

C 91/8

Review of the

REGULAR PROGRAMME 1990-91



Food
and
Agriculture
Organization
of
the
United
Nations

C 91/8

July 1991

**Twenty-sixth session
9-28 November 1991**

**REVIEW
of the
REGULAR PROGRAMME
1990-91**

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DIRECTOR-GENERAL'S FOREWORD

This is the seventh Review of the Regular Programme. As in the past, it provides a biennial overview of FAO's programme implementation and assesses the performance of selected activities with respect to their objectives, implementation efficiency and effectiveness in achieving their results.

The biennium covered by this Review has been a period of profound changes and challenges for the Organization. The revived global concerns with the potentially calamitous effects of human activities on the natural environment have added a broad dimension to our endeavours for agricultural and rural development, raising a host of complex issues regarding sustainable development. This has come at a time when the long-standing problems of hunger, malnutrition and poverty continue to persist in many parts of the world.

Within the United Nations system, the modality of technical assistance based on tripartite cooperation is under evolution, with serious implications on FAO's substantive development role and its future resources for development activities. At the same time, the financial position of the Organization remained under severe strain, making it extremely difficult for the Organization to consolidate, assert its comparative advantage and adapt itself to meet new challenges.

In short, this has been a period of hard trial, testing the strength of our resolve and resourcefulness, and above all management capacity. In this context, the comprehensive Review of FAO and its results flowing from the deliberations of the last Conference, have been timely and useful. The Conference, besides confirming the basic soundness of the Organization and its programmes, established the areas of priority and provided clear directives and guidance in the planning and implementation of FAO's work under the Regular and Field Programmes.

The value of constructive performance re-assessment is clear, and I continue to attach importance to evaluation as a tool for sound management. Together with improvements being made in the planning, programming and budgeting process, including the re-introduction of a Medium-Term Plan for the next six years, FAO's evaluation system continues to be strengthened. The Review of the Regular Programme forms an important part of that system.

The Review has been progressively improved to respond to the guidance of our Governing Bodies. Given the complexity and range of FAO's work, there is always scope for improvements. I trust that the Conference will find the Review useful in making its own assessment of the relevance and cost-effectiveness of the Organization's programmes, and I look forward to its further constructive observations and guidance.



Edouard Saouma
Director-General

SUMMARY

Part One

1. The performance reviews of the Major Programmes cover the main activities and achievements during 1990-91. Some 48.2% of Regular Programme funds have been allocated to three substantive Major Programmes (with 37.4% for Agriculture, 6.4% for Fisheries and 4.4% for Forestry). Development Support Programmes accounted for 15% (including 10% for FAO Representatives) of the total, and the Technical Cooperation Programme 12%. The Supporting Services absorbed 17% of the total. A major share of the Regular Programme support under the three technical Major Programmes was devoted to advisory services and technical support to member countries, as well as technical and operational backstopping to field projects (Chapter Four presents statistical information on these selected aspects for each of the three technical Major Programmes).

2. Programme implementation during the biennium shows, in general, an improvement over the last biennium, reflecting efforts to pursue full programme implementation despite the continuing resource constraints. This is evident in the achievements under technical programmes as well as progress being made elsewhere, such as the operational functioning of FINSYS/PERSYS and consolidation under way for the field programme support work. In particular, many indicators of activities and outputs under the three technical Major Programmes, reported in Chapter Four, show a trend of recovery after the setbacks caused by the severe resource constraints during the last two biennia. For example, compared with the last biennium, the number of training activities increased by 24% (to 759 from 614), meetings, seminars and expert consultations by 27% (to 742 from 584) and the work months devoted to technical backstopping of projects by 8% (to 3,572 work months from 3,306). However, the effects of the financial stringency are still felt in many programmes and units in the form of staff vacancies, backlog of work, and delays in starting new activities.

3. During the present biennium, the importance of inter-programme coordination has been steadily increasing, especially in priority areas of the Organization, such as sustainable agricultural development, policy analysis and planning, and development of the integrated corporate database. Thus, a considerable effort has been directed at improving and streamlining inter-sectoral coordination through specific mechanisms, such as the Steering Committees to guide the Inter-Departmental Working Groups/Task Forces (e.g. environment and sustainable development, sector and structural adjustment policy work and WAICENT). Similarly, inter-disciplinary coordination is being enhanced by improved harmonization in work planning, through the programming process and special joint projects among the units concerned (e.g. the Geographic Information System). In particular, the work on environment and sustainable agriculture has entailed considerable coordinated inputs from all three Major Programmes in connection with the FAO/Netherlands Conference on Agriculture and Environment (1991) and the preparatory activities for the 1992 UN Conference on the Environment and Development (UNCED).

Agriculture: Major Programme 2.1

4. Major Programme 2.1 provides multi-disciplinary support for sustainable agricultural development to ensure improved food security and better living standards, especially for the most disadvantaged sections of the population. It is the largest single FAO's programme, absorbing three-quarters of the Regular Programme resources for technical programmes, and consisting of eight technical Programmes divided into 43 Sub-programmes (1.4).

5. Environmental issues are cross-sectoral, involving all FAO technical programmes. As a follow-up to the recommendations of the 25th Conference, FAO strengthened its internal coordination mechanisms for the environment and sustainable development (1.8). During the biennium, FAO was heavily committed to the preparatory activities of the United Nations Conference for the Environment and Development (UNCED). The FAO/Netherlands Conference on Agriculture and Environment held in 1991 endorsed the Den Bosch Declaration and Agenda for Action (1.12).

6. Under Natural Resources, the development and expansion of the FAO Geographic Information System (GIS) continued, providing a basis for land use planning for various regions (1.20). Farming systems development work is incorporating the land resources and soil conservation aspects, and updates of FARMAP user's manual were issued (1.25). Development work has started on a framework programme for national strategies for conservation and regeneration of soil fertility and the FAO Fertilizer Programme databank now contains results of more than 80,000 trials (1.27). Work is under way in producing world maps showing areas where potential sulphur response can be expected (1.30). Guidelines have been issued on ways of using saline water for irrigation (1.31). An international scheme for the conservation and reclamation of African lands was endorsed by the 1990 FAO Regional Conference for Africa (1.34). The Sub-programme on Assessment and Planning is reviewed separately in Chapter Seven.

7. Crops: Biotechnology advances received attention among the inter-disciplinary programme activities. Thirty-seven PFL projects, worth a total of \$ 25.8 million, were operational in 1990 (1.41). Within the FAO/WHO joint programme, work continued on the assessment of residue levels and acceptable daily intakes of pesticide compounds (1.43). Adherence to the International Undertaking on Plant Genetic Resources, as of February 1991, stood at 102 countries while 111 member countries had joined the Commission (1.44). FAO and IBPGR agreed to further coordinate their activities on plant genetic resources to reduce possible duplication (1.45). The direct exchange of seeds between countries continued to increase (1.48). An amended version of the International Plant Protection Convention came into force on April 1991 (1.49). In Asia, encouraging results have been obtained on Integrated Pest Management in rice (1.50). The Prior Informed Consent was included in the Code of Conduct for the Distribution and Use of Pesticides (1.52). The Sub-programme on Crop Improvement and Management is reviewed separately in Chapter Eight.

8. Livestock: FAO has provided leadership and support to the international campaign for the eradication of the New World Screwworm from North Africa. The spread of the pest has now been contained and its reported attacks on livestock have declined significantly in recent months (1.63). A programme for the conservation of animal genetic resources, including the publication of a World Watch list of endangered breeds, has been established (1.68).

Sustainable forage conservation and management work continued in collaboration with regional Working Groups in Africa, Asia and Latin America (1.60-1.61). New techniques in animal feed production were extended to 50 member countries (1.62). The various regional rinderpest campaigns now aim for complete worldwide eradication of the disease by the year 2000. Control programmes for Foot and Mouth Disease, and for a wide range of other diseases, were continued (1.64-1.67). Integrated dairy development remained a priority (1.70).

9. Many of the Technology and Research Development activities are carried out with other Sub-programmes. The joint FAO/IAEA Division collaborated with the Natural Resources Programme in two coordinated studies focusing on yield improvement and nitrogen-fixation of food legumes (1.76). Support continued to the regional research associations for Asia and the Pacific and Near East and North Africa (1.78). External programme reviews were completed by the TAC Secretariat for three CGIAR centres (1.79). Promising results have been obtained on the suitability and safety assessment of low-dose irradiation for insect control in food products (1.83). The first Joint Technical Consultation reviewed the progress of AGRIS and CARIS and made recommendations for future improvements (1.84). Chapter Nine contains an in-depth review of the Sub-programme on Remote Sensing and Agrometeorology.

10. An important inter-disciplinary area of activity in the Rural Development Programme consisted of follow-up activities to WCARRD (1.93). Inter-disciplinary activities related to population issues were undertaken under several Sub-programmes. A new regional rural development centre was established in the Near East and North Africa region (1.94). Promotional activities for World Food Day continued to increase international public awareness on the issues of hunger, malnutrition and environmental protection (1.96). Low-cost strategic extension campaigns training sessions were held in Asia and the Pacific and the Near East and North Africa (1.98). The FAO staff training on gender analysis was under way and project formulation guidelines were issued for integrating women's issues in development programmes and projects (1.106). Support continued to the regional agricultural credit associations and rural financial institutions (1.109).

11. Nutrition: Though not provided for in the 1990-91 Programme of Work and Budget, Regular Programme support was given to preparatory activities of the International Nutrition Conference planned for 1992 (1.113). Malnutrition and ways of achieving a balanced diet were addressed during the 1990 FAO Regional Conferences in Latin America and the Caribbean and the Near East and North Africa (1.114). The consumption of traditional food plants was promoted in Africa and Latin America (1.117). Training sessions were given on food contamination problems, including street foods (1.118). The safety of biotechnology-produced food products was the subject of a joint FAO/WHO consultation (1.120). Financial constraints have delayed the establishment of a special unit aimed at expediting cooperation between the Codex Alimentarius Commission and the GATT (1.121).

12. Work on Agricultural and Food Information focused attention on the implementation of the World Agricultural Information Centre (WAICENT). The conceptual design, hardware specifications and software requirements of WAICENT have now been completed (1.126). Special annual SOFA chapters reviewed specific priority topics (1.130). The databank on external assistance to agriculture became operational (1.128). Long-term market prospects for sugar and wine were completed. GIEWS bulletins are now electronically disseminated through the United Nations International Emergency Network (UNIENET) (1.134).

13. Most of the Food and Agricultural Policy Programme work is inter-disciplinary in nature. The "Long-term Strategy for the Food and Agriculture Sector" document was discussed at the FAO Council session in 1990 (1.139). To follow up on the recommendations of the 25th Conference, an ad hoc task force recommended possible means for strengthening FAO's role in ECDC. Work on a new edition of "Agriculture: Toward 2000" is under way (1.142). Studies on agricultural taxation policies highlighted the need for reducing tax evasion and avoidance in agricultural tax reforms (1.143). FAO assisted developing countries with their negotiating proposals at the Uruguay Round of GATT (1.147). The need for greater flexibility in the provision of food aid was highlighted at 1991 annual meeting of the Committee on Food Security (1.148). The Food Security Assistance Scheme achieved in 1990 its highest new funding support to date: over US\$ 25 million (1.149). Analysis of the potential impact of structural adjustment on agriculture and the rural sector remained a priority in policy advice and FAO introduced improved internal arrangements for coordination in this field (1.150).

14. Despite severe resource constraints, substantial progress was achieved in expanding collaborative work with other agencies like the World Bank, UNEP, WHO and GATT in the priority areas (1.155). Changing policies and perception of the role of the private sector and NGOs are providing new opportunities (1.159) and the advantages of advances in computer technology were exploited in the development of various information systems (1.160). The changing nature of the technical backstopping role of the Major Programme, especially with the increasing trend towards nationally executed projects, presents a challenge (1.162).

Fisheries: Major Programme 2.2

15. The 1984 FAO World Fisheries Conference's Strategy for Fisheries Management and Development and five associated Programmes of Action (planning, management and development of fisheries; development of small-scale fisheries; aquaculture development; international trade; promotion of fisheries in alleviating undernutrition) continued to provide the framework for Fisheries programmes (2.1). The biennium saw an increasing concern with environmental issues (2.2). Implementation was satisfactory on four of the five Programmes of Action while there was temporary interruption in some activities on aquaculture development due to funding cutbacks (2.4).

16. The priority in fisheries information is on modification and consolidation of fisheries statistics systems (2.6). The FAO/IOC/UNEP/UNOALOS Aquatic Sciences and Fisheries Abstracts (ASFA) database continues to expand (2.8). Recent consultations and investigations identified shortcomings in present methods of recording catches and efforts are being made to obtain better baseline data to monitor trends for specific species and areas (2.10).

17. Under fisheries exploitation and utilization, major efforts were placed on upgrading national capabilities to foster sustainable fisheries development (2.14). These included several technical publications concerning the conservation and management of marine resources, such as manuals on stock assessment of tropical fisheries and remote sensing applications to tuna fisheries (2.15-2.16), training (2.18) and software development for marine resource analysis (2.19). An inter-agency study of international fishery research needs for developing countries was near completion (2.17).

18. Many activities formerly funded by UNDP under the Aquaculture Development and Coordination Programme have been assumed under the Regular Programme in the Sub-programme on inland fisheries and aquaculture (2.20). Steps were taken to collaborate more closely with other FAO units to bring aquaculture further into the mainstream of rural development efforts (2.22). Increased attention was given to environmental monitoring (2.23-2.25).

19. Activities regarding the development of small-scale fisheries under the fish production Sub-programme were largely funded from extra-budgetary resources (2.28). Emphasis was also given to studying potential environmental damage in relation to the fishing gear and vessel technology used and to developing the harvesting of non- and under-utilized species (2.31). Work on fish utilization and marketing focused on improved use of fish for human nutrition, quality assurance and fish inspection (2.34-2.38). Support to the global network of fish marketing information services remained an important element of the Sub-programme (2.39-2.41).

20. Priority in the programme on fisheries policy was on integrated coastal management to promote sustainable resource utilization and environmental protection (2.44). Much of the work consisted of direct assistance to member countries in strengthening national planning and management capabilities (2.45) and supporting FAO regional fishery bodies and other international fishery organizations (2.49-2.51).

21. The effects of the Organization's financial crisis continued through staffing shortages and increased pressure on backstopping responsibilities (2.55). The effectiveness of the Major Programme depends considerably on international meetings, but their number and duration were constrained by budgetary difficulties and the escalating costs for interpretation (2.56). Areas of future emphasis will include integrated coastal zone management (2.57), aquaculture development (2.58) and the expansion of the network of Fishery Information Centres (2.60).

Forestry: Major Programme 2.3

22. The overall implementation strategy for the Major Programme Forestry remained unchanged from the previous biennium (3.1). The planning and implementation of TFAP exercises was a major focus (3.2). The Major Programme also took on considerable responsibility for preparing inputs to the UN Conference on Environment and Development and for work on global initiatives on climate change and a convention to preserve biodiversity (3.3).

23. The TFAP was reviewed by an external team which noted the enthusiastic response to the Plan thus far and made suggestions for improving its orientation and implementation methods and procedures (3.5). This was followed up by an ad hoc meeting of experts which agreed on general goals and objectives and endorsed the concept that TFAP should be a country-led process. Pending settlement of modifications to institutional arrangements for overall TFAP management, FAO continued to work on improving implementation methods and procedures (3.6).

24. The Sub-programme on development and management of forests has concentrated on the development of guidelines for practical forest management and on assessment of forest resources at global, regional and national levels (3.12). This Sub-programme is taking an active role in the "Tropical Forests Assessment 1990" supported by Trust Funds (3.16). In tree improvement and plantations, emphasis was on forest plantation management, forest protection and forest genetic resources conservation, although the latter was constrained considerably by funding shortages (3.17-3.18). Concentration areas in conservation and wildlife were watershed and upland areas, dryland areas and wildlife and protected area management (3.21). The Sub-programme on forest food, fodder and fuelwood systems (2.3.1.4) is reviewed separately in Chapter Ten.

25. Activities on development of forest industries emphasized human resource development, environmental issues and small-scale rural forest-based industries (3.29), while the trade and marketing Sub-programme concentrated on provision of trade information and trade policy analysis (3.34). The sub-programme on forest harvesting and transport worked on development of suitable wood harvesting systems and provided training in this area (3.37).

26. The Sub-programme on training and institutions focused on improving the technical competence of forestry teachers. Activities aimed at strengthening forest research, such as an experts meeting held in 1990, were under this Sub-programme (3.43). Analytical work on forestry development planning was carried out as part of TFAP exercises as a key activity of the investment planning and statistics Sub-programme. It also worked towards strengthening national forestry statistics and was responsible for FAO's forestry statistical publications (3.45-3.47). Meetings of statutory and advisory bodies are serviced by the forest policies and information Sub-programme (3.48). Considerable extra-budgetary support was received for the Sub-programme on community forestry development, which develops approaches aimed at promoting trees as a sustainable resource for rural development with rural people as direct beneficiaries and managers (3.53-3.55).

27. For the future, the Major Programme Forestry will continue to focus on environment and sustainable development issues (3.57). The TFAP will remain a central activity of the Department (3.56). Improvement of assessment and monitoring will be a key objective (3.59) as will improved statistical information on the forest resource base (3.58).

Technical Cooperation and Development Support: **TCP and Major Programmes 3.1 to 3.4**

28. The budgetary allocation for the 1990-91 TCP assistance amounted to US\$ 67.8 million, representing 11.9 percent of the Regular Programme resources. The number and total cost of approved TCP projects in 1990 increased significantly compared with 1988. There were 289 approved projects in 1990 for a total cost of US\$ 42.4 million, representing an increase of about 10 percent over 1988 (5.4).

29. During 1990-91, the most important areas for TCP assistance have continued to be the provision of advisory services and training which together accounted for more than 75% of allocations. The share of projects under emergency category declined substantially from 26% in the previous biennium to 8% (5.5). TCP allocations for TCDC, a new category

created in 1986, have increased slightly to 3% in this biennium, mainly due to the difficulties in complying with the strict funding criteria of the programme (5.6). Africa continued to receive the largest share of the TCP assistance, followed by Latin America and the Caribbean, Asia and the Pacific, Near East and North Africa and Europe (5.7). TCP operations for the period 1986-90 are reviewed in Chapter Three of the Review of Field Programmes 1990-91.

30. Overall Field Programme delivery in 1990 reached US\$ 406.7 million compared with US\$ 358.0 million in 1989, a 12 percent increase. The Field Programme Development Division provided support to some 2,250 projects with a total donor allocation of US\$ 2.1 billion as of April 1991. Africa had the largest regional share with 46 percent of total expenditures (5.12). UNDP-funded projects decreased in number but increased in terms of expenditure in 1989-90 (5.13). The future FAO share of UNDP funding for the agricultural sector remains unclear (5.14).

31. In 1989-90, project expenditure under Trust Fund allocations totalled some US\$ 312.2 million, a slight increase over the 1987-89 period; however, with a new reporting system introduced for 1990 which includes commitments, the total expenditures were US\$ 358.6 million. The Netherlands became the single largest TF contributor during the biennium, followed by Italy and Saudi Arabia (5.15). A notable new activity within the TF Programme during the biennium has been the screwworm eradication campaign (5.16). Unilateral Trust Funds have increased slightly in 1989-90 compared with the previous two years, reflecting greater efforts by FAO mounted at the country level (5.17).

32. During 1990, the Investment Centre was involved in identifying or preparing 108 investment projects and 14 sub-sector and area development studies. Thirty-eight investment projects worth more than US\$ 2.5 billion prepared by the Investment Centre were approved by financing agencies in 1990 (5.29). Work with the World Bank and IFAD continued at a high level (5.30). The Investment Centre has prepared new guidelines for the improved design of agricultural investment projects (5.34).

33. There has been a sharp increase in project approvals for execution under the Freedom-from-Hunger Campaign (FFHC/AD) in 1990: US\$ 8.7 million in 1990 compared with US\$ 5.2 million during 1986-88. NGO contributions to FFHC/AD projects steadily continued to grow in the last two biennia (5.41). The Fourth International FFHC/AD consultation, originally scheduled for 1990, has been delayed to the 1992-93 biennium due to budgetary constraints (5.43).

34. The number of FAO Representations has remained unchanged at 74 (5.48). Measures are under review to reinforce their role in the provision of technical advice and as a communication channel between member countries and the Organization (5.50). With the planned introduction of the national execution modality in projects financed by UNDP, the future role of FAO Representations in support to national project directors is expected to expand (5.52).

Information and Documentation (Major Programme 5.1)

35. The main focus during the review period was on world food security, the screwworm threat in Africa and FAO's regular assessments of the world food situation (6.3). Other important topics included sustainable development with special reference to the TFAP, genetic resources, biodiversity, climate change and depletion of plant nutrients (6.5).
36. The wider use of computer-based techniques for the production of information materials continued (6.10), thus enhancing the capability to produce quality products in a timely and cost-effective way (6.11). Particular support was given to the Screwworm Emergency Campaign in North Africa (SECNA), including production of display materials, graphics and a regular newsletter (6.12). Production of Ceres was resumed in late 1990 (6.15).
37. The bi-monthly current bibliography of the David Lubin Memorial Library was sent regularly to 3,200 recipients (6.17). The level of acquisitions generally improved over the previous biennium due to relatively modest price increases for both books and periodicals (6.19).
38. Requests for document and publications processing were higher than in the previous biennium but still below the average for earlier biennia (6.21). However, sales revenue fell as a result of the small number of publications produced between 1987 and 1989 (6.22). Unasylya and World Animal Review, suspended during the previous biennium, were re-launched (6.23). Following the recommendation of the FAO Management Review, a reduction in internal printing capacity was initiated (6.25).

Administration (Major Programme 5.2)

39. Administrative backstopping of field projects and FAO representations remained at a low level due to financial restrictions. This, along with a decrease in resident Administrative Officer posts and an increasing trend toward national execution and National Project Directors, gives rise to a concern that demand for administrative support is likely to grow (6.32). The downward trend in dollar value and number of transactions for procurement continued (6.33), while for contracts the dollar value remained about the same but the number of contracts fell by 20% (6.35). Major building works began at Headquarters (6.36). Recommendations of the FAO Management Review were implemented, particularly for employing external contractors for maintenance functions (6.37). There was a drastic increase in facsimile transmissions, while telex traffic decreased (6.38).
40. The implementation of various sub-systems of FINSYS encountered some difficulties requiring refinements (6.40). By February 1990, full implementation of the FINSYS project had been achieved (6.43), although there were backlogs in a number of processing areas (6.44). Use of mainframe computer resources increased considerably with the installation of FINSYS/PERSYS (6.46). All departments completed medium-term computerization plans during the biennium (6.49).

41. The number of vacancy announcements and staff recruited more than doubled over annual levels of the previous biennium (6.50). Several enhancements to PERSYS were developed and implemented in 1990 (6.55). The core programme of Staff Development was maintained, with much of the work carried out on a cost-sharing basis. Funds were made available to resume the External Training and Language Training Programmes (6.56).

Part Two

42. Chapters Seven to Ten under this section cover the in-depth reviews of four selected Sub-programmes over the last three biennia (1986-91). The theme of all these Sub-programmes is rational/sustainable use of natural resources for agricultural production; the reviews of each are intended to present the achievements and contributions of each Sub-programme to this broad theme. The Sub-programmes reviewed are: 2.1.1.1 - Assessment and Planning (Chapter Seven), 2.1.2.2 - Crop Improvement and Management (Chapter Eight), 2.1.4.4 - Remote Sensing and Agro-meteorology (Chapter Nine) and 2.3.1.4 - Forest Food, Fodder and Fuelwood Systems (Chapter Ten).

Assessment and Planning (Sub-programme 2.1.1.1)

43. FAO has taken the lead in developing definitions and methods for natural resources survey and data analysis, maintaining a global database and incorporating natural resource considerations into the planning process. In this respect, the Sub-programme has played a major role, particularly covering soil and water (7.2). The initial emphasis on documentation of the world's soil resources has gradually led to other priorities: the better integration of information on soils and water with data on other physical aspects such as topography and climate, land suitability assessment and finally to land use planning (7.3). Particular emphasis has been given to the development of the Geographic Information System (GIS).

44. The work of the Sub-programme is guided by the IDWG on Land Use Planning, and linked with that on Environment and Sustainable Development (7.7). It has maintained close collaboration with the International Soil Science Society, the International Soil Reference and Information Centre and the International Board for Soil Research and Management (7.8).

45. Increased Regular Budget resources were given to the Sub-programme during the review period, reflecting its priority and in particular the establishment of the GIS (7.10). Some 48 field projects were backstopped during the review period; the concentration has remained on land resource assessment but countries which had already established soil mapping capabilities are shifting to application of land resource survey results, together with other information on land use planning and the application of agro-ecological zones methodology (7.12).

46. Land resource inventories and evaluation remained an important priority (7.13-7.20). The basic agro-ecological zones methodology was expanded to cover more crops, population supporting capacities and fuelwood and livestock carrying capacities (7.21). Priority was given to adapting the methodology to national level assessments (7.22). Areas in Africa suitable for large and small-scale irrigation were identified and delineated by the Sub-programme, with particular emphasis on the hydrology of small basins (7.27). The Guidelines for Land Use Planning are particularly innovative in that they stress the consideration of economic and social factors along with the analysis of the physical environment, the participation of end-users in the process and environmental sustainability (7.34).

47. The positive effects and impact of the Sub-programme are evident at international level, through the development of standards as well as expansion and improvement of information and databases; within FAO, Sub-programme outputs are incorporated in the work of other programmes; at national level, through the results of field projects (7.42).

48. As with other Sub-programmes, resource constraints created difficulties for the assignment of priorities. Outputs in some areas were limited for this reason, e.g. in development of the GIS and operationalizing the agro-ecological zones methodology at country level (7.50). The Sub-programme faces a number of tasks in the near future: strengthening the central services of the GIS while providing on-line access in the user divisions (7.51); development of procedures to make electronic data available to outside users (7.53); and development of national institutional capacity (7.56), including gearing of planning units to respond to specific questions rather than conducting comprehensive planning exercises *per se* (7.58).

Crop Improvement and Management (Sub-programme 2.1.2.2)

49. The Sub-programme is aimed at increasing the production and improving the quality of agricultural crops within the framework of more appropriate cropping systems. Particular emphasis has been given to collaborative work with the international and national agricultural research systems and the promotion of under-utilized crops (8.6-8.7). The Sub-programme has extensive links with a number of other Sub-programmes, with a large field component (8.10). Much of the Regular Programme work has consisted of direct support to member countries for developing projects or technical backstopping of field projects (8.8).

50. Work on food legumes has focused on development of research networks and assistance to national programmes, either directly or in cooperation with the International Agricultural Research Centres (8.14-8.21). Rice has been a special area of emphasis because of its world-wide importance as a cereal crop. Priority has been given to rice in sub-tropical, temperate and upland conditions; the International Rice Research Institute covers tropical rice. Work has centered on on-farm demonstration of low-risk technologies, promotion of swamp rice development and hydromorphic rice as an alternative to "slash and burn" upland production systems and diversification and intensification of rice-based farming systems (8.22-8.29).

51. For cereals (other than rice), the emphasis has also been on on-farm demonstrations, along with the development of integrated and diversified cropping systems involving cereal crops. Close consultation is maintained with the IARCs on this element (8.30-8.34). Vegetable production took a multi-faceted approach involving promotion of traditional and under-exploited plants, intensified production in areas of limited water availability and under controlled environments and promotion of home and school gardens for women and youth (8.35-8.41). The roots and tubers component is largely field-based (8.42-8.46), as is that on fruit which, however, includes a considerable component on research and development (8.47-8.53). High priority was given to crop diversification and intensification of mixed cropping systems, involving horticultural crops, in small farmer production systems in specific areas (8.54-8.57). On oil crops, the work has focused on improving crop technology along with varieties and planting material. Inter-country cooperation, through meetings and material exchange, has been significant (8.58-8.64). Inter-country cooperation has also been emphasized in the work on fibre crops (8.65-8.67). Work on industrial crops largely consisted of direct assistance to countries (8.70-8.73). Alternatives to shifting cultivation (8.68-8.69), plant biotechnology (8.74-8.75) and policies for sustainable production systems (8.76-8.77) are new programme elements with strong multi-disciplinary orientation.

52. Particular achievements of the Sub-programme have included the areas of network establishment, development of close working relations with the IARCs/national agriculture research systems and work on Azolla technologies (8.78-8.81). For the future, given the limited resources available to the Sub-programme, a more selective approach in setting priorities may be indicated (8.88). This could include: sound cost/benefit analysis of proposed packages, better balance in resource allocation among crop sub-sectors and programme elements, elimination of certain duplications and overlappings (8.89-8.92).

Remote Sensing and Agrometeorology (Sub-programme 2.1.4.4)

53. The Sub-programme covers two closely related subjects, with the agrometeorology work for the Crops Programme transferred in 1990 to the Remote Sensing Centre in the Research and Technology Development Division (AGR) (9.1-9.8). Activities covered under the Sub-programme include mapping and assessment of land use, agricultural crop assessment and production forecasts, monitoring of forest and grasslands, survey of coastal zones and inland water resources, monitoring and assessment of natural disasters (9.9). The Remote Sensing Centre is the focal point for coordination of remote sensing and agrometeorological activities. In-house end-user requirements are harmonized through an Inter-Departmental Remote Sensing and Agro-meteorological Data Users Committee (9.10). The Centre also acts as a clearing house among UN agencies for information on the application of remote sensing to the development, management and protection of renewable natural resources (9.11) and assists developing countries in the application of remote sensing technologies for mapping, assessment and management of their renewable resources (9.12).

