TECHNICAL CO-OPERATION REPORT FOR 1997

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 Co-operation Report for 1997, the draft of which was considered by the Board at its June 1998 session.

FOREWORD

The Agency's Technical Co-operation (TC) Programme faced a number of challenges during 1997: approval and implementation of the TC Strategy; moving to a new management structure and organization; non-availability of expected resources; and continued high level of implementation of the approved TC Programme. The Annual Report summarizes the Agency's efforts to respond to these challenges and also includes the activities which had previously been covered in the document *"Strengthening of the Agency's Technical Co-operation Activities".* This merger acknowledges the Secretariat's effort to implement the TC Strategy as a systematic management response to strengthening the entire TC Programme.

Part I, *Strengthening of Technical Co-operation*, outlines the steps taken to strengthen planning, design, monitoring and evaluation of TC projects. It reviews activities such as TCDC and an elaboration of the "centres of excellence" concept. The major goal for 1997 was to consolidate past TC initiatives which had provided a beacon for best practices, such as the Model Project concept, into a process covering the entire TC Programme and the full project cycle. For example, in the area of capacity building, great emphasis was placed upon sustainability – the utilization of existing facilities to ensure their relevance and viability, independent of outside support. The section also describes how the programme's operational base is being broadened to form new partnerships, using *Country Programme Frameworks* and *Thematic Planning* to meet the Member States' priority needs and expand project impact. These efforts are well under way in the current programme and, more importantly, in the development of the 1999–2000 TC biennium programme.

Part II, *Technical Co-operation Programme Performance,* covers the TC activities and gives examples of the most significant accomplishments during the year. A new organizational structure has been put in place to strengthen the TC Department's capability to plan and prioritize more rigorously, and to provide better continuity in management and control of the programme and better utilization of human resources. Collectively, these steps have facilitated the transition from "input management" to performance based management accountable for producing sustainable and relevant projects. Through these changes, the policy guidance provided by the Board has been successfully incorporated into the TC Programme. Section B sets out the status of resources and delivery of the TC programme. During the last few years, continued high implementation and less than expected programme resources underscores the need to ensure sufficient and predictable resources for the TCF.

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HIGHLIGHTS

- The Department of Technical Co-operation was reorganized and the new TC Strategy was approved, elaborating the ***Partner in Development*** concept. — para 12, 14, 15
- Systematic efforts were made to ***implement the TC Strategy*** for the entire Programme, covering the full project cycle. — para 12-17
- ***Thematic Planning*** was formulated in five areas of activity, setting out the conditions for project success and identifying possible target countries. 51 ***Country Programme Frameworks*** are now being completed. — para 20-26
- ***New mechanisms*** were established to improve programme co-ordination within the Agency, involving close collaboration with the technical divisions in the areas of nuclear safety, isotope hydrology and health. — para 9, 10, 25
- ***Project Framework Matrices*** setting out design elements and performance indicators were implemented for 36 newly approved Model Projects. — para 46
- A Model Project dealing with ***upgrading radiation protection infrastructure*** to meet the Basic Safety Standards focused on national systems of registration and inspection of radiation sources. — para 180
- The ***regional agreement*** mechanisms have contributed to TC objectives by implementing problem solving approaches, facilitating greater ownership and field management and strengthening organizational structure. — para 64-67, 80-85, 110-114
- Programme quality continued to attract donor ***extrabudgetary contributions*** and national cost sharing. — para 203, 207
- In ***Africa*** success was achieved in the area of food security.
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  - In Zimbabwe, dramatic increases in soybean production of between 72% and 502% were obtained using biofertilizers. — para 72
  - Major achievements in animal production included control of swine fever in Madagascar, proof of rinderpest elimination in Mali, and increased pregnancy rates in cattle in Tunisia. — para 70
- In ***Latin America*** there were several successful hydrological and wastewater projects.
  - In Brazil, the electron beam technique is being studied for the purification of wastewater. — para 88
  - In Venezuela, where more than 60 new wells are providing 1000 litres per second of water, management to avoid overexploitation is being studied. — para 94
  - In El Salvador, an increase of 30% in electricity production from geothermal fields was realized. — para 90
- In ***East Asia and the Pacific*** health care was fostered by Agency projects.
  - In China, a technetium-99m generator now supplies 50% of national needs with 500,000 patients a year being served. — para 125
  - In Thailand, 400,000 newborns per year are receiving neo-natal screening for hypothyroidism. — para 122
  - In the Philippines, following a survey of urinary tract infection, a nationwide preventive system for kidney disease was established. — para 123

- In **West Asia** radioisotope production, water resource management and SIT were supported.
  - Iranian radiopharmaceutical production provided diagnosis/treatment for 5000 patients per week. para 138
  - Geochemical evaluations were made and groundwater pollution studied in aquifer units in eight countries in the region. para 135
  - SIT was initiated in Israel and Jordan and collaboration was fostered between the two countries. para 143
- In **Europe** focus was on nuclear safety and nuclear power operation.
  - Increased co-ordination and cost sharing was achieved in the area of nuclear power and safety related assistance in Central and Eastern Europe. para 152, 153
  - Regionally based training for nuclear accident medical preparedness was provided to medical doctors and technicians. para 163
  - In Ukraine a milk decontamination plant became operational. para 177
- The ***Centre of Excellence*** concept was launched and proposed actions by the Agency were outlined. para 36-40
- ***New resources*** totalled US $59.4 million and total new obligations reached US $64 million. The financial implementation rate reached an all time high of 76.2%. para 187
- The ***useable unobligated balance*** dropped to one million dollars and the first overprogramming in eight years was recorded. para 200, 201
- An all time low of only 70.2% of the ***TCF target*** was pledged. para 192
- In December the 1998 TC budget provisions were not approved and overprogramming for the coming year was allowed to float above the 15% limit set earlier by the Board of Governors until June 1998. The ***final allocation for the TC Programme for 1998*** would be made at the June Board Meeting. para 195
- Measured in 1997 dollars, the total ***TC resources*** have been more or less stagnant for the last ten years. para 188

TECHNICAL CO-OPERATION REPORT FOR 1997

PART I: STRENGTHENING OF TECHNICAL CO-OPERATION

1. Background

1. The 1997 General Conference requested the Director General "*to pursue, in consultation with Member States, efforts to strengthen the technical co-operation activities of the Agency through the development of effective programmes aimed at improving the scientific and technological capabilities of developing countries, account being taken of the infrastructure and the level of technology of the countries concerned, in the fields of peaceful applications of nuclear energy, including both the applications of nuclear methods and techniques and the production of electricity"*. The Conference emphasized "*that these programmes should contribute to achieving sustainable development in developing countries and, in particular, the least developed countries".*

2. The resolution requested the Director General *"to continue to take account of the view of the General Conference on this question when requesting Member States to pledge their respective shares of the Technical Co-operation Fund target and to make timely payments to the Fund*". It further requested the Director General "*to consult with Member States on the identification of regional centres of excellence, including criteria, so as to facilitate and enhance technical and scientific co-operation among developing countries"*.

3. The General Conference also agreed that the special Strengthening Report should be merged with the 1997 Technical Co-operation Report to avoid duplication in reporting and to better demonstrate the correlation between TC Programme activities and the General Conference recommendations. In order to respond to these requests, modifications to the usual format were required.

2. Introduction

4. The first part of this report deals with actions taken to strengthen technical co-operation in response to Resolution GC(41)/13. Developments since the 1997 General Conference are covered, as are activities to promote TCDC, identify centres of excellence and the results of evaluation activities that improved the quality of the TC Programme. The second part of the report deals with the performance of operational activities during 1997.

5. The Director General was asked to report on efforts to improve the scientific and technological capabilities of Member States and to achieve sustainable development. Since these are fundamental objectives of the new TC strategy, capacity building for sustainable development is presented as a primary goal in the regional highlights sections. Thus, technical capacity is integrated with both the problem solving approach to project design and the priorities resulting from programme planning mechanisms.

3. Initiatives for Management Reforms

6. During 1997, the Secretariat made efforts to direct resources toward strengthening TC in pursuit of sustainable development in Member States. Plans for a comprehensive internal review of the efficiency and effectiveness of Agency programmes and a parallel external in-depth review of the Agency's programmatic activities were completed.

7. A Senior Expert Group was established to examine and advise on the future direction of the Agency's main programme activities, to ensure that these activities meet Member State priorities and to ensure that the Agency is the best placed institution to perform these activities.

8. The Standing Advisory Group on Technical Assistance and Co-operation (SAGTAC), during its review of the TC Strategy, recommended that *"the full nature and scope of the Agency's TC related activities, funded by both the TCF and the Regular Budget, should be … integrated within an Agency Strategy"*. SAGTAC will elaborate this recommendation during the second term, 1998–1999.

9. Several recent examples illustrate the improvements taking place in the co-ordination of different Agency programmes. For the Nuclear Safety Programme, the *"Integrated Strategy for Assisting Member States in Establishing and Strengthening their Nuclear Safety Infrastructure"* continued to work effectively, with co-operation between the Department of Nuclear Safety and the Department of Technical Co-operation. By integrating regular budget, extrabudgetary and TC funds, the Agency is providing more efficient and effective safety assistance and services to meet the priority needs of all Member States. The first TC thematic plan to be translated into an operational project was the 1997–1998 Model Project – *Upgrading Radiation Protection Infrastructure,* which aims to have in place by the end of 1998 a working system of notification, authorization and control and an inventory of all radiation sources in the 53 participating developing countries. One recent product of this collaboration was Model Legislation which provides an example of a legal framework for radiation protection and safety infrastructure for Member States seeking to meet the Basic Safety Standards (BSS) for Protection against Ionizing Radiation and for the Safety of Radiation Sources.

10. In the area of isotope hydrology, joint planning have identified priorities in Member States and resulted in collaboration on TC project activities in water resource management and in regular budget support for workshops at which Member States exchange technical information and co-ordinate backstopping activities. This effort responds to the TC Evaluation findings, which suggested a more structured framework for consultative services. The results of this approach have led to improved project design in hydrology. Follow-up missions are assessing national technical capabilities and helping Member States evaluate physical conditions.

11. TC efforts are now being directed towards two integrated activities in further strengthening the TC Programme: improved programme management by better clarification of accountability for the TC project cycle, and integration of Agency activities – extrabudgetary, regular and TCF – in order to maximize the benefits of technical co-operation for Member States. Such programme integration is the next major challenge for strengthening technical co-operation.

4. Implementation of the TC Strategy

12. The Technical Co-operation Strategy (GOV/INF/824) was presented and discussed at the 1997 TACC meeting, and approved by the Board of Governors in December. The Strategy elaborates the *Partner in Development* concept as a set of objectives aimed at maximizing the role of nuclear science and technology in sustainable development in Member States. These objectives recognize that nuclear science and technology provide

important tools for national development, and TC should systematically promote the most efficient and effective means that can demonstrate tangible social and economic benefits.

13. The success of the use of Model Project design and selection criteria is now fully integrated into the TC process. The next phase for strengthening TC is systematic implementation of the strategic objectives, a process that is well under way. Formal country and Thematic Planning mechanisms have been implemented to help focus activities and align Agency and Member State priorities; the introduction in July 1997 of quality standards for project planning and design; a newly developed system for project monitoring, to become operational in 1999–2000; and the integrated evaluation methodology, have been developed, tested and applied as reported last year. These steps have strengthened TC by facilitating the transition from "delivery" based management to a "performance" based management system, accountable for sustainable and relevant project results, leading to social and economic benefits for Member States.

14. In order to better integrate the TC process, functional responsibilities and organizational structure, the Director General presented to the March 1997 Board the results of a TC departmental study to determine restructuring options to enhance management effectiveness and efficiency. The chosen option called for an integration of the programming and implementation functions along the lines of regional areas which offered several advantages: a sharper country focus; greater continuity in the management and control of the TC cycle; and better workload distribution and utilization of human resources.

15. The TC Department restructuring plan was implemented in September 1997 in a cost-neutral manner through the redeployment of staff members without change in grade. The major structural change was the creation of a third division, the Division of Planning, Co-ordination and Evaluation, to strengthen the Department's general managerial capabilities for pre-programme activities such as long and intermediate range planning and to ensure that standards and policies are well integrated. The change combined evaluation, programme co-ordination and information management that had previously functioned directly under the DDG-TC, under the new division's management. A new Section for Concepts and Planning was also created within the new division, with the responsibility for implementing the TC Strategic Plan and ensuring that policy issues raised by the Board and Member States are properly implemented throughout the TC Programme.

16. With new management tools and the departmental reorganization, the Secretariat is prepared to strengthen TC through *quality* management of the TC programme throughout the project cycle – from project identification to systematic and integrated evaluation and impact assessment upon project completion.

17. As a result, projects to be proposed for approval by the Board for 1999–2000 will meet design standards that include specified objectives, detailed workplans, measurable outputs and performance indicators. These projects will be monitored not only for financial disbursement (implementation) but also for performance against the agreed workplan. Work planning is assigned high priority because it provides an organizational frame for tasks, scheduling "milestones" and detailed responsibilities for Project Officers, Technical Officers and counterparts. It also provides the basis for systematic programme monitoring and progress reporting.

5. Regular Training Courses

18. Training is a critical component of national and regional capacity building that is being aligned with the problem solving and performance management approaches. The Forecast of Interregional and Regional Regular Training Courses for 1998–2002 (GOV/INF/825), presented to the Board in December 1997, proposed a gradual integration of human resources development with TC programming objectives. With the Board's approval, the number of basic or general training events was reduced for 1998, while training activities in national and regional TC projects increased correspondingly. In effect, the same level of

training if not more will be delivered in 1998 as in past years, but regular training courses are gradually becoming more integrated with TC planning mechanisms such as CPF and Thematic Planning.

19. New guidance is being developed for inter-country human resources development, emphasizing training based on practical problems relevant to Member States' priorities and objectives. This development will be accomplished through project planning and design standards and managed in line with performance criteria. This guidance also seeks to ensure that project based human resources development activities increasingly rely upon national/regional institutes to deliver training activities. In the meantime the Agency's role will evolve into monitoring the quality of the training and sustaining the results of training through country programme activities.

6. Country Programme Frameworks (CPFs)

20. The foundations for country planning are now well in place with the benefit of two years experience and the consolidation of new CPF guidelines and "best practice" examples. The process is being followed in most recipient Member States as part of programme development for the next TC cycle (1999–2000). The pre-programme activities are now focused on the CPF objectives. As a result, more country submissions are better focused and more clearly integrated with national development objectives. One example of this took place in Tunisia. An Agency mission visited Tunisia to revise the existing CPF document in accordance with the new Government's programmes and priorities. The mission also assisted in the conceptual design of environment related project proposals which could be implemented through cost sharing between the Government and the Agency (marine pollution monitoring, sediment transport studies and radiation treatment of sewage) for agricultural purposes. Additional examples are provided in the regional highlights section.

21. The CPF process continues to be a major effort for Member States and the Secretariat, but emphasis is shifting to the final product: formal agreement and commitment by the relevant government authorities. In total, 51 CPFs are in various stages of realization. This process ensures focus on higher value activities where project impact can be sustained and multiplied through partnerships with national and international organizations.

7. Thematic Planning for Technical Co-operation

22. During the current TC biennium, programme managers have sought to focus country programmes on national priorities and development programmes where nuclear techniques have demonstrated value. The country planning process has demonstrated that, in non-nuclear power countries, priorities in radiation safety and waste management are readily identifiable. However, the value of many applications have to be verified on a case-by-case basis despite individual success stories.

23. The concept of TC Thematic Planning was introduced to establish programming priorities by providing both direction and clear objectives for TC Programming based upon projects which demonstrate success or significant value to Member States. Therefore, the activities chosen for Thematic Planning are either mandated safety related areas or follow successful Model Projects. The importance of thematic objectives is that they establish areas of accountability for timely and successful solution for common but high priority problems in Member States. In effect, this planning brings together demand (priority problems), supply (existing capacity and expertise) and value (demonstrated success), and thus enhances the relevance and sustainability of the TC Programme.

24. With the active collaboration of technical divisions and representatives of Member State institutions, TC thematic plans are being developed in radiation protection, nuclear

safety, RIA for neonatal screening, rinderpest eradication, and isotopic investigations of human nutrition. Two of these reflect plans for interregional projects in radiation protection and the eradication of rinderpest from Africa, but have common characteristics with the TC thematic plans because they set programme objectives, define preconditions for successful national programmes and align human and other resources to achieve the objectives. Thematic plans provide a clear framework for project appraisal; they set out the conditions necessary for success and identify possible target countries which could benefit from future technical co-operation – a potentially important input to the CPF. They also provide resource mobilization opportunities and help guide staff training and recruitment activities.

25. The Thematic Planning process has demonstrated its value as a joint planning tool for harmonizing programme objectives and resources. For example, three out of four major TC activities in human health are to be covered by thematic plans during 1997–1998. In the area of quality assurance in radiotherapy, inter-departmental programme integration has been strengthened. A co-ordinated effort is taking place integrating a TC evaluation of quality assurance in radiotherapy with a RIHU programme evaluation on radiotherapy regular programmes. This joint assessment with the appropriate co-ordinated follow-up is intended to improve radiation dosimetry and clinical practices in Agency supported facilities.

26. Additional thematic plans are under development: waste management technology; isotope hydrology studies in urban groundwater; artificial recharge and dam leakage; radiation sterilization of tissue grafts; development of nitrogen fixing biofertilizers; SIT for tsetse fly, fruit fly and screwworm eradication; supplemental feed for ruminants; diagnostic services for livestock reproduction and quality assurance of nuclear analytical techniques.

8. New Partnerships

27. In line with the TC strategy to broadly engage the international community in support of national programmes, multiple efforts continued throughout the year to strengthen partnerships with bilateral donor organizations and within the UN System. At the field level, the impact of TC projects has been enhanced through linkages with the operational activities of other agencies. During 1997, this applied particularly to sectors where nuclear analytical techniques can provide useful contributions, such as hydrology or nutrition studies. For instance, a 1997 CPF mission to Senegal led to a proposal to use nuclear techniques to evaluate a community nutrition programme supported by the World Food Programme (WFP) and the World Bank. A joint project formulation activity with UNICEF is being planned which is expected to lead to a pilot study during 1998 on the efficacy of iron and zinc supplementation in food products in Indonesia. Programme co-operation discussions are also under way with the United Nations Educational, Scientific and Cultural Organization (UNESCO) on water resource management in Sub-Saharan Africa, the WFP and the UN Population Fund (UNFPA) for studies on nutrient requirements of expectant or nursing mothers, and with the Inter-American Development Bank on financial support for pre-feasibility activities in geothermal development in Equador and Panama. Such partnerships can enhance the financing of technical co-operation or multiply the impact of TC projects by helping Member States sustain project results.

28. Bilateral donor organizations also showed greater interest in the TC Programme. An important development during 1997 was joint planning activities with bilateral donor organizations including the Canadian International Development Agency (CIDA) and United States Department of Agriculture (USDA). A mission was fielded with CIDA to assess the post-eradication animal production activities in Zanzibar following eradication of the tsetse fly. Joint planning activities with USDA focused on establishing baseline data for a SIT programme to eradicate the New World screwworm in Jamaica. Joint planning and co-ordination activities also included the area of nuclear power related assistance to Member States from the former USSR. During 1997, the EU, France and the USA helped plan future training activities for nuclear power personnel in Armenia. Agency assistance to Lithuania in the nuclear power sector is being co-ordinated with the EU and the USA.

29. The Agency/UNDP programme is focusing increasingly on projects in environmental protection and natural resource management. During 1997 new projects were formulated in collaboration with UNDP field offices. For instance, the Agency assisted in formulating the joint RCA/UNDP/IAEA programme comprising air and water pollution and cleaner, more energy efficient, technologies by developing a project formulation framework (PFF) with the UNDP field office in Jakarta, Indonesia, and later negotiating the finance package. The project incorporates the new TC objectives – such as participation by end users, development of regional resource units, and focuses on problem solving – with the environmental priorities of UNDP. It was approved by UNDP in November 1997. Other new environmental projects under development in 1997 include a fully UNDP funded project in the Russian Federation on radionuclide pollution of groundwater and surface waters and a second phase Black Sea Environmental Project financed by the UNDP Global Environment Facility and implemented through UNOPS. The latter project is expected to be approved in 1998. UNDP and UNOPS activities has been co-ordinated to minimize duplication with the Agency's regional project RER/2/003 Phase II, *Environmental Assessment in the Black Sea Region,* that started during 1997.

30. China, Mali and Tunisia were among the Member States that benefitted from collaboration with UNDP to provide technical assessment missions during 1997. Additional pre-project missions with UNDP planned for 1998 will help link national projects to the wider developmental community.

