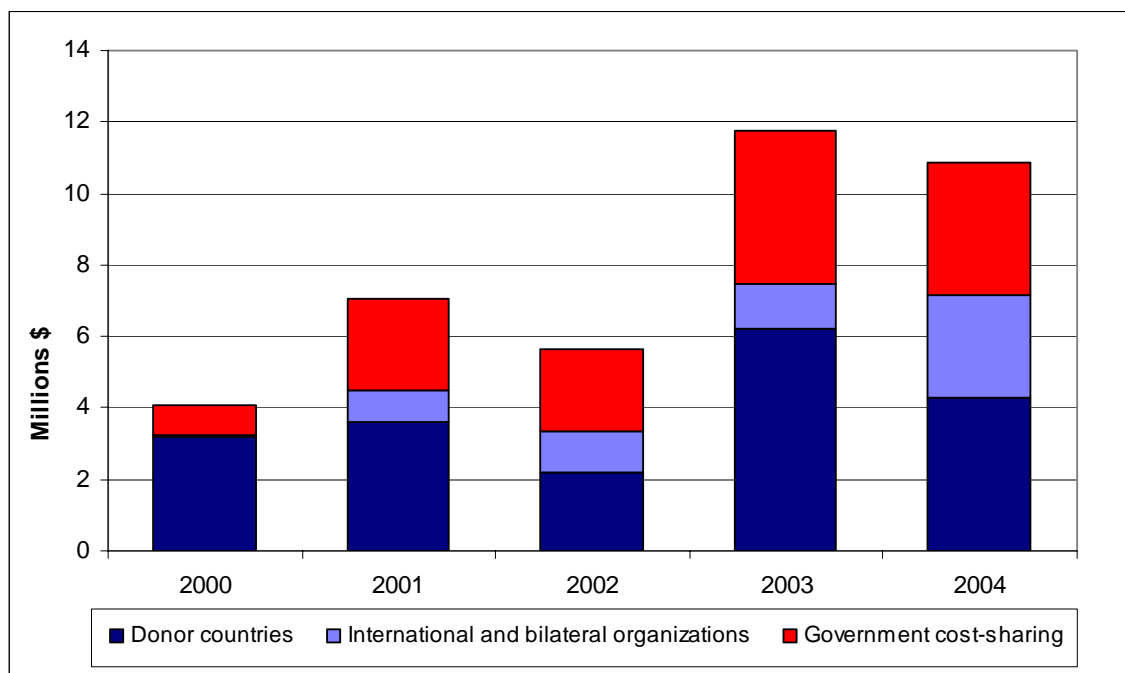
7. Burkina Faso, Mali, Niger and Senegal participated in a project that led to the establishment of a network of field trials in each of the countries with the participation of farmers to generate specific technologies for integrated crop, soil, water and nutrient management in cropping systems. The project also promoted partnerships with the Tropical Soil Biology and Fertility Programme of UNESCO and the Consultative Group on International Agricultural Research (CGIAR), as well as links with the Desert Margins Programme of the United Nations Environment Programme/International Crops Research Institute for the Semi-Arid Tropics (UNEP/ICRISAT).

8. In the Europe region during 2004, national TC projects on decommissioning of NPPs in Bulgaria, Lithuania, Slovakia and Ukraine were coordinated with assistance provided by the European Bank for Reconstruction and Development.

9. In West Asia, the financial support of the United States Agency for International Development's (USAID's) Middle East Regional Cooperation (MERC) Program to the Agency's sterile insect technique (SIT) projects contributed to the successful transfer of the technique to Israel, Jordan and the territories under the jurisdiction of the Palestinian Authority.

A.2. Trend in Extrabudgetary Resource Contributions

10. The extrabudgetary resource contributions during 2004 totalled \$10.9 million. While this amount was down slightly from the 2003 record high of \$11.8 million (see Figure 1), it represents a continued and significant increase over the five-year period 1998–2002, during which an average of \$4.6 million was received each year.

Figure 1. New Extrabudgetary Resources: 2000–2004

11. This funding provided support to 22% of the approved footnote-a/ project activities in 2003 and 17% of the approved footnote-a/ provisions in 2004 (compared with 11% and 8% in 2001 and 2002, respectively). Nevertheless, the need for increased fund mobilization efforts is obvious from the substantial portion of the footnote-a/ programme that remains unfunded.

12. In addition to funding footnote-a/ activities, resources totalling \$1.6 million were provided to fund non-footnote-a/ activities, such as the unforeseen fuel transfer activities as part of the Global Threat Reduction Initiative (GTRI).

13. Of the total extrabudgetary resources received in 2004, \$3.7 million was provided as government cost-sharing by Member States to increase the assistance in their own countries. The following are some examples of government cost-sharing and contributions for footnote-a/ project activities from 2004.

14. In the Europe region, the Czech Republic contributed \$1.5 million for the purchase of a linear accelerator, which will be used for research in the country. Over the past few years, the Ministry of the Environment of Latvia has contributed consistently to a project through government cost-sharing. In 2004, approximately \$110 000 was provided to finance activities under their footnote-a/ project, LAT/9/007, Support for Radiation Protection, Waste Management, and Regulatory Activities. The Government of Croatia provided \$260 000 in 2004 for radiotherapy equipment. Another example of a TC project successfully implemented from extrabudgetary funds in combination with Technical Cooperation Fund (TCF) resources and in-kind cooperation is a project in Bulgaria, where an electron beam flue gas pilot plant at Maritsa East was successfully put into operation in July 2004 with the donation of accelerators from the Government of Japan and government cost-sharing from Bulgaria.

15. The Government of Ethiopia contributed \$150 000 under a cost-sharing scheme to procure a new cobalt-60 machine for the Black Lion Hospital radiotherapy service.

16. To improve the safety features of the Karachi nuclear power plant, the Government of Pakistan made an extrabudgetary contribution of \$400 000 for the purchase of equipment under project

PAK/9/022. The Islamic Republic of Iran has continued to demonstrate its commitment to the programme through the provision of financial resources as government cost-sharing in support of its national projects. Under the 2005–2006 TC programme, Iran has indicated it would provide \$1.5 million to support the implementation of three of its new TC projects.

17. As it celebrated its 20th year of cooperation with the Agency in 2004, China announced an extrabudgetary contribution of \$1 million to the Agency for footnote-a/ projects in the biennium 2005–2006. The extrabudgetary contribution will support projects in nuclear applications and strengthening nuclear security.

A.3. Continuing Technical Cooperation among Developing Countries

18. Regional projects, including those under the African Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (AFRA), the Co-operation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL), the Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (RCA), and the Co-operative Agreement for Arab States in Asia for Research, Development and Training related to Nuclear Science and Technology (ARASIA) continued to be important mechanisms for technical cooperation among developing countries (TCDC). Regional resource centres provided an increasing amount of laboratory services, training facilities, and experts for the implementation of projects in the regions.

19. To strengthen cooperation among them, RCA Member States adopted revised procedures for the development of projects, their implementation and monitoring, and for publicizing the outcomes. The revised procedures and criteria have been incorporated into the Guidelines and Operating Rules for the RCA programme.

20. With the rapid expansion of the nuclear power programme in the East Asia and the Pacific region, and the newly issued nuclear safety regulations and standards by the Agency, both the utilities and regulatory bodies in countries developing or using nuclear power are facing new challenges in maintaining and enhancing safety levels. Two regional projects in East Asia and the Pacific have been key in addressing these challenges. The Republic of Korea continued to serve as the regional resource centre for providing training to other countries in various fields such as nuclear power planning and quality assurance for nuclear power plants, as well as their safe operation and maintenance. The Qinshan Nuclear Power Corporation of China, which was a recipient of Agency support in the 1980s and 1990s, is now providing technical support to the Chashma NPP in Pakistan for the implementation of its management improvement plan.

21. The Agency continued to assist Chile and the Republic of Korea in their bilateral cooperation in the peaceful use of nuclear energy. Following the first joint committee meeting that was held in Gwacheon, Republic of Korea, in November 2003, a second meeting was held in Santiago, Chile, in December 2004. The participants discussed and defined bilateral cooperation in the following areas: nuclear and radiological safety; training on accelerators and cyclotrons; developing a joint study on radiation oncology by medical doctors from the two countries; preparing a preliminary feasibility study on the introduction of small- and medium-sized nuclear reactors in Chile; producing radioisotopes for medical and industrial applications; and exchanging experiences in public acceptance of nuclear energy.

22. There are proven cases for TCDC in the Latin America region and Europe region as well. The experience of Nicaragua in establishing a radiotherapy centre was used to support Haiti in its initial efforts to re-establish its national radiotherapy centre.