54. Significant extra-budgetary resources, particularly from four large-scale projects, have directly supported Sub-programme activities. Practically all costs for publications, travel, contracts and consultants are met by extra-budgetary funds, which also covered 11 of the 17 Professional posts in the Centre (9.15-9.18).

55. Information support activities of the Sub-programme focus on publications. Nearly all remote sensing applications developed and proceedings of training courses are available in the Remote Sensing Series. To date, 62 specialized documents have been published, 27 of which during the period under review, and demand for publications is high (9.22).
56. Technical backstopping and advisory services were provided to over 60 projects, a third of which are exclusively in support of remote sensing training and applications development (9.23). Activities have included elaboration of thematic land use maps, development of new techniques and applications of remote sensing (9.24-9.27). Some 47 training courses, with 1007 participants, were carried out during the review period (9.28-9.32). Experience gained through the courses has resulted in a revised training strategy aimed at regional and sub-regional level focused on differentiated target audiences (9.36).
57. In the field of agrometeorology, over 20 projects were backstopped in support of national Early Warning Systems and land use planning (9.39). Agrometeorological monitoring is carried out in over 30 African countries to assess the impact of weather conditions on crop production (9.42); since 1987, all meteorological and agricultural information available within the Sub-programme has been computerized (9.43). Regular contact is maintained with specialized international institutions but meetings were curtailed in the period under review (9.46). The Sub-programme provides secretariat services to the Working Group on Climatic Change within the IDWG on Environment and Sustainable Development and elaborated an FAO position paper on the subject (9.47).
58. The Sub-programme has been instrumental in initiating new areas of work for FAO in the fields of environmental monitoring, natural resources and land-use assessment and monitoring of climatic change. The high demand for outputs of the Sub-programme reflects the need to fill information gaps on the trends of the natural resource base of member countries (9.66). However, there are constraints caused by the reliance on external funding, most of which is due to terminate in 1992 (9.67). Particular attention is needed to explore possibilities for income-generation to augment the self-supporting Regular Programme resources such as the sale of the Centre's products (9.68) and the integration of its activities into Regular Programme work (9.69). Training programmes, curtailed because of lack of funds, need to be re-directed to cover agrometeorology better and to follow up more closely the work of former trainees (9.74-9.75).

Forest Food, Fodder and Fuelwood Systems (Sub-programme 2.3.1.4)

59. This Sub-programme emphasizes technical and management approaches for integration and use of forests and trees with agriculture and livestock-raising under various ecological and socio-economic conditions, together with appropriate land evaluation and land-use planning techniques (10.8). Its activities are closely linked with numerous other Sub-programmes, both inside and outside the Forestry Department (10.10-10.11).
60. The field component of the Sub-programme is some 30 times greater than the Regular Programme allocation; there was thus an emphasis on technical backstopping of field projects during the review period (10.14).

61. Work on shifting cultivation and particularly agroforestry is of increasing importance to FAO projects. An informal Working Group under the IDWG on Land Use Planning will play a stronger role in identifying successful agroforestry approaches under different agro-ecological conditions (10.16). Some specific examples of successful approaches are cited (10.17-10.18) and this particular element has been an important focus of TFAP exercises (10.20).

62. The programme element on Diversified Mountain Economy Systems concentrated on people's participation in watershed management and upland conservation during the review period. The work was closely coordinated with that on Conservation and Wildlife and Community Forestry Development (10.25). Field projects (10.28-10.29) were an important focus, along with an Asian regional workshop (10.26) and publications (10.27).

63. Activities on Trees as Support to Agricultural Production in Arid Zones were complementary to those on Arid Zone Forestry and Desertification, with some activities drawing support from both Sub-programmes (10.30). During the reporting period, emphasis was on production of audio-visual aids on tree species of importance in arid zones (10.31-10.32). Work on Fuelwood Resources Development is linked with field projects on management of natural forests (10.35), with emphasis on the CILSS countries (10.34). The Sub-programme also includes the Forestry Department's contribution to the development of FAO's Geographic Information System (10.37-10.40).

64. The effects and impact of the Sub-programme were limited during the reporting period as many Regular Programme activities were cancelled or curtailed due to funding shortages. Publications were particularly affected (10.41). The field projects supported by the Sub-programme have emphasized: a) pilot activities in order to identify and test approaches which may be replicated (10.44-10.45); b) training of different target groups (10.46); and c) institutional strengthening (10.47). In these activities, the thrust has been on sustainable development, involvement of local people in planning and implementation, introduction of new income-generating ventures, soil conservation measures and tree planting for multiple purposes. While many projects have been successful during their implementation, more information is needed on the sustainability of benefits (10.48).

65. The elements of the Sub-programme are inter-related and closely linked to other Sub-programmes. There has been some rationalization of programme elements and there may be further scope in future (10.49-10.50). A key part of the Sub-programme to be strengthened in future is the work on shifting cultivation and agroforestry (10.51). Although FAO has accumulated considerable field experience, this has not yet been adequately synthesized (10.52). There should be more emphasis on the constraints of the poorest farmers and improvement of their production systems (10.55).

Common Themes and Issues

66. As was stated at the outset, the Sub-programmes reviewed in Part Two all deal with aspects of rational/sustainable use of natural resources for agricultural production. Sub-programmes 2.1.1.1 and 2.1.4.4 are concerned with the assessment of natural resources, while 2.1.2.2 and 2.3.1.4 are aimed at sustainable development of those resources. These reviews reveal some common themes and issues as follows.

67. What emerges clearly from the reviews is that various facets of sustainable agriculture and environmental concerns have been addressed in a variety of ways through individual technical programmes. In particular, while emphasis on individual aspects evolve over time, issues related to sustainable exploitation of natural resources have been an integral part of FAO's work on rational use of natural resources for food and agriculture development. Secondly, there is an increasing trend for coordination and integration of various work at conceptual, methodological and information levels. It simply underscores that the real world is organic and indivisible, requiring changes in conventional approaches based on compartmentalized specialization.

68. In this connection, one significant response of FAO has been the Geographic Information System (GIS), which is emerging as an essential tool for natural resource planning. The GIS is a computer-based information system that can store, manipulate, display and produce geographic (spatial) information integrated with statistical and textual data. It allows resource planners, especially through maps with integrated information, to compare and analyze selected factors (e.g. soil type, vegetative cover type) in relation to a given geographic location or to assess the status of one particular area in relation to other areas (e.g. which of two areas would be most suitable for a particular crop). Its capacity for a flexible synthesis analysis of vast amount of information makes it a powerful tool for resource planners and managers.

69. Demand for GIS services is growing and is expected to grow further. One issue is how to ensure adequate resources to respond adequately to such demand as well as to continue with its development work. At present, information is made available to external users on request and the Organization's direct costs are not covered. It is thus a priority to develop ways to charge developed countries and international institutional users while providing a more flexible, standardized service to developing countries.

70. A broader issue related to the GIS is the linkage between FAO data-bases. Although progress has been made in this area, more remains to be done. There are limitations posed by the Organization's central computer capacity. No easily usable link exists, for example, between the remote sensing data bases, that on forest cover and that on fertilizer response. Work on development of some data bases has proceeded independently from others with which they could now usefully be correlated. Resolution of this issue should be achievable with more resources, clearer definition of priorities and more consultation on the most useful forms of information that could be provided.

71. The Sub-programmes reviewed all had considerable field components requiring technical backstopping. Particularly for Sub-programmes 2.1.2.2 and 2.3.1.4, technical backstopping responsibilities have been such as to constrain Regular Programme activities. In a situation of overall resource shortages where hard choices have to be made, it is inevitable that field problems have to be resolved first. Thus, apart from the problem of resources, it becomes critical that the workload of technical programmes should reflect a clear assessment of their own "carrying capacity".

72. The reviews have clearly indicated the benefits from the close collaboration with other international bodies. Joint meetings and training courses have proved cost-effective and have allowed participants to tap the resources of both FAO and specialized, skilled international organizations. This type of interchange can be expected to continue and expand in future, especially in new programme areas.

73. One such area where the Organization should direct more attention in the future is agroforestry, which is covered by Sub-programmes 2.1.2.2 and 2.3.1.4. Thus far, information on this subject within FAO has not been systematically studied to identify successful approaches and determine gaps in knowledge. This can be attributed to the complex nature of the problems involved and partly to lack of resources. However, it is hoped that with the revival of a Working Group on the subject and new staff resources being made available, FAO will play its important role in this field.

Part Three

74. This section, as in the past, reviews thematic subjects that cut across all technical programme areas. This time, the subject examined is Technical Cooperation Networks, which have become an increasingly important means of action for FAO, with some 135 continuing networks as well as a growing number of networks of more limited duration in specific subject areas, especially research (11.3). The review contains the results of an internal study conducted in 1990 based on questionnaires and a desk study of 24 network cases (11.10).

75. Although many institutional arrangements today bear the title of "network", for the purpose of the study, a network was defined as "a voluntary cooperative arrangement among individuals or institutions and/or individuals in two or more countries, set up for a period of at least several years, to carry out jointly certain specified activities for the purpose of direct exchange of relevant techniques and experience on common development issues." While the network need not be self-sustaining, it must include the concept of membership which contributes in some tangible way to its activities. Regional centres and economic groupings per se are not included, nor are networks consisting exclusively of FAO projects or staff (11.5-11.6).

76. An essential characteristic of networks, in contrast to other forms of similar FAO support, is that they are intended to mobilize indigenous resources and expertise among countries for mutual benefit, with less reliance on external inputs. Thus, there is a strong TCDC orientation in many networks with the expectation that networks become more self-reliant (11.7). Networks offer advantages for developing countries, for they facilitate flexible means of sharing expenses, which is relevant to members' particular needs and available capacities; and for FAO they offer cost-effective means of catalyzing technical cooperation and development (11.8).

77. Networks have been promoted under all sections of technical programmes, particularly by those with a large component of field operations, working directly with national institutions. There are particularly numerous networks under the following programmes: Natural Resources, Crops, Rural Development, Fisheries and Forestry (11.11). In terms of regional distribution, 22% of the FAO-associated networks are in Africa, 31% in the Asia and Pacific region, 22% in Latin America and the Caribbean, 19% in the Near East, North Africa and Europe and 6% are global or inter-regional (11.12). All Regional Offices, especially RLAC and RAPA, have played a key role in network promotion (11.18).
78. During 1986-89, the Regular Programme support to networks amounted to some US\$ 8.0 million for the 135 networks, representing some 6% of the programme expenditures (excluding staff costs). Sub-programmes, such as Livestock, Research and Technology Development, Natural Resources and Forestry, devoted significantly higher proportion of their respective programme expenditure to networks. Such FAO contributions have been generally in kind, for specific purposes (11.20-11.22). Some 30% of the networks have been supported by field projects, mostly funded by UNDP (11.24-11.27).
79. Some networks have been established for particular tasks and are not expected to continue once the work is completed. These networks are most commonly for experimental research activities or coordinated field trials (11.17). Particularly successful networks of this type are those organized by the joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture (11.41).
80. The major functions of FAO networks are institutional strengthening, development and promotion of technical standards and methods, and exchange of technical information. Many networks have more than one of these functions, with information exchange being most common, especially at an early stage. Many networks have not moved beyond information exchange with passive coordination among members (11.16, 11.31-11.32). Networks in Asia and the Pacific as well as in Latin America and the Caribbean tended to be older and more active than those in other regions (11.34-11.35).
81. While less than 20% of FAO networks are primarily devoted to information exchange, this may be an important activity for many other networks, particularly in the early years when emphasis may be on meetings and publications. Most progress has been made in this area by networks devoted to fish marketing information (such as INFORFISH and INFORPESCA) and agricultural research, especially those under ESCORENA and CARIS (11.37).
82. Although a number of networks are attempting to develop common standards for research and statistical work, achievement to date has been limited, with a notable exception of work on fishery statistics by regional fishery bodies (11.45). Some networks have made considerable progress in institution-building, particularly through training at technical and managerial levels (e.g. Asian Marketing Association, Asian Credit Association). Training is commonly funded through external financial support, but these networks have succeeded in mobilizing considerable national inputs for training activities (11.46). Staff exchange, usually through study tours, is often carried out (11.47), but secondment of staff from one institution to another is less common (11.48).

83. Some critical factors in the promotion of networks emerged from the study. Networks can be more successful when there is an agreed need among members to work on a given subject with a shared conviction among them that tangible benefits will accrue from joint effort. Often, this realization has come after an intervention by an FAO Regular or Field Programme activity (11.53). An incremental approach, whereby members gradually come to share their common concerns, has usually proven more effective (11.54). The definition of precise, realistic work plans for network members has proven important to the success of some of the networks studied. However, there is a tendency in some networks to develop overly-ambitious lists of topics to be covered (11.57).

84. Networks vary considerably in their levels of formal institutional arrangements, from highly formal structures with precise conditions for membership, to loose structures with no rules (11.59). The effectiveness of networks is not necessarily influenced by the extent to which it is formalized; some of the more formalized networks have spent more time in meetings on procedure at the expense of technical discussions (11.62).

85. There are advantages to networks starting small to ensure that all members have a common commitment (11.63). The nature and quality of the network secretariat is important. In many cases, FAO provides the secretariat but there are examples of individuals or institutions from the region providing key staff (11.68). Where governments have set up a network, there is a tendency to appoint a focal point in a central department, often with little interest in the functioning of the network, thus contributing to inefficiency (11.71).

86. The ability of networks to raise funds from their own sources is dependent, *inter alia*, on the nature of member institutions and the relative prosperity of the countries involved. Government departments concerned with extension and research have had particular difficulties in this regard with the notable exception of NACA, which has become an autonomous inter-government body supported by the government agencies of China, India, the Philippines and Thailand (11.75). In general, networks have not become, as yet, entirely self-supporting, the nearest being some in Asia, especially those dealing with commercial and business matters (AFMA, APRACA, INFOFISH). Thus FAO support must be based on a long-term commitment with some support on a continuing basis (11.77). FAO's financial support has proven to be very important in the early days of many networks, even when the amounts involved have been limited (11.80).

87. Project funding for networks has proved valuable in some cases, but caution needs to be exercised to ensure that the self-reliance of the network is not sapped (11.81). There is, thus, a fine dividing line between too much and too little support (11.82). In order to develop self-reliance, FAO's support has been aimed at fostering interest and initiative in developing network programmes, ensuring technical and other contributions from members and providing limited financial support in selected areas such as travel and per diem (11.83-11.87). FAO has been more successful in promoting networks in subject areas where it has the experience to support them technically (11.89). Networks have been a cost-effective point of contact for the FAO Regular Programme in many areas (11.90).

88. Networks have shown success in stimulating sharing of experience among the members on common concerns. Although several networks have made notable progress, the establishment of genuine inter-country cooperation has been more difficult to achieve. Apart from the need for strong identification and commitment by the members, networks members should have relatively developed technical capacity to contribute to the joint effort (11.92). Effectiveness of networks is especially apparent in research coordination, joint training and exchange of technical information, including market information. Even then, they could seldom implement their activities, especially those involving financial resources, without some form of external support (11.93).

89. Networks have served as a cost-effective vehicle in catalyzing more self-reliant inter-country cooperation and at the same time have served as an effective means for two-way communication with many national institutions in a number of Regular Programme activities (11.101). Thus, FAO support to networks needs to be on a longer-term basis and to be targetted on critical areas of needs, taking into account the prospects of internal financial capacity and additional external support (11.103).

INTRODUCTION

The Review of the Regular Programme, together with the Review of Field Programmes, forms an essential element of FAO's overall evaluation process. Since its inception in 1979, it has been the main mechanism for reporting to the Governing Bodies on the work implemented, and results achieved, under the Organization's Regular Programme. Other evaluation activities include the annual auto-evaluations undertaken by all programme managers of the Regular Programme, special evaluations commissioned by the Director-General and those conducted by the United Nations/Joint Inspection Unit, and evaluations of technical cooperation projects under the Field Programmes, including thematic evaluations, carried out by the parties concerned.

The format and structure of the Review has largely been maintained in view of the general satisfaction expressed by the Conference. Part One, the Performance Report, gives a summary overview of FAO's work under the Major Programmes during the current biennium. Part Two presents in-depth reviews of four selected technical Sub-programmes covering the last three biennia. Part Three presents an in-depth review of FAO's experience in promoting Technical Cooperation Networks.

Part One draws on the findings of the auto-evaluation process as well as on the programme implementation reports considered by the Committees on Agriculture, Fisheries, and Forestry. As an innovation in this Review, the objectives and priorities of each Programme have been included, so as to recall the main priority areas and provide a context for the performance report. Major inter-disciplinary activities are also highlighted. The performance database related to the activities of the three Major Programmes now contains more information on the existing data bases in FAO.

Part Two consists of in-depth reviews covering the following Sub-programmes: Natural Resources - Assessment and Planning (2.1.1.1), Crop Improvement and Management (2.1.2.2), Remote Sensing and Agrometeorology (2.1.4.4), and Forest Food, Fodder and Fuelwood Systems (2.3.1.4). The reviews present a comprehensive picture of the Sub-programmes' objectives, resources and activities during the past six years, provide an assessment of their effects and impact and identify perspectives for follow-up action by FAO and member countries. In order to provide concrete information on results at field level, findings of relevant project evaluations have been included. Common themes and issues revealed by these reviews are exposed in the Summary from paragraph 66 to paragraph 73.

The subject covered by Part Three, Technical Cooperation Networks, should be of widespread interest to the Member Nations. A large number of networks are being promoted by FAO, supporting cooperation among national institutions of many developing countries. Despite their extensive use under FAO technical programmes, the approaches and methods of promoting networks and their performance had not hitherto been reviewed in a comprehensive way. Chapter Eleven presents an overview of networks promoted by FAO, their nature and scope, the support provided by FAO and the main features of their achievements and results. It also contains a set of preliminary conclusions and lessons for future work in this field.

The reviews contained in Parts Two and Three underscore the complementarity between FAO's Regular and the Field Programmes. Virtually all technical work under the Regular Programme is related to extra-budgetary supported activities, and there is generally a symbiotic relationship between these two sets of activities. While the Regular Programme serves as a basis for synthesis and dissemination of appropriate technologies and approaches, field projects provide a learning and testing ground for innovative ideas, and in turn inspire the development of new programmes or technical approaches. The experiences presented in these chapters may be useful in the discussion of FAO's role in the future, particularly in view of the changes currently taking place in the modality of executing field projects.

With this seventh edition, a renewed effort has been made to present the Review with a focus on results and achievements. Relevant cases of project evaluation findings have been incorporated in the in-depth review chapters, and it is intended to further strengthen this in future. However, within the given timeframe it is not always possible to assess the likely effects or impact, particularly for activities reported on in Part One. A balance, it is hoped, has been provided by the in-depth reviews and the special topic which give a sharper focus on FAO's Regular Programme activities. In this connection, it should be noted that with this seventh Review, 29 Sub-programmes, or 46% of all technical Sub-programmes, have been covered by in-depth reviews, together with twelve special topics.

In view of the length of the Review, an effort has been made to make the Summary section as self-contained as possible, with cross-references to the text. In particular, it is hoped that the analysis of the common themes and issues arising from the in-depth reviews of the four selected Sub-programmes under Part Two of this section (paras. 66-73) will facilitate better feedback from these reviews on thematic aspects common to FAO's work in the field of rationale use of natural resources.

Finally, the Review reflects, in various chapters, the effects of a severe financial contraction during the recent years, which resulted in substantial cuts and adjustments in FAO's work programme. The combined effects of the budgetary cuts and financial uncertainties have been critical, not only in the short-run by impeding the implementation of priority work at hand, but also in the longer-run by eroding the momentum of priority technical work and the staff resource base. In terms of the long-term effects, the Organization's overall technical capacity has suffered a serious setback and will require intensive efforts and financial stability to recover and to regain the lost ground.

PART ONE

The performance report in Part One contains six chapters:

Chapter One	:	Agriculture (Major Programme 2.1)
Chapter Two	:	Fisheries (Major Programme 2.2)
Chapter Three	:	Forestry (Major Programme 2.3)
Chapter Four	:	Information Base Related to the Performance of Technical and Economic Programmes
Chapter Five	:	Technical Cooperation and Development Support
Chapter Six	:	Supporting Services

The reports on individual programmes are of necessity selective, and seek to highlight the main achievements. The traditional means of implementation - i.e. training, meetings, publications, direct support to member countries, technical support to field projects and key computerized data-bases are reported in tabular form in Chapter Four, covering four biennia. The data include the contribution of Regional Offices.

In order to provide a common framework for analysis, the following format was used for the performance report (with modifications in Chapters Five and Six due to the slightly different nature of the programmes covered):

- Objectives and Strategy covers medium-term and immediate objectives and the strategy and priority considerations governing programme implementation:
- Progress and Achievements gives an account of activities and results during 1989-90 and those planned for 1991. Major inter-disciplinary activities are highlighted, and basic objectives and priorities are summarized to provide a context for the significance of individual activities;
- Outlook and Issues discusses key issues arising from the preceding analysis.

CHAPTER ONE

AGRICULTURE

Major Programme 2.1

Objectives and Strategy

- 1.1 The principal goal of the Major Programme continues to be the sustainable increase of agricultural production and rural incomes and the elimination of hunger and malnutrition. Its wide spectrum of activities provides multi-disciplinary support for sustainable agricultural development to assure improved living standards, especially for the most disadvantaged sections of the population. This entails greater production, trade and consumption of food and other agricultural products, which in turn are based on sustainable improvements in resource productivity, improved marketing and distribution systems, increased purchasing power and broad public participation in the development process. Special attention is given to Africa and to improving the lot of small-scale producers, women, youth and the landless poor.
- 1.2 In this effort, the Major Programme works at the global, regional and national levels on the following priority areas:
 - enhancing food security at all levels;
 - promoting improved food and agriculture production and distribution in the developing countries;
 - improving resource management and sustainable development of natural resources, including environmental protection;
 - reduction of rural poverty, promotion of economic growth with equity and development of human resources;
 - assessment of the food and nutrition situation, monitoring of changes and improving food consumption, nutrition and food safety standards; and
 - policy formulation and advice, together with related information and statistics, and improving the international trading environment for agricultural commodities.
- 1.3 Three main roles have been recognized for FAO, i.e. policy advice, global information functions and technical assistance. The Major Programme plays the central part in all these roles, providing the backbone in the formulation of FAO's broad agricultural and rural development strategies, such as World Food Security and WCARRD, as well as specific action oriented programmes, such as that for the

elimination of rinderpest. These require concerted action at the international level, both for policy coordination and on technical approaches involving extensive FAO studies, publications and meetings. These FAO actions serve to enhance government and public awareness of development problems, issues and possible solutions. Standards, methodologies and international commitments are proposed by FAO for adoption and acceptance by countries, for example, the Codex standards and the International Undertaking on Plant Genetic Resources. Approaches, technologies and findings of comparative studies for application by countries are disseminated including through FAO-sponsored networks. National and international studies, including planning work is underpinned by the FAO information and databases which are steadily improved in quality and accessibility. WAICENT is particularly important in this regard as global point of reference for all information relevant to food, agriculture and rural development. National development is supported directly through the Field Programme, complemented by Regular Programme activities. TCDC and ECDC are promoted to enable developing countries help themselves through the exchange of information and experience and joint development cooperation.

- 1.4 Major Programme 2.1 is the Organization's largest programme, with the Regular Programme resource allocation of US\$ 212.2 million for the present biennium, which accounted for 77 percent of resources for technical programmes, and of 37.3 percent of the total Regular Programme Budget, and which represented a 0.4 percent increase over the previous biennium (the resources allocation to the Major Programme is given in Table 4.1 in Chapter Four). It comprises eight Programmes, divided into 43 Sub-programmes. Twelve Special Action Programmes as well as the Screwworm Emergency Centre for North Africa are coordinated and backstopped by this Major Programme.
- 1.5 The Major Programme is jointly managed by the Agriculture and the Economic and Social Policy Departments, with the full involvement of the Regional Offices and some technical participation from the Department of General Affairs and Information. Several programmes receive contributions from the Fisheries and Forestry Departments. A system of inter-departmental working groups facilitates multi-disciplinary activities cutting across the Major Programmes. The Development Department provides the coordination and the development of field projects, including liaison with donors. The field projects under the Agriculture and the Economic and Social Policy Departments are for the most part operated by the Agricultural Operations Division.

Sustainable Development and Environment - A Thematic Priority

- 1.6 **Basic Objective:** Work on sustainable development and environment is intended to contribute to the management of the natural resource base in such a way as to increase food supply and economic benefits for present and future generations, while at the same time protecting the environment. Such development should conserve land, water, plant and animal genetic resources and should be environmentally non-degrading, technically appropriate, economically viable and socially acceptable.

- 1.7 Work on the environment in relation to sustainable development has long been an FAO priority. Environmental issues and the more recent sustainability concerns cut across sectoral boundaries within FAO's activities and are undertaken under many FAO programmes.¹ Coordination of all FAO Regular and Field Programme activities related to the subject is, therefore, a major priority.
- 1.8 In line with the recommendations of the last session of the Conference (Resolution 3/89), special attention has been given to ensuring a coherent and integrated approach to the environmental, technical, social and economic aspects of sustainable development. Organizational and structural changes made as follow-up actions to the Conference include the appointment of a Special Adviser to the Director General/ADG for the Environment and Sustainable Development in February 1990. The Special Adviser provides guidance designed to strengthen the Organization's internal coordination and ensure that sustainability and environmental protection problems are approached in an interdisciplinary manner. The Special Adviser's Office also serves as a focal point for collaboration with other institutions involved with sustainable development and environment matters. In addition, a Steering Committee for the Environment and Sustainable Development was set up at ADG level, under the Chairmanship of the Special Adviser. This Committee assists the Director-General in internal decision-making and direction in these fields. The Interdepartmental Working Group (IDWG) on the Environment and Sustainable Development has also been set up at the Head of Division level to assist the Special Adviser and the Steering Committee on policy and programme matters. Work on specific technical subjects is addressed through several ad hoc sub-groups under the auspices of the IDWG. Such groups presently exist for the following topics: Policy and Planning, Biological Diversity, Climate Change, Desertification Control, Integrated Coastal Area Management and Energy. These mechanisms are supported by the Environment and Energy Programmes Coordinating Centre which reports directly to the Special Adviser for its substantive and operational activities.
- 1.9 Ad hoc groups and task forces continued during the biennium to address specific technical matters related to the environment and sustainable development. In 1990, the Sub-group on Biological Diversity prepared draft articles for an international convention for the conservation of biodiversity and elaborated a common strategy and programme approach for FAO activities related to biodiversity for agriculture, forestry and fisheries. A report on the implications of climate change for agriculture, forestry and fisheries was prepared in 1990 by the Sub-group on Climate Change for the Intergovernmental Panel on Climate Change (IPCC). Other inputs were provided

¹ Representative examples include the following Sub-programmes: 2.1.1.1 (Assessment and Planning); 2.1.1.2 (Farming Systems Development); 2.1.1.5 (Conservation and Reclamation); 2.1.1.6 (Sustaining Resource Potentials); 2.1.2.1 and 2.1.3.1 (Plant and Animal Genetic Resources, respectively); 2.1.2.4 (Crop Protection); 2.1.4.4 ((Remote Sensing and Agrometeorology); 2.1.4.5 (Environment and Energy); 2.1.5.1 (Agricultural Extension, Education and Training); 2.1.5.2 (Rural Development Analysis and Organization); 2.1.6.3 (Food Control and Consumer Protection); 2.1.8.2 (Agricultural Policy Analysis); 2.1.8.5 (Agricultural Planning Assistance); 2.2.2.1 (Marine Resources and Environment); 2.2.3.1 (Fisheries Policy and Planning); 2.3.1.3 (Conservation and Wildlife); 2.3.1.4 (Forest Food, Fodder and Fuelwood Systems); 2.3.1.5 (Tropical Forestry Action Plan); 2.3.3.3 (Forest Policies and Information) and 2.3.3.4 (Community Forestry Development).

through ad hoc groups and focal points designated to contribute to both the organizational and substantive sessions of the Preparatory Committee for the UN Conference on Environment and Development (UNCED) and to the inter-agency Working Parties established by the UNCED Secretariat.