9. Automation

31. The Department's efforts to streamline and simplify operations and improve management continued into 1997. The information systems and technological modifications supported this effort. Two major client–server applications were made operational: the TC Project Information Management System (TC-PIMS) and the new Expert Management System (EMS). TC-PIMS development is being completed and the system has been installed for all country officers and programme managers. Its primary functions include planning, management and monitoring of TC project activities. TC-PIMS allows the creation of a project workplan as a result of the project review and approval process. The workplan allows the programme manager to monitor milestones and achievements. The EMS allows faster and more efficient contracting of experts while establishing the information databases required for the other systems. Several modules of the outdated mainframe system have been redesigned and migrated to client–server environment. A new application was developed for Member States (TC-PREFS) to enter new project requests to a local database and send them electronically to the IAEA. About 40% of new requests for the 1999–2000 TC Programme were received in TC-PREFS format. Other office automation and electronic communication features were added to existing information systems. Testing of the new TC Project Reporting Information Dissemination Environment (TC-PRIDE), including access to TC project information utilizing Internet/Intranet technology, was initiated. TC-PRIDE provides data on TC projects which will further improve communication and streamline TC project related workflow.

10. Technical Co-operation between Developing Countries (TCDC)

32. New initiatives for strengthening TCDC involve a stronger role for more advanced institutions within a region. The TC Programme is increasingly focused on problem solving, and TC activities are therefore being formulated on the basis of clearly defined and relevant problems, derived objectives and specific end user beneficiaries. Another important priority is **sustaining** technical and managerial capability in Member States. AFRA, ARCAL and RCA are making efforts to implement TC objectives by adopting a new approach to project design and management that investigates and solves problems in member countries using existing technical capacity and experience in each region. Under the new field management arrangement, AFRA is applying this new approach in areas such as isotope hydrology where

regional capability is linked to common goals for mutual benefits. Last year a team led by an Agency consultant, and including two AFRA experts, visited Morocco and Namibia to investigate the causes of leakage from four dams and reservoirs. Investigation of six other dams in three other AFRA Member States is planned.

33. In line with the "centres of excellence" or "regional reference unit" approaches, current thinking about how best to enhance TCDC activities stresses greater delegation of authority to national institutions to undertake pre-project activities such as assessments and feasibility studies, and for implementation services through subcontract arrangements. The approach encourages a leadership role from the more advanced institutions within the region to share existing facilities, capabilities, expertise and basic "fit-for-purpose" know-how with less advanced institutions – particularly LDCs. Lead institutes within a region would benefit by taking on an operational role in meeting the tangible demand for technical support and implementation services within the region. A problem may sometimes be more easily solved using existing capabilities than by waiting for new infrastructure or training to be put into place. Establishing clear areas of interest for nuclear applications is a guiding principle for regional programme development, and a prerequisite for expanding technical capacity.

34. The Agency placed particular emphasis on technical co-operation between individual Member States. The Slovak Nuclear Regulatory Authority has been active since 1996 in supporting institutional capacity building in Armenia, Romania and Ukraine. In 1997, this co-operation was extended to Bulgaria, and several Bulgarian scientific visitors went to Bratislava, under the auspices of the Agency, to learn from the Slovak example. Under a Memorandum of Understanding signed in 1996, Croatian experts advised Bosnia and Herzegovina, the Former Yugoslav Republic of Macedonia and other countries of the region on issues involving radiation protection and nuclear medicine, within the framework of the Interregional Model Project INT/9/143 – *Upgrading Radiation Protection Infrastructure,* and other TC projects.

35. During 1997, Chile continued technical and financial support for joint efforts with Peru to eradicate the medfly along their common border. Chile has provided US $512,000 for fly suppression and as well as technical support to Peru and donated US $378,000 worth of sterile fruit flies. Under the Model Project IVC/5/024 – *Regional Reference Laboratory for Animal Disease Diagnosis*, national analytical and diagnostic capabilities in Côte d'Ivoire supported several national programmes on rinderpest and other animal diseases by using ELISA technology for analysing blood samples as part of the Pan-African Rinderpest Campaign. In 1997, neighbouring countries began to send samples to Côte d'Ivoire, and this co-operation is expected to expand. Projects in ARCAL and RCA for upgrading nuclear medicine practices have introduced and tested three different computer interface cards (developed in Cuba, India and Slovakia as a result of the project) to improve the performance of portable image processing (PIP) software in participating hospitals.

11. Centres of Excellence

36. Operative paragraph 6 of GC(41)/RES/13 seeks to facilitate and enhance technical and scientific co-operation among developing countries by promoting regional centres of excellence identified according to criteria and consultations with Member States. This approach is in agreement with the TC Strategy to consolidate and utilize existing national and regional capacity and the TCDC objectives outlined above.

37. Several operational issues must be resolved before implementation can be realized: (1) The volume of collaboration between TC managers, Technical Officers and national institutes imposes an additional and substantive workload on all involved, all of whom have limited resources. (2) Such centres would function at several operational levels such as service, training or reference centres, sometimes in combination. No common criteria can be used since the nature of these activities will differ between fields of expertise. (3) The process of selection must be based upon established criteria, practical operational experience and the consensus of Member States. The best mechanism for selection would

probably be the regional agreement framework. (4) Selected centres should not enjoy an unwarranted position for financial support from the Agency. A step by step approach with monitoring and adaptation will be adopted to ensure that all issues will be identified and resolved prior to full implementation.

38. The Secretariat has initiated work towards this objective through the Thematic Planning process. Several of the thematic plans now under development include assessments of institutional capabilities that can help guide future programming. The criteria for these assessments are developed in collaboration with expert consultants and Member State institutions and are based on Agency standards and accepted sources reflecting good international practice. For example the recent thematic plan for tissue banking calls for an assessment of 20 Agency supported operational tissue banks in four regions in order to guide the introduction of quality management systems and identify deficiencies to be addressed in less advanced facilities. Expert missions to Member States are planned to discuss the criteria with national experts. While the thematic objective is quality control and quality assurance for all tissue banking facilities, implementation must take into account factors of sustainability, relevance and impact. Networking between more advanced and less advanced institutions is an essential condition of a step-wise process. In this way, no one institute owns a monopoly on excellence or can expect to benefit from a privileged TC arrangement.

39. The approach foreseen by the Secretariat for implementing the “centres of excellence” concept is to develop "consensus" criteria for assessing more advanced institutions through Thematic Planning, which would be submitted to Regional Agreement Co-ordinators, or to regional representative meetings where regional agreement mechanisms do not exist. Member States could then review the performance of more advanced institutions within the region against the criteria, as is being done under the Regional Resource Units concept in the new RCA/UNDP/IAEA project. The Agency could utilize such institutes as a project formulation–implementation partner. Through this co-ordinated effort, Member States will be able to participate in a framework to reach agreement for designated centres; and a new implementation mechanism is introduced that strengthens TC strategic objectives and encourages technical support among Member States.

40. An important step in the implementation of this approach was recently taken in AFRA at the 9th Technical Working Group Meeting in Addis Ababa. Participants agreed to identify “AFRA Designated Centers for…” selected areas of technical support and services based upon recognized performance and criteria. These centers will backstop specialized teams and provide services to end-users, foster TCDC modalities and harmonize technical and managerial practices.

12. Evaluation

41. TC's evaluation function is expected to be strengthened through the creation in late 1997 of a new organizational scheme within the TC Department, which seeks to integrate evaluation into the strategic planning functions of the new Division of Planning, Co-ordination and Evaluation, to ensure a systematic follow-up of evaluation findings. In collaboration with the programming divisions, an integrated project appraisal system will be introduced to ensure that both best practices and quality standards are adequately reflected in TC project design for the 1999–2000 Programme.

42. TC’s evaluation efforts have made a major contribution by integrating evaluative criteria at the project formulation and design stages. This resulted in new *“Guidelines for Planning and Designing IAEA TC Projects”*, which was prepared by the Secretariat and reviewed by a group of internal and external consultants. The standards established in these Guidelines were followed in the design review of the Model Projects approved under the 1997–1998 programme and form the basis for the design and review of new projects for 1999–2000.

43. Project evaluation in 1997 focused on the Isotope Hydrology Programme, with the goal of providing a stronger basis for decision making in this field. Two Model Projects on neonatal screening and the Agency's activities in radiation protection and waste management in Turkey in the past ten years were also evaluated. The Evaluation Report, presented to the Board in December 1997 (GOV/INF/826) and its attachment, provide further details and examples of how follow-up actions taken on evaluation recommendations are assisting TC project managers in project formulation and design.

13. Lessons Learned from Evaluation

44. Some refinements in project design may be needed in order to extend the Model Project standards to all projects, but the record shows significant overall improvement in project design quality and the usefulness of the results achieved.

45. The evaluation found that isotopic studies can play an important role in guiding plans for developing water or geothermal resources, but the timeliness of their application, adequate integration into overall projects and the involvement of end users are key factors for success that must be carefully considered during project design. Further efforts are required by the Agency and counterparts to use refined project identification, formulation and appraisal mechanisms which would improve the project impact. This evaluation also suggested the need to rethink how to make the best use of regional capacity in assessing and responding to Member States' requirements. When a problem occurs it may be several years before effective national capacity can be established. However, existing regional capacity can sometimes be called upon to solve problems or provide analysis immediately, while national capacity is being developed as a parallel activity. Where appropriate, this concept will be reflected in future project design and in the appraisal process for the next programming cycle.

46. A review was conducted of the design quality of the 36 newly approved Model Projects in the 1997–1998 cycle. Project Framework Matrices (PFMs), specifying the design elements, performance indicators, baseline data and assumptions, were submitted by the project managers. Some problems with project objectives were noted, but there were also positive trends in programme planning. In particular, the co-ordination efforts with other donor Agencies were appreciated, such as the 7th Regional Isotope Hydrology Programme Meeting for the Arab Region and the Workshop on Integration of Isotope Field Investigation into Water Projects in Water Scarce Areas, organized jointly with UNESCO and national and regional institutions in Morocco in September 1997.

47. In the area of expert services, the Agency usually recruits short term consultants on an ad hoc basis. This approach is being re-examined as a result of the hydrology evaluation and in the light of the present focus on problem solving. The needs of the Agency's counterparts are also evolving, and in view of this changing environment a less impromptu framework for providing consultative services may be desirable. For example, longer term partnerships with qualified corporate and academic institutes might meet the needs of Member States for consultation better than the current system. Such arrangements would strengthen the commitment to meeting project objectives on the part of both provider and recipient of the services concerned. This partnership concept is most applicable to projects with adequate links to end user organizations, and where TCDC can play a meaningful role. In such cases, partnerships would facilitate the design and execution of projects and lead to self-sustaining operations by the recipient.

48. The Evaluation Report recognized that when project deficiencies were identified, they were mainly due to the following:

- There was insufficient understanding of the nature of the problem or the counterpart's capability; or there was a general lack of realism in problem solving.

- Some essential factors were not fully addressed, such as: formulation of clear and realistic objectives; detailed plans to translate technical data into development objectives; strengthening managerial skills; economic and financial viability of projects; and provision for risks. National commitment is also a decisive factor in the success or failure of a project.

49. The *"Guidelines for Planning and Designing IAEA TC Projects"* address these issues in a systematic manner and aim at assisting national liaison offices, institutions preparing project requests for the Agency's technical assistance for the biennium 1999–2000, and Agency staff responsible for reviewing and selecting project proposals.

PART II: TECHNICAL CO-OPERATION PROGRAMME PERFORMANCE

A. REGIONAL HIGHLIGHTS

1. Africa

OVERVIEW

50. Sustained efforts were directed during the year towards improving programme management through extensive collaboration with Member States. Increasing participation and co-operation by counterparts in recipient countries have greatly contributed to the qualitative and quantitative achievements of 1997 in spite of the difficult economic and social conditions prevailing on the African continent. The success is partially reflected in the high financial implementation rates of over 81% for all funds and over 85% for TCF. As in previous years, the major component of programme delivery has been in the areas of food and agriculture (36% of the TCF disbursements).

51. The quality of the programme continues to attract the interest of donors, who contributed over US $1.5 million in 1997.

52. Consistent with the new TC strategy, greater importance was given to co-operation within the region. The adjusted programme for regional activities, including AFRA, of about US $7.6 million, represented over 40% of the total available resources for the region.

53. The modalities and mechanisms for strengthening the capacity of African Member States in project planning and formulation were improved in preparation for the 1999–2000 biennium TC Programme. A Regional Workshop on Project Design, Management and Evaluation was organized in Tunis in July which focused on the new concepts and trends underlying the Agency's TC strategy, with particular reference to the Model Project concept, Country Programme Frameworks (CPFs) and Technical Co-operation Among Developing Countries (TCDC). The new form for submission of a project under the IAEA's TC Programme and its electronic version (TC-PREFS) was also introduced. At the request of the Nigerian Government, a national workshop was organized to familiarize Nigerian authorities and technical counterparts with project design, monitoring and evaluation tools. Thirty participants drawn from 16 Nigerian institutions and Ministries attended the workshop.

54. Special efforts were made, in co-operation with National Authorities, to develop opportunities for future Model Projects. These included: eradication of fruit fly in deciduous fruit growing regions (South Africa); improving coconut palm production through the introduction of new agricultural practices (Côte d'Ivoire); exploitation of geothermal resources (Ethiopia); increasing livestock production (Cameroon, Sudan and Zanzibar); control of diamondback moth by SIT (Mauritius); improving early diagnosis and curative treatment of cervical cancer (Kenya); and planning and evaluation of community nutrition programmes (Ghana and Senegal).

55. CPF missions to assist in programming for the 1999–2000 biennium were carried out in Mali, Niger, Senegal and the United Republic of Tanzania. A follow-up mission was fielded to Tunisia. Development of African planning activities was co-ordinated with UNDP, which contributed financially to the missions to Mali and Tunisia through the Support Services for Policy and Programme Development Facility.

- In Mali, the opportunities identified for the near term core programme pertained to: improvement of cereal and legume crop production in support of food security; livestock disease control (contagious bovine pleuropneumonia and peste de petits ruminants (PPR)); and development of water resources in the Gao-Kidal region, in Northern Mali, in support of a drilling programme funded by Germany.

- In Niger, Agency assistance will focus on improvement of integrated crop/livestock production in smallholder farming systems and on assessment of natural and artificial recharge of the aquifers of Zinder, the country's second largest city, and of the vulnerability to pollution of these aquifers.

- In Senegal, opportunities identified in the CPF include: development of integrated cereal/legume production systems; support for a mass vaccination campaign for small ruminants against PPR; development of the resources of Senegal's deep aquifer (supported by a programme funded by the World Bank); and assistance to a National Community Nutrition Project. This project is the first to receive high governmental support. It is co-ordinated by the Presidency of the Republic, implemented by a private agency and supported by the Government, the World Food Programme, the World Bank and Kreditanstalt für Wiederaufbau (Germany).

- Following the successful eradication of tsetse on Zanzibar, the Agency's contribution further strengthens and consolidates the Government's efforts to increase livestock and crop production on the island.

56. Based upon discussion with the national authorities, Ethiopia's future TC-supported programme, in addition to continuation of the Model Project on tsetse eradication in the Southern Rift Valley, is expected to centre on isotopic studies of geothermal fields and the assessment of micronutrient deficiencies in women and children.

57. Four National Reserve Fund Projects were established in 1997:

- In Egypt, assistance was given in evaluating electrical generating options, including the nuclear option, until the year 2020 in light of the anticipated future needs in devising appropriate energy strategies.

- In Ethiopia, assistance was given to studying, using isotope hydrology techniques, the problems caused by the continuous expansion of Lake Beseka from 3.3 km^2 in 1964 to 35 km^2 in 1990.

- South Africa requested assistance in an independent review of the radiological situation at Vaalputs radioactive waste depository due to the leakage of radionuclides from containers.

- In Zambia, assistance was given in the control of a recent outbreak of contagious bovine pleuropneumonia – a major cattle disease in several Sub-Saharan countries.

REGIONAL ACTIVITIES

58. Substantial assistance was provided to the countries in the region to increase livestock productivity. Efforts continued to be directed towards improving national capabilities for diagnosis and control of animal diseases, particularly rinderpest, and promoting cost effective supplementary feeding packages.

59. The bulk of the Agency's assistance in control of animal diseases was provided under the Model Project RAF/5/043 in support of the Pan-African Rinderpest Campaign (PARC). A meeting of key donors and PARC and country representatives addressed the prevailing

problems associated with the surveillance of residual rinderpest. They proposed possible solutions with a view to strengthening disease surveillance and improving the IAEA supported laboratory network in the region. The Agency's support, consistent with PARC's objectives, focused on establishing national and regional capabilities for diagnosis of rinderpest and related viruses. The goal of PARC is to achieve freedom from the disease in the region within three or four years. The Agency is supporting the efforts of some Member States to follow the pathway of the Organisation internationale des epizooties (OIE). The assistance provided under the regional project RAF/5/043 was closely connected with the Model Project IVC/5/024, which aims at establishing a Regional Reference Laboratory in Côte d'Ivoire for animal disease diagnosis. Regional efforts focused on capabilities for confirmation and differential diagnosis of rinderpest and related diseases such as bovine viral diarrhoea and malignant catarrhal fever.

60. An extrabudgetary contribution of US $100,000 was made by the USA to promote the validation in Africa of diagnostic tests associated with recombinant vaccines which could be used in the case of outbreaks of rinderpest with ring vaccination, allowing naturally infected animals to be distinguished from vaccinated animals.

61. Under Part I of RAF/5/036, which deals with soil fertility and pesticide monitoring in support of the FAO Special Programme for Food Security (SPFS) in Low Income Food Deficit Countries (LIFDCs), progress has been made in soil fertility monitoring including soil characterization and use efficiency of nitrogen fertilizer. Soil characterization data are the basis for recommendations on fertilizer application and soil fertility management strategies adopted in SPFS. In general, both SPFS national teams and farmers have found the monitoring information derived from Agency support helpful. The regional project was enhanced in 1997 through the addition of a second component which aims at increasing food production through improvement of smallholder mixed crop livestock farming systems. Activities were supported at the farm level in six countries (Kenya, Mali, Niger, Senegal, the United Republic of Tanzania and Uganda).

62. Basic health care is one of the priority areas for action under the United Nations system wide Special Initiative for Africa (UNSIA). The Agency is supporting ongoing international efforts to tackle communicable diseases in Africa by launching a regional Model Project (RAF/6/017) on the use of nuclear and molecular biology techniques for control of drug resistant forms of malaria and tuberculosis. Support was provided to six countries to improve the diagnostic capabilities of national health centres through the implementation of isotope based technologies.

63. Phase II of the regional Model Project RAF/8/022 – *Isotopes in Groundwater Resources Development*, was launched in 1997. In a region of pronounced water scarcity, this project is of special interest to Government authorities. Activities are being implemented in nine countries covering various aspects of groundwater resources management. Two examples are:

- In Sudan, the project is focusing on areas adjacent to the Nile system looking at data at ten year intervals for connections of groundwater levels and hydrological information, which is important for the long term evolution of aquifers that are subject to pollution and overexploitation.

- In Senegal, the outputs of the project have enabled the Government to devise corrective measures to solve problems of water salination, nitrate pollution and overexploitation in three aquifers supplying water to Dakar.

AFRA

64. The planning and programming activities initiated in 1995 and 1996 produced a five year programme for 1997–2001. The plan, starting in 1997, emphasizes quality and

monitoring of the delivered programme. The new features of the programme which enhanced Member States' ability to effectively absorb assistance included expected outputs, performance indicators and provision of national workplans to allow better monitoring. Consequently, AFRA was able to achieve its highest ever financial implementation rate.

65. AFRA activities in 1997 involved, directly or indirectly, the end users and/or the regulatory authorities in charge of radiation safety. General regulations and standardized codes of practice used to regulate radiation activities in health and industry sectors have been prepared for use by Member States. Formation of steering committees consisting of end users and other relevant parties was encouraged in AFRA countries to supervize the management of co-operative activities at national levels and to ensure proper flow of information and benefits. The Regional Radiation Oncology Association was formed under the auspices of the AFRA project RAF/6/014. AFRA TCDC activities include the exchange of African experts as well as sharing facilities and capabilities within the region. The regional adoption of AFRA TCDC strategy and workplan has increased the interest of donors and AFRA Field Management.

66. The 8th Technical Working Group held in Hammamet, Tunisia, in April agreed on a large number of procedures, rules and implementation modalities. The Working Group also endorsed a proposal to establish specialized teams under ongoing AFRA projects to perform urgent and ad hoc activities at the request of AFRA Member States. The teams will provide urgent services to Member States on a "when needed" basis, with assistance from the Agency until its "financial autonomy" is established during 1998–2000. Two teams were formed and have already performed missions to repair gamma cameras and to identify the origin of leakage in dams and artificial reservoirs in Morocco and Namibia. Other teams are being established to assist in radiological accidents, to inspect safety practices in radiotherapy centres and to handle and safely store radium needles. The Working Group also suggested modalities for the establishment of specialized centres in Africa to provide multinational services to AFRA countries in selected nuclear techniques.