23. In the Europe region, momentum for TCDC was created when 10 Member States joined the European Union (EU) in 2004. There were several cases where national TC projects were implemented using human and financial resources from the region. Experts from Slovakia, which has benefited from TC support in the past, were used last year to assist Bulgaria in the decommissioning of a nuclear power plant. Experts from Belarus, Czech Republic, Poland and the Russian Federation assisted to improve the effectiveness of radiotherapy services in Armenia. In addition, the Czech Government financially contributed to projects in Armenia and Ukraine to upgrade nuclear power plant safety.

24. In the West Asia region, the main approach for enhancing TCDC was to support and promote the use of expertise available within the region through recruitment of experts and the organization of training events. In that respect, Jordan and the Syrian Arab Republic have played a key role in providing extensive support to other West Asia Member States. In the field of agriculture, the partnership (use of facilities and expertise) developed through the SIT projects in the Middle East between Israel, Jordan and the territories under the jurisdiction of the Palestinian Authority has proven to be crucial for the sustainable use of the technique to control the Mediterranean fruit fly in the region.

A.4. Enhancing the Effectiveness and Efficiency of the Programme and Technical Cooperation Management

25. Since the TC programme has grown substantially in size, complexity and the number of participating Member States in the last few years, the Department of Technical Cooperation has embarked upon a change initiative with the objective of strengthening and improving the programme and managerial processes within the Department.

26. Results of internal studies and reviews, audits and evaluations from the past two years, with particular reference to ways for improving the efficiency and effectiveness of programme delivery, provided specific guidance to the initiative.

27. The Department selected a participatory approach to its change process and involved staff from the entire Department through working groups and, as appropriate, stakeholders from outside the Department. This approach included reviews of existing formats and processes and the design of new processes, systems and policies. Some of these review or design processes are still ongoing, while others have been completed.

28. Highlights of the work completed so far include the following:

- Development of a plan for the period July 2004–June 2005 that identifies key issues for the Department in the context of the change initiative, defines actions to address these issues, and coordinates the implementation of the change initiative.
- Successful implementation of the first phase of restructuring of the Department into four regions as of 1 January 2005, with agreement on planning for the second phase. Kazakhstan, Kyrgyzstan, Uzbekistan and Tajikistan, from the West Asia region, are now incorporated in the Europe region, while the remaining 12 Member States¹ and the territories under the jurisdiction of the Palestinian Authority have joined the East Asia and the Pacific Member States to form the Asia and the Pacific region.

¹ Afghanistan, Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates and Yemen.

- Completion of the review and redesign of the TC programme cycle framework that will involve all stakeholders. The envisaged transparent and integrated process will be facilitated by a new web-based information technology (IT) platform that is currently being designed.

29. By the end of 2005, a period of approximately two years of analysis, introspection and planning for change will be concluded. Restructuring and reengineering of the TC programme cycle and managerial changes will be coordinated and sequenced for introduction in a phased manner. Major challenges to this process include the agreement of standards for all processes, monitoring compliance with them, and training staff and Member State stakeholders in the relevant standards and methods in order to develop a common understanding of the Agency's approach to technical cooperation.

30. Based on recommendations from the Standing Advisory Group on Technical Assistance and Cooperation (SAGTAC) and Agency oversight services, the guidelines for thematic planning and Country Programme Frameworks (CPF)s are being revised. After review and approval by the Secretariat later in the year, a programme of briefings and workshops will be organized for Member States covering the new guidance documents.

A.5. Reviewing Ten Years of Upgrading Radiation Protection Infrastructure

31. The year 2004 was a significant year for the programme on upgrading radiation protection infrastructure ('Model Projects'), as it was the 10th year of implementation since the original interregional Model Project (INT/9/143) was launched in 1994. The original Model Project was succeeded by five regional projects (one each for Africa, East Asia and the Pacific, Europe, Latin America and West Asia) in 1997 with 52 Member States, then expanded to 91 Member States with ten regional projects, two for each region covering milestones 1 and 2, and milestones 3–5. The Secretariat presented the comprehensive summary of the cumulative 10-year effort to the Board in November 2004 (document GOV/INF/2004/13).

32. The Model Projects on upgrading radiation protection infrastructures are one of the major TC programmes in size, scope, and impact on Member States. Over the past ten years, more than \$47 million from the Technical Cooperation Fund (TCF) was dedicated to planning and implementing these projects.

33. For many participating countries, the implementation of the TC programme on upgrading radiation protection infrastructures focused mainly on establishing the requirements of milestone 1, such as the drafting of legislation, regulations and procedures; promulgation of laws; approval of regulations; establishing a regulatory authority as well as a system for the notification, authorization and enforcement of radiation practices; developing a national inventory of radiation sources; and recruiting and training of staff. Approximately 5000 specialists in the Member States received training at various events using the 'train-the-trainer' approach, and nearly 1200 gained knowledge through fellowships and scientific visits. In addition to this, more than 1400 international experts and lecturers were fielded to establish the requirements of milestones 1–5 and lecture at national and regional training events. Member States have also received monitoring equipment for occupational, medical, and public exposure control.

34. The Model Projects have played a major role in Secretariat activities to facilitate Member State compliance with the international Basic Safety Standards (BSS), the adherence to which is a prerequisite for the provision of radiation sources to the Member States participating in the TC programme. The Model Projects have been instrumental in introducing effective and harmonized regulatory mechanisms contributing to sustainability in all relevant areas of the safety and security of radiation sources. These activities enhanced global and regional cooperation and contributed to the

promotion of worldwide standardization and unification of internationally adopted safety measures and procedures. As of June 2004, among the 87 participating countries evaluated, 48 (55%) countries achieved the essential parameters signifying compliance with the requirements for attaining milestones 1 and 2, as was endorsed by the Board in November 2004 (GOV/INF/2004/13).

35. In May 2004, the Secretariat conducted a comprehensive evaluation of the Model Projects by an independent panel under the auspices of the Office of Internal Oversight Services (OIOS). The main tasks were to assess the performance of the Secretariat in achieving the stated objectives of the Model Projects, to evaluate the efficiency and effectiveness of management policy in the delivery of these projects to the Member States, and to identify best practices and lessons learned from the implementation of all five milestones that would help define an optimal future approach.

36. The Secretariat has developed a new approach for the future of establishing radiation protection infrastructure based on the OIOS evaluation results and its own assessment of the Model Projects. While the Agency's assistance is critical for the development of such infrastructures, the Member States themselves have the ultimate responsibility for ensuring that adequate regulatory oversight is in place to protect public health against unwarranted radiation exposure, to provide adequate safety and security for radioactive sources, and to ensure that regulatory requirements are compatible with the BSS. The Agency will continue its proactive approach in assisting Member States in thematic area 1 (regulatory framework), which includes the new Code of Conduct on the Safety and Security of Radioactive Sources.

37. For the 2005–2006 cycle of TC projects, the Board approved the radiation protection programme containing 23 regional projects and 29 national projects based on the individual needs as reflected in the project requests.

A.6. Contributing to the Promotion of the Key Areas of the Johannesburg Plan of Implementation and the Attainment of the Millennium Development Goals

38. Promotion of the Millennium Development Goals and the Johannesburg Plan of Implementation provides a key developmental framework for working with Member States to develop the TC programme. Many Member States look to the Agency to help define the role of nuclear science and technology in national development.

39. Many TC projects provide very specific support to the overall framework of development organizations and countries to eradicate extreme poverty and hunger; reduce child mortality; improve maternal health; combat HIV/AIDS, malaria and other diseases; improve environmental sustainability; and develop a global partnership for development. Through various applications of nuclear sciences and technology, the Agency supports Member States in the peaceful use of nuclear technology to manage water resources, practice sustainable agricultural activities, improve human health, protect the environment, and support the development of energy-generation options, and thereby help realize the global targets set by the international development community.

A.7. Following up on TC Fellows

40. In order to assess the impact and the quality of the Agency fellowship programme, the Secretariat conducted a survey among former fellows from the years 2001 and 2002. These fellows have all completed the fellowship training, and have had time to judge in what way their training is useful to

their work in their home country. This ‘tracer study’² could serve as a starting point for continuous systematic feedback to the fellowship programme, as well as other participatory programmes.

41. Out of the 2042 fellows from the years 2001 and 2002, 583 participated in the survey (meaning 29% of all fellows, and 47% of those reached by email or fax). The results of the survey given below represent only the survey participants’ opinions, not those of all former fellows.

42. The fellowship programme contributes successfully to technology and knowledge transfer to fellows’ home institutions, their home countries and the TC projects they are involved in, as evidenced by the following survey results:

- 94% of the fellows returned to their home institution in their home country and can apply the skills and knowledge acquired during their training.
- 96% think the skills and knowledge acquired are useful for their work.
- 96% of the fellows shared their knowledge with colleagues and students in their home institutions through presentations, workshops, on-the-job training, individual consultations or teaching.
- 87% developed useful contacts during the fellowship, and 76% are still in touch with their host institution, which contributes to ongoing knowledge transfer from the host to the home institution.