- 1.10 Besides the on-going cooperation with UNDP, World Bank, IFAD, UNEP and Regional Banks in field projects, FAO continued to collaborate with UN and non-UN coordinating bodies² including DOEM, DESCON, CIDIE and ECG. FAO hosted a meeting of the DOEM in Rome in 1990 which finalized the draft ACC report on Inter-Agency Cooperation in the Field of Environment. Together with WMO, UNEP, Unesco and ICSU, FAO co-sponsored the Second World Climate Conference held in Geneva in November 1990 and issued a major position paper on this occasion. Within the ACC-Intersecretariat Group on Water Resources, FAO is currently preparing papers and programme proposals for the International Conference on Water and the Environment scheduled to be held in Ireland in 1992.
- 1.11 FAO Regional Conferences in Europe, Africa, and Latin America and the Caribbean in 1990 addressed matters related to the environment and sustainable development. Follow-up initiatives to the Regional Conferences include the Special Action Programme on Conservation and Rehabilitation of African Lands, assistance to the implementation of the Amazon Cooperation Treaty, and studies on the sustainable management of fragile ecosystems in Latin America and the Caribbean.
- 1.12 The FAO/Netherlands Conference on Agriculture and the Environment was convened in the Netherlands in April 1991 with participation from 119 countries, 17 inter-governmental organizations and 20 non-governmental organizations. The conference launched a process through which the concept of sustainable agriculture and rural development can be translated into greater operational reality. The essential goals of the approach include not only natural resource conservation and environmental protection, but also the attainment of sustainable food security; rural employment and income generation including poverty eradication. To this effect, the Conference adopted the Den Bosch Declaration and Agenda for Action on Sustainable Agriculture and Rural Development.
- 1.13 To create the conditions for sustainable development, the Den Bosch Declaration and Agenda for Action call for fundamental changes in current practices. Priority areas identified for action include: reviews of national policy; re-orienting research and technology development; accelerated development of rural organizations including people's participation programmes; human resource development; integrated resource planning and management; improved use of local renewable natural resources and energy; optimized use of inputs, particularly through Integrated Pest Management and Integrated Plant Nutrition Systems; and diversification of agricultural and other income-earning activities in rural areas.

² DOEM - Designated Officials on Environmental Matters,
CIDIE - Committee of International Development Institutions on the Environment
DESCON - Consultative Group on Desertification
ECG - Ecosystem Conservation Group

- 1.14 FAO has been actively contributing to the preparatory process of the United Nations Conference on Environment and Development (Rio de Janeiro, Brazil, June 1992). UNCED's Preparatory Committee was kept informed of the preparations of the FAO/Netherlands Conference, its outcome and follow-up. In addition, FAO has contributed to UNCED's Working Parties on Atmosphere, Oceans, Biological Diversity, Biotechnology, Forests, Land and Agriculture, Toxic Chemicals, Freshwater Resources, Environment and Development, and to cross-sectoral issues such as Rural Poverty and Food Security. FAO has played a key role in the preparation of a number of documents for the consideration of the UNCED Preparatory Committee and has prepared proposals as programme elements to be included in UNCED's Agenda 21, as regards food, agriculture, freshwater, forestry and fisheries.
- 1.15 Activities and outputs related to the environment and sustainable development are discussed in the context of each of the Programmes. Some examples may serve to illustrate the diversity of that effort. Under the Food and Agricultural Information and Analysis Programme (2.1.7) attention has been given to developing the information based on the environment and a special chapter in the State of Food and Agriculture (SOFA) was devoted to this. Stress has been placed on training and advice for the inclusion of sustainability issues in policy and planning in Food and Agricultural Policy (2.1.8).
- 1.16 Within the Natural Resources Programme (2.1.1), work is taking place on the assessment of agricultural areas at greatest risk of degradation. Research has been supported on the relationship between erosion and soil productivity. Proposals for an inter-disciplinary International Scheme for the Conservation and Rehabilitation of African Lands were formulated and were fully endorsed by the 1990 FAO Regional Conference for Africa. Efforts in cooperation with the Crop and Livestock Programmes (2.1.2 and 2.1.3) and involving the Joint FAO/IAEA Division have focused on integrated plant nutrition systems including use of legumes and animal residues. Work in the Crops and Livestock Programmes on genetic resource conservation and on the more rational use of pesticides relates directly to the environment. Under Research and Technology Development (2.1.4) climate change and its implications for agriculture are being monitored.
- 1.17 In addition to major activities such as food contamination monitoring, control and the improvement of food quality and safety under Programme 2.1.6 Nutrition, examples of less major activities relating directly to the environment are found throughout the text below: for example, under Programme 2.1.3 Livestock, the study of the environmental impact of meat processing and the promotion of plants suitable for the conservation and rehabilitation of arid grazing lands.

Programme 2.1.1: Natural Resources

- 1.18 **Basic Objective:** The Programme is designed to secure the more productive and efficient use of land, water and farm inputs to meet the present and future needs of all people on a sustainable basis, particularly in relation to food and agriculture.

Attention is given to the promotion of development approaches and techniques which are compatible with the need to safeguard the physical environment in its broadest sense.

- 1.19 **Priorities:** The systematic quantification of land and water resource potentials is to continue, together with the incorporation of this information in FAO's Geographic Information System, as a source of reference for national and international development agencies. This includes establishing a quantitative crop growth requirements database to increase the reliability of assessments for land suitability. Irrigation potential is being examined in particular for small-scale schemes. The wider application is promoted for the World Soil Charter and for the FAO methodology for assessing, at national level, potential land productivity and population supporting capacities. Methods and training are being developed for integrated improvements in productivity and conservation, including integrated soil and plant nutrition: other priorities include improved water management and farming systems approach to agricultural development. Economic and ecological aspects are to be better integrated in natural resource assessment and planning.

Inter-disciplinary Activities

- 1.20 The FAO Geographic Information System (GIS) digitized map has been expanded and restructured. The system was used, among others, for assessing the effects of medium-term climate fluctuation during the Sahel drought of the 1970s and 1980s on production potentials and population supporting capacities. An extensive review of technical and policy aspects related to land, water and input-use was presented to the Near East and North Africa Regional Commission on Land and Water Use. It was concluded that few or no unutilized natural resources remained in most Near East countries and recommendations were made to foster sustainable and degradation-free agricultural development. Applications of the Guidelines for Land Use Planning, developed by an inter-departmental working group, were examined and initial steps taken to monitor field tests of the recommended procedures.
- 1.21 In 1990, a network of field trials on Integrated Plant Nutrition Systems (IPNS) was established in Asia.³ Efforts are under way to extend the network to other countries in Asia as well as Africa. The network is intended to identify promising treatment combinations for different agro-ecological situations and cropping systems. The results will be utilized by national demonstration programmes within the framework of FAO Fertilizer Programme field projects. Work on biological nitrogen fixation (BNF) has strengthened *Rhizobium* inoculant production pilot units, which FAO has helped to establish, so far in 16 countries.⁴ Inoculants produced by the units are being used in demonstrations by the extension services and now by farmers. Improved support of BNF activities by FAO Headquarters has been made possible by

³ Member countries: India, Indonesia, Laos, Nepal, Pakistan, Thailand.

⁴ Bangladesh, Bhutan, Brazil, Burundi, Colombia, Kenya, Madagascar, Mozambique, Nepal, Nicaragua, Rwanda, Tanzania, Tunisia, Turkey, Viet Nam, Zaire.

the creation of a Trust Fund and the re-establishment of a technical BNF post. This work was closely related to that on fodders and pastures which also involved the Forestry Department (see Programme 2.1.3 Livestock).

- 1.22 Preparations were completed by JEUR for the joint FAO/ECE Symposium on methods and concepts for the use of organic and chemical fertilizers, held in Geneva in January 1991. This concentrated on optimizing the relationship between farm productivity, sustainable soil quality and the quality of the output. The RAPA-supported Organic Recycling Network now corresponds with 464 institutions and resource persons in 32 countries. RAPA continued to produce the annual bulletin for the network, and training courses were conducted in China with UNDP support. The second meeting of the sub-network on organic and bio-fertilizers was held in 1990 and was attended by participants from 11 member countries.⁵ The RLAC-supported network on alternative sources of energy continued its mainstream work on biogas.
- 1.23 Tillage and residue management networks were initiated in Africa and Latin America,⁶ and FAO collaborated with the International Board for Soil Research and Management (IBSRAM) in the organization of an International Workshop on Tillage and Organic Matter Management in Madagascar. Two training courses on tillage are being organized in 1991 in Africa and Latin America. RAFR initiated a network on biogas⁷ and provided financial support to Burkina Faso for a study on the cost-effective use of local materials in the construction of biogas digesters. The study concluded that while the biogas technology was suitable for African conditions, there was a need to reduce the cost of the biogas digester and to make a proper assessment of available feed-stock resources. In Europe, REUR continued to support the two Cooperative Research Networks on Trace Elements and Animal Waste Utilization through the publication of newsletters and technical papers.

Sub-programme Implementation

- 1.24 Assessment and Planning: The Sub-programme is the subject of a separate in-depth review (see Chapter 7).
- 1.25 Farming Systems Development: The Sub-programme work (FSD) has emphasized linkages with land evaluation and soil conservation. New activities related to farm household-environmental economics were initiated in 1990, and methodologies and training materials were prepared for publication. A document on integrating land evaluation and farming systems analysis is now available for distribution. A workshop in India compared methodologies and use of micro-level data for policy formulation

⁵ Bhutan, China, India, Indonesia, Laos, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam.

⁶ Cameroon, Malawi, Nigeria, Zambia, Argentina, Bolivia, Paraguay, Venezuela.

⁷ Benin, Burkina Faso, Ghana, Mali, Niger, Togo.

and assessment. National experts in nine countries⁸ have prepared Farm Data Handbooks for major agro-ecological zones for use by rural development planners and extension agents. An updated and more elaborated users' manual is now available for the Farm Analysis Package (FARMAP) and was used in training.⁹ The findings of case studies commissioned by RAPA on farming systems development in upland areas in Asia were presented at a regional expert consultation.

- 1.26 Soil Management and Fertilizers: The threat to food production of plant nutrient depletion was highlighted at the "Fertilizer Week" organized in April 1990. The biennial sessions of the Commission on Fertilizers and FAO/Fertilizer Industry Advisory Committee of Experts and a consultation on the FAO Fertilizer Programme were held consecutively as part of the "Fertilizer Week", attended by 186 participants. On the recommendation of the Commission, work has begun to develop a framework programme for national strategies to conserve and regenerate soil fertility. This includes (i) case studies of national fertilizer and fertility situations and strategies, (ii) preparation of a Covenant on Good Fertilizer Use, and (iii) the better incorporation of sustainable development aspects in the on-going Block Demonstration Programme through Fertilizer Programme projects.
- 1.27 Updated issues of "Current World Fertilizer Situation and Outlook", including the forecasts produced by the FAO/UNIDO/World Bank Working Group on Fertilizers, were published. Computer programmes for modelling fertilizer strategies were adapted to the country's situation in Ethiopia. Computer programmes and designs for fertilizer trials have also been updated. The data bank of the FAO Fertilizer Programme now contains the results of more than 80,000 trials and demonstrations in 32 countries. In collaboration with the International Fertilizer Development Centre (IFDC), FAO is planning to support the African Fertilizer Trade and Marketing Information Network (AFTMIN) and co-financing FADINAP¹⁰ together with ESCAP and UNIDO.
- 1.28 Under the umbrella of the FAO Fertilizer Programme, 48 projects in 28 countries were operational in 1990 (80 percent being funded through Trust Funds) reaching more than 250,000 small farmers. The emphasis of these projects has shifted in recent years from general fertilizer extension toward the formulation of detailed and specific recommendations using on-farm trials, and also the establishment of agricultural inputs coordination and planning units at national level.
- 1.29 The International Fertilizer Supply Scheme received no new pledges of fertilizer during the period under review and has come to a virtual halt. At its height in the 1975-79 period the Scheme distributed on average around 124,200 tonnes per year.

⁸ Cameroon, Ivory Coast, Mali, Zambia, India, Indonesia, Philippines, Thailand, Trinidad and Tobago.

⁹ Held in FAO Headquarters, Asian Institute of Technology (AIT), Malaysia and Turkey.

¹⁰ Fertilizer Advisory Development and Information Network for Asia and the Pacific.

- 1.30 The sulphur deficiencies network has now conducted 224 field trials in Asia and Africa. Concentration was on practical means for solving deficiencies.¹¹ Follow up surveys of soil sulphur status were initiated in 1990 in seven countries¹² to produce maps delineating areas where response to sulphur could be expected. Results of an international study on soil micro-nutrients in 15 countries¹³ funded by FINNIDA have also been published.
- 1.31 Water Development and Management: In collaboration with the International Commission on Irrigation and Drainage (ICID), a global review was initiated in 1990 to collect and evaluate trends and potentials for improved irrigation and drainage technologies. Using experiences gained in developing countries, a study on energy aspects of irrigation was started in 1991 and training manual preparation is underway. Following an expert consultation, guidelines for using saline water of differing qualities were issued. At the request of the Lake Chad Basin Commission, FAO prepared a water resource development and management programme for the basin.
- 1.32 An Expert Consultation on FAO methodologies for calculating crop water requirements in 1990 resulted in specific recommendations for improvement. Joint FAO/WMO roving seminars on the application of climatic data for irrigation planning and management are underway with the first one to be held in Nigeria and four others planned for 1991. The dissemination and upgrading of the computerized FAO Irrigation Management Model CROPWAT has continued with the development of version 5.6 which incorporates a 144 country and 3,162 station climatic data. The computer software package is useful for the calculation of crop irrigation requirements and/or the possible crop mix in an area given its climate and type of soils.
- 1.33 A regional workshop for Asia and the Pacific on Improved Irrigation Systems Performance, held with participation from IIMI (1990), laid the basis for the establishment of a regional network. The RLAC-supported network on the utilization of natural resources in the semi-arid Chaco region organized three training courses on rain water harvesting, and the network has expanded its activities to all countries in the region. At its second seminar (in 1990) the African Network on Wetland Development and Management agreed to adopt a multi-disciplinary approach to achieve an environmentally sound development of wetlands.
- 1.34 Conservation and Reclamation: FAO has been promoting research into the relationship between soil erosion and soil productivity in cooperation with 12

¹¹ Burkina Faso, Cameroon, China, India, Indonesia, Kenya, Nepal, Pakistan, Sri Lanka, Sudan, Tanzania, Thailand, Zaire.

¹² China, Indonesia, Kenya, Nepal, Pakistan, Tanzania, Thailand.

¹³ Ethiopia, Finland, Iraq, Malawi, Mexico, Nepal, Pakistan, Philippines, Sierra Leone, Sri Lanka, Tanzania, Thailand, Turkey, Zaire, Zambia.

institutes in 10 countries.¹⁴ As follow-up to the recommendations of the FAO study "African Agriculture: Next 25 Years", an international scheme for the conservation and reclamation of African lands was prepared and was endorsed by the 1990 FAO Regional Conference for Africa. In 1991, work began in developing land conservation and reclamation programmes in Africa.¹⁵ Collaboration has continued with UNEP on the production of a general world map of land degradation. A network on Management of Gypsiferous Soils is being established in the Near East Region and an expanded Arabic version of the Soils Bulletin on Gypsiferous Soils is under preparation.

- 1.35 **Sustaining Resource Potentials:** This Sub-programme was established in the 1990-91 biennium. A major element has been the formulation of the International Action Programme on Water and Sustainable Agricultural Development (IAP-WASAD) under the umbrella of the Mar del Plata Action Plan Strategy for the 1990s. Activities completed include regional missions to assess progress achieved in the implementation of the Plan and the preparation of the IAP-WASAD plan which was adopted by the ACC-Intersecretariat Group on Water Resources in October 1990. FAO is a member of the steering committee and is preparing papers for the International Conference on Water and the Environment to be held in Ireland in January 1992. A demonstration programme on sustainable farming practices with particular emphasis on soil and water conservation has been prepared and extra-budgetary support is being sought for its implementation.

Programme 2.1.2: Crops

- 1.36 **Basic Objectives:** The Programme aims to achieve appropriate improvements in crop production, processing and conservation. Such production should be sustainable in agro-ecological and socio-economic terms, while also being nutritionally sound.
- 1.37 **Priorities:** Backstopping of field projects is a major activity for this Programme, which also gives emphasis on the promotion of regional crop specific networks to encourage exchange of technology. Increased production is being stimulated in areas less well covered by other agencies, in particular the International Agricultural Research Centres (IARCs). Priority is given to roots, tubers, plantains and grain legumes; especially selected crops for nutrition and cash-income, including vegetables, fruits, medicinal plants, essential oils and under-utilized oilcrops; environmentally appropriate production from under-utilized areas such as wetlands; mixed cropping for sustainable production; and Integrated Pest Management especially in crops where there is a high incidence of pesticide use. The reduction in harvest and post-harvest food losses remains a priority, as well as the control of migratory insects, especially locusts which can have devastating effects on both production and the environment.

¹⁴ Botswana, Brazil, Ethiopia, Indonesia, Kenya, Lesotho, Mozambique, Spain, Tanzania, Thailand.

¹⁵ Central African Republic, Ghana, Madagascar, Mali, Togo.

- 1.38 Also of major concern for the Programme is the further development of the Global System for the Conservation and Utilization of Plant Genetic Resources and the effective implementation of the International Undertaking on Plant Genetic Resources. This is designed to provide a continuing basis for genetic improvements in plants of importance to mankind. Important in this context is the development of international agreements and arrangements to facilitate safe conservation, unrestricted availability and sustainable use of plant genetic resources. This includes the development of a Code of Conduct of International Collecting and Transfer and the Code of Conduct on Plant Biotechnology. Similarly the International Plant Protection Convention is designed to control the spread of disease, while the International Code of Conduct on the Distribution and Use of Pesticides helps to ensure quality and protection of the environment. Thus special attention is being given to the "Prior Informed Consent" clause which allows developing countries to exercise at low cost greater control over potentially harmful pesticides.

Inter-disciplinary Activities

- 1.39 Efforts are being made to introduce a matrix-manner of working for the Crop Improvement and Management, Genetic Resources and Seeds Sub-programmes. Within this organizational framework officers and activities would relate not just to one discipline, but also to a particular group of crops and strong cross linkages within the Programme would be forged.
- 1.40 The Programme continued to be heavily involved in inter-disciplinary and inter-departmental activities. Advances in plant biotechnology have been pursued and a Network on Plant Biotechnology was established in Latin America in 1990 with the participation of national laboratories and regional institutions such as CIAT, CIP and CATIE. Similar networks are being formed in Asia and Africa.
- 1.41 The Prevention of Food Losses Programme (PFL) pursues its objectives within a multi-disciplinary framework. PFL projects continued to focus on small farmers and women, especially through farmers' groups. During 1990 there were 37 operational PFL projects with total budget allocations of US\$ 25.8 million; of which 19 were in Africa, 7 in Asia and the Pacific, 5 in Latin America and the Caribbean, and 5 located in the Near East, North Africa and Europe. While staple foodgrains formed the basis of earlier PFL projects, increasing emphasis is now being given to roots, tubers, fruit and vegetables, and efforts were made to integrate pre- and post-harvest factors. Collaboration with the private sector has been initiated in several PFL projects,¹⁶ particularly in the manufacturing of post-harvest machinery and equipment. Links with CIAT have been strengthened with holding regional workshops and information exchange on cassava production and processing. Work continued in cooperation with the EEC on the control of the Larger Grain Borer in Africa.

¹⁶ Indonesia, Jamaica, Philippines, Senegal.

- 1.42 In collaboration with the Nutrition Programme 2.1.6 and the International Vitamin A Consultative Group, the implementation of the UN-Action Programme for Prevention of Vitamin A Deficiency has been pursued by promoting the cultivation of Vitamin A-rich horticultural crops through field projects.¹⁷ Joint activities in the field of nitrogen fixation and bio-fertilizer are referred to under Programme 2.1.1 (Natural Resources) and Programme 2.1.3 (Livestock).
- 1.43 In their annual sessions in 1990 and 1991 the FAO/WHO Joint Meeting of the FAO Panel of Experts on Pesticide Residues in Food and the Environment and the WHO Expert Group on Pesticide Residues evaluated three compounds for the first time and re-evaluated the toxicology and residue of 77 compounds. During the same period, 12 Acceptable Daily Intake and 59 Maximum Residue Levels were established for further consideration by the Codex Alimentarius Committee on Pesticide Residues.

Sub-programme Implementation

- 1.44 Genetic Resources: As of February 1991, 102 countries had adhered to the International Undertaking on Plant Genetic Resources and 111 member countries had joined the Commission. A number of countries that had originally adhered with reservations have withdrawn these. Following recommendations of the Commission on Plant Genetic Resources, preparations were made for: a Global Information and Early Warning System on plant genetic resources; the establishment of networks of *ex situ* base collections (gene banks) and *in situ* protected areas; the preparation of a Code of Conduct for International Collecting and Transfer, as well as a Code of Conduct on Biotechnology in relation to the conservation and utilization of plant genetic resources.
- 1.45 Resolutions of the 1989 FAO Conference on the interpretation of the International Undertaking on Plant Genetic Resources and on Farmers' Rights recognize that both plant breeders and farmers who contribute germplasm should be compensated, and in 1991 the Commission considered mechanisms for the implementation of Farmers' Rights. A Memorandum of Understanding on programme cooperation was signed with the International Board for Plant Genetic Resources (IBPGR) in 1990. In cooperation with IBPGR, expert groups have been convened to establish crop-specific guidelines for the safe and expeditious transfer of germplasm and to set up an international seed bank, to be held in permafrost at Svalbard, Norway. With Regular Programme and project funding, FAO continued to support activities¹⁸ for the rational conservation and sustainable use of plant genetic resources.
- 1.46 Crop Improvement and Management: The Sub-programme is the subject of separate in-depth review (see Chapter 8).

¹⁷ Burkina Faso, Laos, Mali, Mauritania, Nepal.

¹⁸ Republic of Korea, Nicaragua, Thailand, Turkey, Viet Nam, Yemen, Yugoslavia.

- 1.47 Seeds: There was a steady increase in requests for assistance in developing vegetable seed and seed production of asexual crops, as well as cereals, particularly from Near East and Asian countries. Training activities increasingly focused on specific aspects of seed technology, such as seed quality, testing and the micro-propagation of disease-free planting material. These were supported by the publication of technical guidelines, and were in several cases organized in collaboration with international agricultural research centres, particularly ICARDA. The development of the seeds sub-sector for major food crops will be discussed at the Near East Regional Commission on Agriculture in December 1991.
- 1.48 The FAO seed exchange and information unit continued to provide seed and planting material, information on seed sources and variety characteristics. As a result of the policy to facilitate more direct exchange between countries (without passing through the FAO seed laboratory), the quantities of seed and planting samples handled directly by FAO continued to decline. In 1990, the laboratory despatched 19,798 samples as compared to 24,000 samples in 1989. In Asia and the Pacific region, seeds of improved varieties and lines of maize, mungbean, soybean and minor legumes were shared among nine countries through a UNDP-supported project. The updating of the Seed Review was initiated in 1990.
- 1.49 Crop Protection: By March 1991, 95 countries had adhered to the International Plant Protection Convention (IPPC). An amended version of the Convention, which was adopted by the FAO Conference in 1979, came into force on 4 April 1991. FAO is mandated under the IPPC to exchange information related to all aspects of plant quarantine. Annual meetings were organized with Regional Plant Protection Organizations to discuss cooperative work programme to harmonize the principal standards including those for plant quarantine and pest risk assessment. The Near East is the only region lacking such an organization and now effort is being made to establish it.
- 1.50 The FAO/UNEP Panel of Experts on Integrated Pest Control continued to guide Integrated Pest Management (IPM) activities. Important achievements in IPM have been obtained in Asia and the Pacific region, especially in a programme on rice (funded by the Netherlands and the Arab Gulf Fund) and a connected Government programme in Indonesia (funded by USAID). These projects have also greatly increased the interest in and request for IPM projects in the region. A Workshop on IPM in Cotton was also organized for the main producing countries in Asia and the Pacific region. Preliminary studies are being conducted to determine pest control practices in Africa and in the Near East. Sub-regional technical meetings organized in RLAC resulted in the publication of a manual on IPM in vegetable crops.
- 1.51 Draft guidelines on the introduction of biological control agents were discussed by an expert consultation held in September 1991, in close cooperation with the International Organization on Biological Control. Control of the Striga weed continued to receive emphasis in Africa. A cooperative programme on improved weed management has also been operating with RLAC support.

- 1.52 Implementation of the International Code of Conduct on the Distribution and Use of Pesticides was supported through a regional project funded by Japan for 27 countries in Asia and the Pacific region and through eight TCP projects.¹⁹ Workshops on the subject were held for Latin America and the Caribbean, Southern and Western Africa. The 25th FAO Conference incorporated the Prior Informed Consent (PIC) clause into the Code of Conduct, under which the international shipment of a banned or restricted pesticide should not proceed without the agreement of the country of import. A joint FAO/UNEP programme was established to implement PIC, and a first implementation phase has started in late 1991. To assist member countries to benefit from PIC first steps were taken to establish a joint FAO/UNEP database on pesticides, and 106 countries had appointed Designated National Authorities to send, receive and/or make decisions on restricted pesticides.
- 1.53 The Desert Locust continued in recession during 1990, and as a result, the Emergency Centre for Locust Operations (ECLO) ceased to exist as a separate unit in 1990, but its activities have been continued within the normal programme. Particular emphasis was directed towards strengthening and maintaining control capability, improving forecasting and rapid transmission of locust and environmental data. A five-year project to strengthen desert locust preventive control in West and North-West Africa was drafted. Grasshopper infestations in the Sahel declined considerably from the 1989 levels due to the poor rains. The Desert Locust Control Committee and the Regional Locust Commissions met and emphasized the need for more intensive training and for more attention to the environmental hazards of spraying.
- 1.54 Agricultural Engineering: Preparations were made for the development of an information exchange system to permit the more systematic dissemination of agricultural engineering information among institutions responsible for education, research, extension and other support services. Cooperating institutions with the system have been identified in Asia and Latin America, and an update of the International Directory of Agricultural Engineering Institutions has been produced. The 10th FAO Panel of Experts on Agricultural Mechanization in 1990 identified education and training materials needed to redress the lack of adequately trained manpower to manage, operate and maintain agricultural machinery. As a follow-up to the recommendations of the Panel, four publications were prepared on farm tools and equipment which can be duplicated by developing countries for distribution to rural communities. Guidelines and training materials were also prepared during 1990 for national workshops and projects in member countries. The updating of three databases (Farm Machinery Manufacturers, Farm Machinery Specifications and Worldwide Agricultural Engineering Institutions) was continued. Advice on the formulation of agricultural mechanization strategies also continued to be a priority, with national strategies being formulated in Malawi and Zimbabwe with FAO/TCP assistance.

¹⁹ Cameroon, Costa Rica, Ecuador, El Salvador, The Gambia, Ghana, Guatemala, Pakistan.

- 1.55 **Food and Agricultural Industries:** There was a significant increase in field activities related to the utilization of indigenous flours in convenience food products. Support was provided to project activities in the fields of apiculture, biotechnology, fruit, vegetable and oilseed processing, spice product development, value-added starch products, and natural fibre development. With a view to future inclusion in the field programme, information was collected on local manufacture of food packaging materials, the commercial potential for the development of medicinal plants, biogas technology, and post-harvest treatment of foods (this Sub-programme was reviewed in depth in the Review of the Regular Programme 1988-89 - Chapter 7).

Programme 2.1.3: Livestock

- 1.56 **Basic Objective:** The Programme is designed primarily to develop sustainable livestock production from land unsuitable for crops including extensive grazing lands, the productive utilization of crop residues and maintenance of fertility in the mixed farming system, and the provision of supplementary income earning opportunities. Emphasis is on increasing value added, both during production and in subsequent processing and conservation and on meeting the growing demand for livestock products.
- 1.57 **Priorities:** Special stress is placed on strengthening institutional capacity within the livestock sector. Attention is given to the maintenance of biological diversity, including the establishment of a global data bank. Eradication and control of major diseases remains an important area of emphasis, in particular through the Pan African Rinderpest Campaign, the maintenance of control belts for Foot and Mouth Disease, the control of Trypanosomiasis, and eliminating the New World Screwworm from North Africa. Biotechnology applications are promoted in vaccine development and disease diagnosis. In livestock feeding, stress is on the effective use of by-products and residues and the introduction of non-conventional improved plants and fodder trees into both range and mixed farming. Greater processing of livestock products, including indigenous products, is to be encouraged at village level.

Inter-disciplinary Activities

- 1.58 Greater emphasis is being placed on the formulation of strategies for the sustainable development of livestock and mixed farming production systems. The importance of biotechnology in the livestock sector continues to be highlighted, with particular regard to the preservation and improvement of genetic resources, livestock breeding and disease control. Seed money was provided to national institutions in The Gambia and Ghana for applied research in open nucleus breeding of small ruminants. Networks on animal biotechnology have been set up in Asia and Latin America.²⁰ Applied research by national research institutions is being funded with Regular Programme seed money. Work on Biological Nitrogen Fixation (BNF), in

²⁰ Asia: China, India, Indonesia, Korea, Malaysia, Pakistan, Philippines.
Latin America: Argentina, Brazil, Chile, Colombia, Cuba, Mexico, Uruguay.

cooperation with Programme 2.1.1, continued to concentrate on enhanced productivity of grain and forage legumes. FAO supported training courses have established pilot units for the local manufacture of inoculants. Regional training programmes on BNF in Argentina and Morocco received technical and financial support. The Code of Principles for Milk and Milk Products was updated within the framework of the Codex Alimentarius Commission.

- 1.59 The Programme for the Control of African Animal Trypanosomiasis and Related Development is guided by an integrated approach which relates control measures to settlement and land use. Support continued to be given to research institutions²¹ through contracts for the refinement of field control techniques. In collaboration with the Joint FAO/IAEA Division consideration has been given to the use of the sterile insect technique for the control of tsetse fly. There were also encouraging findings on the chemical sterilization of wild flies.