67. Fund mobilization is still of major concern to the AFRA programme. Continuous effort by the Agency and the AFRA Field Management produced positive results as reflected in the extrabudgetary contributions made by France, Spain, the USA and the OPEC Fund. With the approved AFRA strategy for fund raising, and with support from the African Group and the Organization of African Unity (OAU), the future financial situation of AFRA should continue to improve. This issue has been given high priority by the AFRA Field Management, mainly because the programme needs to expand in order to reach the desired level of co-operation by AFRA countries.

HIGHLIGHTS OF NATIONAL PROGRAMMES

68. Assistance in the areas of food and agriculture continued to receive the highest priority in Africa. Fifteen national projects dealing with pest control and the diagnosis and control of animal diseases contributed to efforts to increase livestock productivity and production. The successful eradication of tsetse on Zanzibar, under the Model Project URT/5/016, has received international attention. Formal announcement of the eradication was made in December, following a visit by independent experts and Agency and Government authorities in October. The elimination of trypanosomiasis has opened new prospects for developing integrated dairy farming and cropping systems. The OAU in a letter has officially commended the Agency "*for the excellent achievement*" and assured "*OAU support to the Agency for similar projects in Africa*". Consultations with Government officials on near term post-eradication plans defined additional Agency assistance within the framework of the Government's five year dairy and meat programme. The Agency's assistance will focus on applying isotopic tools for increasing the efficiency of artificial insemination, improving dairy cattle reproductive performance and promoting sustainable crop/livestock integrated smallholder systems.

69. On the basis of the Zanzibar experience, the Agency will pursue efforts in collaboration with other partners to promote in Mainland Africa the integration of SIT in areawide programmes for tsetse and trypanosomiasis management. Preparatory work was undertaken with national authorities in 1997 to lay a solid foundation for the implementation of the Model Project ETH/5/012, aimed at eradication of tsetse in the Southern Rift Valley.

70. Some major achievements under TC projects pertaining to animal production include the following:

- Studies undertaken under a project in Tunisia (TUN/5/015) identified strategies that improved pregnancy rates in cattle from initially 60% in 1992 to 80% in 1997 under certain management conditions. Such improvements have led to increased milk and meat production, bringing financial benefits to the farmers.

- The assistance provided to Madagascar has enabled the national veterinary services to significantly improve control of classical swine fever, an animal disease of major social and economic importance. This has reduced animal losses and increased productivity.

- In Mali, the diagnosis capabilities established in co-operation with PARC through Agency assistance at the Central Veterinary Laboratory contributed to the first OIE declaration in 1997, which was linked to the cessation of vaccination against rinderpest in the country. These capabilities are also being fully used for systematic and effective control of major animal diseases.

71. Under a national project and a regional project (AFRA), 12 countries were assisted in improving basic food crops through plant breeding, including the use of radiation induced mutations:

- In Ghana, promising results have been achieved under GHA/5/026. A number of mutants for improved tuber quality were selected and subjected to on-farm and on-station trials. A new variety known as TEK-Bankye, with increased tolerance to the African cassava mosaic virus, has been officially accepted for release.

- The Agency supported Sudan's efforts at the Gezira Research Station of the Agricultural Research Corporation to develop, through mutation breeding techniques, improved varieties of cotton, banana and vegetables. Five banana mutants were identified in a preliminary evaluation trial with increases ranging from 24% to 132%. If this performance is confirmed over three cycles, the material would become available to growers by the year 2000–2001.

- Field performance tests of selected mutants of sorghum and African rice were undertaken in 1997 under Model Project MLI/5/013. The results obtained in 11 locations confirmed the superiority of the mutant lines over the local varieties in terms of grain quality, colour and yield. The increase in the average yield ranged from 13% to 30%, and the best mutant lines are expected to be released in 1998.

72. The Model Project ZIM/5/009, aimed at promoting biological nitrogen fixation to increase crop production for smallholders in Zimbabwe, made significant progress. Demonstrations of biofertilizer use were conducted on soybean on farmers' fields in three provinces. A total of 75 demonstration sites were chosen and over 2000 farmers were reached. Grain yield increases between 72% and 502%, comparable to those in commercial farms, were obtained. The Government has therefore decided to expand the project activities to the entire country. Representatives from five African countries with good potential for biofertilizer use (Kenya, Niger, Senegal, the United Republic of Tanzania and Zambia) visited the project and learned from the Zimbabwe experience, with a view to developing a regional co-operative effort in this field with a major TCDC component.

73. Through Agency assistance, the Kenya Forestry Research Institute applied isotopic tools to evaluate the nitrogen fixing potential of various strains of multipurpose leguminous trees, as well as the effectiveness of different management protocols for use in agro–forestry systems in critical areas of Kenya. The achievements are, in the long term, expected to benefit small scale farmers by minimizing the negative effects of intensive land cultivation. Isotope aided soil/plant studies undertaken at the Kwanda Agricultural Research Institute in Uganda helped identify effective rhizobia strains for inoculation of soybean in order to increase nitrogen fixation and thus increase crop yields. Grain yields of inoculated soybean cultivars equivalent to 80 kg of nitrogen per hectare were achieved.

74. Irrigation studies in Tunisia (TUN/5/016), using isotope technologies, generated very useful information on the possibilities of using salt water and treated wastewater for crop irrigation. For example, it was shown that for irrigation of sorghum, fertilizer use efficiency is only slightly lower when using drainage water with a higher salt content than when using pumped groundwater. Increased use of wastewater is expected to have a beneficial effect on crop production in certain parts of Tunisia.

75. Several regions in Namibia suffer from acute water shortages. In these regions, available water sources are often limited to groundwater. This major problem is hampering the development of these regions. The Government has shown strong commitment to finding solutions in order to meet the basic needs of the ever growing population and the demands of agriculture, industry, mining and tourism. To this end, the Agency assisted the Ministry of Agriculture, Water and Rural Development to introduce isotope hydrology to carry out indirect flow gauging in the Eastern Caprivi in order to establish a reliable water stage-to-discharge relationship and to carry out regular checking for hydrological monitoring of various sites.

76. The Human Nutrition project in Ethiopia was reactivated through assistance in establishing iron baseline data for a target population in the northern region. The results will be used as a basis for an iron intervention programme by UNICEF. In Cameroon, the Food and Nutrition Research Centre has succeeded in identifying, through isotope aided studies, iron-rich traditional foods and weaning foods that help prevent anaemia. As a result of this success, the Ministry of Health has taken steps to support the findings in the framework of the World Bank funded national project Nutrition–Fertility–Health.

77. The first national radiotherapy facility in Ghana, established at the Korle Bu Hospital in Accra through Agency assistance under the Model Project GHA/6/009, has become operational. Following the commissioning of equipment, treatment of cancer patients started in November. A second cancer treatment service is being established at Kumasi and will become operational by the end of 1998. The achievements of this Model Project represent a major contribution to health care in Ghana. These facilities are expected to make cancer treatment accessible not only to Ghanaians but also to patients from other countries in the sub-region. Assistance in the field of radiotherapy was provided to ten other Member States to support national efforts to set up cancer treatment facilities and help improve the safety and standards of radiotherapy practice. Of particular importance is the assistance provided to Egypt to design and manufacture a prototype simple cobalt teletherapy machine suitable for local conditions in order to deal with the ever increasing national needs for palliative cancer treatment.

2. Latin America

OVERVIEW

78. Many Latin American and Caribbean countries continued the process, initiated in 1996, of reorganizing their nuclear sectors. As a result, activities relating, for example, to the

applications of nuclear techniques in agriculture, human health, industry and hydrology have been transferred to other national institutions outside their Atomic Energy Commissions or the institutions responsible for nuclear technology.

79. The focus of activities in 1997 was the implementation of the projects approved for the biennium 1997–1998 and pre-project planning activities for the programming cycle 1999–2000. The quality and implementation rates of the programmes, both national and regional, were very satisfactory. Pre-project activities included CPF activities in Colombia, Ecuador, Guatemala, Nicaragua and Peru. Meetings with national counterparts were held in different countries to explain TC policy for the biennium 1999–2000 and the main elements in planning and designing projects, including Model Projects, with great impact on the socio-economic sectors of Member States. In addition, delegations from the region to the IAEA General Conference were briefed on TC strategy, including the new programming guidelines.

ARCAL

80. A draft intergovernmental agreement for ARCAL was adopted during a meeting of the Highest Nuclear Authorities of States participating in ARCAL in Havana, Cuba, and negotiations were concluded in December. The agreement will further strengthen the ARCAL Programme and enhance the participation of Latin American Governments in the implementation of regional projects under the Programme. Consistent with the draft intergovernmental agreement, two documents were prepared: a revised version of the Regional Co-operation Plan for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean, and the first draft of the Manual of Procedures for ARCAL.

81. The action of new policies and rules relating to the work of ARCAL significantly strengthened the programme for the biennium 1999–2000. Sixty-four project proposals were submitted, out of which 59 were made directly by eight Latin American countries. The other five were proposed by the Agency. Four expert groups reviewed the proposals and recommended that the Agency consider only 22 of them.

82. A number of rules, guidelines and procedures in the area of radiation protection were written and approved under the project ARCAL XX – *Guidelines on Control of Radiation Sources* (RLA/9/028). When these are adopted and put into practice by individual countries, the radiation protection situation in ARCAL Member States will be further improved.

83. The principal criteria for recommendation of project proposals were: identification of clear objectives; measurable results; submission of a workplan of activities; and a detailed budget for implementing the activities.

84. Two Model Projects, ARCAL XXX – *Improved Quality Assurance in Radiation Therapy,* and ARCAL XXIII – *Upgrading Nuclear Medicine Practice,* were successfully implemented. Under the ARCAL XXX project, nine medical physicists were trained in different countries of the region, and six national laboratories for dosimetry and calibration of radiotherapy equipment were established. A quality assurance programme for nuclear medicine is being prepared by a group of experts from the region for use by the participating countries.

85. Under ARCAL XXIII, 25 gamma cameras were upgraded using three interface cards (one of them produced by Cuba) and the PIP software. In December another 28 interface cards were distributed to the participating countries. The project ARCAL XIX – *Maintenance of Nuclear Instrumentation*, was successfully completed. The national capacity for maintaining nuclear instrumentation in the region was strengthened by the training of more than 250 technicians in three years. Hundreds of instruments and pieces of equipment were repaired, including eight gamma cameras (approximate value more than US $1.7 million). An estimate indicates that for each dollar invested in the repair of the equipment, the countries received a return of almost six dollars in equivalent new replacement cost. Three

regional centres established under the project continued to repair equipment and nuclear instruments for all countries of the region. Cost analysis indicates that repair costs remain at between 10% and 20% of the value of the repaired equipment and instruments.

HIGHLIGHTS OF NATIONAL PROGRAMMES

86. In Argentina, the Model Project ARG/5/005 – *Fruit Fly Eradication in the Southern Region*, made important progress during 1997 in suppressing the wild fruit fly population in the target area. Starting in September, aerial releases of 12 million sterile male flies per week was started. The flies were provided by the Mendoza mass rearing facility. The releases will continue for one year in the main apple, pear and peach producing area of Argentina. It is expected that by mid-1998 the area will be declared a *low fly prevalence area.*

87. In Brazil, under BRA/4/043 – *Production of Iodine-123 via Xenon Target*, the required infrastructure was established at the Nuclear Engineering Institute, Rio de Janeiro, to produce I-123. Production is expected to start early in 1998 and should be able to meet national I-123 production requirements, a major contribution to the health sector. The service will provide better diagnostic services, particularly for patients with low incomes.

88. Under the Brazilian project BRA/8/025 – *Electron Beam Purification of Wastewater*, the implementing institution (IPEN) has established one of the best equipped electron beam pilot facilities in the world. The facility, in collaboration with commercial chemical companies and the State of São Paulo Waste Facility, is studying the possibility of using the electron beam technique for purification of wastewater. The feasibility study including recommendations will be completed in 1998. If the techniques under consideration can be adopted at an industrial level, the ability to purify and recycle industrial wastewater will lead to significant health and economic benefits, accompanied by reduced environmental impact.

89. In Costa Rica, under the Model Project COS/8/008 – *Rational Exploitation of Geothermal Resources*, the Instituto Costarricense de Electricidad (ICE) was able to improve local capabilities for isotope and geochemical monitoring in order to contribute to the further development of the Miravalles geothermal reservoir. As programmed by ICE, the generation of electricity was increased by the end of 1997 to 75 MW(e). Regular chemical monitoring of the wells was carried out to determine the reaction of the system to mass removal and re-injection in the geothermal reservoir. With the increase in production, the mass extraction from the field rose from about 800 kg/s in 1994 to almost 1050 kg/s in 1997 while at the same time the gas content in the steam declined from approximately 1% in 1994 to 0.5% in 1997. By completion of the project, it is expected that monitoring will afford a definitive understanding of the reservoir and the effects of the re-injection process, thereby enabling sustainable exploitation of the well.

90. In El Salvador, the Model Project ELS/8/005 – *Isotope Hydrology and Geochemistry in Geothermal Fields*, was implemented, with support from the Agency and the World Bank, within the context of the country's overall geothermal development plan including the expansion of the Ahuachapan and Berlin geothermal fields. Tracer techniques applied under this Model Project allowed the counterpart institutions to make decisions on optimized drilling strategies based on real-line data. The project design included a modelling component which integrates the results of other project elements, allowing study of the geothermal areas under investigation. The objective of the project was to identify sites for production and injection wells in the Berlin and Ahuachapan geothermal fields and to explore other geothermal areas. The use of electricity generated from geothermal areas increased the production of electricity, bringing it to 30% of the national energy supply. The direct benefit of the project was to contribute to the reduction of the country's dependence on imported fuel and the related use of foreign exchange. The counterpart is committed to the further development of geothermal resources in El Salvador through the application of the isotopic techniques employed during the development of Ahuachapan and Berlin areas.

91. In Paraguay, under the Model Project PAR/8/006 – *Groundwater Studies in Eastern Region and Chaco*, additional freshwater resources are being sought owing to the general presence of saline groundwater in the area. Additional water resources are expected to be obtained through improved management of existing pockets of fresh groundwater and the increase of groundwater due to improved mechanisms of artificial recharge from precipitation sources. To this end, under the Agency's support, the characterization and monitoring of the recharge processes is being studied through the construction of new piezometers. The chemical and isotopic data from samples obtained using the piezometers is expected to provide information on the dynamics and effectiveness of the current methods used in the recharge processes. The new equipment has been installed in selected areas by the local counterpart; the data will be compared with the samples collected from nearby exploitation wells for chemical and isotope analysis. Studies of the Yparacarai Basin and Lake and the determination of necessary corrective actions to improve the quality of groundwater have been hampered by the lack of basic hydrogeological information and an assessment of groundwater dynamics. Efforts to collect the missing data are continuing under the project through the collection and updating of basic hydrological data; groundwater samples have been collected and tested from different well depths along several groundwater flow lines.

92. In Peru, under the Model Project PER/5/024 – *Introduction of Barley and Other Native Crop Mutant Cultivars*, a workshop was organized on Barley in the Peruvian Highlands, and demonstration plots in 14 locations were established and managed. For the promotion of barley variety UNA-La Molina 95 a large number of pamphlets and leaflets with information on the new variety and how to grow it were distributed. Seed multiplication started through an agreement between the National University and the Ministry of Agriculture, resulting in about 260 tonnes of seed. A field day for local farmers was held at two locations and data of the 1996–1997 demonstration plots were discussed. The farmers were impressed by the earliness and grain quality of the new mutant variety even though the overall yield was not as high as expected owing to weather conditions. More than 1500 hectares of demonstration plots and multilocation trials were established with farmers, with an additional 15 demonstration trials organized by some of the workshop participants.

93. In Peru, the Model Project PER/7/003 – *Nuclear Techniques to Improve Child Nutrition*, demonstrated that isotopic techniques have unique capabilities in the evaluation of several nutrition studies. The studies monitored under the project and some of the conclusions are as follows:

- A school breakfast programme (250 children): The evaluation resulted in the zinc supplement for the pre-school feeding programme being increased to reach the recommended daily intake. Radioisotope studies also concluded that the zinc uptake from the supplement was not impaired by a high calcium content.

- A supplementation programme for pre-school children (500 children): An evaluation of the pre-school feeding programme measuring body composition and serum-ferritin using isotope techniques is being carried out.

- Measurement of iron bioavailability of fortified flour (15 women): The Government is using radioisotopic techniques of iron bioavailability to study the impact of fortifying wheat flour to prevent anaemia in Peru. Samples are being analysed and it is expected that the results will be used as a basis for future interventions.

94. In Venezuela, under the Model Project VEN/8/010 – *Groundwater Resources in the Caracas Valley*, more than 60 wells are now providing about 1000 L/s of water to the system, corresponding to about one third of the water deficit before the wells were drilled. The current concerns are for water supply and management of groundwater resources in order to avoid overexploitation, change in water quality and possible geotechnic effects due to pumping of local groundwater. A preliminary mathematical flow model of the central part of the Caracas Valley has been developed to assist in the definition of proper management strategies. Using radioisotope tracer technologies supplied by the Agency, water quality is monitored and the presence of inorganic contamination (e.g. chlorides, nitrates and bicarbonates) have only been found in some parts of the shallow aquifers. Nitrate

concentrations, probably from the sewage system, are in some instances high and constitute a localized problem, while heavy metals have either not been found or found only at the detection limit.

95. In Cuba, under CUB/5/036 – *Mutation Breeding for Tropical Crop Improvement*, activities were carried out on the genetic improvement of tropical crops. New varieties of rice and tomato were obtained which are resistant to high temperatures and humidity and can be grown in saline soils. The new rice varieties will significantly benefit the Cuban population as rice is an essential element in the national diet.

96. In Uruguay, under URU/5/021 – *RIA as a Tool to Improve Milk Production in Sheep*, the goal was to improve milk production and the reproductive performance of sheep through the introduction of milking breeds for crossing with local breeds. Production of milk from sheep is used as a commercially viable alternative to milk from dairy cattle, especially for small scale farmers. The primary limitation in the past was the lack of improved dairy breeds of sheep for use by the local farmers. Under this project a baseline study was made on the feasibility and economics of milk production from dairy sheep under small scale farm conditions using family labour. A strategy for providing the farmers with improved sheep breeds was formulated and implemented. This included the transfer of embryos collected from selected Manchega ewes in Spain to Correadale ewes in Montevideo. An increase of 70% in milk production was achieved during this study. The RIA laboratory, using hormone assays, played a crucial role in the field activities.

97. Two large breeding farms were selected and given programme assistance to upgrade their production management system. These farms are serving as nucleus flocks for multiplication of the elite sheep produced by embryo transfer. Plans are being implemented to extend these activities to more farmers. The investment cost of milking equipment and livestock to establish a family unit farm with 150 milking ewes is approximately US $18,000. Such a farm unit can produce 24,000 litres of milk over a lactation period of 160 days and produce an estimated profit of US $20,000 in the first year of operation. This project has identified and contributed to a means by which small scale farmers can assist in a sustainable milk production system.

98. Under GUA/6/012 – *Neonatal Hypothyroidism Screening in Rural Areas*, a network of three laboratories was completed in Guatemala to establish a national programme. The programme, implemented with full Government support, has resulted in a major benefit for the low income section of the population living in remote areas by allowing access to the low cost screening technique.

99. In the State of Guarico, the lowest income part of Venezuela, the project VEN/5/020 – *Animal Nutrition and Productivity,* has produced good results on a test batch of cattle through the collaboration of four national universities and research institutions with local farmers. In particular, the use of radioisotope tracers in monitoring nutritional supplements together with locally grown animal food has reduced the interval between births of dual-purpose cattle by more than 20% by increasing weight gain and increased pregnancy rate. Milk production also increased by 70%. It is estimated that participating farmers increased their income by an average of 40%, leading to plans to extend the methodology and benefits to Guarico's neighbouring states.

3. East Asia and the Pacific

OVERVIEW

100. East Asia and the Pacific is a very dynamic region with many socio–economic challenges, mainly in the areas of food supply, health care, industrialization and

manufacturing, environment and sustainable development, and nuclear energy security and safety.

101. The regional development challenges are reflected in the distribution of Agency supported projects, the greater part of which in 1997 were in the area of food and agriculture, followed by health care, industry, nuclear safety, nuclear energy and technology, radiation biology, mining and minerals, with only a small number of requests for assistance in nuclear chemistry and nuclear physics. The large requirement for training outside the national projects was met through the *Regional Human Resources Development and Nuclear Technology Support* project. The total programme of the region in 1997 was US $12.3 million.