43. The quality of the fellowship programme itself is judged very highly:

- Both the host institution and the training programme are considered suitable by 94% of the participating fellows.
- 81% feel that the guidance they received was good or very good.
- 82% of the fellows found the quality and adequacy of the facilities made available to them good or very good.

44. Participants also included suggestions on the improvement of the fellowship programme and ideas for enhancing its impact. Among the latter, a systematic follow-up was mentioned frequently. The results also suggested that the establishment of mechanisms for continuous contact between the home and the host institution and platforms for regional and interregional information exchange would improve the programme.

45. The results of this survey will be made available in an in-depth report on the Department of Technical Cooperation’s website in May 2005, and will be discussed with stakeholders within the Agency.

A.8. Addressing the Opportunities and Challenges to the Programme

46. In *Evaluation of Technical Cooperation Activities in 2003* (document GOV/INF/2003/18), the Office of Internal Oversight Services reported on an evaluation of technical cooperation radiotherapy projects in Latin America. One of the conclusions from the evaluation was that the Agency’s investments in the field of radiotherapy have substantially increased, and therefore the Agency should consider making adjustments in internal mechanisms to respond to this increase.

47. In light of the growing burden of cancer world-wide, and the comparatively scarce resources available to the Agency from traditional sources, the Secretariat saw an opportunity to bring attention to and to help address the increasing need for radiotherapy in all regions by raising funds from non-traditional donors. In late 2003, the Agency launched the Programme of Action for Cancer Therapy

² A study that traces the path participants have taken after the activity.

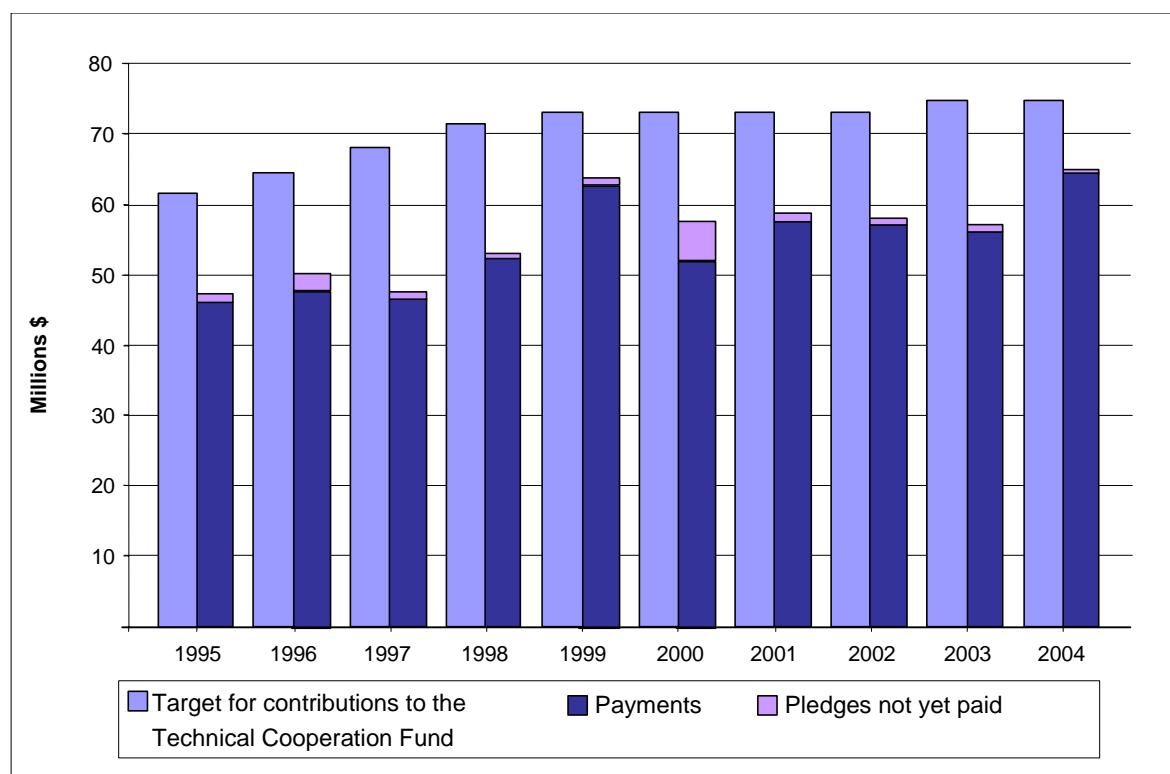
(PACT). Endorsed by the Board of Governors in June 2004 and by the General Conference in September 2004, PACT is committed to working with others to address the challenge of cancer in developing Member States in all its aspects, with particular emphasis on the provision of cancer therapy. PACT aims at saving or improving the quality of many lives of people in developing countries, mainly by expanding the Agency's fundraising efforts with non-traditional donors to help developing Member States build a sustainable capability to provide cancer therapy in the context of sound national cancer control strategies and within the appropriate legal, regulatory, security, and safety frameworks. The Secretariat is working on PACT programme development and implementation, including technical analysis, building public awareness, and development of partnerships and alliances.

48. The river Nile is one of the world's great rivers and traverses almost 6 700 kilometres from its farthest sources at the headwaters of the Kagera river in Burundi and Rwanda, to its delta in Egypt on the Mediterranean Sea with ten countries sharing this common water resource. The Nile Basin Initiative (NBI) was established in 1999 to address issues affecting the river Nile within a basin-wide context. To enhance Member States' capability to meet the Shared Vision of the NBI: "to achieve sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin resources", the Agency is supporting a regional project using isotope techniques for establishing the water balances of Lake Victoria, of the Blue Nile Basin and the High Dam to the Delta. This will add to a comprehensive hydrological picture of the Nile Basin to be used for management purposes. Similar projects involving the assessment of large, shared water resources are being supported by the Agency, and this is viewed as an important strategic direction for the Agency-supported programme using isotope hydrology in the Africa region.

49. Creation of tsetse-free zones requires concerted action by Member States themselves together with many partners over several years. This work needs to include the appropriate policy, institutional and technological interventions, together with substantial human resources and financial commitments. Aware of the extent of the challenge, Africa and its international partners have renewed their efforts to address the problem of the tsetse fly and trypanosomiasis. During the past year, the Agency conducted a thorough review and re-assessed its role in supporting national and regional goals to create tsetse-free zones by contributing, where feasible and justifiable, the SIT component to area-wide campaigns against the tsetse fly. A clear policy and guiding principles for its future activities were established. In its partnership with African Member States, the Agency will continue to focus on its role and contribution based on its mandate to support the application of nuclear techniques where they have a particular and valuable contribution to make, and on its scientific, technical and project management expertise.

50. For the Secretariat's assistance to be effective, it must be well planned. The availability of funding, in the form of a predictable and stable resource base, is an important factor in that planning. As Figure 2 shows, pledges and payments do not meet the target as set by the Member States. Since 1994, the number of Member States pledging at the General Conference has remained about the same, but the percent of the target pledged has gone from nearly 20% to less than 12%. The unpredictability of the TCF is a significant factor in not fully meeting the expressed needs of the Member States as approved in the TC programme. If the Secretariat were confident that the TCF target, or at least that a certain percent of that target would be met by the end of each year, the Secretariat would be able to better plan and implement projects with realistic work plans and budgets. This is why it is so important for Member States to pledge to the TCF target and pay on time.

**Figure 2. TCF Target and Contributions
with the Status at 31 December of Each Year: 1995–2004**



51. The overall implementation rate for 2004 was only 68%, showing a decrease from the previous year of 72%. This decrease can be attributed to many factors, including the following:

- The prevailing global security concerns adversely affected implementation of activities involving travel, such as fellowship training, training courses, meetings and fielding of expert missions. Many of these issues are due to the increased difficulty, or in some cases, impossibility to obtain visas. The Secretariat does not have much control over this matter, but has tried to alleviate the difficulties by increasing the lead-time for implementing activities, which in turn lowered the implementation rate for the year.
- Major footnote-a/ projects with assured funding in a Balkan State suffered setbacks due to institutional instabilities.
- Several key posts in the programming sections (including the Section Heads of the East Asia and the Pacific and West Asia regions) remained unfilled for a full year pending restructuring of the Department. This has meant an increased burden on staff and a challenge for management to pay close attention to project implementation issues.

52. Effort and management attention are being increased to overcome these challenges and shortcomings in 2005.

53. The decision to replace assessed programme costs (APCs) with the new national participation costs (NPCs) was made during the June 2004 Board of Governors meeting. All Member States receiving support from the TC programme were informed of the NPC payment due by January 2005 before the commencement of projects. The Secretariat is strongly encouraging timely payment of the NPCs to assure full implementation without undue delays.