Sub-programme Implementation

- 1.60 Grassland, Forage and Feed Resources: The rehabilitation and development of arid and semi-arid grazing lands through the introduction of leguminous fodder trees and shrubs has remained a priority. Particular emphasis is placed on Prosopis, where FAO provided seed money for the selection of high-yielding and drought-tolerant ecotypes, and provided continuing assistance to the International Prosopis Association for the publication of its newsletter. The work on integrated management of arid and semi-arid grazing reserves was further supported by the UNESCO-MAB programme, which funded such activities as meetings and training in Latin America, East Africa and the Sahel. Also, a Regional Working Group on Grazing Resources for the Maghreb countries has been established, and Regular Programme funds have been provided for the collection of indigenous fodder shrubs, grasses and legumes adapted to arid conditions.
- 1.61 Work on the development of pastures in humid and sub-humid areas mainly took place through regional working groups. After the establishment of the Latin American Working Group, similar groups have also been set up in South East Asia and East Africa. Within the framework of the South East Asian Group, Regular Programme and TCP funding assistance was provided in support of work on the selection of shade-tolerant grasses and legumes in Malaysia and in the Philippines on new fodder species for backyard fattening of cattle and pasture development under coconuts. The East African Working Group on Pastures was formed following a workshop in Kenya in 1990. Its aim is to encourage seed production, forage conservation, selection of adapted leguminous species and pasture management, and work is to be carried out in close association with the UNESCO-MAB programme, ILCA and ICRAF. In the Mediterranean region, FAO continued its assistance in enhancing the production of local legume species and the improvement of cereal/medic rotations, in cooperation with national institutions and ICARDA.

²¹ Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, Mali, Uganda, Zambia, Zimbabwe.

- 1.62 The use of crop residues and agro-industrial by-products for animal feeding has been further promoted. A urea-molasses block-making technique developed by a TCP project in Senegal is now being applied in some 50 countries. Some 20 countries have been advised on urea treatment in straw. A new technology substituting sugarcane juice for maize grain in feedstuffs, originally developed by a TCP project in the Dominican Republic, is now being applied with FAO support in nine countries.²² Task forces for the promotion of these technologies have been established in the Africa and Latin America and the Caribbean regions.
- 1.63 Animal Health: Funded mainly from extra-budgetary resources, the eradication of the New World Screwworm from North Africa became a new priority for the Organization. The screwworm appeared in Libya in 1988, threatening the human population, livestock and wildlife of Africa, Mediterranean Europe and the Middle East. FAO responded to the emergency situation and has approved 10 TCP projects worth a total of US\$ 2.3 million. A coordinated international programme was promoted to which donor governments and international funding agencies had pledged over US\$ 44 million, by May 1991. The eradication programme organized by the Screwworm Emergency Centre for North Africa (SECNA) started applying the sterile insect technique in late 1990. The FAO/IAEA Joint Division contributed to the technical backstopping of the field work and to the design of appropriate bait stations to suppress the screwworm. Twenty-eight million sterile male screwworm flies were released per week up to end of April 1991 and then increased to 40 million per week. The number of reported screwworm attacks in Libya declined from 191 cases in December 1990 when the campaign began to six reported cases from January to May 1991.
- 1.64 With the launching of the multi-donor funded Pan-African Rinderpest Campaign (PARC) in 1987, the strategy for global eradication of rinderpest has gained momentum. FAO continued to support PARC in epidemiology, data collection and processing, distribution of vaccines, cold chain, some aspects of field diagnosis, communication and relevant training. FAO has been coordinating the West Asia Rinderpest Eradication Campaign and has prepared the strategy and project for coordination of the South Asia Rinderpest Eradication Campaign. The global strategy aims for the complete worldwide eradication of rinderpest by the year 2000.
- 1.65 The DANIDA-funded programme for the control of ticks and tick-borne diseases in Eastern, Central and Southern Africa started its second phase. Activities during this phase have supported the development of strategies for the control of livestock ticks, country immunization programmes, and the production and quality control of vaccines against Anaplasmosis, Babesiosis and Heartwater. A regional project for the production of East Coast Fever vaccine was supported by the Netherlands. The programme was complemented by national projects funded by UNDP and TCP. The Fourth Session of the Near East Regional Commission on Agriculture in December 1991 will discuss necessary control measures for tick-borne diseases transmissible from animals to man.

²² Barbados, Belize, Colombia, Cuba, Dominican Republic, Haiti, Mauritius, Philippines, Viet Nam.

- 1.66 The European Commission for the Control of Foot and Mouth Disease (FMD) focused its efforts on assistance to Turkey and the Near East countries in the implementation of their national programmes for the control and eradication of FMD. For almost two years no cases of FMD have been reported in Europe and vaccination has been discontinued in all European countries in 1991. The buffer zone in Southeastern Europe has been relocated from the Thrace area to Western Anatolia in Turkey. RAPA provided support to expand FMD free zones in Southeast Asian countries²³ and in strengthening animal quarantine management of South Pacific countries.²⁴
- 1.67 FAO continued to support a network of 13 global and regional collaborating centres for veterinary public health with WHO. In addition, there are 16 FAO collaborating centres and 20 FAO designated reference laboratories for various diseases. Through the RLAC supported Network Among Veterinary Research and Diagnostic Laboratories, 12 institutions are providing reference services on swine and bovine tick-borne and viral diseases. A TCP-funded regional project for tick control activities in CARICOM member states has also become operational.
- 1.68 Genetic Resources: The 1991 Session of the Commission on Plant Genetic Resources considered it premature to widen its mandate to also include animal genetic resources. The Eleventh Session of COAG (1991) recommended, *inter alia*, that a follow-up expert consultation examine the issue. As recommended at the 1989 Session of COAG, a programme for animal genetic resources has been established which includes publication of a World Watch list of endangered breeds and preparation of projects for conservation.
- 1.69 The genetic improvement of livestock was continued through the FAO Bull Semen Donation Scheme. In 1990, the FAO semen bank received 79,000 doses of deep frozen semen from Germany, Italy and the United Kingdom and, in the same year, provided 81,000 doses of bull semen to 11 countries.²⁵ The Asian FAO Semen Bank established in Bangkok has received 5,000 doses of the semen of best-quality indigenous cattle and buffaloes, and five countries were provided with semen.²⁶ With project support, work on breed development has concentrated on the development of comprehensive breed development plans in Ethiopia and Turkey, and the initiation and demonstration of practical breed improvement strategies based on

²³ Indonesia, Malaysia, Philippines, Thailand.

²⁴ Fiji, Papua New Guinea, Vanuatu, Western Samoa.

²⁵ Albania, Bhutan, Bolivia, Ecuador, Ethiopia, Ivory Coast, Myanmar, Philippines, Sudan, Uganda, Zaire.

²⁶ Iran, Myanmar, Sri Lanka, Thailand, Viet Nam.

the genetic screening of indigenous breeds.²⁷ Genetic screening projects²⁸ for sheep were also initiated with Regular Programme support.

- 1.70 Dairy Development: The International Dairy Development Programme (IDDP) continued to provide a framework for integrating all FAO activities related to the dairy sector. The focus of the programme is on the small dairy producer. Among the integrated model dairy projects initiated earlier, the Netherlands/WFP funded project in Ecuador has succeeded in strengthening producer organizations, increasing pasture and fodder production, and upgrading the milk collection and processing systems. The recently completed phase (1985-90) of the FAO/DANIDA Dairy Development and Training Programme had been reoriented to provide direct assistance to smallholder dairy development schemes. This included the organization of training courses, which by the end of 1990, were attended by 4,100 participants at the national, and 400 participants at the regional, level. Village milk processing has been promoted through five TCP²⁹ and four UNDP³⁰ projects. A first regional workshop for Francophone Africa in 1991 focused on ways of sharing experiences in this field. A publication on the technology of traditional milk products in developing countries has been published in 1990.
- 1.71 Meat Development: Activities in meat development focused on low-cost methods of meat preservation and the provision of short-term advisory visits, especially for the establishment of small and medium-scale meat plants. A network for the development of low-cost meat preservation methods was established in Africa.³¹ Guidelines have been published on construction and running of meat plants and butchering and meat handling. Preparatory work was also undertaken for guidelines on handling of animals prior to slaughter, and on the environmental impact of meat plants. Support was given to the development of training programmes for meat development, and a regional seminar on traditional and low-cost meat preservation methods was held in RAPA. TCP project assistance was given to Colombia and St. Lucia, and a trust fund project has been approved for the Dominican Republic, for the establishment of small-scale slaughter-houses.
- 1.72 Livestock Production: Following a series of in-house seminars and an expert consultation on strategies for the sustainable development of animal agriculture in

²⁷ Cattle: Central African Republic, The Gambia, Guinea.
Sheep: The Gambia, Indonesia, Jordan, Turkey.

²⁸ Awassi sheep in Jordan, Turkey and Syria; Djallonke sheep in The Gambia, Ghana, Guinea; Tropical Hair sheep in Indonesia and Malaysia.

²⁹ Cameroon, Ethiopia, Laos, Morocco, Niger.

³⁰ Burkina Faso, Niger, Pakistan, Uganda.

³¹ Member countries: Burkina Faso, Cameroon, Chad, Ghana, Liberia, Mali, Nigeria, Senegal, Somalia, Sudan, Tanzania, Zambia, Zimbabwe.

December 1990, five case studies³² were initiated. The emphasis is on introducing acceptable simple and sustainable technologies and organizational changes into existing production systems, coupled with genetic improvement of indigenous breeds. The production of extension and training materials has been a significant activity. Rabbit production systems in arid conditions in North Africa have been studied with a view to an eventual replication in other areas. Close cooperation continued with the Regional Small Ruminant Research and Development Networks in Asia, Africa, the Near East and Latin America.³³ The work programme on large ruminants has been expanded with the establishment of an International Network on Buffalo Research and Development.³⁴ Efforts are under way to establish information networks on pig production and regional training programmes have already been initiated.

Programme 2.1.4: Research and Technology

- 1.73 **Basic Objective:** The Programme is designed to advise governments on agricultural research and development to facilitate a continuing stream of improved and appropriate technology available to agriculture and to assist countries in applying a sustainable and environmentally balanced approach to agricultural development. It is also intended to bring about improvements in the efficiency and appropriateness of energy use in agriculture.
- 1.74 **Priorities:** Efforts to ensure improved technology to the farmer are concentrated on three fronts. Support is provided for effective planning in the CGIAR, both directly and through the secretariat of its Technical Advisory Committee (TAC) hosted in FAO. National research systems are strengthened through the organization, planning, management and evaluation of agricultural research and through exchange of scientific and technical information. In collaboration with IAEA, FAO applies nuclear and now also other molecular biology techniques for the study and solution of a wide range of agricultural problems. In addition the Programme provides the focal point in the UN System for the application of remote sensing to renewable natural resources. Information is also provided for early warning on food emergencies and on locusts. In energy, the main aim is to improve rural energy planning and in-house and international cooperation for energy development.

³² Ethiopia, Malaysia-Philippines, Nepal, Pakistan, Tunisia.

³³ Asia: Bangladesh, India, Indonesia, Pakistan.
Latin America: Bolivia, Chile, Colombia, Peru.
Near East: Iraq, Jordan, Syria, Turkey.
Africa: Benin, Ghana, Nigeria.

³⁴ Argentina, Bangladesh, Brazil, China, Cuba, Egypt, India, Indonesia, Islamic Republic of Iran, Laos, Malaysia, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Trinidad and Tobago, Turkey, Venezuela, Viet Nam.

Inter-disciplinary Activities

- 1.75 Much of the work of this Programme is by definition inter-disciplinary (activities in the environment are discussed separately in paras 1.6-1.17). The Research Development Centre continued to serve as FAO's focal point on science and technology for development and prepared several contributions to the UN system, including an end-of-decade review of the Vienna Programme of Action on Science and Technology in FAO. The Centre worked closely with other technical programmes on biotechnology. Research institution-building projects and advisory missions covered technical as well as planning and managerial aspects. In support of the Global Information and Early Warning System (GIEWS) and the Emergency Centre for Locust Operations, the Remote Sensing Centre continued to strengthen the ARTEMIS environmental monitoring system, and agro-meteorological data services. The Remote Sensing Centre also provided remote sensing technical advice and project backstopping for programmes throughout FAO as well as undertaking joint remote sensing training courses and pilot studies.
- 1.76 The FAO/IAEA Joint Division collaborated with Programme 2.1.1 (Natural Resources) in two new coordinated research programmes which focus on improvement of yield and on nitrogen-fixation of grain legumes under low input agricultural systems in Asia and on better utilization of trees with high nitrogen-fixation potentials in agro-forestry and for restoration of soil fertility. The collaboration with Programme 2.1.2 (Crops) concentrated on increasing plant biodiversity, optimizing pesticide use and controlling insect pests. The collaboration with Programme 2.1.3 (Livestock) focused on eradication of the New World Screwworm in North Africa, the Pan-African Rinderpest Campaign and tsetse control.

Sub-programme Implementation

- 1.77 Research Development: Continued attention was given to training in research organization and management. The yearly research management course organized jointly with CIRAD in France since 1986 was maintained. Sub-regional research management training courses were conducted in Ecuador and Jamaica in 1990 with co-sponsorship from IICA and ISNAR. Major research review missions were organized in seven countries.³⁵
- 1.78 Inter-country cooperation was promoted through support to the Association of Agricultural Research Institutions in the Near East and North Africa (AARINENA) and country profiles were published on the research systems in the region. The Asia-Pacific Association of Agricultural Research Institutions (APAARI) was established in December 1990. FAO participated in the preparation of the Second Congress of the Pan-African Union of Science and Technology (PUST). The PUST on-going agricultural research inventory now covers 34 national research systems and regional

³⁵ Cape Verde, Central African Republic, Chad, Laos, Oman, Western Samoa, Zanzibar.

and international agricultural research centres.³⁶ Other regional organizations to which FAO gave active support were SPAAR, CORAF and CARDI.

- 1.79 Together with UNDP and the World Bank, FAO is a co-sponsor of the CGIAR and hosts the TAC Secretariat. During the period under review, the TAC Secretariat organized and executed the External Programme Reviews of IITA, IFPRI and ICRISAT. It also organized and executed a joint programme and management review of IBPGR and initiated preparations for the external reviews of ISNAR, ILCA, ILRAD, IRRI and WARDA. The assessment of ten international non-CGIAR centres for possible support was completed. The recommendations made to CGIAR included support to selected aspects of research in fisheries, vegetables, coconuts, irrigation management, banana and plantain as well as a proposal for a new initiative on forestry and agro-forestry. The review of experience and lessons learnt from the implementation of the new CGIAR resource allocation process was also completed and a start was made on the revision of CGIAR priorities and strategies.
- 1.80 Agricultural Applications of Isotopes and Biotechnology: Much of the work of this joint FAO/IAEA Sub-programme is carried out through networks of national agricultural research institutes and universities in developing and developed countries. A new network was started with 11 institutes in the field of crop nutrition. The aim is to identify genetic variability in the ability of crops to grow under nutrient and water stress conditions. Other research programmes focus on nitrogen-fixation in grain legumes in Latin America, declining fertility in fragile tropical soils, and the enhancement of crop yields under conditions of water scarcity. The use of radiation-induced mutations for the genetic improvement of basic food crops in Africa has received high priority in the field of plant breeding. Significant progress was made in the research programme on the use of double-haploid cells and mutation techniques in the breeding of cereals.
- 1.81 In addition to collaborating in animal health campaigns, work was also undertaken on improving the productivity of animal production systems. A new coordinated research programme on cameloids was established with 17 institutes in Africa, Asia and Latin America, with the aim of obtaining basic information on existing levels of production and finding ways of improving productivity through better management of feeding and reproduction.
- 1.82 A coordinated research programme concerned with minimizing consumer and environmental hazards resulting from pesticide use continued. Work also continued to evaluate newly developed controlled-release formulations of rice herbicides, insecticide-impregnated screens for tsetse fly control, and insecticide-baited traps for screwworm control. New research has begun to examine the deterioration of acaricides in cattle dips. The sterile insect technique is being applied in tse-tse fly control programmes in Nigeria and Zanzibar. A strain of the Mediterranean fruit fly was devised in which females can be eliminated by genetic means during mass

³⁶ Sub-regional - INSAH, IRAZ, SACCAR, WARDA and regional - ICRAF, ICRISAT, IITA, ILCA, ILRAD.

reproduction. Irradiated males of this strain were found to perform well in an application of the sterile male technique to protect citrus.

- 1.83 The coordinated research programme on the use of irradiation as a quarantine treatment of agricultural commodities has been completed and showed that low-dose irradiation is effective for fresh fruits and vegetables, especially for controlling insect pests. Training is now being provided in the technique. As irradiation of food leaves little or no trace, a new research programme has begun on detecting if food has been irradiated: preliminary results indicate promising methods for a variety of irradiated food commodities of commercial interest.
- 1.84 AGRIS and CARIS: These two international, multilingual, cooperative information systems continued to expand. At the first Joint Technical Consultation in 1990, representatives from 90 AGRIS and CARIS participating centres and 21 observers reviewed progress and made recommendations for the future.
- 1.85 Participation in AGRIS has increased to 143 countries and 22 regional and international centres. By December 1990, the AGRIS database had grown to more than 1,800,000 references. In addition to Agrindex, the monthly bibliography in English, French and Spanish, the AGRIS database for 1986-September 1990 has been issued on compact disk CD-ROM (Read Only Memory)³⁷ and made available free of charge to AGRIS participating centres and by subscription to other users. With this new technology, the centres are able to search the database at their own micro-computers. A software package, AGRIN, was developed to enable AGRIS centres to produce a national database without much additional effort. On request, AGRIS continued to provide participating centres with specialized outputs including national bibliographies and mini-databases on diskette.
- 1.86 By the end of 1990, participation in CARIS had increased to 110 national and 15 regional and international centres, while the global CARIS database contained about 25,000 descriptions of research projects in developing countries. In return for their input, participating centres received a printed master copy of the national CARIS directory for duplication and distribution. Centres that have micro-computer facilities received their national databases on diskettes. CARIS maintained contacts with AGREP, the similar system which is coordinated for Europe by the Commission of the European Communities (CEC), with the object of achieving closer compatibility. Data were exchanged with SPAAR (Special Programme for African Agricultural Research) for the research projects supported by donors.
- 1.87 The multi-lingual AGROVOC thesaurus, originally produced in 1982 in cooperation with the CEC, has been continuously updated. To achieve more precise subject identification, the number of descriptors has been increased from 8,000 to 15,000 and the structure of the thesaurus has been simplified and improved. The revised versions of AGROVOC were published in mid-1991 in English, French and Spanish, with German, Italian, Portuguese and Arabic versions to follow. FAO also continued to

³⁷ One such disk can hold about 400,000 entire records with all the indexes needed for rapid searching and retrieval.

provide support to developing countries in setting up and strengthening their agricultural documentation and information services.

- 1.88 Remote Sensing Technology and Agrometeorology: This Sub-programme is covered separately in an in-depth review (see Chapter 9).
- 1.89 Energy: Activities on energy continued in the three fields of work: policy assistance, technological development and information exchange. Collaboration started with five Asian countries³⁸ in preparing national studies for an integrated approach and strategy for energy development in rural areas. The Latin American Working Group on Energy Planning for Sustainable Rural Development was established and is now active in national case study preparation and project formulation.
- 1.90 REUR networks continued to concentrate on solar energy, biomass and energy conservation and these have held workshops and issued publications dealing with such topics as heat and power from biomass and geothermal energy for agriculture. The RLAC-sponsored network on alternative energy sources has continued its work of training and exchange of information on such topics as solar, wind and biodigester energies. In Africa, RAFR serviced the biogas network in West Africa.³⁹ In Asia and the Pacific, the Network on Rice Husk Gasification continued to be active as was the subgroup on biogas of the Organic Recycling Network. A Rural Energy Bulletin continued to be produced by RAPA, which also serves as information vehicle for the Rice Husk Gasification Network.

Programme 2.1.5: Rural Development

- 1.91 **Basic Objective**: The Programme works to ensure effective follow-up to the WCARRD Plan of Action, and the promotion of more equitable incomes, access to resources and services, better organization of the rural development process, and participation in decision making for the rural population. The focus is on the disadvantaged, especially the landless, impoverished pastoralists, small farmers, women and rural youth. The key role of population education is recognized in this context.
- 1.92 **Priorities**: The Programme encourages improved policy planning and implementation for rural development and better monitoring of the situation of the disadvantaged including women. There is particular focus on problem analysis, strengthening of the organization and management of rural institutions, the development of people's participatory organizations and activities which can improve incomes and access to services. Emphasis is also given to: human resource development through education and training; overall agricultural extension services including communication strategies with the farmer and strategic extension campaigns that use multi-media

³⁸ Afghanistan, Bangladesh, Indonesia, Philippines, Sri Lanka.

³⁹ Benin, Burkina Faso, Ghana, Mali, Niger, Togo.

channels; rural marketing policy and trade liberalization; and expanded rural financial services for credit, savings and crop and livestock insurance.

Inter-disciplinary Activities

- 1.93 The Third Progress Report on WCARRD Follow-up was prepared for submission to this session of the FAO Conference. An abbreviated version of the report will be submitted to ECOSOC in 1992. During 1990 major attention was given to the fielding of three Inter-Agency Missions on WCARRD Follow-up to Madagascar, Paraguay and Surinam and a mission is planned for Namibia. As recommended by the Reviews of FAO's Objectives, Role, Priorities and Strategies and FAO's Field Operations, an external review has been commissioned on the experience of FAO and other UN agencies in implementing the WCARRD Programme of Action. It is also presented to this session of the Conference. The Programme continues to provide the secretariat for the ACC Task Force on Rural Development and to publish its newsletter.
- 1.94 Collaborative work continued with the Centre for Integrated Rural Development for Asia and the Pacific (CIRDAP) to develop national monitoring and evaluation mechanisms for agrarian reform and rural development. FAO provided technical support to the meetings of the executive committee and governing council of the newly established Centre for Agrarian Reform and Rural Development in the Near East (CARDNE). With the establishment of CARDNE, the regional rural development centres now cater for all the developing regions with the exception of Latin America and the Caribbean.
- 1.95 Population activities cut across several programmes of the Organization, including Agricultural Extension and Training (2.1.5.1); Women in Agricultural Production and Rural Development (2.1.5.4) and Nutrition Programmes (2.1.6.2). With support from UNFPA, 55 inter-regional, regional and country projects have been implemented. Project activities have involved: (a) the integration of population issues into rural information transfer, including agricultural extension programmes, field-level nutrition training, development support communication, and educational programmes for rural areas; (b) studies on the inter-relationship between women's roles, population change and agricultural development; and (c) applications of the computerized planning package, CAPP. FAO Regional Population Advisers, funded by UNFPA, continued to provide advice and project backstopping to member governments in all four developing regions.
- 1.96 The World Food Day (WFD), launched a decade ago by FAO, continued to heighten public awareness and promote effective action on the problem of hunger. Since 1983 a different annual theme has been selected to provide a common focus for the various WFD events around the world. WFD activities in 1990 focused on the theme "Food for the Future" and the challenges ahead in providing food for one billion more people by the year 2000 without depleting the earth's resources. In October 1991, the focus of WFD was on "Trees for Life" and the vital role trees play in the survival

of mankind. These themes have been promoted through a great variety of activities in member countries.

Sub-programme Implementation

- 1.97 Agricultural Education, Extension and Training: A particularly strong linkage exists between this Sub-programme and the field programme of the Organization. Annually, the Sub-programme backstops more than 200 projects in over 100 countries. During the course of this biennium, strategy options for agricultural education have been examined in 21 case studies which formed the basis for a series of papers discussed at regional meetings in Africa and Asia, and a global meeting is planned for later this year. Follow-up to the 1989 Global Consultation on Agricultural Extension included the publication of a technical report and the issue of a directory covering 115 countries. The importance of environmental education and training both as specialist subjects and within agricultural and rural development curricula has also been recognized and is receiving emphasis in field projects. Programmes aimed at farm women and rural youth have been intensified through field projects, often employing a participatory approach.
- 1.98 A regional consultation on management and supervision of agricultural extension for the Asia and the Pacific region recommended the formation of an extension network to help in the exchange of information and experience among the countries in the region. RAPA also organized a consultation on reorienting agricultural extension towards the small farmer. Extension staff in Asia, Near East and Africa were trained on the application of the strategic extension campaigns. This approach highlights particular identified problem areas to be tackled through a concerted campaign using diverse media including farmers' groups. Two important guides on curriculum design and instructional module development for extension workers were also prepared in 1990.
- 1.99 In support to agricultural extension programmes for rural youth, the newsletter YOUTHWORKS continued to be produced in English, French and Spanish. The newsletter covers such topics as sustainable agriculture, population concerns, sanitation and other general information relevant to rural youth as well as articles and editorial correspondence from the readers. Approximately 5,000 copies were produced twice a year for worldwide circulation to readership which included both government officials and leaders of youth groups.
- 1.100 As micro-computer technologies have become less expensive, more powerful and user-friendly, their potential applications for training in developing countries have risen. Preliminary assessments of micro-computer application potentials in education and training for extension and the environment were thus started in 1990.
- 1.101 Development Support Communication: Activities have continued to focus on building up national capacity to apply improved communication methods and media to increase people's participation and to improve the quality and outreach of extension and training activities. In Africa, TCP projects have helped to strengthen rural radio

services.⁴⁰ Traditional/folk media have been used to motivate rural audiences in population communication programmes financed by UNFPA.⁴¹ Rural communication units have been established to develop low cost audio-visual media for extension training.⁴² In Mexico, the rural communication system is being transferred to the farmers themselves with the aim of involving them in the planning and implementation of local development programmes.

- 1.102 Agrarian Reform and Land Settlement: Case studies were launched during the year in Africa on communal land and its future prospects⁴³ and agrarian policy options in land deficit countries.⁴⁴ Once completed, they will provide inputs for the organization of regional workshops and for the design of medium-term FAO programmes.
- 1.103 Studies on land tenure and production structure in China and Viet Nam have been completed. Further to the recommendation of the Fifth Government Consultation on WCARRD Follow-up, held in Guatemala in 1989, three studies on the role of NGOs in rural development and agrarian reform were undertaken⁴⁵ and the findings were discussed at a national workshop in Jamaica. Studies were completed on land markets for selected countries of Latin America and the Caribbean and on major economic indicators in agrarian reform settlements in Brazil. Technical assistance on issues related to land adjudication, partition and allocation was provided to Zanzibar and Trinidad and Tobago.
- 1.104 Rural Institutions and Employment: Country studies⁴⁶ have been conducted in the field of agricultural cooperatives, with the purpose of offering alternative participatory arrangements for the provision of inputs and services to small farmers. Additional country studies⁴⁷ in Latin America examined the role of cooperatives in alleviating poverty. The role of public and private sector involvement in the provision of agricultural services was discussed at the Near East Regional Economic and Social Policy Commission in October 1991. Based on experience from people's

⁴⁰ Burkina Faso, Chad, Guinea.

⁴¹ Burundi, Lesotho, Malawi, Uganda.

⁴² China, Mali, Mexico, Nepal, Nicaragua.

⁴³ Ghana, Nigeria, Swaziland, Zambia.

⁴⁴ Burundi, Gambia, Mauritius, Seychelles.

⁴⁵ Costa Rica, Trinidad and Tobago, Jamaica.

⁴⁶ Argentina, Bolivia, Brazil, Colombia, Ecuador, Paraguay, Uruguay, Indonesia, Philippines, Thailand, Algeria, Libya, Morocco, Tunisia, Bulgaria, Germany (former Democratic Republic), Hungary, Poland.

⁴⁷ Brazil, Colombia, Guatemala, Panama.

participation field projects, guidelines have been developed to help introduce the concept into larger-scale agricultural and rural development programmes.

- 1.105 In collaboration with CIRDAP and the University of the West Indies, synthesis reports are being prepared, drawing from case studies on the organization and management of agricultural services for small farmers in several Asian and Caribbean countries.⁴⁸ Findings of these studies include an urgent need for complementarity in the services provided by institutions to the rural sector (research, extension, training, credit, input supplies and marketing) and for improved participation of small farmers in assessing their perceived needs and problems. In follow-up to similar studies previously carried out in Africa and the Near East, national workshops were organized,⁴⁹ and sub-regional programme for institution-building and organization began in Maghreb countries. Two agroforestry participatory assessment studies carried out in Honduras and Costa Rica focused on employment and income generation for marginal semi-landless farmers with insecure tenure. These pointed to the need for training of the semi-landless forest occupants in sustainable resource use and income-generating opportunities.
- 1.106 Women in Agriculture and Rural Development: Training of FAO staff in women in development issues continued to be a priority. Training materials including case studies were developed during the biennium and, more than 700 staff members attended two-day workshops in Headquarters and in the Regional Offices. Coding systems for FAO's Regular and Field Programmes has been developed in order to monitor the integration of women in development concerns into FAO activities. Guidelines are being developed in various programme areas (fisheries, forestry, plant production and protection, and animal husbandry) to assist with the inclusion of Women in Development (WID) concerns in project design and implementation. Advice was provided on the creation or strengthening WID units in mainline ministries.⁵⁰
- 1.107 With support from UNFPA, a global project was initiated to strengthen rural women's participation in agricultural development through on-going projects. Studies on women and population factors were carried out in Asia⁵¹ while technical support was given to 15 on-going field projects. Efforts were made to re-orient home economics training to meet the needs of rural families through a concept paper and a national workshop in India. Two studies were completed in India on a gender-disaggregated database of human resources in agriculture and on women farmers.