102. Among Member States receiving assistance from the Agency, China, the Republic of Korea and Pakistan are engaged in advanced nuclear energy technology programmes including nuclear fuel cycle and nuclear power. Indonesia, the Philippines, Thailand, Viet Nam and Bangladesh (most recently), have indicated their intention to build nuclear power plants for generating electricity. Other Member States with modest nuclear technology related programmes are engaged in projects related primarily to food and agriculture, improved health care and industrialization.

103. Two ongoing projects were upgraded to Model Projects due to their potential impact, increasing the total number of operational national Model Projects in the region to ten. All but two Member States in the region have at least one operational Model Project. Efforts were made to focus the CPF programmes on the main problems and needs. The outlines of the CPFs, which were discussed with Member States, will be used as guidelines in the appraisal and approval of projects for the 1999–2000 cycle.

104. A regional consultants meeting on mutation techniques resulted in a strategy paper on plant breeding priorities, conservation and sustainable utilization of bio-diversity in the region. Two meetings were also held in the area of health. The first was intended to improve and standardize the programme for training professionals in radiotherapy in Asia. At this meeting, training needs and resources available in developing Member States of Asia in radiation oncology were identified. The second meeting identified opportunities for effective use of nuclear medicine technology in health care under RAS/6/028 (RCA). The participants also identified the most important health concerns in the region and evaluated the use of nuclear related technologies in solving problems pertaining to health concerns. The affordability, acceptability, availability, adaptability, and recognized-comparative-edge of nuclear related technologies, when compared with non-nuclear technologies, were assessed. The group's efforts resulted in the development of a programme on myocardial perfusion scintigraphy, scintimammography, radioiodine therapy for thyroid cancer and RIA of microalbuminurea.

105. As a result of implementation of projects under the RCA programme, distant learning materials/packages on tissue banking, radiation protection, nuclear medicine technologies, training and NDT were completed and made available to other Member States in and outside the region.

106. In support of TCDC, a number of Member States have offered the use of their facilities and infrastructure to others for training or as a source of expertise.

- The Government of Singapore offered its facility at the bone bank of the National University of Singapore Hospital for training in the use of the distant learning package on tissue banking.

- Pakistan offered laboratory facilities at the Nuclear Institute for Agriculture and Biotechnology, Faisalabad, as a demonstration centre.

- Malaysia and Thailand offered their facilities as demonstration centres for an interregional project on low level radioactive waste handling technology.

- The Republic of Korea offered the facilities of the Nuclear Training Centre of the Korea Atomic Energy Research Institute for training.

- India made available its regular training courses programme at the Bhaba Atomic Research Centre for training Agency candidates.

107. To improve the quality of the projects for the 1999–2000 TC Programme submitted by Member States, the following pre-programming initiatives were taken:

- One regional and two national workshops on Design, Management and Evaluation of IAEA TC Projects were successfully conducted within the context of the new strategies of the Department of Technical Co-operation. The objective of the workshops was to improve the design quality of the proposals to be submitted for Agency support for the 1999–2000 cycle. The workshops also introduced the new request form, including the electronic version, so that the Area Office now receives requests electronically from most Member States.

- Member States were requested to submit the outline of their initial proposals by mid-1997. Six countries responded. Their initial proposals were reviewed by the Agency in close consultation with the authorities or their Missions in Vienna and the responsible Country Officer. Six pre-project missions were also fielded to assist Member States in preparing specific requests.

REGIONAL ACTIVITIES

108. Member States with operational nuclear power plants are co-operating in a regional project RAS/4/015 – *Management of the Safe and Reliable Operation of NPPs*, through which Member States exchange information on the operation of NPPs and develop self-assessment capabilities to enhance their operational safety performance.

109. Feed supplementation using urea molasses multi-nutrient blocks has resulted in an increase of milk and meat production, which has benefited farmers in the ten participating countries of the regional project RAS/5/030 – *Feed Supplementation and Animal Production Strategies*.

RCA

110. In view of the current trend to regionalize TC activities, the process of harmonizing and co-ordinating activities under the RCA programme with the national programmes of the Member States continues. The majority of regional activities are covered by RCA projects.

111. To improve ownership and management of the RCA, the Member States adopted the Guidelines and Operating Rules for the RCA. In addition, the Meeting of RCA Representatives during the 41st IAEA General Conference considered the continued study of the concepts of regional management, development finance for the less developed Member States, and proposed a vision for RCA for the next 25 years.

112. During 1997–1998, there were 32 new and carry-over projects. A new five year Joint UNDP/IAEA/RCA project started with UNDP funding for the first three years in three out of five sub-areas under the project. Some Member States in the region were affected by serious air pollution from the burning of forests and peat owing to the long draught and the opening of new areas for cultivation. The drought also affected the supply of clean drinking

water. The Agency and the RCA Member States initiated a project on accurate monitoring, assessment and mitigation of water, marine and air pollution as part of a UNDP/RCA/IAEA project. The project was approved, with funding by UNDP, in November 1997.

113. The total of 400 participants in meetings and training courses under the RCA programme demonstrates the importance that RCA pays to individual training. As a comparison, only 18 expert missions were fielded and only US $200,000 was expended on equipment.

114. Member States celebrated the 25th Anniversary of the Agreement, which was extended for five more years from 12 June 1997.

NATIONAL HIGHLIGHTS

Food and Agriculture

115. In China, under the Model Project CPR/5/010 – *Induced Mutations for Improvement of Rice*, production increased to nearly nine tonnes per hectare. The new high yielding varieties with better rice quality were released and accepted by rice farmers in six provinces. Planting covered over two million hectares.

116. The result of the Model Project in Indonesia, INS/5/023 – *Feed Supplementation for Increasing Livestock Production,* received particular attention from President Suharto, who contributed 1222 head of improved bred cattle to participating farmers.

117. In Myanmar, under MYA/5/009 – *Monitoring and Control of Animal Diseases*, a facility for producing a foot and mouth disease (FMD) vaccine was revived and the production of vaccine has been resumed. The vaccine produced was used in vaccination campaigns, which are expected to result in the creation of FMD-free zones and the effective control of FMD, which is the major cattle disease in the country.

118. In Bangladesh, the Model Project BGD/5/017 – *Biofertilizers for Increased Legume Production*, has shown that biofertilization has benefitted farmers. The project attracted OPEC Fund financial support of US $100,000 for the 1997–1998 cycle to extend distribution to more farmers.

119. In Sri Lanka, the project SRL/5/030 – *Mutation Breeding in Bananas and Plantains*, has produced new cultivars with better yield and good quality fruits. As a result, the Regional Development Authority for Mahaweli Valley introduced and distributed banana suckers to farmers, with the result that the income of farmers growing bananas now exceeds that for all other crops.

120. Under THA/5/044 – *Extension of Areas Under Integrated Fruit Fly Control*, the capacity for the mass rearing of sterile flies has increased to 35 million per week and the release area has been extended to 70.4 km^2. The release of sterile male fruit flies as part of integrated fruit fly control has reduced the number of infected mango trees and increased the income of fruit farmers.

Health

121. A footnote-a/ project in Sri Lanka, SRL/7/004 – *Nuclear Techniques for Improvement of Nutrition and Diagnosis*, was upgraded with financial support from the Agency and the US

Government. Blood samples from 40 infants aged between 7 and 14 months, who were fed with iron-fortified wheat flour (sprinkled with two stable isotopes of iron), were collected and analysed. The feeding trial involved local health authorities and the parents of the infants, who gave full consent. The analysis of samples for ferritin has begun, in collaboration with the Hospital for Sick Children, University of Toronto, Canada, with results expected by mid-1998.

122. In Thailand, under the Model Project THA/6/029 – *Extension of Neonatal Screening to Rural Areas*, 400,000 new born babies were screened for hypothyroidism. The project counterpart institute was able to produce approximately 180,000 tests of TSH blood spots in 1997. The counterpart institute was established as the national reference centre for the national neonatal screening programme.

123. In the Philippines, under the Model Project PHI/6/018 – *Nuclear Medical Techniques in Preventive Nephrology*, a national survey was conducted which identified 12,429 cases out of 14,338 students in public schools as having urinary tract infection. With Agency assistance, a cost effective preventive and management system for kidney disease on a nation-wide basis using radioisotopes and gamma camera screening has been established.

Industrialization and Manufacturing

124. There is great concern in many Member States to meet the demands of increasing industrial applications of nuclear technology and to ensure that production meets international standards.

125. In China, under the Model Project CPR/2/006, a new, large scale, gel-type technetium-99m generator production line fulfilling the requirements of good manufacturing practices (GMP) was put into operation. The facility is capable of supplying 50% of the national needs by producing more than 100 generators per week, which are routinely distributed to 120 hospitals. The annual production capacity has been increased two- or three-fold and now has the capability for diagnostic intervention for an estimated 500,000 patients per year. Performance tests carried out by international experts demonstrated that the quality of the gel generators complies with internationally accepted standards and satisfies the requirements of the international and Chinese pharmacopoeia.

126. In Viet Nam, the Government has approved US $1.5 million for the construction of the Centre of Nuclear Techniques in Ho Chi Minh City. The Agency is supporting the Centre by providing part of the Co-60 sources as well as expert advice on quality assurance aspects of the sterilization of medical products.

Nuclear Energy Security and Safety

127. The Agency is supporting Member States in the region by providing training and expertise for planning, safe operation, maintenance, peer review, OSART and follow-up OSART missions in the area of nuclear power (i.e. two OSART Missions fielded to China and the Republic of Korea.)

128. Examples of Agency co-ordinated support to national nuclear energy security and nuclear safety programmes follow:

- The UNDP provided additional resources to the project CPR/4/015 in China to strengthen training for maintenance in nuclear power plants. The project was nationally implemented with support from Hungary and Canada.

- A high level Seminar on 21st Century Nuclear Energy Development in China was jointly organized by the IAEA and the China Atomic Energy Commission. The seminar allowed personnel from planning, policy making and industrial organizations to exchange views and be informed of the latest developments in the area of nuclear energy supply and its contribution to sustainable development.

- With financial assistance from UNDP, a comprehensive document on the first Indonesian nuclear power programme was completed. A workshop on Policy Issues for Decision Makers for high level officials was organized to help the Indonesian authorities to clarify the process and timing of policy decision making for a nuclear power programme. Under INS/9/012 and INS/9/021, site characterization documents prepared by a non-national consultant company on potential nuclear power plants at Mulia Peninsula were reviewed and the future direction for the confirmatory phase of siting studies has been recommended to the Indonesian authorities.

- A fact finding mission on the Rooppur Nuclear Power Project, Bangladesh, was undertaken by senior Agency staff members in December. The mission found a Government commitment to implement the project with a 600 MW(e) reactor as part of the national energy generation programme.

- In the Republic of Korea, Agency support is emphasizing NPP safety through development of human resources. The Agency supported national workshops on safety aspects, such as fire safety in NPPs, and reviewed external events probabilistic safety assessment for Ulchin NPP Units 3 and 4.

- In Pakistan, the project on the safe operation of the Karachi Nuclear Power Plant (KANUPP) was upgraded to a Model Project. With the active collaboration of the relevant Canadian organizations, the project has already made a significant contribution to maintaining an acceptable level of safety during the remaining and possibly extended operating lifetime of KANUPP.

4. West Asia

OVERVIEW

129. The new project requests received from Member States within the region generally reflected an increased emphasis on the Model Project criteria, in particular end user orientation. This was an important outcome of the pre-programming work of the Agency. There were two significant developments in the 1997–1998 cycle: the initiation of two large projects in the Syrian Arab Republic, with substantial government commitments, and the undertaking of national TC projects in Yemen for the first time.

130. Although no specific CPF missions were undertaken in the region during 1997, efforts were made throughout the year to focus the country programmes and plan future activities. One major area of common interest in the region continued to be radiation protection and safety, for which assistance was provided to Kazakhstan, Lebanon, Qatar, Saudi Arabia, United Arab Emirates, Uzbekistan and Yemen under the Model Project INT/9/143 – *Upgrading Radiation Protection Infrastructure.* The Syrian Arab Republic and Jordan joined the project during the year and details of the country specific action plans for these countries and the Agency were worked out. Other major fields of interest were radioisotope applications in hydrology, agriculture, animal disease and human health. These activities were largely implemented through regional projects.

131. Activities in the areas of nuclear power and safety were implemented through national rather than regional projects. Only one country in the region, Kazakhstan, has an operating nuclear power plant, and KAZ/9/005 – *Safety Assessment of BN-350 Fast Breeder Reactor,* was initiated to assess and support the safe operation of this plant during its remaining lifetime and to assist in the development of the decommissioning programme. The Islamic Republic of Iran is at an advanced stage of completing its nuclear power plant, and Agency assistance was provided on the regulatory aspects of this programme through the Model Project IRA/9/015 – *Regulatory Infrastructure for Licensing of Bushehr NPP*.

REGIONAL ACTIVITIES

132. The region is consolidating efforts towards eradication of rinderpest within the framework of the Model Project RAW/5/004 – *Support for Rinderpest Surveillance in West Asia*. The participating countries included Afghanistan, Islamic Republic of Iran, Iraq, Jordan, Kazakhstan, Kuwait, Lebanon, Saudi Arabia, Syrian Arab Republic, Turkey, United Arab Emirates, Uzbekistan and Yemen. Jordan and Lebanon made a provisional declaration of freedom from rinderpest during 1997, while the Syrian Arab Republic was at a comparable stage and is expected to make a similar declaration during 1998. The three countries could then achieve a declaration of freedom on a regional basis in the near future. The Islamic Republic of Iran was not prepared to cease vaccination since the disease was endemic in two neighbouring countries, and the Government decided to wait for the outcome of international efforts to eradicate the disease in those countries before ceasing vaccination independently.

133. The regional project RAW/5/002 – *Water Balance and Fertigation for Crop Improvement,* has yielded good results in all six participating countries. The effectiveness of fertigation was demonstrated through field trials on a variety of crops. In the Syrian Arab Republic, for example, a saving of 36% in water use was recorded for cotton crop grown in the Hamma region using drip irrigation. Higher yields of up to 22% were obtained for the same quantities of fertilizer through fertigation as compared to traditional surface application of fertilizer and water. The combination of reduced consumption of irrigated water and increased crop yield when fertilizer was supplied through drip irrigation boosted the irrigation water efficiency by 93% in field trials. Encouraging results have also been obtained in trials for other crops.

134. Twelve analogue gamma cameras were upgraded in the region during 1997, under RAW/6/004 – *Maintenance and QC of Nuclear Medicine Equipment*. The gamma cameras were equipped with the Agency's hardware and relevant clinical software to improve their performance and add capabilities for dynamic studies and higher throughput. A regional workshop on Preventive Maintenance and Repairs of Gamma Camera Computer Systems was organized for participants from the Islamic Republic of Iran, Jordan, Lebanon, Saudi Arabia and the Syrian Arab Republic. During the workshop, preventive maintenance protocols for selected gamma cameras were demonstrated and intensively practised, and the upgrading of an analogue gamma camera with the Agency's system was carried out and successfully demonstrated.

135. By the end of 1997, progress in isotope field investigations under RAW/8/002 – *Isotope Hydrology Techniques in Water Resources Management,* included studies in 14 aquifer units in the Islamic Republic of Iran, Jordan, Kuwait, Lebanon, Saudi Arabia, Syrian Arab Republic, Turkey and United Arab Emirates. The main objective of the project was to achieve better management of groundwater resources by mapping renewable and non-renewable groundwater in selected regional aquifers. The principal techniques used were: isotopic survey and radiometric dating; estimation of effective natural recharge rate of the renewable groundwater; assessment of the effectiveness of surface reservoirs constructed for improved groundwater availability through artificial recharge of groundwater; and study of the sources of pollution and the progression of water salinity. Specialized training required for the use of advanced numerical modelling techniques for isotope–geochemistry evaluations and groundwater pollution studies was provided at a regional workshop organized at Al-Ain,

United Arab Emirates. Relevant computer software was made available to all participating countries for use with their respective data.

HIGHLIGHTS OF NATIONAL PROGRAMMES

136. During 1997, the Agency assisted the Islamic Republic of Iran under the Model Project IRA/9/015 – *Regulatory Infrastructure for Licensing of Bushehr NPP,* in the analysis and review of the technical and safety documents and in finalizing the relevant codes and standards. The Agency provided guidance to the Islamic Republic of Iran on quality assurance regulations, regulatory approaches on control of nuclear installation safety, inspection methodology for NPPs, and radioactive waste management policy. A national training course on Methodology of Safety Analysis Review for NPPs was organized in the Islamic Republic of Iran for 15 local participants.

137. The Syrian Arab Republic made good progress during the year in the finalization of the contract for the purchase of a cyclotron on a bilateral basis. The architectural and civil engineering design of the facility and the basic site preparation, including electric power and water supply, were completed. The Agency provided assistance through guidance and training to the counterpart under the related Model Project SYR/4/007 – *Cyclotron Facility for Medical Applications*. The third national Model Project in the region, KAZ/3/002 – *Modern Technologies for In-Situ Leaching Uranium Mining*, had less success during the year due to unresolved issues concerning agreement on the type of leaching technology to use and co-ordination among the three major counterpart institutions. These problems were discussed with project counterparts and further progress is expected consistent with the objective of achieving environmentally acceptable uranium production in Kazakhstan.

138. The Islamic Republic of Iran reached a high level of development in radioisotope applications centred around the research reactor in Tehran and the cyclotron in Karadj. The projects IRA/4/023 – *Cyclotron Production of Radionuclides,* and IRA/2/005 – *Development of RIA Kits,* with emphasis on medical applications of the radioisotopes produced by the cyclotron and the development and expansion of the existing facilities for RIA/IRMA radiopharmaceuticals at Tehran, were smoothly implemented and made a valuable contribution to the health sector. This was an important development, as about 5000 patients were treated or diagnosed each week with radioisotopes and radiopharmaceuticals supplied by the facilities of the Atomic Energy Organization of Iran (AEOI). The Nuclear Research Centre for Agriculture and Medicine (NRCAM) of the AEOI is marketing several products including krypton-81m, thallium-201, indium-111 and gallium-67, and is servicing 65 nuclear medicine centres in the Islamic Republic of Iran. The NRCAM also finalized its plans to establish an outpatients PET scanning clinic. As a result of Agency supported activities in the field of mutation and tissue culture, and more recently through IRA/5/011 – *Nuclear Techniques in Cereal Production*, the NRCAM has successfully introduced new mutant lines for wheat, Tabassi, for cultivation on 20,000 hectares in three regions of the Islamic Republic of Iran. A 40% increase in yield has been confirmed by the independent Seed and Plant Improvement Institute (SPII) of the Ministry of Agriculture. Four barley mutants with improved winter hardiness have been submitted to SPII for yield trials at multiple locations. A total of 18 rice and 12 sesame mutant lines are at advanced stages of field trials for acceptance and distribution through SPII. Disease resistant cotton mutant lines have passed the multiple location yield trials and have been approved by the National Cotton Research Institute for wider cultivation.

139. The new facility at Yazd, Islamic Republic of Iran, for the application of electron beam irradiation technology was established during 1997 using national resources. The Agency provided technical advice and equipment for setting up quality control and quality assurance laboratories under IRA/8/013 – *Electron Beam Accelerator for Radiation Processing*.

140. The major emphasis in the Islamic Republic of Iran's TC programme was related to the safety of the national nuclear power programme, which had been reactivated after an interruption of many years. Agency assistance covered both the technological and regulatory aspects through two relevant projects: IRA/4/025 – *Strengthening Reactor Technology for Bushehr NPP,* and the Model Project IRA/9/015 – *Regulatory Infrastructure for Licensing of Bushehr NPP*.

141. The activities at Karadj under IRA/1/008 – *Secondary Standards Dosimetry Laboratory (SSDL) Upgrading,* were completed successfully during the year. Besides providing calibration support, the SSDL is now extending a quality audit service to all radiotherapy installations in the Islamic Republic of Iran. Under another project, IRA/8/012 – *Sealed Sources and Nucleonic Control Systems in Industry*, Agency assistance created the capability to assemble nuclear gauges from imported sub-assemblies for use in industry. Given the assured demand for such gauges in the country, this activity would be easily sustainable through indigenous support.

142. In spite of the special circumstances requiring approval from the UN Sanctions Committee for support to TC projects in Iraq, there were considerable achievements during the year. Thirty fellows were accepted in various countries for training in the approved fields of agriculture and medicine; of these, 22 completed their training during 1997. The Agency also delivered equipment for rinderpest diagnosis and surveillance under IRQ/5/008 – *Immunoassay Techniques for Rinderpest Diagnosis*. The assistance provided to Iraq under this project and the progress achieved under the regional Model Project RAW/5/004 – *Support for Rinderpest Surveillance in West Asia,* would be a vital factor in the eradication of rinderpest from the country and the region.