B. Programme Accomplishments and Impact during 2004

54. It takes the accumulation of project activities to make a significant impact on a community, country, or region. This section highlights some of the activities and accomplishments of the TC programme during 2004, by region and thematic area.

B.1. Africa

55. In 2004, the TC programme in Africa was implemented in 30 Member States, among which 14 are least developed countries.

56. As part of the effort to further enhance planning of the programme, CPFs were signed for Algeria, Democratic Republic of the Congo, Egypt, Ghana, Kenya, Mali, Niger, and Zambia. Furthermore, CPF consultations at various levels of advancement were underway in other countries, including Burkina Faso, Eritrea, Gabon, Nigeria, South Africa, and the United Republic of Tanzania.

B.1.1. Human Resource Development Strategies and Management

57. As in previous years, human resource development continued to receive emphasis as the main vehicle of technology transfer through national, regional and interregional projects.

58. Under AFRA project RAF/0/014, Promoting National and Regional Self-reliance in Nuclear Science and Technology (AFRA V-2), two regional training workshops held in South Africa and Tunisia provided decision-makers and managers of national nuclear institutions and national regulatory authorities assistance to finalize their national strategic plans or business plans to continue the transformation of their institutions into sustainable ones.

59. In cooperation with the United Nations Industrial Development Organization (UNIDO), an AFRA regional project provided specific training programmes for quality management using nuclear and related technologies, including quality assurance and quality control measures.

B.1.2. Creating Tsetse-free Zones and Controlling Crop Insect Pests Using SIT

60. In Ethiopia, Agency assistance is focused on the Southern Tsetse Eradication Project (STEP). In anticipation of the eventual SIT operations, the field team is now suppressing an area of about 12 000 square kilometres using insecticide-impregnated targets and insect repellents that are poured on cattle. According to preliminary reports on the impact of the tsetse suppression efforts made by the project team, milk yield has generally doubled and in some cases even trebled, cattle sale prices have increased four-fold on average due to the greatly improved condition of cattle, the mortality of cattle has decreased from a high of 10% to less than 3%, the number of cattle needing veterinary treatment has decreased by 60%, and ploughing hours have increased from two hours a day to seven hours a day, on average.

61. South Africa has been active in the development and implementation of SIT for the control of fruit flies. Initial involvement was solely with respect to SIT for the Mediterranean fruit fly (medfly), which is one of two species of economic importance in the Western Cape. Following the successful SIT fruit fly pilot project which covered 10 000 ha in the Hex River Valley, sterile medflies are now also being routinely released in the Elgin and Villiersdorp areas and in the Riebeek Valley area. Three other production areas, including one across the border in Namibia, have expressed an interest in using SIT to control the fruit fly. All fruit fly SIT rearing and release activities are now carried out by a

commercial company, SIT Africa (Pty) Ltd. In addition, under project SAF/5/007, Expanding the Use of the Sterile Insect Technique against Fruit Pests in the Western and Northern Cape, SIT activities continued to expand to include the codling moth and false codling moth, both key pests to fruit in addition to the medfly.

B.1.3. Improving Animal Health and Promoting Livestock Production

62. Under the TC programme, one area of focus in Africa has been on developing a regional capability for the production and distribution of diagnostic kits for the detection of rinderpest. With the technical backstopping and support from the International Laboratory of Molecular Biology for Tropical Disease Agents (ILMB) at the University of California, Davis, the advanced molecular biology technique necessary to produce these kits was transferred to Africa for the production of the indirect enzyme linked immunosorbent assay (iELISA) for the detection of rinderpest virus antibodies in livestock. This sensitive kit allows vaccinated animals to be distinguished from infected animals. In January 2004, the World Organisation for Animal Health (OIE) accepted the rinderpest iELISA as a sero-surveillance test.

B.1.4. Strengthening Human Health Capabilities

63. In Algeria, the Agency assisted the Central Army Teaching Hospital and other centres to upgrade nuclear medicine services and to further use the perioperative scintiprobe technique for the surgical management of a number of benign and malignant tumours. As a result, nuclear medicine services in the country were improved and expanded, permitting more patients to be treated within the country.

64. Agency assistance contributed to establishing in vivo single photon emission computed tomography (SPECT) based nuclear medicine capabilities and to upgrading radioimmunoassay (RIA) based services in several countries. In the Democratic Republic of the Congo, under the project ZAI/6/008, Upgrading Nuclear Medicine Services, the University Clinic in Kinshasa has been assisted in establishing nuclear medicine services in a phased approach. In the first phase, an RIA capability has been developed for the measurement of the most common hormones (TSH, FT3 and FT4). An in vivo simple planar gamma camera-based nuclear medicine service was also set up, and the project team performs thyroid, bone and renal scans. Recently, the nuclear medicine capability has been upgraded through the provision of a SPECT system, which was successfully commissioned, and preliminary nuclear medicine studies are under way.

65. In Cameroon, a SPECT system was established at the Yaoundé General Hospital, and heart disease and cancer patients can receive diagnostic services. Under project CMR/6/005, Improving In Vitro Nuclear Medicine Diagnostic Services at the Medical Research Centre, Yaoundé, the Agency assisted the endocrinology and radionuclide laboratory in enhancing services using both bulk reagents and kit-based reagent techniques.

66. In Mauritius, the first full-fledged in vivo SPECT-based nuclear medicine facility has been established at the J. Nehru Hospital. Heart, lung, kidney and cancer patients can now receive diagnostic services. Specific nuclear imaging examinations include scintimammography for breast cancer, lung perfusion for pulmonary embolisms and gastro-intestinal studies.

67. In Sudan, better control of malaria is a priority. Through a TC project, molecular methods coupled with the use of isotopes were useful in the early detection of asymptomatic carriers in Sudan. Isotope-based molecular techniques were successful in reducing malaria prevalence by 63.3% in a village chosen for intervention. Malaria prevalence was 16.7% in the studied site where treatment for asymptomatic carriers was implemented, compared with 43.1% in the control village. Results from this study were recently acknowledged in a report by the WHO's Special Programme for Research and Training in Tropical Diseases (TDR), which highlighted that the study provided evidence that

administration of “Fansidar and primaquine” to polymerase chain reaction (PCR) positive individuals in the dry season could significantly reduce the prevalence of malaria during the transmission season.

68. In support of Nigerian Government efforts to strengthen the national network for radiotherapy services, the Agency assisted the Ahmadu Bello University Teaching Hospital (ABUTH) in Zaria, to establish a referral radiotherapy facility under two TC projects. In addition, the Agency assisted the Government in developing a comprehensive national planning framework to address the issue of cancer control countrywide including prevention, early diagnosis, curative treatment and palliative care, all fully integrated into the practice of radiotherapy in relevant hospitals. A six-year national action plan for improving radiotherapy and cancer control was formulated to strengthen the delivery of radiotherapy services.

69. Improvement of radiotherapy services in Korle-Bu, Accra, Ghana, as well as clinical applications using brachytherapy and orthovoltage X-ray equipment suitable for the treatment of superficial and shallow tumours have been introduced. Further achievements made by the radiotherapy service in Ghana include the organization of postgraduate training in radiation oncology under the auspices of the Ghana College of Physicians and Surgeons, and training of radiation therapy technologists at the College of Health Sciences of the University of Ghana.

B.1.5. Protecting the Marine and Terrestrial Environments

70. Under regional project RAF/7/004, Contamination Assessment of the South Mediterranean Sea, the Agency supported two sub-regional sampling campaigns and training cruises; one in June 2004 along the southern Mediterranean Algerian and Tunisian coasts using a research vessel from Algeria, and the other in October 2004 along the Egyptian coast using an Egyptian vessel with participants from Egypt, Lebanon, Libyan Arab Jamahiriya and Syrian Arab Republic. Marine samples were collected for evaluation of radionuclides, organic and inorganic contaminants in the sea. Results of the project were presented at the International Conference on Isotopes in Environmental Studies – Aquatic Forum 2004, organized by the Agency’s laboratory in Monaco.

71. The Agency continued to assist Nigeria in carrying out hydrological investigations using isotope techniques. The groundwater problems of the Chad basin aquifers were addressed with particular emphasis on the water supply of the city of Maidiguri, capital of Borno State, to better understand the flow regime and recharge conditions of the multi-layered aquifer of the Chad formation and to determine the relationship between the Lake Chad waters and the contiguous aquifer system. Further assistance in this field of activity has been provided to Mali, Niger and Nigeria under the new regional project on development of water resources in the Iullemeden aquifer system (RAF/8/038) in collaboration with UNESCO’s International Hydrological Programme (IHP) and the Observatory of the Sahara and Sahel (OSS).