⁴⁸ Bangladesh, Grenada, Indonesia, Jamaica, Nepal, Pakistan, Sri Lanka, Trinidad and Tobago, Viet Nam.

⁴⁹ Guinea, Madagascar, Tanzania.

⁵⁰ Chile, Congo, Egypt, Sudan, Tunisia.

⁵¹ Indonesia, Malaysia, Nepal, Philippines, Thailand.

Studies on rural women's legal status in nine Latin American countries⁵² were commissioned while an overview paper was prepared for the round table on juridical mechanisms that facilitate rural women's participation in development. RAPA is carrying out pilot surveys to test new methodologies and research instruments aimed at establishing in 1992-93 a new database on women in agriculture and rural development.

- 1.108 Agricultural Marketing: Market liberalization and support to efforts encouraging private sector participation in both input supply and produce marketing continued to be a key focus of this Sub-programme. A special effort was made to increase the depth and quality of support in Latin America through technical advice on marketing and support to five countries.⁵³ Assistance was provided to the three marketing associations in Asia (AFMA), Africa (AFMESA) and the Near East (AFMANENA). This included the holding of two association meetings each under the auspices of AFMA and AFMESA. On the basis of case studies in seven Latin American countries,⁵⁴ a national seminar in Bolivia in 1990 compared the characteristics of fertilizer marketing systems in the region. An in-depth evaluation of Cereal Banks in the Sahel, undertaken with CILSS, revealed that locating these banks in areas of seasonal deficit as well as greater farmer training were necessary conditions to their success.
- 1.109 Agricultural Banking and Credit: During the biennium, collaboration has continued with the four regional credit associations; AFRACA (Africa), APRACA (Asia and the Pacific), CACRA (the Caribbean) and NENARACA (the Near East and North Africa), and technical support was provided to their main meetings. The Fifth Technical Consultation on the Scheme for Agricultural Credit Development (SACRED) was held in April 1991, preceded by a joint meeting of the regional agricultural credit associations. The main areas of discussion included rural banking in an unfavourable socio-economic environment, bank finance for rural development, electronic data processing and research in rural financial issues.
- 1.110 An important part of FAO's direct assistance to rural financial institutions, including cooperatives, is the continued development of MicroBanker software, a package designed specifically for lowering service costs in savings and loans operations. The software programme has been further enhanced with a general ledger module and speedy help access capabilities. As of end May 1991, the MicroBanker was being used by 61 banks and bank branches in three countries.⁵⁵ In 1991, cooperatives in low income areas in Thailand began utilizing the software in their loan operations. Risk insurance has received increased attention and a world compilation of rural crop

⁵² Chile, Colombia, Cuba, Dominican Republic, El Salvador, Guatemala, Mexico, Peru, Venezuela.

⁵³ Bolivia, Colombia, Ecuador, Peru, Venezuela.

⁵⁴ Brazil, Colombia, Costa Rica, Ecuador, Honduras, Mexico, Uruguay.

⁵⁵ Nepal, Philippines, Sri Lanka

insurance programmes was completed as well as training manuals on insurance loss adjustment and a bulletin on strategies for crop insurance planning.

Programme 2.1.6: Nutrition

- 1.111 **Basic Objective:** The Programme aims to bring about increased attention to nutrition in development policies and programmes within agriculture and for rural areas with attention to groups at special risk. It is also intended to achieve an improvement in the quality and safety of food supplies, especially imports and exports, and greater standardization of international practice in this regard.
- 1.112 **Priorities:** In order to raise international consciousness and secure agreement on strategies for action, a joint FAO/WHO International Conference on Nutrition (ICN) is to be held in 1992. Efforts to increase monitoring and surveillance information as a basis for intervention include the continued programme of World Food Surveys and updating of nutrition country profiles. The regular work of the programme gives priority to the strengthening of national institutions and the development of national nutrition strategies. Through training and assistance in programme development, efforts are continuing to integrate nutrition concerns into agricultural education and extension. In close association with WFP, improving the impact of food aid is also a priority. For food standards and control, attention is being given to radionuclide contamination and to the quality of street foods. In cooperation with GATT, it is intended that the Codex standards should be developed to provide a satisfactory basis both to improve standards and reduce non-tariff barriers to trade in food products.

Inter-disciplinary Activities

- 1.113 An FAO Task Force has been established to assist the FAO/WHO Joint Secretariat in the preparations for the International Conference on Nutrition (ICN). No budgetary allocations for the ICN were specifically provided for the current biennium so the Regular Programme activities of the Division have been reoriented. The major activities undertaken in preparation for the ICN include developing with WHO a joint framework paper outlining the main issues to be addressed by the Conference, initial documentation for country participation as well as collaboration with other international, governmental and non-governmental organizations.
- 1.114 A joint expert consultation on trace elements in human nutrition held in June 1990 reviewed deficiencies and excessive intake of 21 nutrients, many of them for the first time. Malnutrition, its causes and prevention was the main issue of the 1990 FAO Regional Conference for Latin America and the Caribbean, and the 1990 FAO Regional Conference for the Near East examined food supply and consumption patterns and suitable measures for achieving a balanced diet. There has been closer collaboration with FAO's Global Information and Early Warning System to include community level nutrition information. The Codex Alimentarius related activities are carried out jointly with the Sub-programmes 2.1.2.4 (Crop Protection) and 2.1.3.2

(Animal Health). Within an FAO/WHO/IAEA Joint Secretariat, FAO is taking part in the revision of Basic Safety Standards for Radiation Protection.

Sub-programme Implementation

- 1.115 Food and Nutrition Assessment: The first phase of the Nutrition Country Profile activity, which aims at providing a concise review of the food and nutrition situation of all FAO member countries, has been completed and work on updating these profiles is under way. Preparations for the Sixth World Food Survey have been proceeding, and expert meetings were held to discuss methodology and data requirements. RAPA completed an analysis of national food availability vis-à-vis average nutrition requirements for the last 30 years. The analysis revealed significant changes in dietary patterns over time among the countries in the region. Work has been initiated on analyzing country-level nutrition data by gender, geographical areas and other major characteristics, such as urban/rural differences. Participation in the Inter-Agency Food and Nutrition Surveillance programme has continued, especially training in data handling and management. Closer collaboration has continued with FAO's Global Information and Early Warning System to include available nutrition information at household and individual levels.
- 1.116 Nutrition Programmes: Project assistance was provided to guide food and nutrition interventions for low-income groups in urban areas.⁵⁶ An informal technical consultation on nutrition education for the public through mass media reviewed recent approaches to nutrition education in developing countries and highlighted the need for policies and actions required for implementation of nutrition education programmes. Within the framework of the UN Programme for the Control and Prevention of Vitamin A Deficiency, technical assistance and support continued to be given in the implementation of specific projects.⁵⁷
- 1.117 Intercountry workshops for training of trainers on population education and nutrition were carried out for West, South and East African English-speaking countries.⁵⁸ A training package for including nutritional adequacy as a criterion in food and agricultural planning and programming has been prepared and will be applied in China, Indonesia and the Philippines. Women's community based activities to improve families' nutritional situation have been assisted in Honduras through the development of training materials. With community participation, food and nutrition interventions for securing adequate food supply and access are on-going in three countries.⁵⁹ The promotion of the consumption of traditional food plants is

⁵⁶ Bangladesh, Brazil, India.

⁵⁷ Burkina Faso, Chad, Guinea, Malawi, Mali, Mauritania, Nepal, Niger, Viet Nam, Zambia.

⁵⁸ Ghana (including Ethiopia, Gambia, Nigeria, Sierra Leone), Uganda (including Kenya, Malawi, Tanzania), Zimbabwe (including Malawi, Tanzania).

⁵⁹ Kenya, Mexico, Philippines.

continuing in Africa⁶⁰ and Latin America⁶¹ through studies, workshops and publications.

- 1.118 Food Control and Consumer Protection: Food control programmes for domestic and imported foods were supported in 16 countries⁶² including laboratory infrastructure and regulatory aspects. In this effort, policy and technical advice were provided to concerned authorities for the setting up of effective national food control systems. Food contamination problems, particularly those of prime importance for consumers' health and the smooth flow of international trade, have received special emphasis in training activities. Workshops on mycotoxins, pesticide residues, sampling procedures, and food import/export quality control were held in the four developing regions of the world.
- 1.119 Street foods continued to receive special attention, particularly in Africa and Latin America. Two studies on the subject were carried out in Nigeria and Uganda and a sub-regional workshop was held for Anglophone Africa. In Latin America, two sub-regional workshops on street vendors were held and training guidelines on the subject were published. A major effort was initiated in Latin America and the Caribbean countries in view of the potential risk of transmission of cholera through street foods. In addition, audio-visual materials were prepared for public dissemination in Africa and Asia. An Andre Mayer Research Fellowship was awarded to conduct a study on street foods in Thailand.
- 1.120 The Joint FAO/WHO Expert Committee on Food Additives met three times to evaluate 54 food additives, environmental contaminants and residues of veterinary drugs. The findings of the Committee were submitted to the Codex Committees on Food Additives and Contaminants and on Veterinary Drug Residues in Food. A Joint FAO/WHO Expert Consultation recommended approaches for assessing the safety of biotechnologies in food production and processing.
- 1.121 The FAO/WHO International Conference on Food Standards, Chemicals in Food and Food Trade was held in Rome in March 1991, in cooperation with GATT. It recognized the important role that the Codex Alimentarius Commission, the FAO/WHO Expert Committee on Food Additives and the FAO/WHO Joint Meetings on Pesticide Residue play in establishing and harmonizing national food regulations, in protecting the health of consumers, and promoting international food trade. Specific recommendations were made to strengthen these programmes and increase their effectiveness. The Conference also recommended methods for strengthening and harmonizing the control standards for food exports and imports with a view to facilitating international food trade. The establishment of a special unit within the

⁶⁰ Nigeria, Uganda, Zambia.

⁶¹ Bolivia, Ecuador, Peru.

⁶² Antigua, Barbados, Brazil, Bulgaria, Burkina Faso, Cape Verde, Chile, Czechoslovakia, Dominican Republic, Hungary, Jamaica, Nicaragua, Panama, Rwanda, Somalia, Trinidad and Tobago.

Food Quality and Standards Service to expedite the cooperation between Codex and GATT could not be achieved due to financial constraints.

- 1.122 Joint FAO/WHO Food Standards Programme (Codex Alimentarius): The membership of the Codex Alimentarius Commission now stands at 137 countries. Participation by developing countries in the Commission's sessions continued to increase. The importance of the work of the Commission has been strengthened by the recognition of the Codex standards, guidelines and recommendation within the context of the GATT Uruguay Round of Multilateral Trade Negotiations. In line with the needs identified in the Uruguay Round, emphasis has been placed on the elaboration of general standards for application to the widest possible range of food commodities, including a new general standard for the use of food additives. Work on the residues of veterinary drugs in food has led to the adoption of the first group of Codex recommendations for these substances. The Commission is reviewing its older standards to ensure their current relevance in international trade. The Codex Codes on Meat Hygiene were redrafted in 1990 and sent to governments for comment. Work on the standards for fruit juices and processed meat was finalized in the period under review. An "Abridged Codex Alimentarius" was published in 1990 in English, with French and Spanish versions to follow. JEUR continued the revision of existing UN/ECE standards and the development of new ones applicable to European trade in perishable food products.
- 1.123 Nutrition Policy at Country Level: Nutrition considerations were introduced in policy and planning through participation in agriculture sector review missions,⁶³ backstopping of on-going projects and by direct advisory activities. Training materials for incorporating nutrition objectives into projects which had been developed in the Philippines and Indonesia were adapted to Kenya and Peru. Post-graduate level training materials for food and nutrition assessment were field tested in Africa and Latin America.⁶⁴ Regional workshops in Asia and Africa examined possible ways of integrating nutrition issues into aquaculture and forestry projects. A training workshop in Latin America⁶⁵ concentrated on new approaches for identifying nutritionally vulnerable families. This is particularly important in selecting target groups for assistance during the ongoing process of structural adjustment.

Programme 2.1.7: Food and Agricultural Information and Analysis

- 1.124 **Basic Objective**: The Programme has the overall aim of improved information for policy-making and planning for agriculture and rural development, as well as for enhanced trade and greater international emergency preparedness and responsiveness. The Programme provides a unique and comprehensive body of global information and statistics, including greater standardization in agricultural information to improve

⁶³ Bangladesh, Honduras, Laos, Philippines, Viet Nam, the South Pacific.

⁶⁴ Benin, Cape Verde, Chile.

⁶⁵ Brazil, Colombia, Mexico, Venezuela.

comparability and interchange. Assistance is also provided to strengthen national statistical and early warning capability. FAO information is being steadily improved in coverage, timeliness, relevance, quality and ease of access to users. It underpins analysis by FAO itself as well as by other international and regional organizations and governments.

- 1.125 **Priorities:** The World Agricultural Information Centre (WAICENT) is being developed to provide a comprehensive and integrated information base for both internal and external users. Emphasis is being given to the improvement of information giving timely indication of changes in rural welfare, particularly the status of disadvantaged groups including women. Information on the environment in relation to agriculture is also a priority. Attention in trade-related information covers market intelligence and trends useful to the smaller and poorer developing country commodity importers and exporters. For food emergencies, local information is to be improved, commodity coverage extended, data strengthened on international stocks and prices, and national early warning capabilities reinforced.

Inter-disciplinary Activities

- 1.126 A major effort has been dedicated to the improvement of data management in the Organization and the implementation of the corporate information system - WAICENT. WAICENT will integrate many of the Organization's information systems in food, agriculture, fisheries and forestry into a single corporate database. It will provide more direct information access to both internal and external users and reduce overlap in the operation of some 40 existing databanks. A review was made of existing "working systems" and applications to ascertain their content and limitations. Studies to determine the conceptual design, hardware and software requirements and functional specifications for WAICENT have now been completed.
- 1.127 Much of the work in Sub-programme 2.1.7.1 (Statistical Processing and Analysis) is carried out in collaboration with other programmes throughout FAO including Natural Resources Development, Crops, Rural Development and Nutrition. In particular, the development of socio-economic indicators has continued jointly with Programme 2.1.5 (Rural Development). Guidelines were prepared for establishing statistics on poverty lines, on women in agriculture and on landlessness. In cooperation with Programme 2.1.6 (Nutrition), a review was started to build up country profiles on food consumption behaviour.

Sub-programme Implementation

- 1.128 Statistical Processing and Analysis: The Sub-programme has continued to maintain and update global information which includes data on production, trade, and utilization of food and agricultural commodities. During the biennium, the 1989 and 1990 FAO Production Yearbooks, Trade Yearbooks and Fertilizer Yearbooks were issued along with the regular issues of the FAO Quarterly Bulletin of Statistics. The "Food Balance Sheets 1984-86 Average" were compiled, while work continued on

finalizing 1989 supply/utilization accounts and related food balance sheets. FAO, in cooperation with the EEC, produced a new system for data collection and dissemination on pesticide statistics. National associations of pesticide manufacturers in some 60 countries were requested to cooperate in this undertaking. Other publications of the Sub-programme included the agricultural support price statistics and several technical papers. The databank on External Assistance to Agriculture became operational and started releasing information to both internal and external users. The development of the databank on fodder and feed statistics was halted due to financial and staff constraints with shift of emphasis to WAICENT. Additional work on trade data reconciliation was also limited.

- 1.129 Dialogue with developing countries on data acquisition was intensified with visits to seven countries⁶⁶ to review data with national authorities. Computer printouts of statistical information were provided to meet individual requests, in addition to the regular transfer of AGROSTAT data to external users⁶⁷ through the on-line AGROTEL system. To improve the usefulness of statistical data, a new system called AGROSTAT PC has been developed which allows data to be utilized on diskettes with personal computers. Cooperation continued with various regional statistical bodies and international agencies in the exchange of data. About 70 member countries are now supplying FAO with trade data on magnetic tapes.
- 1.130 Situation and Outlook: The World Food Report has been integrated into the State of Food and Agriculture (SOFA) which continued to report on major international developments of food and agriculture in the context of changes in the global situation. In 1990 and 1991, special SOFA chapters were devoted respectively to an analysis of structural adjustment and agriculture and to a review of developments in food and agriculture in the 1980s as a basis for assessing the prospects for the 1990s.
- 1.131 The "Commodity Review and Outlook" continued to be published annually, covering current developments and short-term prospects for world trade in agricultural commodities. Work has started on the preparation of a new study on "Agricultural Commodity Prospects for the 1990s" which is due for completion in 1992. This new study focuses on: (i) projections to the year 2000 of production, consumption, trade and prices for all major agricultural commodities, regions and countries; (ii) potential levels and patterns of international trade; and (iii) major food security issues and related policy implications with particular reference to the low-income food-deficit countries.
- 1.132 In cooperation with the International Sugar Organization, FAO completed a study of the world sugar market prospects for the 1990s. Long-term market prospects were also analyzed for tobacco, wine and selected nuts. Despite increased international awareness of the health risks associated with tobacco consumption, the market prospects for tobacco look promising for exporters in the developing countries. In collaboration with the International Wine Office, FAO has produced preliminary

⁶⁶ Cameroon, China, Congo, Gabon, Iran, Nigeria, Viet Nam.

⁶⁷ Eurostat, International Tropical Timber Organization, OECD, USDA, USAID, World Bank.

projections for wine supply and trade to the year 2000. Market analyses were also carried out for the World Apparel Fibre Consumption Survey and the World Statistical Compendium for Raw Hides and Skins, Leather and Leather Footwear (see also Review of the Regular Programme 1988-89, Chapter 8).

- 1.133 Food Information and Early Warning System: The Global Information and Early Warning System (GIEWS) has strengthened arrangements for field information collection and the use of modern technologies for analysis. The number of field crop assessment missions by the staff have increased significantly; 85 on-the-spot assessments by missions were undertaken in 1990-91 compared with 75 in the last biennium. The network of non-governmental organizations sharing information with the GIEWS has also expanded.
- 1.134 The System's Special Report on Africa monitored cereal imports, food aid requirements, food aid pledges and actual deliveries for affected and vulnerable countries. Developments in the desert locust and grasshopper situation, crop prospects in the monsoon season in Asia and the drought-prone Sahelian countries were closely monitored and the situation reported to donors including selected non-governmental organizations. Donors were informed whenever an emerging food shortage or surplus were foreseen. In November 1990, the Director-General established a Special Task Force to monitor the food situation and outlook of the countries most affected by the hostilities during the Gulf Crisis. Summaries of GIEWS bulletins and special reports became available electronically in 1990 through the United Nations International Emergency Network (UNIENET) and complete issues of GIEWS bulletins are included in WAICENT. The "Food Outlook" reports continued to focus on major developments in world food security and have increased their coverage of non-cereal basic foods. The report "Foodcrops and Shortages" has been expanded to provide more comprehensive and up-to-date information on the food supply situation in individual developing countries.⁶⁸
- 1.135 Efforts to strengthen national and sub-regional early warning systems included workshops convened by RLAC and RAPA. Twenty-two field projects were in operation as of December 1990. Increasingly, such projects provide support for the development of large databases to serve a variety of purposes in addition to early warning. These include regular monitoring of socio-economic indicators of chronic food insecurity, medium-term planning, and monitoring of comprehensive food security programmes.
- 1.136 Statistical Development: The report on methodologies used in the 1980 World Census of Agriculture was released for use by all member countries in the preparation for the 1990 census round. The African supplement for the 1990 census highlighted special features of the region for data collection, and the similar Near East supplement was issued in Arabic. The Statistics Advisory Committee of Experts and the Commissions on Statistics in Africa, Asia and the Pacific, Europe and Latin America and the Caribbean held meetings on new approaches to data collection,

⁶⁸ Both the "Food Outlook" and "Foodcrops and Shortages" are issued 11 times per year, i.e. every month except January.

including use of remote sensing and methods for deriving costs of production, prices, and incidence of undernutrition. A study examining the statistical methodology for measuring pre- and post-harvest losses was presented to the 1991 Session of the Near East Regional Economic and Social Policy Commission. In Zaire, a study was under way to compare alternative methods for estimating crop production. Two workshops were held jointly with the Munich Centre for Advanced Training in Applied Statistics for Developing Countries.

Programme 2.1.8: Food and Agricultural Policy

- 1.137 **Basic Objective:** In order to strengthen agriculture, rural welfare and sustainable development, the Programme is intended to result in better formulated and more appropriate policies, plans, and programme and project design, principally at the national, but also at international levels. Improvements are also to be brought about in the trade in agricultural products.
- 1.138 **Priorities:** Principal areas of emphasis are the provision of advice and training in planning and policy analysis and the support to producer/consumer consultations within the Inter-governmental Commodity Groups. Policy and planning advice and training emphasize work related to structural adjustment with particular attention to minimizing any potential negative effects, particularly on disadvantaged groups. Increased attention is given to support for the elaboration of comprehensive food security policies and programmes at national level as well as for decentralized planning. Assistance is provided to make use of the Agriculture Toward 2000 results and methodology. Within the Inter-governmental Commodity Groups, more effort is being made to involve the private sector and to ensure close cooperation and complementarity with the work of other organizations.

Inter-disciplinary Activities

- 1.139 Many, if not most, of the Programme activities are multi-disciplinary and thus only some major examples are highlighted here. Through an in-house Task Force, in 1990, the document "Long-term Strategy for the Food and Agriculture Sector" was completed and discussed at the FAO Council session in November 1990. This strategy document formed the basis for FAO's contribution to the International Development Strategy for the Fourth UN Development Decade (1990s) and to the 19th Special Session of the UN General Assembly. The strategy paper also provided a background for the preparation of FAO's Medium-Term Plan.
- 1.140 Following the 1989 FAO Conference, work has been intensified on issues related to sustainable agriculture and rural development. Analytical tools for integrating environmental concerns into the planning process are being developed, and a case study on policy formulation for sustainable agricultural development is under way in the Sudan. In the field of policy and planning, especially in the context of structural adjustment, consultations have been initiated to strengthen FAO's cooperation with the World Bank, IMF and other multilateral development agencies. The on-going

technical work has included two studies analyzing the concepts and practices of structural adjustment with respect to short-term effects on agricultural production, trade and nutrition.

- 1.141 An ad hoc FAO/ECE meeting was convened to draw up recommendations for strengthening the coordination of the two bodies' activities and reducing possible duplication. The meeting recommended that the ECE Committee, serviced by JEUR, should concentrate on matters relating to agriculture and the environment, while the FAO European Commission on Agriculture, serviced by REUR, should concentrate on scientific and technical issues and rural development. The ECE Committee approved these recommendations at its March session, while the European Commission considered these in its July 1991 session.

Sub-programme Implementation

- 1.142 Global Perspective Studies/Agricultural Policy Analysis: The FAO study "European Agriculture: Policy Issues and Options to 2000" has been co-published commercially in English and French. An analysis of policy issues affecting European agriculture was prepared for the 1990 FAO Regional Conference for Europe and updated for the FAO Council in November 1990. The latter document contained a section on agricultural policy developments in Eastern Europe including the USSR, prepared in cooperation with the ECE. Work started in 1990 on the preparation of a new edition of "Agriculture: Toward 2000", to be submitted to the 1993 FAO Conference. The seventh progress report on the implementation of the Guidelines for International Agricultural Adjustment was prepared for submission to the present session of the Conference. The biennial report on FAO's ECDC activities was published in 1990. In response to the call from the last FAO Conference, an ad hoc Task Force recommended, inter alia, increased involvement of the Regional Offices and FAO-supported networks in promotion of ECDC.
- 1.143 In Asia, a report based on six country⁶⁹ reviews examined both the soundness of price policies and the factors for success in their implementation. It showed that the implementation of price policies across a wide range of commodities often exceeded government capacities and resources to maintain proclaimed policies and that pan-territorial pricing favoured the private sector which, unlike the public agencies, was not obliged to buy in all markets. Country case studies carried out in 16 developing countries reviewed the various instruments used for taxation together with their incidence and impact on agricultural development. In cooperation with RLAC and JLAC, the findings of the country studies were discussed at a Round Table meeting which highlighted the need for agricultural tax reforms to reduce tax evasion and avoidance.
- 1.144 Commodity Policies and Trade: The meeting of the Committee on Commodity Problems (CCP) examined follow-up actions to the Conference Resolution 2/79 on

⁶⁹ Bangladesh, India, Indonesia, Nepal, Pakistan, Republic of Korea.

Commodity Trade, Protectionism and Agricultural Adjustment, with particular attention to progress in the GATT Uruguay Round. The Inter-Governmental Groups (IGGs), and their Sub-Groups, have held 18 meetings during the period under review; these generally reviewed the future production and trade outlook of various commodities, while IGGs on Rice and on Oilseeds, Oils and Fats reviewed follow-up to the agreed guidelines for international cooperation.

- 1.145 In particular, the IGG on Jute, Kenaf and Allied Fibres and that on Hard Fibres continued to operate informal price arrangements for raw jute, sisal fibre and sisal harvest twine and abaca. An in-depth study of prospects for jute products in Latin American and the Caribbean was undertaken, and in cooperation with the World Bank, work started on a new set of jute demand projections to the year 2000. The IGG on Bananas gave special attention to questions of market access, in particular to the EEC's single market in 1992 and to a consideration of a revised draft programme of research and development. The IGG on Grains examined the world millet economy and the impact of trade liberalization on the level of stocks.
- 1.146 The Executive Board of the Common Fund for Commodities, at its February 1991 meeting, designated nine FAO bodies⁷⁰ as International Commodity Bodies responsible for developing and monitoring projects to be financed from the Second Account of the Common Fund and other sources. A considerable amount of work has been done within the IGGs to formulate suitable project profiles and it is clear that the Fund expects the IGGs themselves to indicate priorities when submitting project packages.
- 1.147 Support has continued to be given to commodity and trade activities of other organizations and to interested developing countries. This included assistance to developing countries for the development of their proposals at the GATT negotiations on agriculture and tropical products, including the net food importing developing countries and member countries of the Central American Common Market. Similarly, the CARICOM ACP banana exporting countries were assisted in evaluating their export prospects in the context of a unified EEC market, and India was supported in reviewing its long-term strategies for the future development of vegetable oils and oilseeds.
- 1.148 World Food Security: The Committee on World Food Security continued to meet annually to examine selected issues and the world food security outlook. At its 1990 Session the Committee reviewed the role of women in food security at household level. The 1991 Session examined a study on the role of food aid in the 1990s and stressed the importance of flexibility in the provision and use of food aid as well as its strictly humanitarian and developmental purposes. The Committee also considered a case study on the national experience of Ecuador with food security, which further confirmed that food security was basically a problem of access for vulnerable groups which lack purchasing power. A review has been initiated to determine

⁷⁰ The bodies designated were the IGGs on Bananas; Citrus Fruit; Hard Fibres; Oilseeds, Oils and Fats; Rice; Tea; Meat; the Sub-Group on Hides and Skins; the Sub-Committee on Fish Trade.

improvements in the reporting and analysis of socio-economic indicators for access to food by vulnerable groups.

- 1.149 During 1990-91, the Food Security Assistance Scheme (FSAS) has elaborated comprehensive national food security programmes in four African countries⁷¹ in consultation and cooperation with other FAO units and international organizations. Similar work has been initiated under the Scheme's expanded mandate at the sub-regional levels in Africa, Central America and the Mekong Delta. The Scheme achieved the highest level of new funding to date in 1990 - over US\$ 25 million. About two-thirds of the funding was earmarked for national and sub-regional early warning and food information systems, and the remainder for market management, food security resources and cereal banks.
- 1.150 Agricultural Planning Assistance: The Sub-programme has continued to place emphasis on meeting requests by developing countries for assistance in policy analysis and advice. In particular assistance was provided in conducting (i) analyses of policy options as a firm basis for structural adjustment programmes, (ii) assessment of the potential impact of adjustment on agricultural and rural sectors, and (iii) implementation of sector policy and performance reviews to guide decisions on national development strategies. As a follow-up to the decisions of the last session of the FAO Conference, improved internal arrangements were introduced for the promotion and coordination of sector and structural adjustment programmes.
- 1.151 In Asia, support has been given for policy advice to countries that are in transition from centrally-planned to market-oriented economies. In this effort, four agricultural sector review missions and related policy workshops assisted Viet Nam and Laos to analyze various options. In 1990, several countries in Eastern Europe also embarked on this transition process and have requested FAO assistance in the design and implementation of policies. During the biennium, there has been an upsurge in requests for policy advice; and advisory activities have been or are being completed in seven countries.⁷²
- 1.152 The impact of structural adjustment on agricultural development continues to be an important topic in Africa. Burkina Faso, Guinea, Mali and Senegal have been provided with technical assistance in their efforts to negotiate sectoral adjustment loans from international financial institutions. In cooperation with the Joint ECA/FAO Agriculture Division, a study on the dynamics of rural poverty in Africa was initiated to support on-going regional activities on rural development. Nigeria is being assisted in assessing the impact of its structural adjustment on agricultural performance. As part of the follow-up to the Latin American and the Caribbean Plan of Action, a study on agricultural problems and strategies in the Caribbean was prepared and presented to a seminar. RLAC has completed six case studies⁷³

⁷¹ Chad, Niger, Tanzania, Zambia.