143. The first step in the long term SIT programme for the eradication of medfly from Israel was taken in 1997 under ISR/5/009 – *Feasibility Study of SIT for Medfly Eradication*. The Agency provided batches of sterilized insects and an insect release machine, together with expert advice and training of local staff. A good start was thus made in the ongoing efforts to eradicate medfly from the Arava Valley within four years. The techniques and lessons learned during this campaign could serve as a pilot study for wider application of this technique. Through a similar project in Jordan, JOR/5/007 – *Feasibility of Areawide Control of Medfly by SIT*, efforts will be co-ordinated to cover the whole of the Arava Valley for this eradication study.

144. Upgrading of the scientific and technical infrastructure in Kazakhstan was supported through the establishment of an up-to-date NAA laboratory under KAZ/2/002 – *Neutron Activation Analysis Laboratory,* and the transfer of know-how on plasma spray and coating techniques under KAZ/4/002 – *Technology for Heat and Radiation Resistant Materials*. Assistance to the medical sector in Kazakhstan was provided by the projects KAZ/4/003 – *Cyclotron Production of Industrial and Medical Radioisotopes,* and KAZ/6/002 – *Upgrading Radiotherapy at National Institute of Oncology*.

145. Lebanon contributed US $100,000 as cost sharing for the procurement of the accelerator under the project LEB/1/003 – *Van de Graaff Accelerator for Analytical Applications*. The project has been given high priority by the Government and would contribute considerably to improving the national capability for analysis of a number of industrial and environmental materials. The project LEB/5/013 – *SIT to Control Fruit Tree Pests,* made good progress in setting up field monitoring and establishing a small scale facility for mass rearing medfly.

146. The implementation of activities under the UNDP/IAEA project SYR/3/005 – *Purification of Phosphoric Acid,* proceeded with good results. The Agency gave technical support to the project. The Syrian Arab Republic added almost one million dollars to the project enabling the contract to be signed for the delivery of a pilot plant. The design of this plant, intended for removal of uranium from phosphoric acid through liquid extraction, was accomplished with the active participation of the Syrian Arab Republic counterpart. Site preparation and the architectural design were completed according to the workplan.

147. In the Syrian Arab Republic, the miniature neutron source reactor installed late in 1996 under SYR/4/004, went through the necessary tests and experiments to ensure that the facility became operational. Some problems with the installed equipment were solved and optimum utilization of the reactor has been achieved. Additional assistance was provided under SYR/4/006 – *Neutron Activation Analysis Laboratory*.

148. Yemen's first two national TC projects were implemented with varying degrees of success during 1997. Under YEM/2/002 – *Upgrading Capability of Analytical Laboratories,* gamma spectroscopy and XRF equipment were provided, which contributed to improvement of the analytical capability of the Central Laboratories of the Yemen Mineral Resources and Geological Survey Corporation. The planned activities under YEM/6/002 – *Establishment of a National Centre for Radiation Oncology,* were delayed because of internal problems related to the management structure and funding of some of the counterpart activities. Most of the problems had been overcome by the end of the year and long term training of Yemeni nationals in radiation oncology and medical physics is expected to begin during 1998. As this will be the first Centre in Yemen for the treatment of cancer patients, the importance of the project to the national health care programme cannot be overemphasized.

5. Europe

OVERVIEW

149. One of the important achievements of the TC Programme in Europe in 1997 was its ability to draw a large amount of extrabudgetary support. Over US $2.6 million were contributed to this programme by the Governments of France, Japan, the Republic of Korea, Netherlands, Spain, the United Kingdom, the United States of America and UNDP. In addition, two countries made direct payments to the Agency to cover the cost of their projects (US $0.8 million from the Czech Republic for CZR/4/007 and US $0.3 million from the Former Yugoslav Republic of Macedonia for RER/6/009), bringing the total extrabudgetary contributions in Europe up to US $3.7 million.

150. The inclusion of Malta and the Republic of Moldova brought the total of Member States participating in the 1997 programme up to 24, with over 230 projects and an adjusted programme of about US $18 million.

151. Regional communication and co-ordination in pre-programming activities were improved as a result of three TC Management Workshops, at which Member States participated in planning the activities of future regional projects. The Workshops agreed that the topics of common interest in the region spanned nuclear power generation and safety, environmental issues, human health and some nuclear applications. Discussions on individual country activities, current and future, assisted in setting priorities for the next TC programme cycle. The participants, although satisfied with existing mechanisms for planning regional activities in Europe, recommended that a Memorandum of Understanding be signed by interested institutions in the region in order to further enhance regional co-operation.

152. One primary function of the Agency in Europe is co-ordination of the large amount of nuclear power and safety related assistance to Central and Eastern Europe (CEE) and the Newly Independent States (NIS). Although TC funds represent a small portion of the total contribution from all donors to safety related activities in Europe, the Agency must ensure that its own assistance is cost effective and should address issues which other donors cannot. Therefore, the Agency feels that its role in assisting Member States in Europe is to:

- Assist Member States to prepare plans for the solution of specific priority problems;

- Formulate a potential global assistance programme which includes cost effective and independent assistance from the Agency;

- Act as co-ordinator for bringing all possible participants and donors into the assistance programme with clearly defined assistance packages;

- Assist the Member States with evaluation or assessment of any relevant non-IAEA assistance programmes; and

- Advise and assist Member States with the implementation of the global assistance programme.

153. This approach has been used with good results in various safety related national and regional projects in Europe during 1997 and previous years (e.g. ARM/0/002, BUL/9/012, LIT/0/003, HUN/9/019, HUN/9/020, POL/8/014, UKR/4/003, RER/2/003, RER/9/023, RER/9/035, RER/9/052), using the cost sharing concept of leveraging TC Funds. The Agency's small contribution is used to complement inputs from the recipient or other larger (bilateral) donors.

154. The three Thematic Planning concepts of nuclear safety, waste management and nuclear power were closely co-ordinated with the IAEA Departments of Nuclear Safety and Nuclear Energy with the object of identifying and preparing appropriate projects in these areas for the 1999–2000 cycle.

155. Some difficulties hampered implementation of the 1997 TC Programme. A number of complex national and regional projects had major sub-contract components, which require a specialized approach to project management including detailed determination of specifications, competitive tendering, reviews of bids, completion of procurement contracts and legal formalities. While such projects are slow and cumbersome at the start, they become simpler and easier to implement in later years. Political changes and difficulties in some countries also delayed full implementation of a number of project activities.

REGIONAL ACTIVITIES

156. Regional activities represent the high priority needs of the Europe region and have been defined during several regional meetings even without Regional Agreements similar to those in other regions. As a result Europe uses an approach based on Thematic Planning for common interest activities, the integration of related issues, and full co-ordination with the recipients. In 1997, the regional programme for Europe represented 33% of the total resources allocated to the region. Nuclear safety and nuclear power maintained the greatest share of the region's programme, at 42% of the total. There was a marked strengthening of the programme dedicated to human health: 21% of the programme, as compared to 4% during the previous cycle. Environmental applications ranked third (about 15%), closely followed by human resources development and capacity building. Legislative assistance to the NIS became a new high priority area. The following paragraphs highlight Europe's integrated approach to safety, nuclear power and its utilization, the environment and health issues.

157. The demand for legal advice and assistance increased as a result of Member States embarking on a comprehensive review of their national nuclear related legislation. To meet this demand, the Agency initiated a regional project in 1997, RER/0/015 – *Legislative Assistance for the Utilization of Nuclear Energy*. Following up 1996 activities implemented under a different arrangement, the first task was to conduct a systematic assessment of the needs of the 14 participating States, covering international nuclear law, nuclear and radiation safety, non-proliferation, physical protection and radioactive waste management. Workplans, including preparations for fact finding missions by legal experts, were drawn up for completion in 1998. Implementation of this project began in five countries during 1997. Project activities were co-ordinated with other organizations, including OECD-NEA and the

European Commission's PHARE and TACIS programmes; for example, two seminars on nuclear law and convergence of legislation were organized under the project in collaboration with OECD-NEA. The project was supported by extrabudgetary funds from the Netherlands and the USA. Sweden also made in-kind contributions for some non-Member states in the NIS.

158. Safety culture starts with a governmental commitment to introduce the relevant laws for safe utilization of nuclear energy, radiation protection and radioactive waste management. A reflection of a Member State's commitment to this safety culture is the establishment of a technically competent, independent and sufficiently supported regulatory authority (or authorities, depending on national practices and culture). The Agency's support to this commitment has been the basis for several TC regional projects. One such project was RER/9/052, through which staff members of nuclear safety regulatory authorities were trained in various aspects of regulatory and licensing functions. The project's goal was to assist in bringing the nuclear regulatory authority's capabilities into conformity with international standards, thereby promoting safety culture and public confidence in the peaceful uses of nuclear energy.

159. To strengthen the safety capabilities of Member States, workshops, training courses, expert missions, and an International Regulatory Review Team (IRRT) mission were organized during the year. A meeting in Vienna to assist in planning the region's 1998 activities indicated that progress had been made in achieving the project objectives. The extent of success varied from country to country, depending on factors such as legislative developments, industry restructuring, and economic climate. The meeting concluded that the project should continue in order to assist participating States to meet international norms including the NUSS standards.

160. In the area of capacity building for self-assessment of safety issues, a number of projects were designed to assist the participating Member States in developing capabilities which primarily supported safety related activities, covering: increased capabilities in probabilistic safety assessments; assessment of operational safety of NPPs; emergency planning and preparedness; marine environmental assessment – monitoring radionuclides and use of radioactive tracers; dosimetry and safety concerns related to medical physics.

161. To ensure compliance with NUSS, two major regional projects dealt with the safety assessments by the utilities. RER/9/046 - *Support for Safety Assessment of Nuclear Power Plants (NPPs),* and RER/9/047 - *Capability for Assessment of Operational Safety of NPPs.* RER/9/046 sponsored workshops and expert missions to discuss: increasing the utilities' capabilities in probabilistic safety assessment (PSA); codes and methods for accident analysis; emergency operating procedures; and safety analyses of NPPs during low power and shut down conditions. While significant progress has been made, the requests for assistance continue owing to the complexity of the issues. RER/9/047 – *Capability for Assessment of Operational Safety of NPPs,* completed nine ASSET, OSART and ASCOT operational safety assessments. Requests continue to be received, including several from the Russian Federation.

162. RER/9/049 – *Medical Training for Nuclear Accident Preparedness,* was initiated in 1997 in response to a serious need in the region. The training required for the professionals who will be responsible for reacting to and managing a nuclear accident will include treatment of affected personnel. There are over 60 operating NPPs of older design in CEE and the NIS, and many more nuclear facilities with research reactors and radioactive materials. This regional project pursues a socio–economic development objective, involving education and training, rather than development of technical or industrial infrastructure. With an emphasis on self-sustainability and self-assessment in its strategy, the project would ultimately benefit the entire region.

163. Project activities were co-ordinated by the IAEA through the Boston University Medical Centre (BUSM), USA, and jointly implemented by the IAEA, the University of Massachusetts Medical School, and the Radiation Emergency Assistance Center/Training Site of the Oak Ridge Institute for Science and Education, USA. In 1997, the first cadre of instructors was

trained at Oak Ridge through the train-the-trainers standard course developed by BUSM for the IAEA. Two locations in Eastern Europe (in Armenia and the Russian Federation) were designated as initial centres where the standard training course would be repeated. The training programme will be repeated in other centres in Europe using this experience, and modern teleconferencing systems will connect various centres during training sessions. Representatives of CEE and the NIS, including several high-level officials in the areas of nuclear emergency preparedness and their technical advisors met to agree on the launching of RER/9/050 – *Harmonisation of Nuclear Emergency Preparedness.* A Memorandum of Understanding (MoU) and a workplan were agreed upon. Eleven Member States, the agreed minimum number, informed the IAEA in writing of their intention to join the project and accept the MoU conditions. They also designated national co-ordinators. The IAEA's guidelines on emergency preparedness were presented to the technical advisors during a training workshop.

164. Little attention had been paid during the design, construction and operational phases to the eventual decommissioning of nuclear reactors in CEE and the NIS, in particular the WWER type reactors operating in Armenia, Bulgaria, the Czech Republic, Finland, Hungary, the Russian Federation, Slovakia and Ukraine. The problem of decommissioning has now become acute since many of the first WWER-440 type reactors are approaching the end of their designed lives. The regional project RER/9/034 was launched in 1997, partially through Japanese extrabudgetary funding, to provide basic guidance to operators and regulators of CEE Member States on decommissioning NPPs. As a result of the initial activities, an outline for the definition of information and guidance for WWER decommissioning planning and management has been agreed upon between participating countries. The project includes, as a major component, a peer review of decommissioning plans for selected plants.

165. In the field of environmental restoration, a serious issue in most CEE countries and the NIS is the unregulated exploitation of natural resources, particularly mining and milling of uranium ores. Large areas have become radioactively contaminated and require extensive restoration and the application of appropriate land use management techniques to ensure that the health and safety of affected populations are not compromised. The first phase of a regional project, involving 15 countries, to exchange experience and help to increase the awareness and priority of environmental restoration activities was concluded in 1996. The results of the second phase of the project, initiated in 1997, were published in IAEA TECDOC-982 – *Planning for Environmental Restoration of Mining and Milling Sites in Central and Eastern Europe*. New national TC projects on this topic began in 1997 in Bulgaria, the Czech Republic, Slovenia and Ukraine as a result of the awareness created by the project. National rehabilitation programmes for areas affected by uranium mining in Bulgaria and the Czech Republic were supported. In Slovenia, assistance in decommissioning a large mining and milling tailings disposal facility was initiated. The Agency also assisted Ukraine in evaluating the contamination due to the use of uranium tailings in building materials.

166. Phase two of RER/2/003 - *Environmental Assessment in the Black Sea Region,* focused on capacity building, testing of proficiency and the application of acquired capabilities with the aim of doubling the scope of the project by monitoring the full range of relevant radionuclides in the environmental assessment using radioactive tracers. Georgia joined the other participants - Bulgaria, Romania, Russian Federation, Turkey and Ukraine - as a new Member State in 1997. The traditional type of problems (i.e. customs issues, long delivery times, local economic difficulties) experienced by such complex problems were minimized by good co-operation between project participants. The project objectives are consistent with the global UN programme on the topic - *Global Programme for Action for Protection of the Marine Environment from Land Based Sources* (GPA). The Agency also joined with IOC/UNESCO for implementation of a training activity, collaborated with the Centre for Advanced Technological and Environmental Training in Karlsruhe, Germany, to implement another training course, and also developed ties with EU's EROS 21 programme for joint sea cruises.

167. Studies carried out by the World Bank and WHO have indicated that cancer in CEE and the NIS contributes to about one fifth of all deaths. Radiotherapy is a major form of

treatment and palliation in the management of cancer. A new regional project, RER/6/009 – *Upgrading of Radiotherapy for the Treatment of Cancer,* was initiated in support of ten radiotherapy departments in eight countries. The Agency provided basic dosimetry equipment and training required for the calibration of radiotherapy beams, including medical physics literature, to 13 countries in the region. Treatment planning systems needed for establishing correct radiotherapy dose were delivered to six Member States, including plans for installation and training. Servicing, repair and recharging of brachytherapy equipment (the cornerstone for treatment of gynaecological cancer), were carried out in Armenia, and in Bosnia and Herzegovina. A simple low dose rate brachytherapy unit was supplied to Albania, making such treatment available to the country for the first time. The repair, servicing and replacement needs of Russian made radiotherapy equipment in Armenia and Georgia were surveyed. However, the planned corrective actions for carrying out the necessary repairs and replacement of spent sources in these countries were delayed pending an acceptable solution to the disposal of spent medical radiation sources. Delays in programmes occurred in Albania and the Former Yugoslav Republic of Macedonia for the same reason. The organization of clinical training through fellowships to hospitals in Europe began with the receipt of 15 applications from radiation oncologists.

168. Another important regional project contributing significantly to capacity building was RER/0/011 – *Establishing INIS Capabilities in the NIS*. Representatives from 16 Member States participated in a workshop designed to increase regional co-operation. Eight INIS centres were equipped with computers, allowing scientists and researchers in participating countries access to the IAEA/INIS database.

HIGHLIGHTS OF NATIONAL PROGRAMMES

169. The extensive nuclear power and nuclear safety related programme in Armenia, which is based on the results of several Agency missions and in particular a CPF mission, continued in 1997. The programme addressed issues related to the training of personnel for the operating organization and the regulatory body, and attracted the attention of donors following a visit of the Director General of the IAEA. The USA alone contributed about US $430,000. France also financed one very important project. A significant step forward was made when agreement was reached between several major donors and the IAEA that the Agency should co-ordinate the safety assistance to Armenia. One result of this was a mission to Armenia to review the general plan for NPP personnel training and define the inputs of the Agency and assistance from other donors. A meeting was later organized with Armenia and interested donors at which agreement was reached on a short and medium term plan of assistance for upgrading the NPP personnel training programme in Armenia. The plan calls for approximately US $15 million in contributions, with the Agency's share set at US $400,000. The rest will be provided through bilateral means.

170. In parallel projects completed in Bosnia and Herzegovina and the Former Yugoslav Republic of Macedonia, the Agency strengthened capabilities in NDT through the supply of radiographic and ultrasonic testing equipment and radiation safety and dark room equipment. One significant result was the recertification of two engineers from the former country and one from the latter at Radiographic Testing Level III (the highest level) in accordance with European standards.

171. About 30% of the electricity production in Bulgaria depends on the combustion of high sulphur content domestic lignite in a complex of power plants in the Maritsa region. With high SO_2 emission (850,000 tonnes per year), Bulgaria is among the countries with high levels of environmental pollution. The Government, pursuant to the 1991 "Environmental Protection Law", decided to examine the options for desulphurization of flue gases to meet the requirement of the national environmental protection programme. A promising feasibility study encouraged the Bulgarian Government to initiate a plan to install a small scale electron beam (EB) demonstration plant at the Maritsa-East-2 power plant in order to evaluate the

technology. The total cost of this installation including the EB accelerators is approximately US $7 million.

172. The project BUL/8/014 was launched in 1997 to help to achieve this goal. The Agency will provide about US $1.2 million as part of its 1997–1999 TC programme and the Bulgarian share will be about US $1 million. The accelerators, with a total value of about US $5 million, have been donated by Japan. In November 1997, a Tripartite Agreement was signed between Bulgaria, Japan and the IAEA defining the responsibilities of each party and the schedule, including the start of operation in April 1999. The basic design of the plant was completed late in 1997 and construction is expected to start in mid-1998.

173. A serious radiological accident in Georgia in 1997 was caused by twelve Cs-37 sources left unattended on the territory of a former USSR military base in Lilo. As a result, 11 soldiers were irradiated. The Agency was requested to evaluate the radiological situation and to assist in the examination and treatment of the personnel with radiation burns. Medical treatment was provided under an existing mutual agreement between the WHO and the Agency and the injured persons were sent for medical treatment to France and Germany. Shortly after the request, a radiological assessment mission undertaken by an Agency team verified that the dose rate and contamination levels at the site were at natural background levels. The radioactive sources causing the problem were traced and securely stored. The Agency later agreed to an urgent request from Georgia for assistance to locate other lost and destroyed radioactive sources and to establish facilities for their safe interim storage. A Reserve Fund project, GEO/9/004 – *Radiological Emergency Assistance to Georgia,* was approved with the aim of providing analytical and monitoring equipment and the necessary training to enable the local authorities to locate any additional sources left in the former USSR military bases in Georgia, and to assist in the preparation of an interim storage facility for the conditioning and storage of spent sources from all uses. The two missions carried out together with a meeting of experts confirmed that there were other unprotected sites in Georgia with radioactive sources. The Agency has agreed to continue its assistance during 1998 in order to recover and store the sources in a special bunker.

174. The Hungarian Paks NPP Maintenance Training Centre (MTC) developed under the Model Project HUN/9/019 was inaugurated on 29 April 1997. At the opening ceremony, the importance of the MTC in contributing to plant reliability was emphasized as well as the important role of the Agency in the achievement. This Model Project was a complex, multi-year undertaking involving several national institutions and an overall investment of over US $10 million. It reflected the collective commitment of the participants to increasing the safety and reliability of nuclear power and enabled the Paks NPP to significantly improve its safety and operating performance. This full scale training centre was built at a total cost of about US $10 million, over 70% of which was contributed by Hungary. The rest was covered by the IAEA (TCF 22%, Japan 0.2%, Spain 3% and the USA 1%) and EU's PHARE programme (5%)).

175. The purpose of the Model Project SLR/9/005 was to strengthen and develop the capabilities of the Slovak Nuclear Regulatory Authority (SNRA) to meet international recommendations within a three year period. The project focused on the areas of: national nuclear legislation; role and structure of SNRA; training; emergency arrangements; public information; licensing and quality assurance. The project provided assistance in revising the National Nuclear Act and in drafting supporting legislation such as regulation and standards. More than 50 internal procedures and guidelines were written and developed which are either in force or at different stages of national review. Special training programmes, meeting international standards, were developed and implemented for SNRA inspectors and personnel. The SNRA Emergency Response Centre was commissioned and internal and external emergency exercises were conducted.