B.2. East Asia and the Pacific

72. The TC programme in the region continued to address the needs of 17 Member States, mainly in the energy, agriculture, human health, industrial, environmental and water resource sectors. In each of these sectors, nuclear technologies are being successfully applied to address priority problems through national, regional and interregional projects.

B.2.1. Improving Livestock Productivity

73. Member States participating in an RCA regional project to improve animal productivity and to make animal reproduction more efficient succeeded in introducing medicated urea molasses multinutrient blocks for controlling internal parasites and supplementing low quality feed. Out of the 47 new feeds evaluated by participants of the project, 39 have been identified as having improved potential as animal feeds. The new feeds have been introduced to farmers in five Member States. The project has substantially contributed towards improving livestock productivity and increasing the production of food from animals, especially milk and meat, hence leading to enhanced income levels of farmers.

B.2.2. Eradicating Transboundary Animal Diseases

74. The last outbreak of rinderpest in Myanmar was in 1957 and mass vaccinations continued until 1961. Since then, Myanmar has been operating an efficient disease reporting and disease surveillance system and undertaking extensive clinical and serological surveillance to prove the absence of rinderpest. As a result, Myanmar in 2004 became eligible to apply for recognition of freedom from rinderpest infection based on the 10-year rule. Through assistance provided under project MYA/0/006, Myanmar is finalizing a dossier for immediate submission to the World Organisation for Animal Health (OIE) in 2005.

B.2.3. Increasing Crop Productivity

75. In Indonesia, hundreds of mutant sorghum lines have been tested against severe drought. Eight mutant sorghum lines were found to be high yielding with better biomass or vegetative growth compared with the parental lines. These promising mutants could be an excellent source for alternative food and feed, and research on seed multiplication and multi-location trials are being conducted prior to the release of these varieties.

76. In Myanmar, drought and salinity are the main constraints to rice production especially in the coastal area. Radiation-induced mutation is conducted to create desired traits in traditional rice varieties that are tolerant to salinity and drought. Of the five salinity-tolerant mutant lines tested, two show promising performance. Large quantities of seed are being produced for larger field tests in 2005.

B.2.4. Improving the Quality of Healthcare Services

77. The National Cancer Centre in Ulaanbaatar, Mongolia, is the only institution providing radiotherapy services to cancer patients in the area. The centre needed to introduce a quality assurance (QA) programme in response to the requirements of the international Basic Safety Standards (BSS). Daily and weekly QA procedures were developed and used by the team consisting of a radiation oncologist and a medical physicist. Physicians and medical physicists were trained in various QA procedures.

78. The increasing demands for cancer diagnosis and treatment has led the Banjarmasin Provincial Authority to establish the first radiotherapy centre on Borneo Island, Indonesia. With Agency support,

the centre was established at the Ulin General Hospital. Civil work is in the final stage, with a contribution of more than \$250 000 by the local authorities to support the facility. The Agency will provide the centre with a new Cobalt-60 radiotherapy machine to start the treatment. To ensure safety and effective operation of the facility, training of personnel is continuing. The local government demonstrated strong commitment and cooperation, which is the key factor for success and sustainability of the efforts.

79. During the last three years, a project was implemented in Thailand to develop QA procedures for radiotherapy and support the calibration of dosimeters and radiotherapy machines. As a result of the project, the radiotherapy QA programme has been adopted throughout Thailand, and physicists use the same set of protocols.

80. In 2004, the Agency, in collaboration with the Republic of Korea, developed a standard curriculum for training on production of cyclotron-produced radioisotopes. The Korea Institute of Radiological and Medical Sciences (KIRAMS) has experience and facilities in this area and is willing to host group fellowship training in the future.

B.2.5. Combating Air Pollution

81. An RCA regional project led to the better understanding of sources of air pollution, which are specific to each individual country. National regulatory organizations and environmental agencies which are responsible for controlling air pollution, as well as setting standards and making policy decisions, have been using the air pollution data generated under the project. The project also demonstrated that the banning of two-stroke engines in Bangladesh in 2002 had a significant impact on local airborne particulate matter pollution by reducing the particulate matter level by approximately 40%.

B.2.6. Understanding Water Resources and Environment in Geothermal Areas

82. A general understanding of recharge and discharge between the Black River in China and the adjacent shallow aquifers was achieved through three sampling campaigns using isotope hydrology techniques during 2004. As a result of these campaigns, river water in the middle stream was identified as being strongly influenced by the irrigation runoff from agricultural activities. Isotope data also indicated that there is a deep-seated aquifer that is not linked to the shallower one. Further investigation of this deep-seated aquifer is essential for the overall assessment of water resources in the Black River catchments, which is to be achieved in the 2005–2006 programme cycle.

83. By investigating water resources and the environment in geothermal areas in the East Asia and the Pacific region, participating Member States have acquired the capability to apply isotope techniques, such as artificial radiotracers tritium and sulphur-35, in the management of their geothermal reservoirs. Benefits of the investigations were extended to seven geothermal fields, and as a result, the total installed electric power generation capacity grew to 1320 MW(e). Participating countries carried out isotope investigations on a total of 33 new geothermal prospects using isotopes such as oxygen-18, deuterium in water and sulphur-34, as well as carbon-13 in water and gas samples. Hydrological information generated under the project includes identifying the origin of geothermal fluids and labelling the reservoir temperatures, which is essential for planning further development of the geothermal resources.

B.2.7. Introducing Advanced Nuclear Techniques for Industrial Applications

84. Under the regional project RAS/8/091, Process Diagnostics and Optimization in Petrochemical Industry (RCA), inter-well tracer test (IWTT) technology was further developed and promoted to oil companies in China, Pakistan and Vietnam for routine service. In China, IWTT was applied to more

than 200 well groups and it generated an annual increase of about \$2 million. According to a recent survey, industries in Thailand saved \$10 million over a period of five years by reducing the productivity losses through the use of radioisotope techniques, introduced through this project and previous RCA projects in this area.

85. In Malaysia, advanced non-destructive testing (NDT) techniques are being transferred to the Malaysian Institute for Nuclear Technology Research (MINT). In 2004, with Government investment, the NDT laboratory infrastructure was improved through the establishment of new facilities and the purchase of new equipment. Working procedures for advanced NDT methods are being prepared with Agency assistance, and syllabi for an advanced NDT methods course have been drafted. The NDT laboratories at MINT have already been accredited in accordance with Quality Management System ISO 90001:2000 for radiography and ultrasonic testing services.

B.3. Europe

86. During 2004, the emphasis of the TC programme in Europe was to further strengthen the cancer management capacity, strengthen the safety and security infrastructures in Member States towards complete self-reliance, and to accelerate the highly enriched uranium (HEU) research reactor fuel return programme. Ten Member States (Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia) joined the European Union in May 2004 and decided voluntarily to increase their share of contributions and government participation in project financing and implementation.

87. The 2005–2006 programme in Europe relied heavily on CPFs jointly completed and formally signed with Member States for programme formulation. By the end of 2004, 26 Member States in Europe had signed CPFs.

88. One other major achievement demonstrating the real ownership of the TC programme in Europe by the Member States was significant government cost-sharing of the new projects. Almost \$3 million was received from ten Member States in Europe for cost-sharing their projects. This follows the experience of the last six years, which have seen an increase in direct financial transfers to the project budgets by the participating governments.

B.3.1. Expanding the Scope of Cancer Therapy and Diagnosis

89. Cancer rates are rising and the TC programme in Europe strives to assist Member States in their effort to resolve this growing and major health concern. The Agency has a longstanding role in cancer diagnosis and treatment, and since 2000, has supported Member States in Europe with more than \$15 million of support through the TC programme. Diagnostic radiology and nuclear medicine are needed for diagnosis, while surgery, chemotherapy and radiotherapy are the optimum curative therapy approaches for most types of cancers.

90. During 2004, there were 24 active national projects in the field of cancer management, including 18 related to radiotherapy and 6 on nuclear medicine. National health priorities in the Member States were addressed and training and essential equipment were provided through government cost-sharing to Member States in response to their urgent needs in the field of cancer management. A linear accelerator was supplied to the National Oncological Centre in Yerevan under Armenia's national project, which is aimed at improving the effectiveness of radiotherapy services. In the Republic of Moldova, a computed tomography (CT) system for radiotherapy was provided to the Moldovan Oncological Institute under the scope of a national project. In addition, the Mother Tereza Hospital in Tirana, Albania, received a new cobalt-60 teletherapy machine. The machine is expected to treat 1000 cancer patients per year from both Albania and the neighbouring countries in the region.