⁷² Cyprus, Egypt, Indonesia, Jordan, Laos, Malta, Viet Nam.

⁷³ Brazil, Colombia, Guatemala, Jamaica, Mexico, Venezuela.

analyzing agricultural economic policies and planning systems under the present situation of structural adjustment and the results were discussed at a regional seminar.

- 1.153 Three studies in the Near East region examined (i) inter-regional labour mobility, (ii) agricultural policy analysis and (iii) the emergence of new sub-regional communities and their implications on regional food supply prospects up to the turn of this century. Case studies were undertaken on rice policies in the Sahel⁷⁴ with focus on problem of soaring domestic demand, stagnating domestic production and rising imports in the midst of financial and economic difficulties. Regular Programme resources were used to provide assistance in the preparation of strategies for small farmer development and decentralized district-level planning in six Asian countries.⁷⁵ In Africa, the case study on decentralized planning was completed in Ethiopia, and similar studies have been initiated in Ghana and Zambia, with another planned for Uganda.
- 1.154 Development of training materials and curricula for Food and Agricultural Policy Analysis was intensified. A synthesis of training needs assessment carried out in eight African countries⁷⁶ confirmed the need for strengthening analytical skills of national officers involved in policy formulation and analysis, resulting in a regional policy analysis training programme proposal for financing by UNDP. The training documentation for the Computerized System for Agricultural and Population Planning Assistance (CAPPA) was reinforced and new training tools for decentralized planning, project preparation and analysis were elaborated. Work has started on the integration of environmental concerns into training for policy analysis and planning.

Outlook and Issues

- 1.155 The Major Programme has continued to work within severe resource constraints exacerbated by shortfalls in contributions. Decisions of the 1989 Conference to place even greater emphasis on work for the environment and sustainable development and on FAO's policy advisory role have necessitated some significant adjustments within individual Programmes. The increasing cooperation with other agencies to ensure a balanced service to member countries was discussed in this Chapter of the 1988-89 Review. Substantial progress has been made in expanding collaborative work, especially with the World Bank, UNEP and GATT in the priority areas. Cooperation with WHO, which has always been strong on all matters relating to nutrition, has been further reinforced in preparation for the International Conference on Nutrition. Similarly, the Joint Division of Nuclear Techniques in Food and Agriculture provides a sound basis for cooperation with IAEA and the cooperative research contract system is proving cost-effective. Such cooperation also has very evident advantages in ensuring the comparative advantages of FAO and institutions such as the international

⁷⁴ Burkina Faso, Chad, Niger, Mali.

⁷⁵ India, Indonesia, Malaysia, Philippines, Sri Lanka, Thailand.

⁷⁶ Burkina Faso, Cameroon, Ghana, Liberia, Malawi, Mali, Tanzania, Togo.

agricultural research centres are fully exploited, but it can also prove time-consuming to manage.

- 1.156 The need for cross-programme responses has been steadily increasing, especially in the growing areas of work on sustainable agricultural development, policy analysis, planning and human resources development. This recently led to the establishment by the Director-General of a Steering Committee and Central Task Force for the coordination of sector and structural adjustment work as well as similar arrangements for coordinating the work on sustainable development. The positive results the Major Programme Agriculture has had in this regard are evident from the many inter-linkages and examples of inter-disciplinary activity discussed in the text. This work owes much of its success to the mechanism of Inter-Departmental Working Groups. Inter-disciplinary activities are increasingly better specified in the Programme of Work and Budget, and the efficiency and effectiveness of activities involving several programmes would be enhanced through further improvements at the planning and programming stage. These are being reinforced in the 1992-93 Programme of Work and Budget with resources specifically set aside for joint activities among Sub-programmes in priority areas relating to sustainable development. Studies and the preparation of inter-disciplinary conferences have been facilitated by drawing resources from several programmes and managing these as internal projects (for example, the Geographic Information System). This has also encouraged clear specification of objectives and more concerted action. Such an approach can also have advantages within programmes by bringing resources together for a limited time to work on a precise goal.
- 1.157 Inter-disciplinary effort has also increased the need for training of FAO technical staff in broad development issues. This is particularly important at a time when many experienced staff are retiring and replaced by new staff members with less overall development experience. Thus, a major effort has been made to train technical staff in the issues of women in development and courses are in preparation covering other issues including the environment. Further additional efforts will be required to provide more effective internal dissemination of technical information arising from both the Regular and the Field Programmes. Steps have been taken to internalize the collective experience of long-serving staff leaving the Organization and to enhance institutional memory through their submission of evaluative end-of-assignment reports.
- 1.158 The Major Programme has faced an uphill battle in maintaining the necessary emphasis on genuine and continuing development concerns which have slipped from the public eye. While such major current issues as the environment, bio-technology and structural adjustment in agriculture have appropriately received a greater share of resources, there is no less need now than there was a decade ago for attention to the plight of the rural poor, strengthening national agricultural research and extension, rural communication and training, or improving land tenure and local participatory institutions.
- 1.159 Changing policies in the developing countries, together with an increasing appreciation of the potential development contribution of the private sector and NGOs

have provided new opportunities for the Major Programme. In activities such as the Prevention of Food Losses Programme (PFL) and in marketing and rural financial services, private sector involvement has been encouraged to make appropriate contributions, such as in the manufacture and supply of equipment and in providing services. Networks have proved to be a useful avenue for work with both business organizations and NGOs, but there are limitations for FAO as an inter-governmental Organization in working directly to strengthen the capacity of national private sectors. Nevertheless, increasing attention is being given by the Major Programme to their involvement in appropriate training activities and action at the project level. At the same time, attention has been given to appropriate policy and institutional frameworks within which the contribution of the private sector can be maximized in meeting the development needs of the poorest.

- 1.160 Advances in computer technology have provided the opportunity to manage information in a way which is more user-accessible and in a much more integrated environment. Developments with WAICENT, AGRIS and CARIS and the Geographic Information System (GIS) are particularly important for both internal and external users. The AGRIS data-base can now be made available on compact discs for use on personal computers and AGROSTAT PC has been developed to allow the use of information from this core FAO data base on personal computers. AGROSTAT is also available on line to selected users through AGROTEL and Food Information and Early Warning System reports can be obtained from UNIENET. Such developments, which make information available on micro-computers, are particularly valuable for the developing countries where users do not always have access to mainframe computers and on-line systems. The costs of developing these programmes have been met entirely by the Major Programme. As in the case of the trend towards joint commercial publication, there is now a need to explore flexible ways of meeting the costs of such FAO activities through sharing resources with, and making charges to, external users.
- 1.161 Pressure has also been placed on the Regular Programme by the changing pattern of field projects. With the growing sophistication of developing countries' needs and of available technology, projects cover increasingly diverse and complex topics. The trend towards smaller projects with more short-term, specialized staff also augments the demand for technical support from FAO. Many of the most valuable outputs of the Regular Programme in recent years have been developed through the synergy of Regular and Field Programmes. In this context mention may be made of the leading role the Major Programme has played in the development of the integrated pest management concept; computer packages for local credit institutions, crop water management and land use planning; practical experience on the involvement of women and the very poor in the rural development process; and the developments in national and sub-regional early warning systems which link into the Global Information and Early Warning System.
- 1.162 The nature and scope of the technical backstopping role of the Major Programme will become more complex with the increasing trend towards nationally executed projects. Clearly, FAO needs to continue to provide such a function to assist the Member Countries in pressing national development requirements, even if in some cases, such demands do not coincide precisely with the particular priorities of the Major Programme.

CHAPTER TWO

FISHERIES

Major Programme 2.2

Objectives and Strategy

- 2.1 The Strategy for Fisheries Management and Development and the five associated Programmes of Action adopted in 1984 by the FAO World Fisheries Conference have continued to provide the framework for the fisheries programmes as recommended by the Committee on Fisheries at its Eighteenth Session in 1989. The Programmes of Action cover the following topics: (i) Planning, Management and Development of Fisheries; (ii) Development of Small-scale Fisheries; (iii) Aquaculture Development; (iv) International Trade in Fish and Fishery Products; and (v) Promotion of the Role of Fisheries in Alleviating Undernutrition.
- 2.2 The biennium has seen an increasing concern with environmental issues. Although addressed traditionally under the Major Programme 2.2, they now represent a priority of the fisheries programmes together with sustainable development of fisheries, including aquaculture development (activities related to environmental matters are reported in paras. 2.24-2.26 and 2.32). Within the overall priorities, the objectives of the Major Programme cover the following aspects:
- (i) assist developing countries in strengthening their institutions for the better management and development of their fisheries, the conservation of aquatic ecosystems, and the prevention of environmental degradation;
 - (ii) support full participation and equitable sharing of benefits among all who are dependent on fishery activities, in particular small-scale fishing communities and small-scale fish farmers in developing countries, so as to maximize the contribution of fisheries to rural development;
 - (iii) assist developing countries to increase the productivity of their fisheries especially through the reduction of by-catch and post-harvest losses, the development of products from under-utilized resources, and reduction of fishing costs;
 - (iv) assist developing countries to increase their participation in international trade in fish and fishery products; and
 - (v) assist in accelerating aquaculture development.

- 2.3 As of May 1991, extra-budgetary resources for field projects approved or under implementation amounted to US\$ 291.7 million (excluding support cost). UNDP continues to be the major donor with a contribution of 67% to the extra-budgetary resources, and Trust Fund donors account for the remainder. Extra-budgetary expenditure under the Major Programme in 1990 amounted to US\$ 37 million, compared with US\$ 19.6 million under the Regular Programme, including TCP. Total extra-budgetary contributions committed to the implementation of the Programmes of Action amounted to US\$ 18.6 million in 1989, US\$ 16.0 million in 1990 and US\$ 14.7 million estimated for 1991. These figures show a continuing decline since 1989, and the 1990 and 1991 figures fall short of the annual target of US\$ 20 million recommended by the 18th Session of the Commission on Fisheries in 1989. The figure for 1991 may, however, still move upward due to additional contributions during 1991.

Programmes of Action

- 2.4 The implementation of the Programmes of Action generally proceeded according to schedule, with the exception of Programme of Action III - Aquaculture Development - where the termination or decrease of extra-budgetary support caused the temporary interruption of some activities. Programme of Action I - Planning, Management and Development of Fisheries - continued to benefit from long-term assistance and Regular Programme commitments. FAO provided over 40 countries with advice on fisheries planning, management and law, supported national and inter-country programmes for resources evaluation and management, assisted in species identification and data collection, and conducted training on the above subjects. Programme of Action II - Development of Small-scale Fisheries - benefited from regional programmes that contained strong TCDC and training elements. The global network of regional fish marketing information services remained the key element of Programme of Action IV - International Trade in Fish and Fishery Products. The marketing information services have started to develop gradually into self-financing intergovernmental organizations, and the COFI Sub-committee on Fish Trade has submitted to the Common Fund for Commodities a funding request for a US\$ 15 million Fishery Commodities and Marketing Development Programme (see also paragraph 2.40 below). Increased extra-budgetary support for Programme of Action V - Promotion of the Role of Fisheries in Alleviating Undernutrition permitted the full implementation of its two basic elements: research and information, and training.

Programme 2.2.1: Fisheries Information

- 2.5 **Basic Objective:** The specific objectives of the Programme are:
- (i) provide information and data on world fisheries in sufficient detail for global analysis of trends in important production areas;
 - (ii) disseminate efficiently information and data to Member Countries, research institutes and other interested parties; and

- (iii) support fisheries research of Member Countries through information centre networks, advice on data collection, analysis and storage, and improved access to fisheries information.

2.6 **Priorities:** A major priority of the Programme is the modification and consolidation of fisheries statistics systems. The existing systems provide insufficient information on fields like aquaculture, sustainable use of fishery resources and environmental protection, and additional reporting methods will have to be developed while maintaining existing statistical series. Some progress regarding the quality and coverage of aquaculture statistics was already achieved during the biennium, particularly in the Asia and the Pacific region.

Sub-programme Implementation

- 2.7 The Aquatic Sciences and Fisheries Information Sub-programme (2.2.1.1) continued to provide bibliographic databases in print format, on magnetic tape and increasingly also as CD-ROM (Read-Only-Memory) diskettes. National and regional information centres received training and software, and access was provided to over 100 databases through an on-line information retrieval system. Two separate bibliographical abstract series, Aquatic Pollution and Environment Quality, and Marine Biotechnology, were started in 1990.
- 2.8 The Aquatic Sciences and Fisheries Abstracts (ASFA) database, which is sponsored by FAO, IOC,¹ UNEP and UNOALOS,² continued to expand during the biennium. The expansion, however, created a problem as FAO's budgetary contribution had to rise concomitantly while many newly-added subject areas are of no direct relevance to FAO's fisheries programme. The issue is being reviewed in 1991 with a view to modifying current funding arrangements.
- 2.9 In the biennium, the core activity of collecting and disseminating fishery statistics was given priority under the Fishery Data and Statistics Sub-programme (2.2.1.2). Aquaculture bulletins and statistical bulletins for the Fishery Committee for the Eastern Central Atlantic (CECAF) and the General Fisheries Council for the Mediterranean (GFCM) complemented data regularly published in the FAO Statistical Yearbooks. A document was also published on assessing the role of fish in human consumption.
- 2.10 Recent consultations and investigations identified shortcomings in present methods of recording catches, partly as a result of the widespread use of quotas for managing fisheries in Exclusive Economic Zones (EEZs) that has led to misreporting and misidentification of species. In this context, efforts will be increased to obtain better baseline data to monitor trends in fishery activities for specific species and areas.

¹ Intergovernmental Oceanographic Commission of Unesco.

² United Nations Office of Ocean Affairs and the Law of the Sea.

- 2.11 The Coordinating Working Party on Atlantic Fishery Statistics, which held its 14th session with FAO support in March 1990 has proved a successful venture in this regard, and it is planned to set up similar arrangements for the Pacific Ocean. Further improvements to the fisheries database are expected in conjunction with the development and consolidation of FAO's corporate database WAICENT (World Agricultural Information Centre).
- 2.12 A regional seafarming resources atlas was published by the Asian and Pacific Regional Seafarming Development and Demonstration Project in 1991, providing a complex view of seafarming resources and activities in 12 countries of the Region. The Regional Office for Africa (RAFR) completed a situation analysis for the improvement of fisheries data collection in SADCC countries, and a Directory of Fisheries Training, Education and Research Institutions in Africa.

Programme 2.2.2: Fisheries Exploitation and Utilization

- 2.13 **Basic Objective:** The specific objectives of the Programme are:
- (i) assist Member Countries to utilize better their fishery resources, including those of their EEZs, and provide standards and guidelines for fisheries management in line with international conventions;
 - (ii) assist Member Countries in all aspects of designing and implementing fisheries programmes and projects, including aquaculture;
 - (iii) support the protection of aquatic environments for fisheries, and advise on fishing methods with a view to increasing catches and reducing incidental mortality of non-target species;
 - (iv) promote the development, transfer and adoption of appropriate methodologies for data gathering and analysis, stock assessment, and bioeconomics in order to improve identification of, and information on, fishery resources; and
 - (v) advise on fish handling and marketing with a view to enhancing the diet particularly of the poorer segments of society, and provide information on international fish trade so as to increase foreign exchange earnings.
- 2.14 **Priorities:** The improvement of national capabilities to foster sustainable fisheries development is a key priority area of the Programme. This includes action to preserve fishery resources and habitats, to increase national knowledge of fisheries and related sciences, to upgrade national planning and management skills, and to provide assistance to the fishing community to improve fishing methods and their overall quality of life.

- 2.15 A number of major publications concerning the conservation and management of marine resources was published during the biennium under the Marine Resources and Environment Sub-programme (2.2.2.1). These included a Manual on Stock Assessment in Tropical Fisheries, a Manual on Remote Sensing Applications to Tuna Fisheries (in collaboration with Sub-programme 2.1.4.4), several species identification sheets on selected groups of marine organisms, manuals on stock assessment and fishery modelling, and a major input to the 1991 COFI document on Environment and Sustainability in Fisheries. The Global Species Databank SPECIESDAB has been considerably advanced and now includes more than 1,300 species. The various sections are constantly being revised and updated by specialists.
- 2.16 Papers on certain regions as well as on specific resources have been or are under preparation in response to a growing number of enquiries on marine resources. The papers include several Global Species Catalogues³ and five Field Guides to Commercial Marine Resources for the Gulf of Guinea, Mozambique, the Northern Coast of South America, Somalia and Sri Lanka. A future priority of the Sub-programme will be the development of a computerized Geographic Information System (GIS) for coastal resource assessments, which could later be extended to high seas fisheries.
- 2.17 The study of International Fisheries Research Needs for Developing Countries, which is coordinated by the World Bank, FAO, UNDP and the Commission of the European Communities on behalf of 17 donors, is nearing completion. The study will, inter alia, outline an international fisheries research programme in the implementation of which FAO is expected to play a major role.
- 2.18 The project on Training in Fish Stock Assessment and Fishery Research Planning, funded by Denmark and based at FAO Headquarters, continued its activities as scheduled. French, Portuguese and Spanish versions of the training manual on Introduction to Tropical Fish Stock Assessment were published during the biennium, and 17 training courses were organized at national and regional level in Africa, Asia and Latin America.
- 2.19 Software packages in French and English on stock assessment and bioeconomics and modelling of fisheries have been produced, and substantial inputs in this field have been provided to a DANIDA stock assessment training programme, to joint work with ICLARM (International Centre for Living Aquatic Resources Management) on a biological and stock database, and to the FAO/IOC (International Oceanographic Centre) Programme on Ocean Science in Relation to Living Resources (OSLR).
- 2.20 The Inland Fisheries and Aquaculture Sub-programme (2.2.2.2) has been substantially reinforced by the addition of two new positions, a P5 Senior Adviser for Aquaculture Development and a P4 specialist in fish nutrition. Most activities formerly carried out under the UNDP-funded Aquaculture Development and Coordination Programme (ADCP), which terminated in December 1989, have been taken over under the

³ Groupers or Serranidae; Threadfin Breams or Nemipteridae; Cutlassfishes, Snoeks and Escolars or Trichiuridae/Gempylidae; Marine Lobsters; Bivalves and Gastropods; Seaweeds.

Regular Programme. This has been made possible by the addition of the above-mentioned new aquaculture posts to the Fishery Resources and Environment Division, and the inclusion of aquaculture-related activities into the responsibilities of officers in other divisions. Likewise, the formerly UNDP-supported Network of Aquaculture Centres in Asia (NACA) was established in 1990 as a self-supporting, inter-governmental organization. Some aspects of NACA's work are supported by the Regional Seafarming Development and Demonstration project funded by UNDP.

- 2.21 Shrimp culture in the Asia-Pacific region was the subject of a study prepared by the Regional Office for Asia and the Pacific (RAPA) in 1990, which compared the economics of various shrimp culture systems and put forward a forecast of future developments. RAPA also supported projects for the development of aquaculture in the least developed countries of Asia, especially in Bhutan, Cambodia and Viet Nam and provided assistance to a project in Thailand on aquafeeds based on locally available ingredients. A series of training manuals serving as basic texts for rural aquaculture was completed by the Inland Water Resources and Aquaculture Service. Japan continued funding the Regional South Pacific Aquaculture Development Programme, which organizes mainly training activities for South Pacific island states.
- 2.22 Steps have been taken to collaborate more closely with other FAO units (FII, FIP, AGL, AGS, ESH) in order to bring aquaculture into the mainstream of rural development efforts. Geographical Information Systems (GIS) have been used in selecting the location of sites for aquaculture in Ghana and it is planned to expand the approach to encompass general inland fisheries planning.
- 2.23 Increased attention has been given to environmental monitoring, in particular to the recording of changes in aquatic ecosystems and the effects of inappropriate land use systems. A Departmental Working Group on Fisheries and Environment has been set up to coordinate the work of the Department on environmental issues, and to prepare the Fisheries Programme's contributions to other bodies like FAO's Interdepartmental Working Group on Environment. Work on environmental topics related to inland fisheries and aquaculture is coordinated with other FAO divisions particularly through the Inter-departmental Working Group on Land Use Planning. A comprehensive regional analysis was prepared by RAPA in 1990 on environmental issues of aquaculture development in developing countries in Asia. The network of pollution monitoring and research projects, hitherto covering the Mediterranean and West and Central Africa, has been extended to Eastern Africa.
- 2.24 Collaboration with other United Nations organizations continued in the implementation of regional environmental programmes and in particular through the IMO/FAO/Unesco/WHO/WMO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP). A working group of GESAMP was established in May 1990 to evaluate the impact of coastal aquaculture on the marine environment. The report of the working group was published in March 1991.
- 2.25 Cooperation with UNEP in implementing the Action Plans for the Protection and Development of the Marine Environment and Coastal Areas is continuing, with FAO taking the lead in implementing the West and East African Action Plans. FAO has

also continued to participate actively in the long-term Programme for Pollution Monitoring and Research in the Mediterranean (MED POL). A similar role for FAO is envisaged in the implementation of the project on integrated coastal zone management in Eastern Africa.

- 2.26 The Fish Production Sub-programme (2.2.2.3) continued to have its main focus on marine and inland fishing technology, sustainable development of small-scale fisheries, and transfer of technology.
- 2.27 During the biennium, Headquarters staff and/or consultants participated in, or organized, eight national training courses⁴ in collaboration with TCP and extra-budgetary funded projects, in fishing technology, fishing vessel design and construction, and, in cooperation with APRACA,⁵ on fishery credit.
- 2.28 Activities regarding the development of small-scale fisheries were substantially funded from extra-budgetary resources. Under the Integrated Development of Small-scale Fisheries (IDAF) Programme in West Africa, funded by Denmark and Norway, several national projects have become operational. Among others, the Programme organized several workshops and seminars in the Region, and in conjunction with the Regular Programme (Fisheries Department and RAFR) formulated a long-term canoe replacement programme for West Africa.
- 2.29 The Sweden/Denmark-funded project for Small-scale Fisherfolk Communities in the Bay of Bengal has attracted complementary support projects from several other donors,⁶ and is now partly financed from participating country contributions. The main project will terminate by end-1992, while individual components will continue until 1994.
- 2.30 Efforts to promote credit facilities for fishing communities continued, and a sub-regional workshop on this topic was held in India⁷ in February 1991, with another one scheduled for September 1991 in Côte d'Ivoire.⁸ Progress was also made on the integration of UNFPA-funded activities into artisanal fisheries development programmes in Africa and Asia. RAPA completed studies on fisherfolk organizations in Bangladesh, India and Sri Lanka.

⁴ Cyprus: Training of harbour engineers in fishing harbour maintenance and design; Grenada, Mauritius: Training of boatbuilders in foam sandwich construction techniques; India, Tanzania: Workshop and training course on provision of credit to fisherfolk; Philippines: Workshop on creation and management of revolving funds; Thailand: Introduction to the use of a computer programme for the control of loans by sources of institutional credit; Yemen: Training of shipwrights in lofting techniques.

⁵ Asian and Pacific Regional Agricultural Credit Association.

⁶ AGFUND, UNDP, UNFPA.

⁷ Participants from Bangladesh, India, Sri Lanka.

⁸ Participants from Benin, Côte d'Ivoire, Gambia, Ghana, Guinea, Madagascar, Mali, Nigeria, Senegal, Sierra Leone, Togo.

- 2.31 Fishing gear selectivity was a topic that cut across various units within the Department. Within this Sub-programme, emphasis has been given to studying potential environmental damage in relation to the fishing gear and vessel technology used, and also to developing the harvesting of non- and underutilized species. A major paper on specifications and guidelines for fishing gear selectivity is being prepared for publication during the next biennium. The application of the International Convention for the Prevention of Pollution from Ships (MARPOL) was another area of concern, particularly with regard to the marking of fishing gear, and the reduction of air pollution through better combustion methods.
- 2.32 The FAO Programme for the Cooperative Use of Vessels for Fisheries Research, Development and Training has been enhanced through the support of a UNDP interregional project, and is fully operational. It provides information and advice to developing countries in need of vessel services by matching the needs with the availability of suitable vessels in the region. FAO is also cooperating with the respective Intergovernmental Oceanographic Commission (IOC) and the International Hydrographic Bureau (IHB) on aspects of ownership, management and operation of research vessels, and has assisted the International Centre for Ocean Development of Canada (ICOD) in the preparation of a manual and training courses on the subject.
- 2.33 The Fish Utilization and Marketing Sub-programme (2.2.2.4) continued to focus on alleviation of undernutrition, rational utilization of fishery resources, and enhanced participation of developing countries in international trade.
- 2.34 Within this framework, a new activity on quality assurance and fish inspection in support of the CODEX ALIMENTARIUS and GATT work on sanitary and phytosanitary regulations was introduced, and collaboration with GATT on the identification of non-tariff trade barriers continued. An expert consultation was organized in Rome in December 1990 on a Code of Practice for Fishery Products from Aquaculture, which will form a basis for consumer protection and facilitate international trade in aquaculture products. The draft Code is being finalized in 1991, and is expected to be submitted to the CODEX meeting in May 1992.
- 2.35 The cooperative research activities in Asia in the field of fish utilization have continued and further expanded with extra-budgetary support from Australia through the project Support to the Network for cooperation between Asian Fish Technology Research Institutes. FAO provided several keynote speakers to the Aquatech '90 International Conference on Shrimp Culture, which was organized jointly by INFOFISH and the Fisheries Development Authority of Malaysia. The FAO-assisted Japan Seafood '90 trade conference proved useful to the fish industry of developing countries. The Conference provided information on the world market for high value seafood products together with recommendations for sales strategies, and details on all aspects of handling and processing. These two conferences involved 680 participants, largely from industry and trade circles. A network on quality assurance and fish inspection has been established in Latin America, while in Africa the cooperative research programme in fish technology has been carried out in cooperation with JAFR and RAFR. The fifth expert consultation on fish technology

in Africa is planned for 1991. RAFR organized a regional training course on improved fish smoking technology.

- 2.36 Progress has been made on integrating national fishery development plans and nutritional policies, particularly in the promotion of aquaculture for human nutrition. The countries involved are Tanzania, Thailand, Zambia and Zimbabwe.
- 2.37 An important activity in this regard is the project funded by Norway - Increasing the Role of Fish and Fisheries in Alleviating Undernutrition - which became fully staffed in November 1990. Activities are concentrated in Southern Africa, and several studies have been carried out including the overlaying of data on fisheries and aquaculture potential derived from a satellite GIS system with data on the regional and district nutrition situation in order to identify the most needy areas and their development potential.
- 2.38 The Inter-regional Programme on Quality Assurance and Fish Inspection continued to provide assistance to strengthen national capacity in this field through the organization of regional and national training courses for participants from government institutions and industry, and through the provision of training materials. During 1990-91, six regional courses⁹ and four national courses were organized for 195 trainees from 49 countries. Two more regional and one national course are scheduled for the second half of 1991.
- 2.39 Fish marketing information and technical advisory services continued to receive attention from the world fishing community. The 1991 World Tuna Trade Conference in Indonesia (405 participants) was organized by INFOFISH with technical support from FAO in close collaboration with the regional fish marketing information services. The first international conference on small pelagics, which drew 190 participants from industry circles in Africa and Europe, was held in Côte d'Ivoire.
- 2.40 The COFI Sub-committee on Fish Trade at its third session in September 1990 approved a Technical Assistance Programme for Fishery Commodities and Marketing Development to be financed by the Common Fund for Commodities. The Programme has three components, training, trade support services, and product and market development. An Advisory Group on Projects was established to monitor the planning and implementation of the Programme.
- 2.41 Support to the global network of the regional fish marketing information services (INFOFISH - Asia and Pacific, INFOPECHE - Africa, INFOPESCA - Latin America and the Caribbean, INFOSAMAK - Arab countries) continued to be an important element of the Sub-programme. The services are going through a phase of transition. INFOFISH is already established as an independent intergovernmental organization,

⁹ Three in Africa, one in Asia, one in Latin America and the Caribbean, one (for trainers) in Canada.

and the other services are likely to follow that course, as donor support is gradually being phased out or reduced.¹⁰

- 2.42 The technical support provided by the FAO Regional Office for Latin America and the Caribbean (RLAC) was greatly improved with the filling of the Regional Fisheries Officer post in late 1989. Many support activities were channelled through the Technical Cooperation Network on Aquaculture and Fisheries and the Caribbean Network in Artisanal Fisheries and Aquaculture, which facilitated especially TCDC exchanges. The RLAC organized or supported six training courses in the Region¹¹ as well as four consultations or international meetings,¹² and regularly attended meetings of regional fishery bodies. In addition, studies were funded and documents prepared in support of regional fisheries activities.

Programme 2.2.3: Fisheries Policy

- 2.43 **Basic Objective:** The specific objectives of the Programme are:

- (i) provide expertise based, *inter alia*, on the systematic assembly and analysis of biological, technical, and socio-economic information, and advise developing Member Countries on fisheries planning, management and development for an effective and sustainable utilization of fish resources;
- (ii) support developing Member Countries to develop their capabilities in the planning and management of their fisheries sectors so as to improve socio-economic conditions as well as investment potential; and
- (iii) foster international collaboration in fishery research, management and development through regional fishery bodies, and strengthen cooperation concerning the management of fisheries of the high seas.