176. An important TC project for the introduction of the Systematic Approach to Training (SAT) in the Ukraine was completed as a joint IAEA/EU initiative. The objective of UKR/4/003 – *Training for Safe Operation and Management of NPPs,* was to develop and upgrade the Ukrainian NPP personnel training system and to improve NPP management through the development and implementation of a SAT-based personnel training programme

for the South Ukrainian NPP. The project was mainly financed through Spanish extrabudgetary contributions using a Spanish firm for implementation of the SAT programme. The Agency was responsible for the organization and co-ordination of the project, including evaluation of the implementation of the project plan and the quality assurance programme. The Needs Analysis Report (NAR) was completed in 1995; know-how was transferred through the development of SAT procedures and training courses for each phase of the SAT process; the basis of quality was provided through SAT procedures and the quality of the project was ensured by the Quality Assurance Manual. Guidelines were provided through the conceptual training document and the NAR.

177. In November 1997, a milk decontamination plant was commissioned at the Ovruch Dairy, in Ukraine, 80 km west of Chernobyl. The plant was designed and constructed after the successful outcome of UKR/9/007 – *Reduction of Radionuclides in Human Food and Environment*. The trilateral agreement between the State Committee of Food Industry of Ukraine, the firm Selentec, and Argonne National Laboratory, USA, for the implementation of the *MAG*SEP* technology for decontamination of milk and other food products in Ukraine was initiated by the IAEA and financed by the US Government. At the end of 1997 the plant was still being tested, but the first results appeared promising: 70–80% of radioactive caesium was being removed from dairy products. The plant decontaminated eight tonnes of milk in 20 minutes, and much more contaminated milk is expected to be processed to lower contamination levels. The radiological and radiochemical laboratory established at the milk plant in Ovruch under this project is intended to provide an efficient new technology for the control of radionuclides in milk. The Ukrainian Government is considering the construction of additional plants for milk decontamination based on the technology. The laboratory would thus be used as a model teaching laboratory for specialists from the Ukrainian food Industry.

6. Interregional

OVERVIEW

178. Interregional activities in 1997 were generally of three types: (a) new initiatives to apply Model Project principles to inter-country projects; (b) implementation of programme planning mechanisms including Thematic Planning, Country Reviews, Country Programme Frameworks (CPFs) and Strengthening of Technical Co-operation among Developing Countries (TCDC); and (c) improving the design and formulation of activities to be undertaken by many countries in more than one geographical region, thus enhancing the quality of the project.

HIGHLIGHTS

179. Seventeen interregional training courses trained 429 participants on subjects of interest to a large number of developing countries. Nine courses were devoted to nuclear power, nuclear safety and radiation protection, including electricity demand forecasting for nuclear power planning, operational safety of nuclear reactors, interim storage of spent fuel, near surface radioactive waste disposal, and radiological emergencies. The remaining courses were devoted to information science, nuclear electronics, and the application of isotopic and radiation techniques in agriculture, nuclear medicine, industry, and environmental research and monitoring.

180. A major interregional activity, the Model Project INT/9/143 – *Upgrading Radiation Protection Infrastructure*, continued to make progress towards the goal of the participating countries: to achieve the minimum requirements of safety by the year 2000. The main

activities in 1997 focused on achieving a national working system of notification, registration, authorization and inspection of the radiation sources based on an appropriate legal and regulatory framework consistent with the international Basic Safety Standards (BSS). The principal regional accomplishments to this end are as follows:

- **Africa**: A seminar for senior managers was held in Addis Ababa to address salient issues pertaining to the Model Project in the region. The seminar led to the adoption of a set of priority actions and operational modalities to ensure ways and means to implement the project and to achieve the short term goals. These include: (a) promotion of national workshops supported by the Agency to facilitate the promulgation of national legislation and enforcement regulations; (b) adoption of interim arrangements towards establishing a system of notification, registration and licensing in compliance with the administrative requirements of the BSS; and (c) development of the required human resources. A survey conducted during the seminar revealed that legislation has been promulgated and a National Regulatory Authority has been established and is functioning in 70% of the 17 participating countries.

- **East Asia and the Pacific**: Of the five participating countries in the region, radiation protection regulations and systems of notification, registration, licensing and inspection of sources were finalized for Bangladesh, Myanmar and Sri Lanka. Laws were enacted in Myanmar and Sri Lanka to address the same issues. Mongolia and Viet Nam are in the process of establishing their laws.

- **Europe**: All 11 participating countries had initiated steps to implement the Model Project. The status of calibration laboratories, as well as equipment maintenance and repair facilities, was reviewed. New or better functioning radiation monitoring and associated equipment was delivered to participating countries in the region. Four regional activities were held and a number of national training courses were organized in the individual countries. Five countries have completed their National Radiation Protection Law and the remainder are in the process of adding new legislation. Estonia, Latvia and Lithuania have partially completed their regulations, and seven other countries are in the preparation stage of completing the new legislation, while still making use of regulations from former governments. An up-to-date inventory or registry of radiation sources in each of the participating countries has been established.

- **Latin America**: Experts have been working on the elaboration of national regulations in the Dominican Republic, El Salvador, Jamaica and Panama to support regulatory control activities. Bolivia, the Dominican Republic and Panama have approved the draft regulation. Bolivia, Costa Rica, the Dominican Republic, El Salvador, Guatemala, Panama and Paraguay have been able to implement an inspection system owing, in part, to the training and equipment provided under the Model Project. Bolivia, Costa Rica, the Dominican Republic, Guatemala and Panama are developing training courses on radiation protection to meet licensing requirements.

- **West Asia**: The Agency has completed all necessary actions for the establishment of a legal framework, including the preparation of draft laws, regulations or decrees in Kazakhstan, Lebanon, Saudi Arabia, Syrian Arab Republic, the United Arab Emirates, Uzbekistan and Yemen. All of these legislative instruments have been approved. A system of notification, registration, licensing and inspection was introduced by national authorities in Lebanon, and similar steps are under way for Saudi Arabia. Relevant documentation and equipment for occupational exposure were provided to participating countries. A personnel monitoring programme was prepared for Kazakhstan, Lebanon, Syrian Arab Republic and Yemen, and the latter also received a TLD reader system under the project.

181. The combined resources of *Pre-Project Assistance* and *Country Programme Review* provided, as in the previous year, the means through which Member States were assisted in identifying their priority needs in formulating TC programmes which are in line with TC's new direction, and in developing TC activities using Model Project standards in priority areas in their national development goals. Thirteen missions were undertaken during the year, with the participation of 20 experts including in-house staff. Two of them were CPF formulation missions; three assisted in programming efforts, and seven assisted in the design of individual TC projects in priority areas in their national development goals.

182. *Technical Co-operation between Developing Countries* (TCDC) is another important objective of the interregional programme. It promotes technical co-operation not only between developing countries, but also between the three regional programmes AFRA, ARCAL and RCA. A draft strategy for expanding TCDC activities was prepared. The strategy provides guidance for innovative roles for more advanced counterpart organizations within regions to serve as training and resource centres in support of the TC Programme.

183. The initial phase of the Model Project INT/4/131 – *Sustainable Technologies for Managing Radioactive Wastes,* concentrated on: (a) collecting and conditioning used radioactive sources, especially spent Ra-226 sources; (b) treating and storing low level solid and liquid wastes; and (c) upgrading the skills of waste management operating staff. An in-house study identified appropriate waste management technologies to meet these objectives and also identified a number of individual Member States potentially needing assistance in these areas. A specialized team from Brazil helped in conditioning Ra-226 sources in Guatemala, Nicaragua and Uruguay, and two more countries (Ecuador and Paraguay) were identified for this work in the near future. The experience gained would be used in adopting a similar approach for other regions. Hands-on demonstrations were arranged on the conditioning of low level solid and liquid wastes and on the grouting of spent sealed sources at the existing facilities in Chile and Turkey.

184. Under the Model Project INT/5/144 – *Sustainable Utilization of Saline Groundwater and Wasteland for Plant Production,* ten-hectare sites were selected in each of the seven participating countries, and analysis of soil and groundwater was completed for determination of their initial status. Groundwater from the sites and from points in a 1–2 km radius was analysed for chemical and isotopic content at regular intervals. Some suitable salt-tolerant species have been introduced on the sites and some were grown in nurseries. Interaction and exchange of materials between participating countries has been encouraged in order to facilitate TCDC. Efforts at co-operation and support from other agencies have led to positive responses from the Islamic Development Bank and the FAO Regional Office for the Syrian Arab Republic.

185. Certain developing Member States have achieved good tissue banking practices. However, more emphasis needs to be given on quality and training in order to achieve internationally recognized standards. This is the objective of the interregional project INT/6/049 – *Centre of Excellence in Tissue Banking.* In recognition of the high standards achieved and practised at the tissue bank of the Singapore National University, an IAEA/RCA regional training course for tissue bank operators was held in Singapore in November 1997 to launch the first Diploma course using the Multi-Media Distance Learning Curriculum developed under the RCA programme. Tissue bank activities were reviewed in Argentina, Brazil and Cuba, with a view to expanding activities in Latin America.

186. Implementation of the interregional project INT/2/010 – *Quality Assurance in Analytical Diagnostic Laboratories,* started early in 1997. Thirty-one laboratories with high proficiency testing performance were selected as potential counterparts (10 RIA, 10 ELISA and 11 optical emission spectrometry for N-15). The first workshop for counterparts of RIA laboratories was held in Mexico where a two year workplan for the establishment of a quality assurance system was established for each participating laboratory.

B. RESOURCES AND DELIVERY

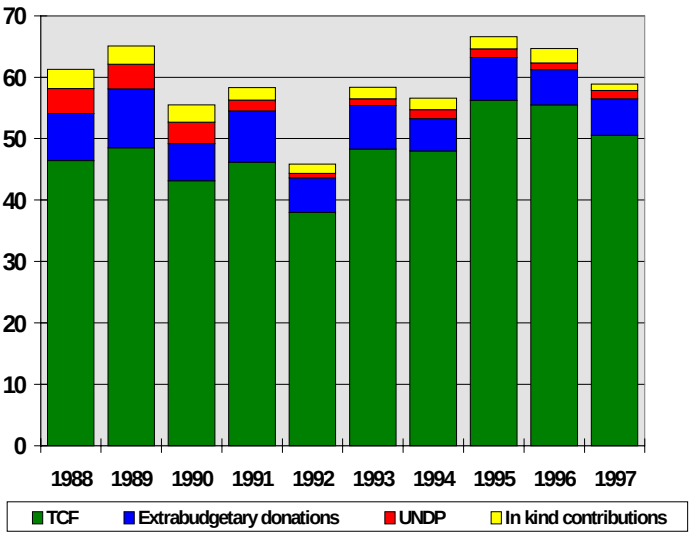
1. Overview

New resources	*$59.4 million*
Adjusted programme	*$81.5 million*
Total new obligations	*$64.0 million*
Implementation rate	*76.2%*
Disbursements	*$60.6 million*

187. New resources in 1997 totalled $59,368,000 (US dollars are used throughout this Section), a decline from $63,243,000 recorded in 1996. While the TCF was down 6.9%, the "other resources" (extrabudgetary and in kind) were down by 1.2%. This unexpected drop in the major fund only became apparent in the second half of the year and the Secretariat was forced to take remedial measures with regard to the adjusted programme and financing of the 1998 core programme.

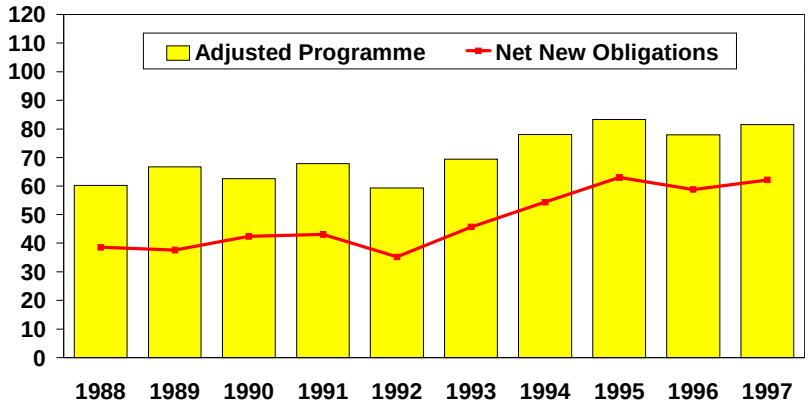
188. TC resources, like the regular budget of the IAEA, can and should be adjusted for inflation. For these adjustments, the consumer price increases of the industrialized countries (excluding those with high inflation) as calculated by the OECD have been used. The calculations were made with 1997 as a base year and the previous years were adjusted to 1997 prices. 1984 to 1989 saw a continuous increase from $50.7 million to $65.1 million (in 1997 dollars). As can be seen in the next chart, there have been swings up and down since then, with 1997 showing, in real terms, a decline of 9.6% to $58.9 million from the $65.1 million recorded for 1989.

IAEA TC RESOURCES ADJUSTED FOR INFLATION: 1988–1997
(in millions of dollars)



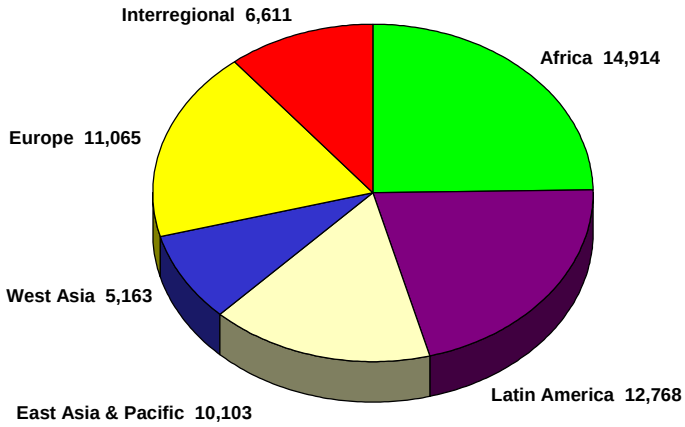
189. The total adjusted programme equalled $88,955,000 at 30 June 1997, reduced by the end of the year to $81,526,000. This compares with an adjusted programme of $77,981,000 in 1996 and $83,264,000 in 1995. Against this programme, financial implementation was at an all time high level with a rate of 76.2%, up from 75.4% in 1996 and 75.7% in 1995. Total new obligations, including those against future year programmes, were significantly higher in 1997 than the previous year, growing by about $5.2 million to $64,047,000.

IMPLEMENTATION SUMMARY - ALL FUNDS
(in millions of dollars)



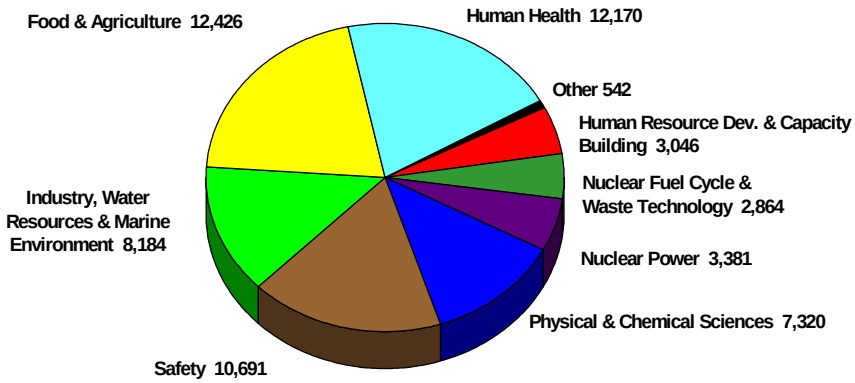
190. The actual delivery of the programme to the Member States is based on disbursements and these rose from $59,552,000 in 1996 to $60,623,900 in 1997. As shown in the next diagram, the highest delivery went to Africa, with 24.6%, followed by Latin America with 21.1%, Europe with 18.2%, East Asia and the Pacific with 16.7% and West Asia with 8.5%. The interregional programme, including all miscellaneous costs, received 10.9%. The most significant change from last year is the relatively steep decline of East Asia and the Pacific, which lost over 5% of the total.

DISBURSEMENTS BY REGION: 1997
(in thousands of dollars)



191. The same delivery is shown by major programme in the next chart. There was a shift from 1996 with Food and Agriculture (Agency Programme Code (APC): D) and Human Health (APC: E) accounting for 20% each. This was followed by Safety with 18% (including APCs: H, I, J, K), Industry, Water Resources and Marine Environment with 13% (APC: F), and Physical and Chemical Sciences with 12% (APC: G). Minor programmes made up 17% of the TC project delivery. These included Nuclear Power with 6% (APC: A), Nuclear Fuel Cycle and Waste Technology with 5% (APC: B) and Human Resource Development and Capacity Building (Management of Technical Co-operation for Development) also with 5% (APC: N). Very minor programmes made up less than 1% (APCs: C, L, M, Q, T).

DISBURSEMENTS BY MAJOR PROGRAMME: 1997
(in thousands of dollars)



2. Technical Co-operation Fund

192. In September 1996 the General Conference approved a target of $68 million for the Technical Co-operation Fund for 1997 following the Indicative Planning Figures (IPF) established a year earlier by the Board of Governors. The General Conference allocated a total of $69,000,000 for the fund, which included an additional one million dollars from other sources. Unfortunately, a trend that began a few years ago manifested itself once again: fewer Member States are pledging at the General Conference. This occurred in spite of the fact that numerous appeals were made and the delegates were kept up to date by daily reports of the pledging. By the end of the 1996 Conference only $9,151,993 (or 13.5%) had been pledged. Nevertheless, the Secretariat had to plan resources for the coming biennium and, on the basis of pledges received for 1995 and 1996, estimated conservatively 76.5% for each of the next two years (77.8% had been pledged for 1995 and 78.5% for 1996). There was a certain amount of optimism during the first half of 1997 when the traditional large donors made pledges and payments. However, information was then received that some major contributors would not be providing resources and by year end it became apparent that much less (70.2%) would be pledged than had been anticipated. This is the lowest amount ever pledged towards a TCF target and compares with an average of 80% pledged over the previous ten years.

193. The Secretariat monitored the resource situation carefully during 1997 and, from July, stringent measures were taken to adjust the programme to bring it into line with the declining funds. The TCF adjusted programme was reduced from $79,473,000 at the end of June to $71,313,000 by the end of the year. This reduction came from savings made by closing projects and reducing project budgets.

194. In preparing for the TACC in November and the Board in December, it became apparent that the resources projected earlier would not cover the financing of the second

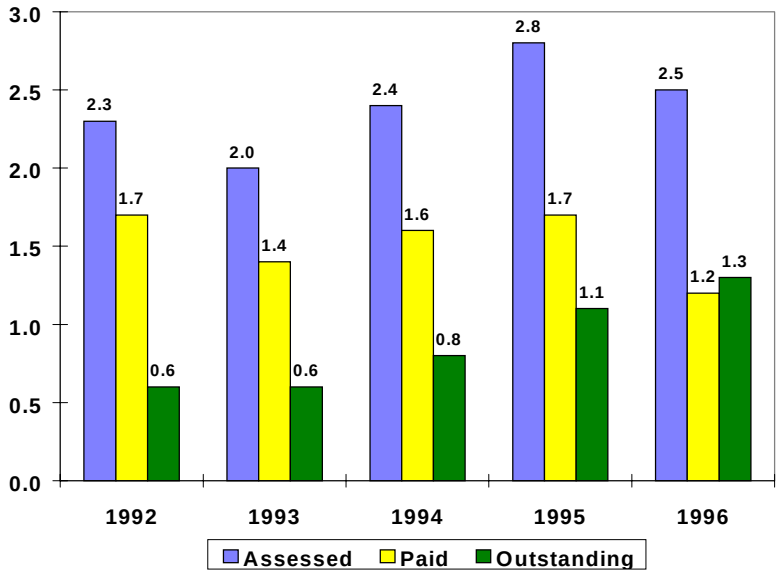
year of the programme as envisaged. Contingency plans were made and presented to the TACC with proposed reductions to the 1998 core project budgets of 4% and 10%. The 4% option was needed if the overprogramming could be increased to 20%; the 10% was needed if the overprogramming was to remain at the 15% ceiling set by the Board.

195. The Board of Governors decided in December not to cut the 1998 programme but rather to allow the overprogramming to float during the first six months of 1998 and to review the situation at the June Board, after receiving up-to-date financial information at the May A & B Committee. The final decision on the allocations for the TC Programme for 1998 would therefore be made at the June Board Meeting.