B.3.2. Global Threat Reduction Initiative and Accelerated Return of Fresh HEU Research Reactor Fuel

91. The Agency has helped to enhance the general safety of ageing research reactors and spent fuel storage in selected countries for more than two decades. In 1999, the US Department of Energy initiated a funded programme to help repatriate Russian-origin fuel, the 'Tripartite Initiative', which involved the Agency, the Russian Federation and the USA. This effort intends to return Russian-origin research reactor fuel to Russia for management and disposition. In May 2004, the Global Threat Reduction Initiative (GTRI), expected to accelerate the highly enriched uranium (HEU) fuel repatriation activities, announced the US Government pledge of an additional \$3 million through the TC programme for Agency-supported activities. In response, the programme for 2005–2006 was streamlined; all activities involving the return of HEU fresh fuel to the country of origin are consolidated in one Europe regional project, RER/4/028, while new national projects are created for subsequent core conversion activities.

92. To date, the Agency, based on Member States' requests and within the context of approved projects, has supported activities related to repatriation, management and possible long-term storage of fresh HEU fuel on five occasions. The first tripartite shipment took place in September 2003, when fresh HEU fuel from the Magurele research reactor in Romania was returned to the Russian Federation. As a complementary activity in October 2004, the Agency assisted the USA and France in supplying Romania with new fuel to finish the conversion of the reactor from HEU to low enriched uranium. The second shipment took place in December 2003, with approximately 17 kg of 36% HEU removed from the IRT research reactor in Sofia, Bulgaria. In March 2004, the third fresh fuel shipment from the Tajoura Nuclear Research Centre near Tripoli, Libyan Arab Jamahiriya, was shipped to the Russian Federation. The fourth shipment took place in September 2004, when approximately 10 kg of fresh reactor fuel was transported from Uzbekistan to the Russian Federation. The fifth shipment took place in December 2004, when fresh nuclear fuel was shipped from Czech Republic back to the Russian Federation. In all cases, the Agency offered its technical and management services in terms of technical advice, training, contract drafting and negotiations, safeguards inspections, and application of transport safety standards to ensure that efficient preparatory steps were taken in the country and that the transfer was managed safely and securely.

B.3.3. Assisting Chernobyl-affected Areas

93. Although the accident occurred nearly two decades ago, assistance for decommissioning, waste safety and physical protection of nuclear materials, prevention of illicit trafficking of radioactive materials in the Chernobyl Exclusion Zone, and for the mitigation of radiological and socio-economic consequences of the Chernobyl accident are still priority areas for the TC programme.

94. In 2004, the Europe Section managed four national and one regional project related to Chernobyl. As a result of the successful implementation of the national project in Belarus, a pilot flour production line was commissioned at the milk-processing factory in Khoyniki, Gomel region. It operates a capacity of approximately 500 kg of wheat or rye per hour. The radiological laboratory at the plant is in full operation, taking samples of the local grain, with strict monitoring for strontium-90 and caesium-137 content.

B.3.4. Implementing the First Cycle of Nuclear Security Projects

95. In 2004, the first biennium cycle on nuclear security projects was completed under the joint management of the Office of Nuclear Security (NSNS) and the Department of Technical Cooperation with primarily footnote-a/ funding from the Nuclear Security Fund. The majority of activities were carried out under the TC programme in Europe with 11 national and 5 regional nuclear security-related projects. The projects aimed at strengthening the national infrastructure needed for combating illicit trafficking of nuclear and other radioactive materials, the national physical protection framework and control over radiation sources in the targeted countries. In addition, one regional project was formulated for each of the other regions to raise awareness and address specific concerns of the Member States.

96. While regional projects were more oriented towards regional training courses, coordination and networking, the national projects focused on specific border crossings, facilities and institutions in individual countries. Substantial assistance was provided through national projects in Azerbaijan, Belarus, Bosnia and Herzegovina, Croatia, Georgia, The Former Yugoslav Republic of Macedonia, Turkey and Ukraine. In 2004, tangible results in building model detection systems at selected border crossings were obtained in Azerbaijan, Belarus, Bosnia and Herzegovina, and Georgia, where the Agency provided relevant detection equipment and training.

B.4. Latin America

97. The Latin American region continued the trend of concentrating its efforts on the implementation of the Technical Cooperation Strategy and utilizing the logical framework methodology for formulating TC projects, including ARCAL regional projects. The methodology was applied to assist the national liaison officers' assessment and prioritization process. The results of the appraisal and approval process for 2005–2006 cycle showed a clear advance in the linkages of the national project proposals with the prioritized needs at the country level as specified in the CPFs.

98. During 2004, an increased number of the human resource activities were implemented, demonstrating the region's potential in TCDC: 74% of the expert missions were implemented with experts from the region (Argentina, Brazil, Chile, Cuba and Mexico), 70% of all awarded fellowships and 63% of all scientific visits were executed in Latin American institutions, mainly by Argentina, Brazil, Cuba, Mexico and Uruguay.

B.4.1. Combating Environmental Pollution Using Isotope Techniques

99. Reliable and precise monitoring of air pollutants using isotope technology has received increasing attention from developing countries. Air pollution in Mexico City causes around 12 000 deaths per year, with trends showing children and the elderly increasingly treated for respiratory diseases. Through technical cooperation, the Agency has teamed up with local scientists and regulatory authorities, and in the past two years, isotope technologies have been used to analyse air samples collected from 15 monitoring stations across the city. These nuclear techniques provide important new data about the size, type and level of contaminants in dust particles suspended in the air. Through this data, scientists and health authorities can better understand and tackle the health dangers associated with pollution, such as cancer and respiratory diseases.

100. Cuba has also established a system to control pollution generated by the sugar industry by applying radiotracers. The technology is being used by more than 25 sugar production plants throughout the country, and it is estimated that a reduction of 25% of the environmental pollution generated by this industry will be achieved by the end of 2005.

B.4.2. Supporting National Medical Centres

101. Under project GUA/6/015, the capabilities of the National Cancer Institute of Guatemala have been enhanced. As a result, 2000 low-income people diagnosed with cancer are now receiving radiotherapy treatment. Cost-sharing from Guatemala in the amount of \$136 000 allowed the purchase of the necessary radiotherapy equipment to meet the demand of this highly vulnerable segment of the population.

102. A TC project complemented the efforts made by Cuba to develop and implement a low-cost technological solution for upgrading gamma cameras (IMGAMMA). Five SPECT gamma cameras were built and upgraded with the IMGAMMA system. The more extensive application of scintigraphy using gamma cameras has improved accuracy and diagnostic reliability in the nuclear medicine services of the cities of Havana, Holguin, Pinar del Rio and Santiago de Cuba.

103. Through technical cooperation, Panama has strengthened its analytical capabilities for the early detection of diseases transmitted by insects. The Gorgas Institute for Health Studies (IGGES) is one of the most advanced centres in Latin America applying molecular and isotopic techniques for the control and surveillance of diseases such as malaria, dengue, leishmaniasis and Chagas' disease, which are endemic in the country. The new technical infrastructure established in Panama has contributed to a reduction by 15% of the number of people affected by diseases transmitted by insects, particularly in the rural areas, during the period of 2001–2004.

B.4.3. Early Diagnosis of Bacteria Infections Using Isotope Techniques

104. An ARCAL regional project started in 2002 aimed at strengthening local capabilities and infrastructures to use an isotope technique, carbon-13 and carbon-14 urea breath test (UBT), for diagnosis of *Helicobacter pylori* (Hp). Hp is a bacterium isolated from human gastric mucosa that causes chronic gastritis and ulcers, and is associated with stomach cancer. Until this technique was transferred, diagnosis of the Hp bacterium had been done only by invasive techniques, such as biopsies.

105. Twelve countries have participated in this project. Three laboratories were fully equipped, with the support of the national authorities in Argentina, Chile and Mexico, to provide analytical services to all participating countries for diagnosis of Hp using UBT. In order to strengthen the human resource capabilities in the region, a training course for 26 junior scientists was organized in Mexico on how to use the technique.

106. As a result, carbon-13 UBT was standardized in all participating countries and some 15 000 samples were analysed; the carbon-14 UBT was established to diagnose infections in adult subjects in Argentina, Costa Rica and Peru. In addition, Peru developed a locally made kit that has been standardized and is now being used in public hospitals. The Research Centre for Food and Development (CIAD) in Mexico has developed a molecular biology technique that identifies two strains of Hp. These two techniques will be transferred to the other Latin American countries in the next phase of this project.

107. The work done in Latin America has received the attention of other regions, and as a result, two of the most prominent regional experts were invited to participate in training courses and seminars in Pakistan, Senegal and Thailand. The second phase of this project will focus on creating awareness at the highest health authority levels of each participating country to adopt the UBT practice in public hospitals.

B.4.4. Geothermal Energy Generation in Central America

108. Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama have been able to strengthen their technical capabilities in geothermal exploration and development for electricity production in Central America.