¹⁰ UNDP funding for the technical advisory support to INFOFISH ended in December 1990, and a regional follow-up project is now funded by Japan until April 1992. Norwegian support to INFOPECHE will continue until end-1992, and the INFOPECHE Advisory and Coordinating Committee at its session in May 1990 in Abidjan recommended the conversion of the project into an independent intergovernmental organization until that date. Project support for INFOPECSA, funded from member nation contributions, service fees, and FAO Regular Programme support will continue until end-1991. Extension of the Project for a second phase until end-1992 has been initiated. Consultations with regional organizations regarding cooperation are under way. Likewise, UNDP funding for INFOSAMAK will terminate in late 1991, after which date a suitable legal structure may be set up in Bahrain.

¹¹ Costa Rica, Chile, Dominica, Jamaica, Guyana, Trinidad and Tobago.

¹² Roundtable on Strategies regarding Exclusive Economic Zones in Barbados and Nicaragua, IV International Congress on Marine Sciences in Chile, meeting of COPESCAL (Comision de Pesca Continental para America Latina) working groups at RLAC.

- 2.44 **Priorities:** Integrated coastal zone management with the aim of fostering sustainable resource utilization and environmental protection has become a priority under the above objectives. Fishing is often the main source of food and income for disadvantaged coastal communities, and protection of their resource base is, therefore, of critical importance. In addition, coastal waters and shorelands are a highly complex and vulnerable ecosystem, the environmental balance of which is influenced both by the conditions of the high seas as well as up-country watersheds.
- 2.45 FAO continued its assistance under the Fisheries Policy and Planning Sub-programme (2.2.3.1) to Member Countries in strengthening national planning and management capabilities through country missions to 30 countries, reviews of the fisheries sectors in 12 countries (some financed by a Norwegian Trust Fund), and organizing 18 workshops, seminars and training courses during the biennium.
- 2.46 Direct support was continued to FAO regional fishery bodies and other international fishery organizations, for which relevant papers were prepared and discussed during meetings. Among others, training documentation dealing with aspects of capture fishery project formulation, aquaculture project formulation, and aquaculture sub-sector planning and organization were published, and a workshop organized in Zimbabwe in December 1990 on enhanced women's participation in fishery development. Furthermore, 38 fishery country profiles were updated and published in 1990, and 40 profiles in 1991.
- 2.47 The Fishery Project Information System (FIPIS) became operational in February 1990. The system constitutes an important source of statistical information on assistance to fisheries sectors (about 3,000 projects) in developing countries and can respond to a wide variety of queries involving combinations of solution criteria, searches on characteristics of fishery projects, and cost aggregations.
- 2.48 The Fishery Policy and Planning Data Bank (FIPPDAT), which will allow access to, and analytical presentation of, a range of socio-economic, social and fisheries-specific data was being developed during the biennium in cooperation with other units within and outside the Department.
- 2.49 In recognition of the increased importance of the International Coordination and Liaison Sub-programme (2.2.3.2), the responsible unit was upgraded to a full Service in 1990. Overall, the Service organized 28 sessions of regional fishery bodies, technical consultations and other meetings in 1990,¹³ and 24 in 1991.¹⁴

¹³ Among others, the 23rd Session of the Indo-Pacific Fishery Commission; the 16th Session of the European Inland Fisheries Advisory Committee; the 3rd Session of the Sub-committee on Fish Trade; the 8th Session of the Committee for Inland Fisheries of Africa; 7th Session of the Western Central Atlantic Fishery Commission.

¹⁴ Among others, the 19th Session of the Committee on Fisheries; the 6th Session of the Commission for Inland Fisheries of Latin America.

- 2.50 A major task of the Sub-programme was the organization of the Expert Consultation on Large-scale Pelagic Driftnet Fishing (Rome, 2-6 April 1990), the findings of which were used in the preparation of the UN Secretary-General's Report to the General Assembly on the same subject. On the same topic, an inter-departmental task force has been set up to take account of the legal and policy implications. The Service was also responsible for the organization of the Nineteenth Session of the Committee on Fisheries (COFI) in April 1991.
- 2.51 Cooperation with regional fishery bodies continued during the biennium, particularly in Africa with the Follow-up Committee to the Ministerial Conference on Fisheries Cooperation among African States bordering the Atlantic Ocean, which has prepared a draft Regional Convention on Maritime Cooperation. In order to further intensify collaboration, the Secretary of CECAF (Committee for East and Central Atlantic Fisheries) has been outposted to the West Africa region. Assistance was also provided to Member Countries through a General Fisheries Council for the Mediterranean/ICATT (International Commission for the Conservation of Atlantic Tunas) consultation on tuna stock assessment, red coral management and control of sponge disease in the Mediterranean Sea.
- 2.52 RAFA organized four international fisheries meetings during the biennium, and RAPA continued to provide secretarial and administrative support to the Indo-Pacific Fishery Commission (IPFC) and the Indian Ocean Fishery Commission (IOFC) and their subsidiaries. Altogether, six meetings of the two bodies were serviced by RAPA. Of particular importance was the decision by the IOFC at its Eleventh Session in July 1990 to recommend the establishment of an Indian Ocean Tuna Commission under Article XIV of the FAO Constitution. The issue will be pending until 1992 to await the outcome of the ongoing negotiations concerning the possible membership of the European Economic Community in FAO.
- 2.53 Work on the computerization of International Fishery Agreements continued during the biennium. By mid-1991, over 1,250 Fishery Agreements covering the period 1351-1981 had been accessed, while 400 agreements for the period 1981-1990 remained to be accessed into the system.
- 2.54 The FAO regional fisheries bodies, especially those dealing with inland fisheries, are in the process of adopting a code of practice to reduce the risks of introduction of exotic organisms, which is patterned on the successful protocol developed by the FAO European Inland Fishery Advisory Commission (EIFAC).

Outlook and Issues

- 2.55 The Major Programme has a coherent programme framework, and its implementation during the biennium has progressed in line with the approved Programme of Work. However, the effects of the critical financial situation continue to be felt during 1990-1991. Staffing levels in some units remained unsatisfactory or returned to normal only in the later half of the biennium. Increased backstopping responsibilities of

Headquarters officers, especially for global projects, have at times competed with Regular Programme activities.

- 2.56 The effectiveness of the Major Programme depends, to a great extent, on international meetings at various levels. In this connection, the budget available for meetings poses strict limitations on the number and duration of meetings, and the provision of support staff. Particularly, the rising costs for interpretation at multi-lingual meetings may necessitate a reduction in the number of meetings supported in the future.
- 2.57 While the Major Programme has traditionally stressed the issues of environment and sustainable development, these concerns will further increase in importance in the fisheries programmes. Particular emphasis will be given to integrated coastal zone management, which has been designated one of FAO's global cross-sectoral action areas in this field. Work on this issue will be pursued in close cooperation with other FAO units, and an Inter-departmental Task force on Integrated Coastal Zone Management has been established.
- 2.58 Aquaculture development and assistance to developing countries in the promotion of international trade of fish and fishery products will remain priorities of the Major Programme. In particular, the increased use of Geographic Information Systems, and closer collaboration with other units in FAO, including the Land and Water Development Division (AGL) and the Human Resources, Institutions and Agrarian Reform Division (ESH), are expected to facilitate the planning and implementation of aquaculture development projects.
- 2.59 Increased emphasis in the Fisheries Policy Programme will be given to support the role of women in fisheries development, and to activities related to the conservation, better use and sustainable development of the living resources of the high seas.
- 2.60 The Fisheries Information Programme is expected to benefit from the progress of the World Agricultural Information Project (WAICENT) in 1992-93, and from an expansion of the network of Fishery Information Centres.

CHAPTER THREE

FORESTRY

Major Programme 2.3

Objectives and Strategy

- 3.1 In the Programme of Work and Budget for 1990-91 approved by the Twenty-fifth session of the FAO Conference, there was no major departure in the stated objectives for Forestry from those in the preceding biennium. The Forestry Department's overall implementation strategy during the 1990-91 biennium, therefore, continued to address the following: (a) integrating trees and forests with other land uses; (b) raising the productivity and broadening the range of goods and services produced by the forests on a sustainable basis, including improved contribution of forestry to food security; (c) developing suitable approaches and arrangements to enlarge the rural people's share of socio-economic benefits from forestry activities and achieve more equitable distribution of such benefits in rural areas, through increased people's participation; (d) promoting the broader and more efficient use of the resource through appropriate forest-based industries, including small-scale enterprises; and (e) adapting and strengthening the institutional framework of forestry to meet the new orientation of forestry for development.
- 3.2 A considerable portion of the Forestry Department's work for 1990-91 focused on responding to the increasing requests from member countries for assistance in establishing their forestry sector priorities through comprehensive analyses in line with the framework of the Tropical Forestry Action Plan (TFAP). The TFAP received the highest priority in recognition of FAO's responsibility for coordination of the programme.
- 3.3 Major global developments made it necessary for FAO to take on a significant unprogrammed activity: preparation for the UN Conference on the Environment and Development (UNCED), the forestry component of which required considerable FAO inputs, particularly in relation to the search for a global consensus on the management, conservation and development of the world's forests. Other important activities related to support of global initiatives on climate change and on a convention to conserve biodiversity.

Interdisciplinary Activities

- 3.4 The major focus of the Forestry Department's activities, involving all its Programmes, has been the Tropical Forestry Action Plan. As of early 1991, some 84 countries adhered to the TFAP and were at some stage in its implementation. FAO continued to participate in and backstop country plans at all stages, from

identification of issues to development of issues papers, preparation of Round Tables, identification of potential projects, etc.

- 3.5 During the biennium, the TFAP was reviewed by a team of three external consultants. The review noted the enthusiastic response to the Plan and considerable cooperation achieved by both tropical and donor countries in its first five years, and made several recommendations for improving the Plan's orientation as well as implementation methods and procedures.
- 3.6 Subsequent to the review, FAO convened a high-level ad hoc meeting of experts with balanced representation from donor and developing countries, together with the World Bank, UNDP and the World Resources Institute (the co-sponsors of the TFAP) to review the TFAP goals, objectives and institutional arrangements. The meeting, held in Geneva from 6-8 March 1991, agreed on revised general goals and objectives for the TFAP and endorsed the idea that TFAP should be a country-led process, focused on catalyzing sustainable development and conservation. Pending the settlement of modifications to institutional arrangements for overall management of the TFAP, work continued in FAO on the improvement of implementation methods and procedures.
- 3.7 Other key interdisciplinary activities involving the Forestry Department included the International Scheme for Conservation and Rehabilitation of African Lands, where the Land and Water Division has primary responsibility (see Chapter One), and work on the development of FAO's Geographic Information Systems (see Chapters One and Ten).
- 3.8 Besides preparatory meetings for the 1992 United Nations Conference on Environment and Development, the Forestry Department contributed to FAO's participation in the second World Climate Conference, which was co-sponsored along with WMO and UNEP. FAO contributed a policy statement on the effects of climatic change on agriculture, forestry and fisheries to the Conference. FAO also published a review on forestry and climate change, following an expert consultation held on the subject in March 1990.
- 3.9 An interdisciplinary group within the Regional Office for Latin America and the Caribbean began work in the new programme area of sustainable development within fragile ecosystems. A document on the subject was received positively by delegates at the Twenty-first Regional Conference for FAO Latin America and the Caribbean, and a seminar on Regional Development in Fragile Ecosystems of Mesoamerica was organized in collaboration with the Rural Development and Nutrition Programmes in RLAC.

Programme 2.3.1: Forest Resources and Environment

- 3.10 **Basic Objective:** The Programme is aimed at the development and conservation of forest resources, control of environmental degradation and meeting the needs of people for forest-based goods and services.

- 3.11 **Priorities:** To achieve the broad objectives of the Programme, work has involved the establishment and management of forests, trees and woodlots in agro-forestry systems as a key priority. Other important priorities are multiple use of existing forest and wildlife resources through comprehensive assessment and sound management; conservation of forest species and wild relatives of agricultural crops; improvements in watershed management and rehabilitation; and controlling and reversing the threat of desertification in dry zones.

Sub-programme Implementation

- 3.12 Development and Management of Forests: The emphasis of the sub-programme has been on collaboration with national and international institutes, the development of guidelines for practical forest management and on assessment of forest resources at global, regional and national levels.
- 3.13 The sub-programme has played a lead role in the formulation of guiding principles and contents of a global consensus on the management, conservation and development of the world's forests, which is now on the agenda of the UNCED preparatory meetings. FAO's contribution included a note on the subject presented to the first meeting of the UNCED Working Party on Forestry in Geneva, and significant parts of the reports presented at the second and third meetings of the UNCED Preparatory Committee.
- 3.14 Three Forestry Papers reviewing tropical forest management systems in Africa, Asia and Latin America were published, to provide governments with technical principles for further development of sound forest management systems. Work on mangrove development was continued through reviews on mangrove management systems for multiple use of these valuable resources; a publication on the subject was postponed to 1992 due to financial and staffing constraints.
- 3.15 Assistance was given to three institutes in Colombia, New Zealand and Viet Nam in the use of the mainframe and micro-computer versions of FIDAPS (FAO Forest Inventory Data Processing System) and testing of a similar generalized system for computerized forest management was also undertaken. In future, however, the emphasis will move from "stand alone" systems to more problem-oriented approaches using commonly-available computer software. Conceptual work in this area began during the biennium.
- 3.16 Regular Programme activities in forest resources assessment and monitoring were closely linked to the project "Tropical Forest Resources Assessment 1990", being carried out with Trust Fund support. Two Expert Consultations on strategies and methodologies to be used in the Forest Resources Assessment 1990 Project were held, involving top-level experts in the various fields concerned. The results from the assessment will be harmonized with information available from developed countries through a study carried out in cooperation with the Joint ECE/FAO Agriculture and Timber Division (JEUR) for a global review of the state of forests and prevailing trends.

- 3.17 Tree Improvement and Plantations: During the period 1990-91, the sub-programme focused on forest plantation management, forest genetic resources conservation, and on forest protection which was introduced as a new programme element. A study, financed by Swedish Funds-in-Trust, was carried out on the social, economic and ecological effects of different types (mixed and pure) of forest plantations. The topic was also considered by a small expert consultation and a report on the study is in press.
- 3.18 Although severely reduced by financial constraints, activities in genetic resources, including seed procurement, tree improvement, genetic conservation and new biotechnologies, were carried out to assist national institutes in some 30 developing countries, with special emphasis on improvement of multipurpose species of value for rural communities. The annual newsletter "Forest Genetic Resources Information" continued to be published yearly, disseminating information to member countries on, *inter alia*, seed availability, results or indications from field evaluation trials, progress in conservation efforts and new technologies of improvement and breeding, including biotechnologies in forestry and their potential role in tree breeding strategies. Exchange of information and materials through the Forest Genetic Resources networks for dry and humid areas were important TCDC activities. A study was initiated on the compatibility of forest management for production purposes and the conservation of genetic resources of component species.
- 3.19 At the recommendation of the FAO Panel of Experts on Forest Gene Resources and the FAO Commission on Plant Genetic Resources, studies were undertaken on the feasibility of establishing a global network of *in situ* conservation areas for plant and animal species. The findings of this study were reported in a Secretariat Note for the 4th Session of the Commission (April 1991). To launch the network, support was also given to a number of national institutes in developing countries for the establishment and management of pilot *in situ* conservation areas for a range of woody species. A study was also commissioned on the efficiency and potential of *ex situ* conservation strategies in long-lived perennial species, as a complement to *in situ* genetic conservation. Software packages were under development for use in management of seedbanks for both production and conservation in developing countries.
- 3.20 Cooperation with JEUR was continued on the evaluation of impacts of forest damage attributed to air pollution and on forest fire management. Two training courses on forest fire prevention and control were held for the Mediterranean region in collaboration with the Instituto para Conservacion de la Naturaleza (ICONA, Spain) and the Mediterranean Institute of Higher Agronomical Studies (CIHEAM). A Workshop on Forest Fires and Meteorology was held with WMO in Morocco in 1991. Assistance was given to member countries in the field of forest pests and diseases. A serious outbreak of Cypress Aphid in Eastern Africa gave rise to a collaborative sub-regional workshop with the Kenyan Forest Research Institute (KEFRI) in June 1991; FAO was instrumental in coordinating international action to control this pest and a TCP project helped combat the problem.

- 3.21 Conservation and Wildlife: Programme emphasis in this area was on concerns of forestry as related to the environment in watersheds and upland areas, in dryland areas and on wildlife and protected area management. The first Latin American Watershed Management Congress was held in Santiago, Chile, in October 1990. It was organized within the framework of the Latin American Technical Cooperation Network on Watershed Management by the Regional Office for Latin America and the Caribbean. During the biennium, the Network organized workshops on watershed management in relation to the TFAP and an International Workshop on Watershed Management in the Andean Countries. In the same region, continued support was given, through a TCP project, to the Special Commission on Environment of the Amazon Cooperation Treaty.
- 3.22 The Caribbean Technical Cooperation Network on Upper Watershed Management held an International Training Course on Watershed Management in Trinidad for institutions from 11 countries. Following recommendations of the Latin American Forestry Commission, the network will now concern itself with a broader range of forestry activities in the sub-region. A short and medium-term workplan was prepared to guide the work of the network over the next three years.
- 3.23 The development of the Forest and Wildlands Conservation Information System continued during the biennium. This data base, covering all the subject areas of the Forest Resources Division, includes some 7000 entries on wildlife and protected areas. FAO Conservation Guide 22 on farming of crocodiles in captivity was issued in English. The Guide, based on the experience of field projects in Africa and Asia, will be translated into French and Spanish.
- 3.24 An NGO in Costa Rica was commissioned to carry out a study on debt-for-nature swaps. The document, reviewed by FAO and by members of the Latin American National Parks and Protected Areas Network, is to be discussed at a regional workshop in Chile late in 1991. Given the importance of small game animals in the African diet, the Regional Office for Africa held a training seminar on the breeding of small game in the West African forest zone. The Regional Office also assisted with the publication of the bulletin "Nature et Faune" in both English and French versions.
- 3.25 FAO provided secretariat services to the 17th session of the Working Party on the Management of Mountain Watersheds (Vicenza, Italy, March 1990), a subsidiary body of the European Forestry Commission. Discussions concentrated on maintenance of stable forest areas to control torrents in the face of pressure from recreational uses and on methods of reducing potential dangers (e.g. risk zoning, hazard mapping).
- 3.26 Forest Food, Fodder and Fuelwood Systems: This sub-programme continued to contribute to the reinforced FAO focus on sustainable development, particularly through interdepartmental work on agro-forestry and management of uplands and drylands, including fuelwood development. A detailed review of this sub-programme over the last three biennia is contained in Chapter 10.

Programme 2.3.2: Forest Industries and Trade

- 3.27 **Basic Objective:** Experience has shown that forest resources can be managed and conserved only if local people are convinced that forest land is more valuable to them than if it is converted to other uses. The objectives of the programme are, therefore, the environmentally-sound and sustainable utilization of forest resources to yield socio-economic benefits to local people from forest-based enterprises and trade in forest products.
- 3.28 **Priorities:** Because of their relatively low capital outlay requirements and potential for providing employment to rural people (including women), the development of small, forest-based enterprises including non-wood products (e.g. rattan, honey) is an important activity. Improved planning and management of larger-scale enterprises, including harvesting operations, continued to receive attention. The Programme is also aimed at sustained production of wood-based fuels for domestic and industrial use in order to reduce dependence on fossil fuels.

Sub-programme Implementation

- 3.29 Development of Forest Industries: Activities relating to wood industries focused on three main areas: development of human resources, environmental issues, and small-scale rural forest-based industries. Under Finnish trust funds, a training manual on the Planning of Forest Industries, as well as the audio-visual aids for presentation in workshops, were prepared. These provided the basic documentation for a series of workshops, the first of which was held in Ghana early in 1991. Additional sessions are planned for the next biennium. Two seminars were also held on the Planning and Management of Plantation-Based Industries in cooperation with SIDA.
- 3.30 As recommended by the 32nd Advisory Committee of Experts on Pulp and Paper, a Working Group on the Environment was established. It reviewed how environmental problems in the pulp and paper industry (especially small-scale mills) are addressed, and recommended solutions to mill problems. These recommendations were transmitted by FAO to interested parties, principally in developing countries and Eastern Europe.
- 3.31 Case studies of small-scale rural forest-based industries in Latin America were prepared and work continued on similar case studies for Asia and the Pacific and for Africa. Position papers were prepared and the survey and selection of basic technologies for small mills was continued. This material will be used in the design of "model units" during the next biennium.
- 3.32 In line with the emphasis on non-wood forest products and energy, guidelines were prepared on assistance to be provided in the area of non-wood forest products and on methods to be used in carrying out non-wood forest products reviews. These guidelines were prepared for publication as an FAO Forestry Paper. Other publications relating to non-wood forest products included FAO Forestry Papers covering: (i) "Inter-national Market Prospects for Key Non-Wood Forest Products of

the Asia/Pacific Region"; (ii) a Compendium of Priority Non-wood Forest Products for Community Enterprise Development, focusing on the Amazon region; and (iii) a survey of non-wood forest products in India. A UNASYLVA article on "Institutions and Markets for Amazon Forest Dwellers" was produced to increase awareness and understanding of the importance of non-wood forest products.

- 3.33 In the area of wood energy, Expert Consultations took place on Wood-Based Energy Systems for Rural Industries and Village Application, in Hat Yai, Thailand and on the Use of Wood Fuels in Rural Industries in Latin America, in San Jose, Costa Rica. Joint activities concerning assistance to African countries were discussed with the World Bank in preparation for a SADCC Charcoal Workshop being organized in Tanzania with the support of the SADCC Regional Biomass Fuels Office. At a Round Table on the Dendro-Energy Environment and Development Problems, held in Rio de Janeiro (1991) in association with RLAC, national Dendro-Energy Network coordinators discussed the position of the network on the development and environment problems related to wood consumption and production. A programme of work for the next biennium was discussed, together with possible expansion of the network's activities.
- 3.34 Trade and Marketing: An expanded programme on trade and marketing emphasised the provision of trade information, trade policy analyses, the assessment of marketing training needs, the development of market intelligence and the marketing of non-wood forest products.
- 3.35 In the area of trade policy, two studies were commissioned on trade in forest products. One, covering substitution between hardwoods and softwoods, was published as a working paper in association with the Centre for International Trade in Forest Products, University of Washington, USA.
- 3.36 Marketing training need surveys were carried out in Brazil and Indonesia in conjunction with field projects and proposals developed for similar work in other countries. Reviews of marketing practices and market intelligence systems for non-wood forest products and rural forest products were carried out in Brazil and the Philippines. Guidance, assistance and participation was provided to regional marketing training courses held in Kenya and Papua New Guinea.
- 3.37 Forest Harvesting and Transport: The sub-programme concentrated on development of appropriate wood harvesting systems and training in this area. A joint FAO/Finland Consultation on the Action Programme in Forest Harvesting Training in Developing Countries was held in Kotka, Finland in April 1990. The meeting, attended by 29 participants from 20 countries, reviewed the Forest Harvesting Training Action Programme which had been prepared on the basis of an expert consultation held the year before. The report of the meeting and the action programme were published and distributed to FAO member countries.
- 3.38 Case studies were prepared on: integrated small-scale forest harvesting and wood processing operations in Zimbabwe; small-scale mobile cable crane operation in the Republic of Korea; basic technology in forest harvesting on steep terrain in Pakistan;

improved utilization and processing of forest mushrooms; and the use of draught animals in harvesting operations. Reviews and studies were completed on log grading rules and measures to reduce waste of timber; wood residues and improved utilization in tropical high forests; and sustainable wood harvesting in tropical high forests.

- 3.39 An international seminar on the environmental impact of forest harvesting on steep terrain was sponsored and hosted by the Government of Austria in May/June 1991. It was attended by 17 participants, mostly from least developed countries, and was aimed at promotion of sustainable harvesting practices.

Programme 2.3.3: Forest Investment and Institutions

- 3.40 **Basic Objective:** The Programme is broadly designed to strengthen national capabilities to formulate and analyze plans for the forestry sector, to improve the ability of national and local institutions to implement forest policies and programmes and to generate investment in forestry activities. It is also aimed at development of approaches and methods to involve local people in self-sustaining forestry activities for their own benefit.
- 3.41 **Priorities:** The activities of this programme have focused on strengthening the institutional, policy, planning and priority-setting framework of the forestry sector, including the reorientation of forest policies, institutional mechanisms and skills. Particular emphasis was laid on strengthening the human resource base through training and extension and on improving forestry research capabilities. In its efforts to involve local people in sustainable forestry activities, priority was on assessing costs and benefits from the perspective of local people and involving them at an early stage of an activity. The programme also provided information on current production, trade and consumption of forest products and on their prospective development as a basis for long-term policy formulation and planning.

Sub-programme Implementation

- 3.42 **Training and Institutions:** Activities on forestry education development concentrated on improvement of technical competence of forestry teachers, based on recent technological advances in forestry and forest products processing as well as methodological advances in the educational and behavioural sciences. FAO assisted in organising an International Conference on Forestry Education, held in Viterbo, Italy (1990). The conference stressed the importance of improving communications skills with special attention to gender issues, and the need to reinforce teaching in forest policy and law. The conclusions and recommendations are to be discussed at the 16th Session of the FAO Advisory Committee on Forestry Education held in Paris (1991) in conjunction with the 10th World Forestry Congress.
- 3.43 An Expert meeting on Forestry Research was held in Rome on 4-6 December 1990 to advise on FAO's role in research, in view of increasing international demands for the strengthening of tropical forestry research, as expressed through IUFRO, CGIAR,

ITTO, TFAP and other fora. FAO contributed to preparation of proposals for establishment of the new entity for forestry research to be created within the CGIAR. FAO Forestry Paper 96: Planning and Managing Forestry Research: Guidelines for Managers, was published in May 1990. Due to shortage of funds, this substantial document was produced in only 1,500 copies against an initial order of 5,000 and quickly went out of stock.

- 3.44 In terms of institutional strengthening, special emphasis was given to identifying and promoting the necessary institutional arrangements required for supporting and orienting the adoption of policies for the sustainable use of forests and trees. Two studies were initiated, one on the rights of forest users and the other on incentives in support of community involvement. Following the study on Forest Policies in Europe, a similar study was undertaken of forest policies in the Near East region and the Maghreb countries. The study included reports from a representative cross-section of 13 countries and the individual reports are presently being analyzed. A similar study is now under way for Asia and the Pacific.
- 3.45 Investment Planning and Statistics: The analytical work on forestry development planning was carried out closely with on-going TFAP exercises. Key statistics on the forestry sector were published on a regular basis. These included the Yearbook of Forest Products, Pulp and Paper Capacities, and Forest Product Prices. Data were also supplied to the UN Statistics Office, Regional Commissions, UN specialized agencies, the World Bank and the regional development banks to meet their requirements for international forestry statistics. A summary compendium of forestry statistics was published as a supplement to *Unasylva* on the occasion of the 10th World Forestry Congress.
- 3.46 An important component of the statistics programme is assistance to strengthen the capability of forestry statistical institutions in member countries in the collection and analysis of national data for international publication. The first seminar on Forestry Statistics in Africa was held in Malawi in 1989 for English-speaking countries and the second for French-speaking African countries in 1991. The report of the 1989 seminar recommended measures to strengthen country capability in data collection, analysis and dissemination as an essential support to improved planning and decision-making in the sector. Continued support of UN agencies - and FAO in particular - was requested and the establishment of a regional forestry sector information and statistics mechanism was recommended to foster contacts and exchange through meetings, networks, bulletins and newsletters. In 1990, the Seminar on Forestry Statistics in Asia and the Pacific held in Bangkok included consideration of statistics on non-wood forest products.
- 3.47 Forest Products world outlook projections have been updated to cover the period 1990-2010. Collaborative work with private sector industry supported the publication of "The Outlook for Pulp and Paper to 1995, Paper Products, an Industry Update." A programme has been initiated to review the fibre supply outlook for the pulp and paper industry.

- 3.48 Forest Policies and Information: The major focus of the sub-programme has been on servicing of statutory and advisory bodies and analysis of the influence of government policies external to the forestry sector on forestry. Work began on a study of the relationships between forestry, national development plans and other sectors of the economy. In order to produce a comprehensive set of guidelines to be used by programme designers and implementers in the field, work was started on Guidelines for Assessing Forestry Project Impacts (GAFPI) in collaboration with UNEP, the World Bank and the University of Minnesota. FAO's contribution concentrates on the social and institutional aspects of the assessment.
- 3.49 The programme supported the policy and advisory activities of FAO statutory bodies and, in addition, provided the technical secretariat for the 10th World Forestry Congress hosted by France in September 1991. The programme also continued publication of Unasylva.
- 3.50 To strengthen capabilities of national forestry planners in the planning, formulation and evaluation of projects, FAO collaborated in the joint USAID/US Forest Service workshop, held in Mali in 1990, on the financial and economic analysis of forestry projects. In addition, training materials in forestry and forestry-related project formulation were developed. The report will be used in training sessions to increase national capacity in these fields.
- 3.51 FAO participated in the workshop on National Environmental Action Plans (NEAPs) in Africa, held in Ireland in 1990. The workshop, organized by the Government of Ireland, the Environment Institute of University College of Dublin and the World Bank, was intended to promote harmonized approaches between the Tropical Forestry Action Plan and the Environmental Action Plan in Africa.
- 3.52 Eight numbers of Unasylva were produced, with an increased focus on the central issues confronting forestry and forest industries within the broader context of rural development. Specific issues dealt with such topics as Forestry and Environment, Forestry and Food Security, and Watershed Management.
- 3.53 Community Forestry Development: Community forestry development has continued to focus on developing approaches and support for new types of activities promoting trees as a sustainable resource for rural development with rural people as the direct managers and beneficiaries.
- 3.54 A considerable expansion of work under the Regular Programme was made possible through extra-budgetary funding from the Special Action Programme on Forests, Trees and People. During the biennium, this programme expanded into a multi-donor programme supported by France, Italy, the Netherlands, Sweden and Switzerland. Topics chosen for further development include: baseline studies; participatory assessment, monitoring and evaluation; forestry and nutrition; tree tenure; small-scale forest-based enterprises; and communication, extension and training. Some 25 documents covering these topics have been published, including Forestry Papers, Community Forestry Notes, Reference Manuals, Field Manuals and Case Studies. An information exchange network has been established to facilitate the distribution

of these information materials, including slides and filmstrips. At the beginning of 1991, there were 1300 members receiving the quarterly newsletter in English, French and Spanish.