196. Details of the TCF pledges can be seen in Table A.3 in the Supplement; three countries pledged more than their target, and 39 pledged 100%. A third group, comprising 18 countries, made pledges ranging between 2% and 95%. Sixty-seven Member States did not pledge at all. These included two with a target of over $3,000,000 each, and one of more than $6,000,000.

197. Additional income for the TCF comes from Assessed Programme Costs (APC), which is intended to reimburse the Agency for local expenditures and is levied at 8% of assistance received. This is calculated only for national projects and fellowship costs. All regional and interregional non-fellowship outlays are not included in the calculation of APC. This regional category has increased substantially over the past few years so that the amounts billed have been proportionally decreasing. The amount of APC collected in 1997 decreased from $2,252,000 to $1,978,000, or about 12%. At the end of the year $7,719,000 in APC was outstanding.

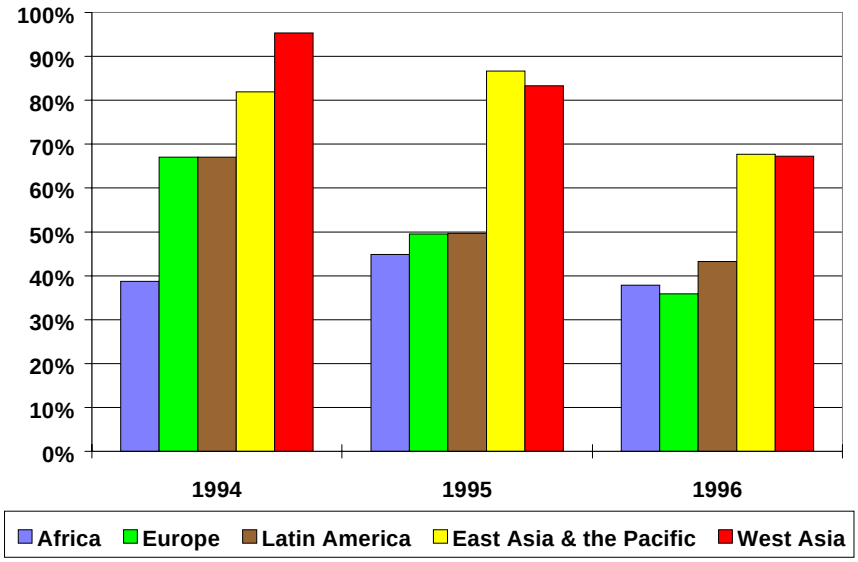
ASSESSED PROGRAMME COSTS FOR THE TCF: 1992–1996
(in million $)



198. As the APC is not voluntary and as “due account” of it is taken when allocating resources from the TCF, appeals have been made to the recipient Member States to pay the outstanding amounts. Within the Secretariat measures have been undertaken to heighten awareness of outstanding payments. Reminders are given during discussions with delegations and when visiting the countries concerned when arrears have accumulated. The next graph shows the payments by area and percentage paid of the APC levied during each

of the previous three years. LDCs are not charged for APC and therefore these do not appear in any calculations.

ASSESSED PROGRAMME COSTS BY AREA: 1994–1996



199. Interest income declined once again to $1,051,976 from $1,367,708 recorded in 1996 and $2,697,669 in 1995. There are two reasons for this: the fact that lower pledges meant less funds to invest and, of course, the declining international interest rates.

200. In spite of the reduction of the TCF adjusted programme from July to December of over 10%, the TCF was overprogrammed at year end by $5,129,000.

RESOURCES AVAILABLE AND PROGRAMME COMMITMENTS BY YEAR END ($)

Year	Available financial resources	Programme commitments	(Overprogramming) Underprogramming
1988	25,209,000	30,046,000	(4,837,000)
1989	33,256,000	36,581,000	(3,325,000)
1990	31,211,000	29,199,000	2,012,000
1991	34,292,000	32,966,000	1,326,000
1992	29,069,000	28,490,000	579,000
1993	36,187,000	30,751,000	5,436,000
1994	36,369,000	35,988,000	381,000
1995	35,512,000	34,552,000	960,000
1996	39,099,000	38,566,000	533,000
1997	**36,868,000**	**41,997,000**	**(5,129,000)**

201. The current year's unobligated balance stood at $10,915,000 at the end of 1997 – a drop of $5,091,000 or about 32%. Including the future year obligations of $1,500,000, the unobligated balance stood at $9,415,000. This unobligated balance includes funds pledged but not yet paid. If these are subtracted, the money left to be obligated is reduced to $5,973,000 – the funds the Agency actually had for obligation purposes. As in the case of the last three years, the *useable unobligated balance* has also been calculated. With the subtraction of currencies which cannot be utilized and of those difficult to use, the balance reduces to $995,000. The following table shows that this is down from $6,855,000 at the end of 1996 and $6,164,000 at the end of 1995. To put this into perspective, one should look at the earmarkings (project components still to be delivered) at the end of 1997 (see the Implementation Summary I at the end of this report). For the TCF the earmarkings stood at $16,044,000. In other words, the Agency had a programme on the books in excess of $15,000,000 over useable funds.

CALCULATION OF THE USEABLE UNOBLIGATED BALANCE ($)

	1995	**1996**	**1997**
Unobligated balance current year	16,923,000	16,006,000	**10,915,000**
Obligated against future year project budgets	(3,150,000)	(478,000)	**(1,500,000)**
Unobligated balance all years	13,773,000	15,528,000	**9,415,000**
Pledges not yet paid	(2,467,000)	(3,827,000)	**(3,442,000)**
Non-convertible currencies which cannot be utilized	(1,578,000)	(1,707,000)	**(1,770,000)**
Currencies which are difficult to convert and can only be utilized slowly	(3,564,000)	(3,139,000)	**(3,208,000)**
Resources which can be used for TC Programme obligations	6,164,000	6,855,000	**995,000**

202. With less than one million dollars in useable unobligated balance, the resource picture had changed dramatically from year end 1996 to year end 1997. The Secretariat, with the full backing of the Board, is planning a number of actions to improve the resource picture in the first five months of 1998.

3. Extrabudgetary Funds

Funds from Member States

203. Extrabudgetary resources from Member States amounted to $6.5 million in 1997 and represented more than 10% of all new TC resources, including Government cost sharing contributions of $1.6 million from ten recipient Member States, compared to four in 1996. The increased number of countries using this mechanism strengthens the partnership concept for the TC programme. Over $2 million of the new resources were in support of Model Projects in the following sub-programmes: $1.27 million for industrial applications and $525,000 for nuclear power and safety programmes in Central and Eastern Europe; $620,000 for pest control and animal disease and $250,000 for nuclear medicine in Africa.

204. Footnote-a/ projects and project components totalling $6.4 million were funded using available extrabudgetary resources of $4.5 million and TCF savings of $1.9 million. This represented 25.9% of the total 1997 footnote-a/ programme of $24.7 million. Type II fellowship resources from France and the USA amounting to $138,260 were also earmarked for these projects.

205. Implementation in this category of funds increased by 5% and reached 64.2%. Following a review by the Area Officers, funds were rephased for planned 1997 activities that had been postponed. Most of the extrabudgetary resources are tied funds and have restrictions on use, and utilization for the recruitment of experts usually requires additional management attention.

206. The unobligated balance for this category of resource was $6.8 million. Receipt of cash late in the year and the absence of allocation instructions from donors prevented over $3 million of this balance from being programmed, and the Secretariat was therefore unable to deliver goods and services against these funds.

207. A Government cost sharing contribution ($1.4 million) from the Czech Republic was successfully negotiated for the purchase of a cyclotron and a PET camera under project CZR/4/007 – *Cyclotron for Short Lived Medical Radioisotopes*.

208. Discussions are progressing with the Ethiopian and Jamaican Governments to secure financial packages for two SIT projects: one, to eradicate the tsetse fly from a 25,000 km^2 tract in Ethiopia's Southern Rift Valley ($43 million), and the other to eradicate the New World Screwworm from Jamaica ($9 million). Negotiations with the Jamaican Government to allocate cash resources of $8 million, derived from the sale of agricultural commodities, were finalized in collaboration with the United States Department of Agriculture.

UNDP

209. Several projects, under development for some time, were approved or made operational during the year. Net new obligations increased by almost 30% to $1.35 million, compared to $1.05 million in 1996, while disbursement decreased by 41%. The difference reflects a number of large obligations opened in the latter half of 1997, for which disbursements are expected in 1998.

210. The RCA was awarded a new project focused on environmental problems, with an initial budget of over $1 million for 1997–1999. A project in the Syrian Arab Republic on uranium removal from phosphoric acid, which was approved in 1996, became operational in May, after the Government added almost one million dollars in cost sharing. About $240,000 was added to an ongoing UNDP project to cover capacity building for a maintenance training centre. Most of these funds were allocated under national execution arrangements whereby the Government is responsible for the implementation of the activity. In addition, the Agency is giving technical support to a Russian UNDP project, approved in 1997, on radionuclides in groundwater and surface water.

211. The year marked a new stage for the UNDP programme, with the introduction of a more flexible, continuous cycle. UNDP sectoral support was phased out and replaced by two special facilities for technical support services. About 100 assignments were carried out under UNDP sectoral support during the year, with total expenditure of over $250,000, making this fund an important addition to the administrative budget for TC field missions. Sectoral support activities included (a) Thematic Planning and programming in human health and (b) responses to requests for assistance from non-member states of the former USSR. A large proportion of the funds were used for programme formulation and co-ordination in Africa, East Asia and Latin America. Two projects were carried out (in Mali and Tunisia) under the new facilities for technical support services.

4. In-Kind

212. Assistance in-kind is recorded only at year end, and the new resources are automatically calculated to be equivalent to disbursements. In 1997, the value of assistance received in-kind amounted to $1 million.

213. Assistance in-kind is recorded according to strict criteria. Credit is given to donor countries for the services of their experts and training course lecturers going to another country; for the sponsorship of foreign training course participants; for equipment actually transported to another country; and for fellowship training utilizing Type II resources.

214. The $1 million recorded for 1997 comprised the costs of the assignments of 191 experts and training course lecturers, and of 166 months of fellowship training.

5. Contributors' Profile

215. During the year, the question of predictable and assured resources for TC was discussed several times in the Board of Governors. Under operative paragraph 2 of GC(41)/RES/13, the General Conference requested the Board of Governors to initiate negotiations among Member States with a view to ensuring sufficient funding for TC activities, since there was no agreement on Indicative Planning Figures (IPFs) for the 1999–2000 cycle. The Informal Working Group on the Financing of Technical Assistance met during the year and in September submitted a working paper to the Board. This resulted in a request for the Secretariat to prepare background documentation on eligibility criteria for TC funding in the UN system and on the application of the "due account" provisions.

216. This section of the report seeks to acknowledge the contributions of those Member States which have fully met their commitment to the TCF, i.e. those who have pledged in full (100%) their share of the TCF target. In view of the fact that there is a gap between the amounts pledged and the amounts actually paid, the pledges of Member States for the TC programme are reflected as receivable income to the TCF.

217. In 1997, 36 Member States pledged their full share and made payments to the TCF. Of these, three countries exceeded their 1997 target: Australia (102%), Egypt (106%) and Liechtenstein (103%). The individual profiles at the end of this section summarizes the contributions from all sources for each of these Member States and is sorted by the amount pledged. The group includes 14 developed and 22 developing Member States, and together they represent 92% of the payments made to the TCF. All Member States are listed in Table A.3 of the Supplement to this report according to the percentage of share pledged.

218. A review of the TCF adjusted programme at year end shows that 27 recipient Member States pledged 100% of their target share and accounted for 27% of the adjusted programme.

219. Extrabudgetary contributions were made by 12 Member States, who also pledged 100% of their target share, compared to nine in 1996. They collectively represented 80% for this category of funds. The next table gives an overview of the programmes receiving financial support in 1997 from these 12 countries. Details of all extrabudgetary contributions are shown in Table A.5 of the Supplement to this report.

SUPPORT BY PROGRAMME FOR SELECTED EXTRABUDGETARY DONORS

Programme	CPR	CYP	CZR	FRA	JPN	MAL	MEX	NET	PHI	THA	UK	USA
A. Nuclear Power				x								
B. Nuclear Fuel Cycle and Waste Technology				x	x							
D. Food and Agriculture		x		x					x			x
E. Human Health				x	x		x					x
F. Marine Environment, Water Resources and Industry	x				x	x			x	x		x
G. Physical and Chemical Sciences			x									x
H. Nuclear Safety											x	x
I. Radiation Safety												x
J. Radioactive Waste Safety												x
K. Co-ordination of Safety Activities				x							x	x
Q. Legal activities, External Relations and Public Information								x				x

220. Besides having met 100% of their TCF target, 23 Member States also supported the TC programme with in-kind contributions, providing 78% of these resources. Most of the support received was directed at the training sector, in particular the fellowship component (Type II). Details of all in-kind contributions are shown in Table B.3 of the Supplement to this report.

221. The 20 largest contributors to the TCF (14 developed and 6 developing Member States) represent 96% of the payments in 1997.

TCF PAYMENTS FOR 1997
(as at 31 December 1997)

Member State	Payments	Percentage of Total Payments
USA	16,598,000	35.5
Japan	10,470,300	22.4
France	4,345,200	9.3
UK	3,604,000	7.7
Canada	1,770,321	3.8
Netherlands	1,077,800	2.3
Australia	1,023,016	2.2
Sweden	833,000	1.8
Switzerland	821,100	1.8
Austria	586,500	1.3
Mexico	533,800	1.1
China	498,100	1.1
Denmark	486,200	1.0
Finland	418,200	0.9
Korea, Republic of	385,000	0.8
Norway	379,100	0.8
Spain	323,100	0.7
Argentina	250,000	0.5
Poland	229,500	0.5
India	210,800	0.5
Sub-total	**44,843,037**	**95.8**
Others	1,959,650	4.2
Total	**46,802,687**	**100.0**

222. Eight Member States from the group that pledged 100% of their TCF target made contributions in all three categories: TCF, extrabudgetary and in-kind.

CONTRIBUTORS' PROFILE

(100% TCF Pledge)

USA

	a/	b/
TCF	$16,598,000	35.5%
Extrabudgetary	$2,380,000	36.7%
In-kind	$529,238	52.1%

Host facilities were provided for 362 trainees of which 37 were financed from type II resources. Two cost-free experts assisted in the administration of the TC programme.

JAPAN

	a/	b/
TCF	$10,470,300	22..4%
Extrabudgetary	$1,201,575	18.5%
In-kind	$13,000	1.3%

Host facilities were provided for 69 trainees. One cost-free expert assisted in the administration of the TC programme.

FRANCE

	a/	b/
TCF	$4,345,200	9.3%
Extrabudgetary	$237,015	3.6%
In-kind	$77,100	7.6%

Host facilities were provided for 110 trainees of which 6 were financed from type II resources.

UK

	a/	b/
TCF	$3,604,000	7.7%
Extrabudgetary	$362,903	5.6%
In-kind	$73,140	7.2%

Host facilities were provided for 98 trainees of which 4 were financed from type II resources.

NETHERLANDS

	a/	b/
TCF	$1,077,800	2.3%
Extrabudgetary	$36,000	0.5%
In-kind	$1,400	0.1%

Host facilities were provided for 11 trainees.

AUSTRALIA

	a/	b/
TCF	$1,023,016	2.2%
Extrabudgetary	-	-
In-kind	$1,525	0.1%

Host facilities were provided for 54 trainees.

SWEDEN

	a/	b/
TCF	$833,000	1.8%
Extrabudgetary	-	-
In-kind	$4,400	0.4%

Host facilities were provided for 19 trainees.

SWITZERLAND

	a/	b/
TCF	$821,100	1.8%
Extrabudgetary	-	-
In-kind	$6,600	0.6%

Host facilities were provided for 7 trainees.

a/ Contributions made during the year.
b/ Reflects percentage of total resources received for each source of funds.

CONTRIBUTORS' PROFILE

(100% TCF Pledge)

AUSTRIA

	a/	b/
TCF	$586,500	1.3%
Extrabudgetary	-	-
In-kind	$2,800	0.3%

Host facilities were provided for 57 trainees.

MEXICO

	a/	b/
TCF	$533,800	1.1%
Extrabudgetary	$51,603	0.8%
In-kind	$5,440	0.5%

Host facilities were provided for 71 trainees.

CHINA

	a/	b/
TCF	$498,100	1.1%
Extrabudgetary	$50,040	0.8%
In-kind	$25,043	2.5%

Host facilities were provided for 66 trainees.

DENMARK

	a/	b/
TCF	$486,200	1.0%
Extrabudgetary	-	-
In-kind	-	-

Host facilities were provided for 9 trainees.

FINLAND

	a/	b/
TCF	$418,200	0.9%
Extrabudgetary	-	-
In-kind	$7,200	0.7%

Host facilities were provided for 60 trainees.

NORWAY

	a/	b/
TCF	$379,100	0.8%
Extrabudgetary	-	-
In-kind	-	-

Host facilities were provided for 3 trainees.

POLAND

	a/	b/
TCF	$229,500	0.5%
Extrabudgetary	-	-
In-kind	-	-

Host facilities were provided for 79 trainees.

SOUTH AFRICA

	a/	b/
TCF	$109,650	0.2%
Extrabudgetary	-	-
In-kind	$10,600	1.0%

Host facilities were provided for 140 trainees.

a/ Contributions made during the year.
b/ Reflects percentage of total resources received for each source of funds.

CONTRIBUTORS' PROFILE

(100% TCF Pledge)

INDIA

	a/	b/
TCF	$210,800	0.5%
Extrabudgetary	-	-
In-kind	-	-

Host facilities were provided for 38 trainees.

CZECH REPUBLIC

	a/	b/
TCF	$176,800	0..4%
Extrabudgetary	$810,000	12.5%
In-kind	$4,687	0.5%

Host facilities were for 54 trainees.

ROMANIA

	a/	b/
TCF	$100,813	0.2%
Extrabudgetary	-	-
In-kind	$5,400	0.5%

Host facilities were provided for 34 trainees.

HUNGARY

	a/	b/
TCF	$95,200	0.2%
Extrabudgetary	-	-
In-kind	-	-

Host facilities were provided for 50 trainees.

MALAYSIA

	a/	b/
TCF	$95,200	0.2%
Extrabudgetary	$10,000	0.1%
In-kind	-	-

Host facilities were provided for 47 trainees.

THAILAND

	a/	b/
TCF	$88,400	0.2%
Extrabudgetary	$10,000	0.1%
In-kind	-	-

Host facilities were provided for 37 trainees.

NIGERIA

	a/	b/
TCF	$78,200	0.2%
Extrabudgetary	-	-
In-kind	-	-

Host facilities were provided for 10 trainees.

SLOVAKIA

	a/	b/
TCF	$56,100	0.1%
Extrabudgetary	-	-
In-kind	$4,600	0.5%

Host facilities were provided for 28 trainees.

a/ Contributions made during the year.
b/ Reflects percentage of total resources received for each source of funds.

CONTRIBUTORS' PROFILE

(100% TCF Pledge)

CHILE

	a/	b/
TCF	$54,400	0.1%
Extrabudgetary	-	-
In-kind	-	-

Host facilities were provided for 17 trainees.

EGYPT

	a/	b/
TCF	$48,023	0.1%
Extrabudgetary	-	-
In-kind	$2,000	0.2%

Host facilities were provided for 47 trainees.

SLOVENIA

	a/	b/
TCF	$22,794	0.0%
Extrabudgetary	-	-
In-kind	$4,600	0.5%

Host facilities were provided for 96 trainees.

PAKISTAN

	a/	b/
TCF	$40,850	0.1%
Extrabudgetary	-	-
In-kind	-	-

Host facilities were provided for 39 trainees.

CUBA

	a/	b/
TCF	$35,700	0.1%
Extrabudgetary	-	-
In-kind	$10,800	1.1%

Host facilities were provided for 45 trainees.

CYPRUS

	a/	b/
TCF	$20,400	0.0%
Extrabudgetary	$9,550	0.1%
In-kind	-	-

Host facilities were provided for 58 trainees.

ICELAND

	a/	b/
TCF	$20,400	0.0%
Extrabudgetary	-	-
In-kind	-	-

Host facilities were provided for 2 trainees.

MOROCCO

	a/	b/
TCF	$20,400	0.0%
Extrabudgetary	-	-
In-kind	$1,400	0.1%

Host facilities were provided for 72 trainees.

a/ Contributions made during the year.
b/ Reflects percentage of total resources received for each source of funds.

CONTRIBUTORS' PROFILE

(100% TCF Pledge)

TUNISIA

	a/	b/
TCF	$20,400	0.0%
Extrabudgetary	-	-
In-kind	$2,400	0.2%

Host facilities were provided for 61 trainees.