109. TCDC has been a key factor for the success of this regional project, while the Agency has played a catalytic role in promoting bilateral collaborations, facilitating field investigations by providing analytical services, training, expert services and upgrading laboratory capacities using the expertise available in the Central American region. The participating countries have shared valuable information, technical knowledge and experience in different areas of geothermal resource management for electrical power generation.

110. The project has contributed to the overall goal of establishing the Central American Interconnected Electric System (SIEPAC). Under the project, the Agency has provided the software Isotope Hydrology Information System (ISOHIS) for the development of a geothermal database for the region. This information network will facilitate not only a better management of data for each country, but also data exchange among the participating Central American countries.

B.5. West Asia

111. The year 2004 witnessed the appraisal process of the 2005–2006 TC programme for West Asia Member States. The process involved a detailed evaluation of the 86 national project proposals that were submitted for consideration under the Agency's programme. As a result of the appraisal and consultation process with the technical Departments and the counterparts concerned, some of these project proposals were eventually consolidated into regional projects (as in the case of radiation protection), and a total of 49 national projects were approved.

112. Significant programmatic action was undertaken in several Member States in West Asia during 2004 to develop their CPFs. Kazakhstan was the first country to sign a CPF, and eight more countries are in the process of completing their CPFs.

113. The first phase of this effort was initiated in 2004 when CPF missions, together with a wide range of in-country consultations, were launched at various levels to help the Islamic Republic of Iran, Kazakhstan, Syrian Arab Republic, Tajikistan and Uzbekistan formulate their national priorities and needs. The above exercise has resulted in mutually agreed documents that highlight the medium-term priorities for these countries and identify those areas that are earmarked for the future programme.

B.5.1. Continuing Fruit Fly SIT Projects in the Middle East

114. Since 2001, the Agency has been responsible for coordinating the activities undertaken through a grant awarded by USAID's MERC Program to control the Mediterranean fruit fly using the SIT in Israel, Jordan and the territories under the jurisdiction of the Palestinian Authority. Throughout these years, and with the assistance of the Agency, the insect pest has been successfully controlled, allowing remarkable annual increases of 'medfly-free' commodity exports.

115. Israel has now acquired sufficient knowledge to establish its own medfly production facility and to apply the technique to some fruit-producing areas of northern Israel. Jordan, which has constantly supported the project through government cost-sharing, is now considering the use of SIT to control the medfly in the Jordan Valley, and the territories under the jurisdiction of the Palestinian Authority are building up capacity for the future use of the technique. Based upon strengthened regional cooperation established during the implementation of the projects, the medfly production facility, planned to become operational in March 2005, is expected to serve the needs of existing and new

projects in commercial fruit-producing areas of the region, which has long been dependant upon the import of sterile pupae from abroad.

B.5.2. Renewed Technical Cooperation Programmes in Afghanistan and Iraq

116. Both Afghanistan and Iraq sent missions during 2004 to the Agency to restart their TC programmes, and to plan how TC activities can best be initiated to support the rehabilitation of the relevant national infrastructures, with special emphasis on human resource development.

117. The Board of Governors approved in November 2004 a new project for Iraq on human resource development in addition to the 2005 resources for those projects that were previously approved by the Board during the previous cycle. A new national counterpart was established in the Ministry of Science and Technology, and that counterpart submitted in September 2004 a number of training requests in the fields of agriculture, human health, and the safety and security of radioactive sources. These activities will address the obvious needs for Iraq's human resource development. The requests have been evaluated for implementation using available modalities to train as many candidates as possible outside Iraq.

118. During 2004, the Secretariat arranged for a team of representatives from relevant ministries and institutes of Afghanistan to visit the Agency for in-depth discussions on the possible scope and priority areas of future TC support. A national liaison officer was designated with a focus on human health (particularly cancer management) and agriculture. A new human resource development project has been subsequently approved for Afghanistan under the 2005–2006 programme as a framework for the delivery of future assistance.

B.5.3. Achieving Sustainability in National Entities

119. Access to fresh water is a major limitation to development in many of the West Asia Member States. In Jordan, through project JOR/8/007, Strengthening the Capacity of the Existing Regional Isotope Hydrology Laboratory, supported by government cost-sharing, the Water Authority of Jordan (WAJ) has acquired important equipment and expertise in the field of isotope hydrology. The WAJ is now in a position to contribute to the effective and sustainable management and analysis of the limited national water resources. Similarly, the assistance provided to Kuwait and to the United Arab Emirates, through two national projects, enabled their national authorities to gain self-reliance for assessing the artificial groundwater recharge, paving the way for sustainable management of water resources.

120. As a result of Agency support and activities, the Yazd Radiation Processing Centre, Atomic Energy Organization of Iran (AEOI), can now provide sterilization services and manufacture modified polymer products. Moreover, the centre can now utilize its facilities for supporting future regional training activities in the field of radiation processing control. Similarly, the Agency provided support to the Syrian initiative to develop radiation-processed wound dressings. During 2004, a monitoring mission found that these healthcare products had already passed clinical testing with firm plans to start pilot production by the end of 2005.

C. Financial Resources and Programme Delivery Indicators

C.1. Year Summary

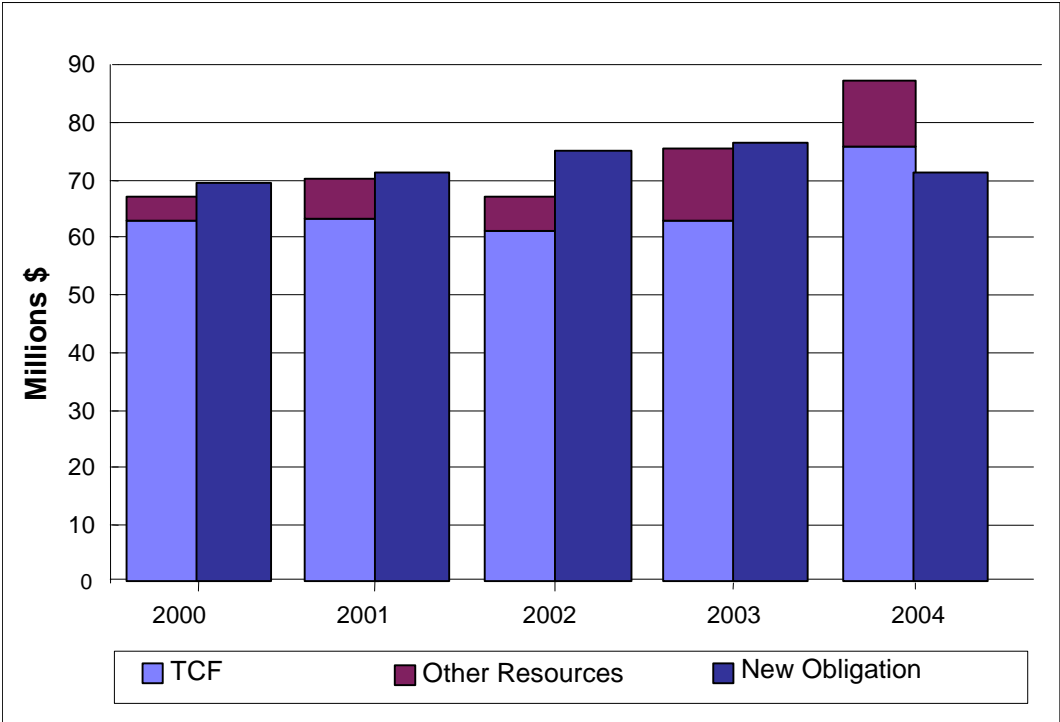
121. The financing of the TC programme continued to be a topic of discussion among Member States and in the Board of Governors, with funding remaining uncertain as the year began. However, final figures for 2004 showed a substantial increase in contributions to the TCF as compared with funds received in 2003. A combination of significant payments against prior-year TCF targets and contributions to the 2004 TCF target led to new resources totalling \$75.6 million, as compared with an amount of \$62.6 million received in 2003.

122. In addition, extrabudgetary resources provided during 2004 reached a total of \$10.9 million, down somewhat from the levels attained in 2003, but well above average extrabudgetary contributions over the past several years. In-kind contributions totalled \$0.6 million, with UNDP resources of \$20 000 being provided to finalize two projects being implemented partly by the Agency. Total new resources for the TC programme in 2004 thus reached a level of \$87.1 million, as compared with \$75.4 million received during 2003.

123. Disbursements, representing actual cash outlays, totalled \$73.3 million, as compared with \$73.2 million in 2003. Net new obligations, a financial measure of the programme set in motion during the year, reached \$71.0 million, down from the record level of \$76.1 million achieved in 2003.

124. Figure 3 provides a comparison of new TC resources with new obligations for the period 2000 through 2004.

Figure 3. Comparison of New TC Resources with New Obligations: 2000–2004



C.2. Technical Cooperation Fund

125. Receipt in 2004 of \$8.1 million against earlier target years allowed the Secretariat to reinstate, during the second quarter of the year, programme budgets that had been curtailed as a result of the lower than expected resources received in 2003. However, because of the uncertainty with regard to the level of funding of the 2004 target, care had to be exercised in implementing the programme until well into the third quarter. This left a very short amount of time to schedule the implementation of the programme with fuller resources. Once again, it has become clear that efficient implementation of the TC programme is dependent on timely indications from all Member States in regard to meeting their TCF target share.

126. The year also saw the introduction of national participation costs (NPCs), a replacement for the assessed programme cost (APC) mechanism, which was suspended in 2003. NPCs will be calculated on the same basis as APCs, but at a rate of 5% (see document GOV/OR.1097). NPCs have been applied to the TC programme as of 1 January 2005. For projects included in their national programme, Member States have the option of paying in one installment before commencement of the projects, or 2.5% before commencement and the balance of the NPCs, on the basis of actual disbursements, on project completion. In this introductory year, Member States were asked to pay by January 2005. Table A.4(b) of the Supplement to this document offers a report on funds collected under this mechanism up to 31 December 2004. It should be noted, however, that arrears remaining from the APC mechanism are still due. These arrears stood at \$5.4 million at the end of 2004.

127. Delivery of the programme funded from TCF resources, as measured by new obligations, stood at \$63.1 million by year-end, compared with \$66.2 million in 2003. The timely availability of resources was a contributing factor, with \$7 million being received against a prior-year target at the end of the first quarter, and an additional \$8 million expected as a result of indications made by Member States around the time of the General Conference in September.

128. As a result, the unobligated balance as of 31 December increased to \$18.9 million, substantially above the levels of either 2003 or 2002. Table 1 below presents a summary of these funds for the period 2000 through 2004.

Table 1. TCF 2000–2004: Structure of the Unobligated Balance (\$)

Description	2000	2001	2002	2003	2004
Unobligated balance at year end	19 901 000	17 131 000	9 968 000	6 408 000	18 865 000
Pledges not yet paid	(6 894 000)	(2 704 000)	(2 882 000)	(3 298 949)	(2 484 331)
Non-convertible currencies which cannot be utilized	(1 631 000)	(1 878 000)	(1 162 000)	(1 171 466)	(12 612)
Currencies which are difficult to convert and can only be utilized slowly	(3 281 000)	(3 468 000)	(4 382 000)	(4 280 648)	(6 179 396)
Resources which can be used for TC programme obligations	8 095 000	9 081 000	1 542 000	(2 343 062)	10 188 661

C.3. Extrabudgetary

129. As stated earlier in the report, new extrabudgetary resources received in 2004 totalled \$10.9 million. Major contribution included \$2.5 million received from the United States of America to fund various safety initiatives requested by Member States in Europe and to assist Jamaica to eradicate the New World screwworm. Japan and Australia each provided approximately \$200 000 to support activities under the Asian RCA programme. More than \$300 000, provided by European Member States, including the Czech Republic, France, Norway and Spain, was allotted to projects in Europe, Latin America, Africa and West Asia. Some \$670 000 was provided by USAID for the ongoing fruit fly project in West Asia. In addition, the Nuclear Threat Initiative supported the activities related to the decommissioning of the Vinča research reactor with contributions in 2004 of \$2.1 million. The OPEC Fund for International Development made an initial contribution of \$80 000 to support a project in Ethiopia for the elimination of the tsetse fly there.

130. More than a third of new extrabudgetary funds were provided as government cost-sharing. In addition, TC implementation mechanisms were utilized to carry out activities included in the Nuclear Security Plan of Action in an amount of \$740 550.

131. Registered in-kind contributions totalling \$635 000 in 2004 were provided by 65 countries and 4 international organizations. In-kind contributions are credited to Member States that have made available the following types of support:

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

132. Nearly half of the assistance provided was through contributions to training programmes, particularly under the fellowship programme. Just over 30% was provided in the form of expert services, with another 18% supporting meetings and seminars bringing together experts from various Member States.

C.4. Programme Delivery Indicators

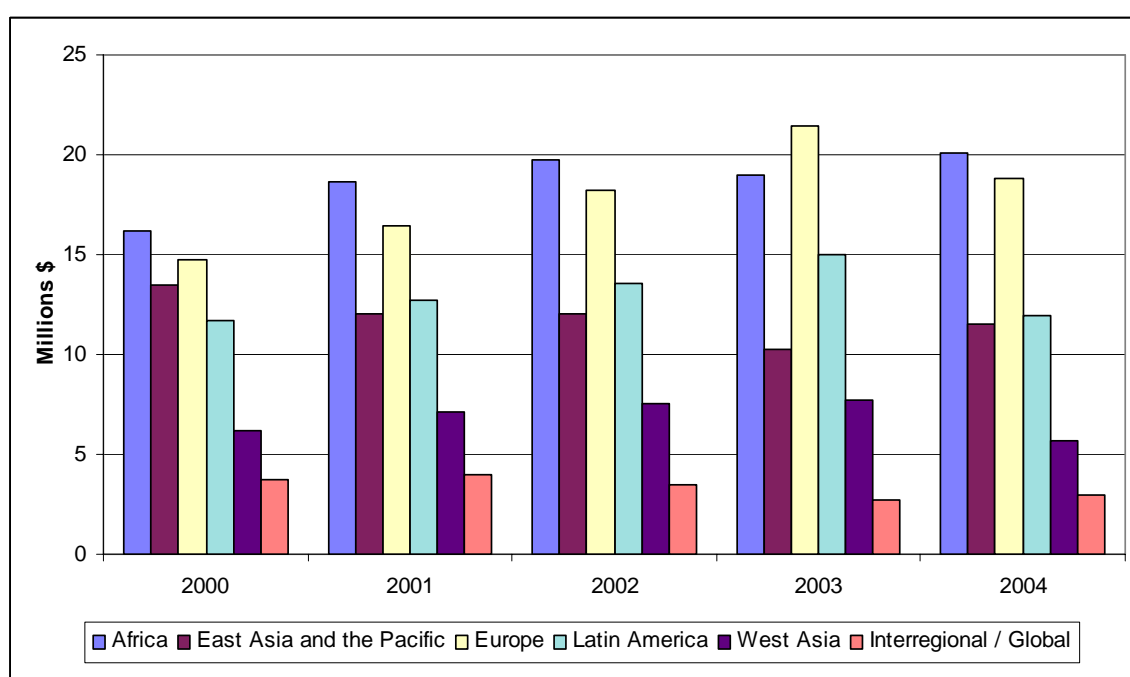
133. Delivery of the programme is dependent on a number of factors. Every implementation action requires lead time, including planning and budgeting the activity, planning and organizing at the host site, arranging for those who need to travel to implement the activity, preparing support materials and specifying, ordering, shipping and installing of equipment. As mentioned earlier in the report, the uncertainty of funding levels for the TCF made it difficult to schedule the full approved programme until well into the year, thus reducing the number of activities which could be implemented by year-end.

134. The Supplement to this document contains detailed financial and statistical data on the TC activities during the year. Table 2 contains a brief summary of financial and statistical indicators to provide a comparison of delivery of outputs in 2004 as compared with 2003.

Table 2. Delivery of Outputs: 2003 and 2004

Indicator	2003	2004	2004 compared with 2003
Adjusted Programme	\$104 893 783	\$104 244 649	(\$649 134)
Net New Obligations	\$76 072 839	\$70 955 517	(\$5 117 322)
Implementation Rate	72.5%	68.1%	
Disbursements (including In-kind)	\$73 216 576	\$73 333 502	\$116 926
International Expert and Lecturer Assignments	3 121	2 618	(503)
Meeting/Workshop Participants and National Experts	3 526	2 296	(1 230)
Fellowships and Scientific Visitors in the Field	1 409	1 444	35
Training Course Participants	2 091	2 041	(50)
Training Courses	154	151	(3)
Purchase Orders Placed	3 110	2 572	(538)
Subcontracts Issued	23	6	(17)

135. Financially, disbursement levels for all funds were higher in 2004, increasing slightly to \$73.3 million, compared with \$73.2 million in 2003. This rise can be at least partially attributed to the weak US dollar, which resulted in a higher US dollar value for many payments made in other currencies. New obligations, which reflect implementation actions set in motion during the year, stood at a level of \$71.0 million, down from \$76.1 million in 2003. Figure 4 provides a summary of new obligations by regions over the past five years.

Figure 4. New Obligations by Region: 2000–2004

136. Programme delivery by technical field based on disbursements (including in-kind delivery) is shown in the pie chart in the 'at a glance' section of this report. Safety and human health each accounted for 24% of disbursements (\$17.5 million and \$17.7 million, respectively), with food and agriculture disbursements of \$8.8 million representing the third largest category at 12%.