LIECHTENSTEIN

	a/	b/
TCF	$7,000	0.0%
Extrabudgetary	-	-
In-kind	-	-

JORDAN

	a/	b/
TCF	$6,800	0.0%
Extrabudgetary	-	-
In-kind	-	-

Host facilities were provided for 11 trainees.

VIET NAM

	a/	b/
TCF	$6,800	0.0%
Extrabudgetary	-	-
In-kind	-	-

Host facilities were provided for 1 trainee.

a/ Contributions made during the year.
b/ Reflects percentage of total resources received for each source of funds.

6. Delivery by Component

223. The Agency continued to place high priority on the delivery of expert services, fellowships, training courses and equipment. The delivery of expert services and group activities increased significantly in 1997. The number of scientific visitors and training course participants remained constant, while the number of fellows decreased.

224. Administrative practices and procedures were harmonized and streamlined, leading to adjustment of fees for experts and training course lecturers.

Experts

Year	Adjusted programme	New obligations	Implementation rate	Number of persons	Number of assignments	Number of months
	$ million	$ million	%			
1993	18.7	11.4	60.8	1,861	2,978	1,172
1994	20.8	12.9	61.8	2,022	3,205	1,288
1995	22.5	15.8	70.1	2,565	3,857	1,420
1996	19.1	13.4	69.9	2,367	3,610	1,302
1997	20.9	14.2	68.1	2,777	4,184	1,402
Increase over five years				49%	40%	20%

225. A total of 4,184 expert and group activity assignments including training course lecturers, were undertaken in 1997. This is 15% higher than last year and was due mainly to the increase in group activities.

226. Of the 4,184 assignments, 13.6% were carried out by international experts and training course lecturers from developing countries. Women represented 8.2% of the international experts recruited and 11.5% of training course lecturers.

227. The new computerized Experts Management System (EMS) went into its final testing phase, to be launched for production early in 1998.

Fellowships and Scientific Visitors

Year	Adjusted programme	New obligations	Implementation rate	Number of fellows	Number of fellowship months	Number of visiting scientists	Number of visiting scientist months
	$ million	$ million	%				
1993	12.8	7.1	55.5	828	2,696	226	136
1994	14.2	8.6	60.3	893	2,924	259	168
1995	15.4	10.8	70.3	1,041	3,356	314	183
1996	13.6	9.8	72.0	1,032	3,490	358	190
1997	12.4	8.0	64.7	862	2,626	361	183
Increase/decrease over five years				4%	(3%)	60%	35%

228. A total of 1,223 trainees (862 fellows and 361 scientific visitors) were placed in 1997, representing a decrease of 12% from 1996. This decline was mainly due to a decrease in the number of training appointments at various host institutions, coupled with an increase in the number of non-IAEA candidates for these appointments. 28.7% of the fellows and 18.6% of the scientific visitors were women.

229. Continued negotiations with host institutions resulted in training costs averaging about $3,000 per month. An estimated $607,000 in cost free fellowship and scientific visitors training was contributed by France, Germany, Spain, the UK and the USA.

COST FREE FELLOWSHIPS

Donor	Number of fellowships awarded	Number of months awarded	Number of fellows in the field in 1997	Number of months of training
Brazil	2	24	0	0
France	3	13	6	21
Germany	4	8	7	12
Mexico	1	12	0	0
Spain	2	3	4	12
UK	9	24	4	9
USA	25	103	37	111

230. The fully functional Fellowship and Training System continues to maximize efficiency of the day-to-day work of the fellowship process. Both Agency and country counterpart TC liaison officers received training in streamlining and harmonizing the fellowship and scientific visits procedures.

Equipment

Year	Adjusted programme	New obligations	Implementation rate	Disbursements	Number of purchase orders
	$ million	$ million	%	$ million	
1993	27.6	19.1	69.3	17.6	3,612
1994	30.7	23.2	75.5	22.9	3,484
1995	32.8	26.1	79.4	25.1	3,632
1996	32.2	25.0	77.8	23.1	3,919
1997	34.7	28.8	83.3	28.1	4,444

231. Full exploitation of the procurement system, the revised policies and streamlined procedures was achieved in 1997. This resulted in a record year for the Field Procurement Section – a record number and dollar volume of orders and contracts issued.

232. After the introduction of the Field Procurement Management System (FPMS) in August 1996, the performance and user friendliness of the client–server system were further improved. Increased productivity and streamlining of the entire procurement process were achieved by standardization of documents and built-in checks. The direct connection of FPMS to the Agency's Topcall fax system through MS Exchange resulted in significant saving in time.

233. The items of equipment required for all projects were extensively reviewed so that consolidated tenders could be made for the most commonly procured equipment based on the standard specifications, which were worked out in collaboration with the technical divisions. FPS now has a number of standing orders for certain items, so that repetitive bidding for the same items has been eliminated and better terms are obtained from suppliers.

Training Courses

Year	Adjusted programme	New obligations	Implementation rate	Number of courses	Number of participants	Number of months
	$ million	$ million	%			
1993	8.2	6.6	80.4	100	1,450	1,066
1994	10.0	8.1	81.1	113	1,633	1,224
1995	10.3	8.7	84.8	119	1,806	1,272
1996	10.0	8.6	86.0	122	1,718	1,138
1997	8.7	7.3	84.2	122	1,752	1,049

234. Nineteen interregional and 103 regional training courses – including 12 relating to RCA, six to ARCAL and 25 to AFRA – were held in 51 countries. Of these 122 training courses, 96 (78.7%) were hosted by developing countries. A total of 1,752 persons, 23.2% of them women, were trained.

235. A computer system to automate the day-to-day work of the training course process and to increase overall efficiency was developed and went into production early in 1997.

IMPLEMENTATION SUMMARY I

ALL FUNDS

(as at 31 December 1997)

Description	Adjusted programme	% of Total programme	New obligations	Implementation rate	Earmarkings
	($)	(%)	($)	(%)	($)
CURRENT YEAR					
AREA BREAKDOWN					
Africa	17,848,028	21.9%	14,495,881	81.2%	3,352,147
Latin America	14,490,968	17.8%	11,581,327	79.9%	2,909,641
East Asia & Pacific	12,257,913	15.0%	8,371,884	68.3%	3,886,029
West Asia	9,224,841	11.4%	7,165,718	77.7%	2,059,123
Europe	17,563,604	21.5%	13,158,140	74.9%	4,405,464
Interregional	8,842,880	10.8%	6,597,031	74.6%	2,245,849
Global	1,297,763	1.6%	772,478	59.5%	525,285
Total	81,525,997	100.0%	62,142,459	76.2%	19,383,538
COMPONENT BREAKDOWN					
Experts	20,875,764	25.6%	14,220,923	68.1%	6,654,841
Equipment	34,696,914	42.5%	28,784,058	83.0%	5,912,856
Fellowships	12,437,716	15.3%	8,044,703	64.7%	4,393,013
Training Courses	8,666,208	10.7%	7,299,508	84.2%	1,366,700
Sub-contracts	3,362,038	4.1%	2,878,946	85.6%	483,092
Miscellaneous	1,487,357	1.8%	914,321	61.5%	573,036
Total	81,525,997	100.0%	62,142,459	76.2%	19,383,538
FUND BREAKDOWN					
TCF	71,312,608	87.5%	55,268,544	77.5%	16,044,064
Extrabudgetary					
Member States	1,605,915	2.0%	1,350,724	84.1%	255,191
UNDP	8,607,474	10.5%	5,523,191	64.2%	3,084,283
Total	81,525,997	100.0%	62,142,459	76.2%	19,383,538
CURRENT AND FUTURE YEARS					
Current	81,525,997	45.8%	62,142,459	76.2%	19,383,538
Future	96,444,169	54.2%	1,904,717	2.0%	94,539,452
GRAND TOTAL	177,970,166	100.0%	64,047,176		113,922,990

IMPLEMENTATION SUMMARY II

ALL FUNDS BY AREA AND COUNTRY

(as at 31 December 1997)

Country	Adjusted programme ($)	New obligations ($)	Implementation rate (%)	Earmarkings ($)
AFRICA				
Algeria	655,214	585,405	89.3%	69,809
Cameroon	256,293	219,349	85.6%	36,944
Côte d'Ivoire	171,739	169,291	98.6%	2,448
Democratic Republic of the Congo	159,833	75,673	47.3%	84,160
Egypt	905,177	587,739	64.9%	317,438
Ethiopia	947,381	562,108	59.3%	385,273
Gabon	43,220	38,849	89.9%	4,371
Ghana	888,588	625,957	70.4%	262,631
Kenya	234,330	208,735	89.1%	25,595
Libyan Arab Jamahiriya	178,358	162,969	91.4%	15,389
Madagascar	228,988	198,416	86.6%	30,572
Mali	283,797	245,617	86.5%	38,180
Mauritius	106,217	102,615	96.6%	3,602
Morocco	1,029,954	724,122	70.3%	305,832
Namibia	304,818	230,528	75.6%	74,290
Niger	62,452	57,667	92.3%	4,785
Nigeria	717,796	615,024	85.7%	102,772
Regional Africa	7,553,366	6,627,460	87.7%	925,906
Senegal	176,760	167,914	95.0%	8,846
Sierra Leone	113,247	13,818	12.2%	99,429
South Africa	311,520	276,373	88.7%	35,147
Sudan	123,763	106,589	86.1%	17,174
Tunisia	769,790	634,043	82.4%	135,747
Uganda	573,203	544,953	95.1%	28,250
United Republic of Tanzania	565,236	438,854	77.6%	126,382
Zambia	276,148	124,681	45.2%	151,467
Zimbabwe	210,840	151,132	71.7%	59,708
AREA TOTAL	**17,848,028**	**14,495,881**	**81.2%**	**3,352,147**
LATIN AMERICA				
Argentina	1,182,653	1,011,118	85.5%	171,535
Bolivia	446,482	399,795	89.5%	46,687
Brazil	921,846	898,306	97.4%	23,540
Chile	683,332	570,786	83.5%	112,546
Colombia	658,404	552,632	83.9%	105,772

Country	Adjusted programme	New obligations	Implementation rate	Earmarkings
	($)	($)	(%)	($)
Costa Rica	609,907	431,374	70.7%	178,533
Cuba	786,503	733,563	93.3%	52,940
Dominican Republic	202,085	122,633	60.7%	79,452
Ecuador	344,380	249,863	72.6%	94,517
El Salvador	346,108	290,220	83.9%	55,888
Guatemala	111,216	107,944	97.1%	3,272
Jamaica	34,462	22,582	65.5%	11,880
Mexico	868,720	604,103	69.5%	264,617
Nicaragua	133,906	58,737	43.9%	75,169
Panama	102,332	101,728	99.4%	604
Paraguay	276,351	148,104	53.6%	128,247
Peru	884,535	749,445	84.7%	135,090
Regional Latin America	4,885,292	3,686,799	75.5%	1,198,493
Uruguay	428,025	338,556	79.1%	89,469
Venezuela	584,429	503,039	86.1%	81,390
AREA TOTAL	**14,490,968**	**11,581,327**	**79.9%**	**2,909,641**
EAST ASIA AND PACIFIC				
Bangladesh	684,082	480,872	70.3%	203,210
China	1,368,225	968,623	70.8%	399,602
Indonesia	792,908	558,417	70.4%	234,491
Korea, Republic of	571,813	284,135	49.7%	287,678
Malaysia	450,389	369,923	82.1%	80,466
Marshall Islands	89,955	20,755	23.1%	69,200
Mongolia	510,731	290,211	56.8%	220,520
Myanmar	571,067	526,712	92.2%	44,355
Pakistan	1,152,603	750,223	65.1%	402,380
Philippines	802,592	635,418	79.2%	167,174
Regional East Asia and Pacific	3,249,370	1,854,928	57.1%	1,394,442
Sri Lanka	755,470	634,446	84.0%	121,024
Thailand	354,736	254,888	71.9%	99,848
Viet Nam	903,972	742,333	82.1%	161,639
AREA TOTAL	**12,257,913**	**8,371,884**	**68.3%**	**3,886,029**
WEST ASIA				
Iran, Islamic Republic of	1,251,459	991,796	79.3%	259,663
Iraq	702,294	508,856	72.5%	193,438
Israel	438,952	281,451	64.1%	157,501
Jordan	967,706	746,163	77.1%	221,543
Kazakhstan	1,146,998	945,783	82.5%	201,215
Lebanon	606,138	560,176	92.4%	45,962
Regional West Asia	1,794,263	1,393,074	77.6%	401,189

Country	Adjusted programme	New obligations	Implementation rate	Earmarkings
	($)	($)	(%)	($)
Saudi Arabia	178,558	112,228	62.9%	66,330
Syrian Arab Republic	1,681,227	1,357,614	80.8%	323,613
The Territories under the Jurisdiction of the Palestinian Authority	123,773	112,188	90.6%	11,585
United Arab Emirates	33,838	27,744	82.0%	6,094
Uzbekistan	162,625	43,458	26.7%	119,167
Yemen	137,010	85,187	62.2%	51,823
AREA TOTAL	**9,224,841**	**7,165,718**	**77.7%**	**2,059,123**
EUROPE				
Albania	150,256	125,303	83.4%	24,953
Armenia	1,018,399	751,012	73.7%	267,387
Belarus	461,382	383,725	83.2%	77,657
Bosnia and Herzegovina	272,068	237,352	87.2%	34,716
Bulgaria	309,347	274,702	88.8%	34,645
Croatia	171,109	114,673	67.0%	56,436
Cyprus	55,960	48,357	86.4%	7,603
Czech Republic	784,956	663,120	84.5%	121,836
Estonia	83,339	56,139	67.4%	27,200
Georgia	365,262	344,285	94.3%	20,977
Greece	212,920	157,523	74.0%	55,397
Hungary	774,429	560,630	72.4%	213,799
Latvia	138,999	37,643	27.1%	101,356
Lithuania	228,713	141,612	61.9%	87,101
Poland	3,053,573	1,942,974	63.6%	1,110,599
Portugal	128,226	83,374	65.0%	44,852
Regional Europe	5,654,259	4,471,381	79.1%	1,182,878
Republic of Moldova	80,228	21,227	26.5%	59,001
Romania	485,451	277,610	57.2%	207,841
Russian Federation	20,600	8,170	39.7%	12,430
Slovakia	507,133	385,853	76.1%	121,280
Slovenia	331,089	262,983	79.4%	68,106
The Former Yugoslav Republic of Macedonia	298,946	253,875	84.9%	45,071
Turkey	507,745	326,629	64.3%	181,116
Ukraine	1,469,215	1,227,988	83.6%	241,227
AREA TOTAL	**17,563,604**	**13,158,140**	**74.9%**	**4,405,464**
Global	1,297,763	772,478	59.5%	525,285
Interregional	8,842,880	6,597,031	74.6%	2,245,849
OVERALL TOTAL	**81,525,997**	**62,142,459**	**76.2%**	**19,383,538**

ABBREVIATIONS

AEOI	Atomic Energy Organization of Iran
AFRA	African Regional Co-operative Agreement for Research, Development and Training
APC	Agency Programme Code
APC	Assessed Programme Costs
ARCAL	Regional Co-operative Arrangements for the Promotion of Nuclear Science and Technology in Latin America
BSS	Basic Safety Standards
BUSM	Boston University School of Medicine
CEE	Central and Eastern Europe
CIDA	Canadian International Development Agency
CPF	Country Programme Framework
DDG	Deputy Director General
EB	Electron beam
ELISA	Enzyme-linked immunosorbent assay
EMS	Experts Management System
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FMD	Foot-and-mouth disease
FPMS	Field Procurement Management System
GC	General Conference
GMP	Good manufacturing practices
IAEA	International Atomic Energy Agency
ICE	Instituto Costarricense de Electricidad - Costa Rican Electricity Institute
INIS	International Nuclear Information System
IOC	Intergovernmental Oceanic Commission
IPEN	Institute for Nuclear Energy and Research (Brazil)
IPF	Indicative Planning Figures
IRRT	International Regulatory Review Team
KANUPP	Karachi Nuclear Power Plant
LDC	Least Developed Country
LIFDC	Low Income Food Deficit Countries
MTC	Maintenance Training Centre
NAA	Neutron activation analysis
NAR	Needs Analysis Report
NDT	Non-destructive testing
NIS	Newly Independent States
NPP	Nuclear power plant
NRCAM	Nuclear Research Centre for Agriculture and Medicine
NUSS	Nuclear safety standards of the IAEA
OAU	Organization of African Unity
OECD-NEA	Organization for Economic Co-operation and Development, Nuclear Energy Agency
OIE	Organisation internationale des epizooties
OPEC	Organization of the Petroleum Exporting Countries
OSART	Operational Safety Assessment Review Team

PARC	Pan-African Rinderpest Campaign
PCC	Programme Co-ordination Committee
PET	Proton Emission Tomography
PFF	Project Formulation Framework
PFM	Project Framework Matrices
PHARE	Poland, Hungary Assistance and Restructuring
PIP	Portable image processing
PPR	Peste de petits ruminants
RCA	Regional Co-operative Agreement for Research, Development and Training related to Nuclear Science and Technology
RIA	Radioimmunoassay
RIHU	Department of Research and Isotopes, Division of Human Health
SAGTAC	The Standing Advisory Group on Technical Assistance and Co-operation
SAT	Systematic Approach to Training
SIT	Sterile insect technique
SNRA	Slovak Nuclear Regulatory Authority
SPFS	Special Programme for Food Security
SPII	Seed and Plant Improvement Institute
SSDL	Secondary Standards Dosimetry Laboratory
TACC	Technical Assistance and Co-operation Committee
TACIS	Technical Assistance for the Confederation of Independent States
TC	Department of Technical Co-operation
TCDC	Technical Co-operation Among Developing Countries
TCF	Technical Co-operation Fund
TC-PIMS	TC Project Information Management System
TC-PREFS	TC Project Request Electronic Forms Support
TC-PRIDE	TC Project Reporting Information Dissemination Environment
TECDOC	Technical document
TLD	Thermoluminescence dosimetry
TSH	Thyroid-stimulating hormone
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Population Fund
UNOPS	United Nations Office for Project Services
UNSIA	United Nations Special Initiative for Africa
USDA	United States Department of Agriculture
WFP	World Food Programme
WHO	World Health Organization
WWER	Pressurized water-cooled and water-moderated power reactor
XRF	X-ray fluorescence

GLOSSARY

Adjusted programme - the total value of all technical co-operation 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.

Assessed programme costs - the cost charged to Member States receiving technical assistance, at present amounting to 8% of the assistance actually provided from both the TCF and extrabudgetary contributions (but excluding UNDP-financed assistance).

Available financial resources - total funds available less disbursements.

Compliance performance - standards have been met and management was responsive and ethical.

Delivery based management - decision making that focuses on the provision of goods and services necessary to achieve project objectives; measured as expenditure.

Disbursements - actual cash outlays for goods provided and services rendered.

Dynamic programming - the process whereby funds released through rephasing and reprogramming are used to meet requirements of developing Member States through the implementation of approved projects for which funds would not otherwise be available; it serves to keep project planning realistic.

Earmarkings - amounts allotted for funding approved assistance awaiting implementation.

Extrabudgetary funds - funds provided by Member States 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 Assistance and Co-operation Fund.

Financial performance - sound financial controls have been applied.

Footnote-a/ projects - projects approved by the Board for which no immediate funds are available.

Global - under the area breakdown in the implementation summary, this represents those miscellaneous costs which cannot be attributed to individual projects or for which detailed accounting would add significantly to overhead costs. Such expenses include cost of radiation protection services, insurance premiums, UNDP field office charges, reimbursement of support services, mission cancellation costs, publication charges, etc.

Government Cost Sharing - funds provided by Member States to augment projects in their own country.

Implementation - 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.

Model Projects - projects responding to a real need with significant economic or social impact for the end user. These projects feature a competitive nuclear technique and require a local environment conducive to project success and sustainability.

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.

Operational performance - actions were relevant (in relation to the problem being addressed); effective (achieved the intended results); and efficient (economical in a cost-benefit sense).

Overprogramming - the establishment of annual programming levels which exceed available resources.

Performance - the process of carrying out a duty or obligation.

Performance based management - decision making that focuses on the intended purpose of goods and services to achieve project objectives; measured as functions, activities, costs and accomplishments.

Programme year - the year for which an activity is planned.

Programme commitments - total unliquidated obligations for the current year plus earmarkings.

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 Regular Programme for the year in question.

Quality management - full accountability for all aspects of decision making according to standards for operational, financial and compliance performance.

Rephasing - a temporary release of 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 Co-operation Fund - at present, the main fund for the financing of the Agency's technical co-operation activities; it is supported by voluntary contributions from Member States, 8% assessed programme costs paid by Member States over assistance received and miscellaneous income.

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

UNDP Programme - projects executed or implemented by the Agency on behalf of UNDP and its associated funds.

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

Unobligated balance - total funds available less disbursements and less unliquidated obligations against the current year.