- 3.55 More emphasis was placed on strengthening local and regional institutions in developing countries, to further enhance the dissemination of knowledge, methods and tools. A major training activity on Rapid Rural Appraisal (RRA) took place at Khon Kaen University in Thailand in 1990 for participants from four Asian countries. The training was later followed up by field exercises - RRA of local wood energy supply systems - in participants' home countries. These RRAs will be edited in a collection of case studies. This training at Khon Kaen will be repeated periodically in order to build up RRA training capacities in selected Asian institutions.

Outlook and Issues

- 3.56 The Tropical Forestry Action Plan will continue in the next biennium as a primary focus of the Forestry Programmes. Efforts are being made to ensure that TFAP develops a more decentralized approach, in which individual countries assume a leading role in the planning and implementation of TFAP exercises. Central to this strategy is the formulation of Country Capacity Projects, designed to strengthen capabilities in setting of forest policies, developing planning skills and providing training at national level in these areas. The March 1990 high-level meeting in Geneva was useful in refining the goals and objectives of TFAP; these are reflected in new guidelines for TFAP implementation. Important features include the involvement of a broad range of interested parties and disciplines in the process and a monitoring system designed to ensure that appropriate consultation has taken place. The Geneva meeting also examined institutional arrangements for guiding TFAP work.
- 3.57 The Forestry Department will continue to focus heavily on environment and sustainable development issues. It will continue to contribute to forestry elements in the preparations for the 1992 UN Conference on Environment and Development, and especially in discussions on a global consensus on management, conservation and development of all forests. This may lead to an eventual conclusion of an international legal instrument or convention or to a less binding agreement, complementary to other global protocols, on biodiversity and climate change. FAO activities will stress the complementarity of environmental conservation and sustainable utilisation of forests through intensified efforts in environmental impact assessment, research and monitoring, and education and training. Forestry research in particular will be an important priority as in many developing countries, these capacities have not been adequately developed as yet.
- 3.58 An important emerging priority for the Forestry Department is the improvement of statistical information on the forestry resource base, including regular monitoring of the resource situation. The Tropical Forest Resources Assessment 1990 is a key part of this. However, there is also a need for a better statistical base in terms of forestry

employment and investment, to complement FAO's traditional statistical information on forest products and trade.

- 3.59 While there are no major changes foreseen in the overall priorities for the Forestry Department, assessment and monitoring will continue to be an important feature, with a view to creating an international capability for continuous monitoring of the world's forests. Agro-forestry will be an increasingly important priority in attempts to determine sustainable farming systems which are acceptable from social and economic as well as technical points of view (see also the Issues section in Chapter 10). The emphasis on non-wood forest products and small-scale forest-based industries will continue in the effort to maximize the direct benefits of forestry to a greater number of beneficiaries in developing countries. Special attention will continue to be given to participatory approaches involving rural people in all stages of the project cycle, with a view to ensuring that benefits reach the most needy.
- 3.60 The ability of the Forestry Department to carry out its programme has been considerably constrained by the resource situation of the Regular Programme. Shortfalls in projected resources have meant both that staff positions have had to remain vacant and that non-staff resources (e.g. consultancies, funds for meetings, publications) have been cut. At the same time, responsibilities of the Department have increased, with TFAP exercises, international events of critical importance to the Forestry sector and the growth of the Field Programme leading to a heavier work load in terms of technical backstopping. It is expected that the personnel situation will improve due to recent recruitment actions and hopefully the resource situation will permit fuller implementation of the approved programme of work.

CHAPTER FOUR

INFORMATION BASE RELATED TO THE PERFORMANCE OF TECHNICAL AND ECONOMIC PROGRAMMES

Major Programmes: 2.1 Agriculture, 2.2 Fisheries, 2.3 Forestry

- 4.1 This chapter presents a quantitative summary of the resources allocated, the activities completed and the outputs produced by the three Major Programmes: Agriculture, Fisheries and Forestry. These include: training activities (courses, workshops, and study tours); meetings and technical consultations to exchange information and adopt policies, strategies and technical recommendations; publications in specialized fields for direct use by Member Countries and other organizations; direct support to the countries for technical and policy advice in the sectors covered by FAO; and the technical backstopping of field projects.
- 4.2 For comparative purposes, the tables give the activity and output levels for the last three biennia. Because of the differences in size and nature of programme activities, caution is needed in drawing conclusions solely on the basis of the aggregate data.

Resources and Management

- 4.3 Table 4.1 presents the Regular Programme allocations to the three Major Programmes; the approved regular budget for these in 1990-91 was US\$ 273,869,000, representing 47.7 percent of the total Regular Programme budget. There has been no significant changes from the previous biennium in the distribution of resources among the three technical Major Programmes: Major Programme 2.1 accounted for 77.5 percent while Fisheries and Forestry for 13.3 and 9.2 percent, respectively. Annual expenditure in 1990 rose to 47 percent of the approved biennial budget as compared with 40 percent in 1988.
- 4.4 Within the Major Programme 2.1, Crops (2.1.2), Rural Development (2.1.5), Food and Agricultural Information (2.1.7) and Food and Agricultural Policy (2.1.8) continued to receive a major share of the allocation. In Fisheries, a substantial portion of resources was allocated to Fisheries Exploitation and Utilization (2.2.2) which constitutes the backbone of fishery technical programmes and which also covers the five Programmes of Action identified by the World Conference on Fisheries Management and Development. In Forestry, the majority of resources was devoted to Forest Investment and Institutions (2.3.3) which covers institutional support, policy advice, training and community forestry, and to Forest Resources and Environment (2.3.1).

Table 4.1: Resources Allocated to Major Programmes
2.1 Agriculture - 2.2 Fisheries - 2.3 Forestry

Programme	Regular Programme Approved Budget	Expenditure 1990		Ratio of Extra-budgetary to Regular Programme Resources	
	1990-91	Regular* Programme	Extra-** budgetary	1988-89	1990
	(All figures in US\$ thousands)				
2.1.1 Natural Resources	19 992	8 962	49 222	6.8	5.5
2.1.2 Crops	32 135	15 393	86 404	7.4	5.6
2.1.3 Livestock	18 808	8 196	42 785	4.5	5.2
2.1.4 Research and Technology Development	18 217	9 232	11 105	1.2	1.2
2.1.5 Rural Development	32 450	15 327	54 031	4.4	3.5
2.1.6 Nutrition	17 633	8 541	6 469	0.6	0.8
2.1.7 Food and Agricultural Information and Analysis	30 827	14 708	8 502	0.7	0.6
2.1.8 Food and Agriculture Policy	33 662	14 786	24 500	1.7	1.7
2.1.9 Programme Management	8 486	4 375	17	0.0	0.0
2.1 Total	212 210	99 520	283 035	3.3	2.8
2.2.1 Fisheries Information	5 487	3 696	2 306	0.8	0.6
2.2.2 Fisheries Exploitation and Utilization	16 784	7 201	33 103	6.0	4.6
2.2.3 Fisheries Policy	7 946	4 179	1 555	0.1	0.4
2.2.9 Programme Management	6 182	2 437	51	0.0	0.0
2.2 Total	36 399	17 513	37 015	2.7	2.1
2.3.1 Forest Resources and Environment	6 720	3 233	38 825	11.3	12.0
2.3.2 Forest Industries	4 245	2 025	14 757	5.3	7.3
2.3.3 Forest Investment and Institutions	8 529	3 801	17 269	5.4	4.5
2.3.9 Programme Management	5 766	3 246	0	0.0	0.0
2.3 Total	25 260	12 305	70 851	5.6	5.8
GRAND TOTAL	273 869	129 338	390 901	3.4	3.0

* Expenditure on staff costs is shown at the rate of exchange used in the budget (Lire 1 335 = US\$ 1)

** Includes support costs and expenditures incurred in support of WFP projects and excludes costs for APOs

- 4.5 Extra-budgetary funding for field projects supported by the three Major Programmes amounted to some US\$ 729,156,000 in 1990-91,¹ approximately a 3 percent increase compared with 1988-89. Some 83 percent of the TCP and 72 percent of the extra-budgetary expenditure in 1990 were under Major Programme 2.1. The overall ratio of project funding to Regular Programme resources declined from 3.5:1 in 1988 to 3.0:1 in 1990, reflecting, for Agriculture and Fisheries, a smaller growth on the former in relation to the increased Regular Programme delivery and for Forestry, a faster rise in project expenditures. This ratio was lowest in Fisheries (2.7:1) and highest in Forestry (5.8:1).
- 4.6 Crops (2.1.2) received the largest share of the extra-budgetary support. An increased level of support was notable for: Livestock (2.1.3), including that for the screwworm eradication campaign in North Africa; Research and Technology Development (2.1.4); Fisheries Policy (2.2.3); Forest Resources and Environment (2.3.1); and Forest Industries and Trade (2.3.2).

Training Courses, Workshops and Study Tours

- 4.7 The effort to maximize programme implementation during 1990-91 had a direct positive effect on training. Some 759 training activities were held in 1990-91 compared with 614 in 1988-89, an increase of 24 percent (See Table 4.2). The number of trainees increased from 13,678 in 1988-89 to 16,225 in this biennium. This represents a recovery from the low level caused by the programme cuts in 1986-87 and 1988-89. Nevertheless, the level of activities in training still remained significantly below that of the 1984-85 period.
- 4.8 Major Programme 2.1 accounted for 88 percent of the training activities, and Fisheries and Forestry each approximately 6 percent. While training under Major Programmes 2.1 and 2.3 witnessed significant increase in 1990-91, those organized under Fisheries have declined by 16 and 19 percent in the numbers of activities and of trainees, respectively, mainly due to the termination of EEC funding for training. There was a 19 percent growth in the number of women trained in 1990 compared with 1989² with a significant rise in activities conducted under the Rural Development and Nutrition programmes.

¹ 1990 actual expenditure and the estimated extra-budgetary resources for 1991.

² Some 1,722 women were trained in 1990 compared with 1,446 in 1989.

Table 4.2: Training Courses, Workshops and Study Tours*
Major Programmes: 2.1 Agriculture, 2.2 Fisheries, 2.3 Forestry
(Headquarters and Regional Offices)

Programme	Activities				Trainees			
	1984-85	1986-87	1988-89	1990-91 Est.	1984-85	1986-87	1988-89	1990-91 Est.
2.1.1 Natural Resources	93	67	48	29	1 692	1 381	994	600
2.1.2 Crops**	159	172	106	125	3 196	5 354	2 666	3 534
2.1.3 Livestock	170	74	44	53	3 928	1 904	606	966
2.1.4 Research and Technology Development	51	97	66	101	852	1 793	1 304	1 205
2.1.5 Rural Development	164	144	136	231	4 143	3 522	3 496	5 312
2.1.6 Nutrition	64	39	48	47	1 590	923	1 266	1 269
2.1.7 Food and Agricultural Information and Analysis	17	17	14	6	376	450	284	103
2.1.8 Food and Agricultural Policy	49	75	64	79	871	1 561	1 020	1 317
2.1 Sub-total	767	685	526	671	16 648	16 888	11 636	14 306
2.2.1 Fisheries Information	5	3	3	1	88	17	56	20
2.2.2 Fisheries Exploitation and Utilization	37	24	36	27	455	436	586	421
2.2.3 Fisheries Policy	10	10	18	20	550	640	550	530
2.2 Sub-total	52	37	57	48	810	1 093	1 192	971
2.3.1 Forest Resources and Environment	14	17	21	28	179	434	557	703
2.3.2 Forest Industries	2	6	4	4	37	112	86	106
2.3.3 Forest Investment and Institutions	13	4	6	8	160	34	207	139
2.3.4 Forestry for Rural Development***	12	10	-	-	236	228	-	-
2.3 Sub-total	41	37	31	40	612	808	850	948
TOTAL	860	759	614	759	18 070	18 789	13 678	16 225

* Includes all training activities organized and implemented by units at FAO Headquarters and the Regional Offices irrespective of the source of funds; it excludes training activities carried out by field projects

** There was a large increase under Programme 2.1.2 in 1987 due to concentrated training for the locust control emergency

*** As of the 1988-89 biennium activities for Programme 2.3.4 have been integrated under the three Programmes 2.3.1, 2.3.2 and 2.3.3

**Table 4.2a: Training Courses, Workshops and Study Tours*
(Regional Offices)**

Major Programme	Activities				Trainees			
	1984-85	1986-87	1988-89	1990-91 (Est.)	1984-85	1986-87	1988-89	1990-91 (Est.)
2.1 Agriculture								
RAFR	27	38	34	16	713	1 075	862	356
RAPA	104	93	66	48	2 378	1 765	1 206	1 111
REUR	1	8	4	10	18	145	96	278
RLAC	94	56	56	87	1 650	1 427	1 262	2 067
RNEA	25	44	40	27	682	749	788	686
Sub-total	251	239	200	188	5 441	5 161	4 214	4 498
2.2 Fisheries								
RAFR	4	7	6	5	68	135	139	89
RAPA	-	-	1	-	-	-	25	-
RLAC	12	9	6	12	180	98	80	125
RNEA	1	-	-	-	10	-	-	-
Sub-total	17	16	13	17	258	233	244	214
2.3 Forestry								
RAFR	1	2	1	2	16	65	5	95
RAPA	4	6	-	-	102	61	-	-
RLAC	18	14	18	16	184	336	419	420
RNEA	-	1	3	1	-	25	25	15
Sub-total	23	23	22	19	302	487	449	530
All Regions								
RAFR	32	47	41	23	797	1 275	1 006	540
RAPA	108	99	67	48	2 480	1 826	1 231	1 111
REUR	1	8	4	10	18	145	96	278
RLAC	124	77	80	115	2 014	1 861	1 761	2 612
RNEA	26	45	43	28	692	774	813	701
GRAND TOTAL	291	278	235	224	6 001	5 881	4 907	5 242

* Includes all training activities organized and implemented by Regional Offices irrespective of the source of funds; it excludes training activities carried out by field projects

- 4.9 Within Major Programme 2.1, a marked increase in the number of training was achieved under Rural Development (70%) and Research and Technology Development (53%). The biggest drop in training occurred under Natural Resources (40%) and Food and Agricultural Information (57%). In Forestry, training activities increased substantially under Forest Resources and Environment (33%) and Forest Investment and Institutions (33%). There was very little overall change in the average number of trainees per course.
- 4.10 Table 4.2a shows a decline in the number of training activities by the Regional Offices. The share of training activities conducted by the Regional Offices declined from 38 percent in 1988-89 to 30 percent in 1990-91. The sharpest decline occurred in RAFR where training activities fell by 43 percent, mostly in those under Major Programme 2.1, followed by RNEA (35%) and in RAPA (28%). On the other hand, REUR organized 10 training activities in 1990-91 which represents a new peak level during the last five biennia. Significant increase in training activities were also recorded in RLAC.

Meetings, Seminars and Expert Consultations

- 4.11 Table 4.3 shows an increase in both the numbers of meetings, seminars and consultations held and of participants attending these activities. FAO organized 742 meetings, seminars and consultations with 21,552 national participants. These increases are 27 and 31 percent, respectively, compared to the 1988-89 levels. Meetings organized under Major Programmes 2.1 and 2.3 have increased by 30 and 21 percent, respectively. There was a slight increase in the number of meetings under Fisheries but a marked rise in the number of participants per activity.
- 4.12 Over 80 percent of meetings, seminars and consultations were organized under Major Programme 2.1. The increase in numbers was most evident for Crops, Livestock, Rural Development, and Food and Agricultural Policy. A significant level of meetings was also maintained under Fisheries Policy and Forest Resources and Environment.
- 4.13 About 40 percent of the meetings were conducted by the Regional Offices, very often in support to technical cooperation networks (see Table 4.3a). Both RLAC and RNEA registered sharp increases during the biennium, with RAPA showing a relatively modest increase. There was a significant decline in the level of meeting activities in REUR (39%) and RAFR (27%): activities by REUR were affected by the vacancies in the staff concerned.

Table 4.3: Meetings, Seminars and Expert Consultations*
Major Programmes: 2.1 Agriculture, 2.2 Fisheries, 2.3 Forestry
(Headquarters and Regional Offices)

Programme	Number of Meetings				Number of National Participants			
	1984-85	1986-87	1988-89	1990-91 Est.	1984-85	1986-87	1988-89	1990-91 Est.
2.1.1 Natural Resources	36	38	36	41	1 243	1 500	782	747
2.1.2 Crops	125	119	82	109	3 373	3 650	2 052	3 005
2.1.3 Livestock	73	55	46	70	2 335	1 301	996	1 422
2.1.4 Research and Technology Development	47	43	96	106	1 607	1 766	2 054	2 064
2.1.5 Rural Development	92	74	70	124	3 615	2 588	1 458	2 637
2.1.6 Nutrition	39	63	64	63	2 866	3 490	2 794	3 897
2.1.7 Food and Agricultural Information and Analysis	16	19	18	14	469	689	386	304
2.1.8 Food and Agricultural Policy	51	48	46	68	3 205	2 707	2 440	3 195
2.1 Sub-total	479	459	458	595	18 263	17 691	12 962	17 271
2.2.1 Fisheries Information	2	8	3	1	24	105	50	10
2.2.2 Fisheries Exploitation and Utilization	44	20	24	22	944	512	441	642
2.2.3 Fisheries Policy	61	54	43	56	3 144	1 666	850	1 475
2.2 Sub-total	107	82	70	79	4 112	2 283	1 341	2 127
2.3.1 Forest Resources and Environment	21	19	16	42	705	524	596	988
2.3.2 Forest Industries	6	8	13	12	178	286	557	360
2.3.3 Forest Investment and Institutions	20	26	27	14	1 177	1 283	937	806
2.3.4 Forestry for Rural Development**	16	10	-	-	516	197	-	-
2.3 Sub-total	63	63	56	68	2 576	2 290	2 090	2 154
TOTAL	649	604	584	742	24 951	22 264	16 393	21 552

* Some of these meetings were partially or entirely financed from extra-budgetary funds

** As of the 1988-89 biennium activities for Programme 2.3.4 have been integrated under the three Programmes 2.3.1, 2.3.2 and 2.3.3

**Table 4.3a: Meetings, Seminars and Expert Consultations*
(Regional Offices)**

Major Programme	Number of Meetings				Number of National Participants			
	1984-85	1986-87	1988-89	1990-91 (Est.)	1984-85	1986-87	1988-89	1990-91 (Est.)
2.1 Agriculture								
RAFR	35	48	34	27	1 629	1 435	680	603
RAPA	43	49	42	53	1 025	1 300	768	1 113
REUR	26	24	48	41	1 066	916	1 306	1 443
RLAC	56	54	34	69	1 409	2 074	794	2 279
RNEA	26	21	20	62	1 040	715	556	1 003
Sub-total	186	196	178	252	6 169	6 440	4 104	6 441
2.2 Fisheries								
RAFR	5	5	11	3	150	132	334	94
RAPA	9	8	4	8	206	179	71	182
RLAC	5	1	-	7	166	19	-	193
RNEA	2	2	-	1	26	21	-	12
Sub-total	21	16	15	19	548	351	405	481
2.3 Forestry								
RAFR	8	4	4	6	276	140	142	628
RAPA	1	1	3	8	30	15	54	140
REUR	11	12	19	-	448	615	838	-
RLAC	5	8	2	11	98	198	42	435
RNEA	1	2	2	3	34	83	52	178
Sub-total	26	27	30	28	886	1 051	1 128	1 381
All Regions								
RAFR	48	57	49	36	2 055	1 707	1 156	1 325
RAPA	53	58	49	69	1 261	1 494	893	1 435
REUR	37	36	67	41	1 514	1 531	2 144	1 443
RLAC	66	63	36	87	1 673	2 291	836	2 907
RNEA	29	25	22	66	1 100	819	608	1 193
GRAND TOTAL	233	239	223	299	7 603	7 842	5 637	8 303

* Some of these meetings were partially or entirely financed from extra-budgetary funds

Publications

- 4.14 Table 4.4 provides an overall view of publications produced by the three Major Programmes. In 1990-91, an estimated 1,700 new publications were issued, an increase of 14 percent over the 1988-89 period. This was largely due to a sharp rise in periodicals, reference documents and newsletters issued by Fisheries (22%) and Agriculture (14%); in particular, notable increases were achieved under Livestock and Fisheries Information. The Regional Offices experienced generally a substantial decline except for RLAC which increased the number of publications by almost 30 percent.

Direct Support to Member Countries

- 4.15 There was a notable growth in the number of work-months devoted to direct support in 1990-91, an increase of 5 percent. The total staff and consultant time devoted to providing technical and policy advice to member countries rose from 3,873 in 1988-89 to 4,069 work-months in 1990-91 (See Table 4.5). Staff inputs into direct support were up slightly while more than half of the advisory visits were conducted with the use of consultants. Direct support assistance increased sharply for Forestry, and to a lesser extent for Agriculture, while it declined very sharply in Fisheries, particularly under Fisheries Exploitation and Utilization. The Regional Offices accounted for 24 percent and 15 percent of the 1990-91 staff and consultancy totals, respectively (See Table 4.5a), representing an overall decline of over 10 percent from the previous biennium, particularly for REUR and RNEA. Thus, while the effort given to this important activity has continued to recover from the lowest level of 1986-87 biennium, the achievement in the present biennium is still below the 1984-85 level.

Technical Backstopping

- 4.16 Table 4.6 shows the data on technical backstopping of field projects, and Table 4.6a shows the role of the Regional Offices. Financial constraints reduced the number of work months devoted to backstopping in the 1988-89 biennium. Although the size of the Field Programme remained at substantially the same level, there was a creditable 8 percent increase during 1990-91 in the total number of work-months for this purpose with a total of 3,572 work-months. Nearly 90 percent of the backstopping was conducted from Headquarters, with the heaviest loads under Crops, Rural Development, Research and Technology Development and Food and Agricultural Policy. In Fisheries, the bulk of backstopping was undertaken under Fisheries Exploitation and Utilization. The number of work-months spent on technical backstopping increased for the Major Programmes Forestry (26%) and Agriculture (9%) while it remained the same level for the Major Programme Fisheries. The level of backstopping by the Regional Offices declined by about 10 percent for the previous biennium, especially for REUR and RNEA, although other Regional Offices showed modest increases.

Table 4.4: Publications
Major Programmes: 2.1 Agriculture, 2.2 Fisheries, 2.3 Forestry*
(Headquarters and Regional Offices)

Programme		1984-85	1986-87	1988-89	1990-91 Est.
2.1.1	Natural Resources	196	84	120	137
2.1.2	Crops	170	249	212	227
2.1.3	Livestock	142	127	98	154
2.1.4	Research and Technology Development	110	132	202**	199
2.1.5	Rural Development	169	196	150	200
2.1.6	Nutrition	155	108	100	66
2.1.7	Food and Agricultural Information and Analysis	141	135	92	133
2.1.8	Food and Agricultural Policy	160	152	122	136
2.1	Sub-total	1 243	1 183	1 096	1 252
2.2.1	Fisheries Information	64	69	43	81
2.2.2	Fisheries Exploitation and Utilization	96	122	136	154
2.2.3	Fisheries Policy	56	61	51	45
2.2	Sub-total	216	252	230	280
2.3.1	Forest Resources and Environment	49	63	89	89
2.3.2	Forest Industries	50	38	33	26
2.3.3	Forest Investment and Institutions	44	29	47	53
2.3.4	Forestry for Rural Development***	31	20	-	-
2.3	Sub-total	174	150	169	168
TOTAL		1 633	1 585	1 495	1 700
Types of Publications					
-	Periodicals, reference documents, and newsletters	660	765	649	893
-	Training and research manuals	245	229	239	269
-	Technical documents and case studies	728	591	607	538
TOTAL		1 633	1 585	1 495	1 700

* Excludes working papers

** Includes some 50 journal papers completed by AGE staff, published in major journals which have no budgetary implications

*** As of the 1988-89 biennium activities for Programme 2.3.4 have been integrated under the three Programmes 2.3.1, 2.3.2 and 2.3.3

**Table 4.4a: Publications*
(Regional Offices)**

Major Programme		1984-85	1986-87	1988-89	1990-91 (Est.)
2.1	Agriculture				
	RAFR	26	113	94	40
	RAPA	97	98	86	75
	REUR	14	40	44	27
	RLAC	131	226	218	280
	RNEA	67	75	60	38
	Sub-total	335	552	502	460
2.2	Fisheries				
	RAFR	4	10	6	8
	RAPA	2	8	5	1
	RLAC	6	17	15	30
	RNEA	2	4	1	-
	Sub-total	14	39	27	39
2.3	Forestry				
	RAFR	2	6	13	14
	RAPA	14	10	9	12
	REUR	22	23	25	-
	RLAC	12	36	53	50
	RNEA	2	5	2	-
	Sub-total	52	81	102	76
	All Regions				
	RAFR	32	129	113	62
	RAPA	113	116	100	88
	REUR	36	63	69	27
	RLAC	149	280	286	360
	RNEA	71	84	63	38
	TOTAL	401	672	631	575

* Excludes Working Papers

**Table 4.5: Work-months of Direct Support to Member Countries
FAO Staff and Consultants***
**Major Programmes: 2.1 Agriculture, 2.2 Fisheries, 2.3 Forestry
(Headquarters and Regional Offices)**

Programme	Staff				Consultants			
	1984-85	1986-87	1988-89	1990-91 Est.	1984-85	1986-87	1988-89	1990-91 Est.
2.1.1 Natural Resources	165	173	132	130	270	191	114	129
2.1.2 Crops	537	398	320	258	353	313	348	317
2.1.3 Livestock	191	224	186	174	324	159	112	156
2.1.4 Research and Technology Development	136	119	180	199	158	161	286	261
2.1.5 Rural Development	274	266	322	509	491	338	386	600
2.1.6 Nutrition	79	91	70	52	204	127	110	85
2.1.7 Food and Agricultural Information and Analysis	71	84	54	37	20	50	46	5
2.1.8 Food and Agricultural Policy	209	228	184	167	252	259	302	344
2.1 Sub-total	1 662	1 583	1 448	1 526	2 067	1 598	1 704	1 897
2.2.1 Fisheries Information	7	3	5	16	3	5	2	8
2.2.2 Fisheries Exploitation and Utilization	108	95	167	171	52	67	194	79
2.2.3 Fisheries Policy	43	78	98	67	120	78	43	37
2.2 Sub-total	158	176	270	254	175	150	239	124
2.3.1 Forest Resources and Environment	40	67	40	12	30	44	30	7
2.3.2 Forest Industries	33	32	34	38	17	18	19	68
2.3.3 Forest Investment and Institutions	35	19	42	40	36	16	47	103
2.3.4 Forestry for Rural Development**	41	48	-	-	54	46	-	-
2.3 Sub-total	149	166	116	90	137	124	96	178
TOTAL	1 969	1 925	1 834	1 870	2 379	1 872	2 039	2 199

* For FAO staff only time spent in the field; for consultants entire duration of assignment
 ** As of the 1988-89 biennium activities for Programme 2.3.4 have been integrated under the three Programmes 2.3.1, 2.3.2 and 2.3.3

**Table 4.5a: Work-months of Direct Support to Member Countries
FAO Staff and Consultants*
(Regional Offices)**

Major Programme	Staff				Consultants			
	1984- 85	1986- 87	1988- 89	1990- 91 (Est.)	1984- 85	1986- 87	1988- 89	1990- 91 (Est.)
2.1 Agriculture								
RAFR	68	86	84	94	65	108	54	108
RAPA	132	130	112	97	114	93	64	63
REUR	12	11	32	7	19	19	20	2
RLAC	89	42	52	63	126	30	16	21
RNEA	113	171	184	104	97	142	124	93
Sub-total	414	440	464	365	421	392	278	287
2.2 Fisheries								
RAFR	3	6	9	38	11	15	7	16
RAPA	6	5	4	5	-	3	-	-
RLAC	10	2	2	2	3	-	-	-
RNEA	18	3	21	10	50	5	9	5
Sub-total	37	16	36	55	19	23	16	21
2.3 Forestry								
RAFR	4	3	1	4	1	8	5	10
RAPA	14	9	14	12	15	20	10	8
RLAC	8	3	4	9	12	5	5	4
RNEA	7	9	10	-	4	8	28	-
Sub-total	33	24	29	25	32	41	48	22
All Regions								
RAFR	75	95	97	136	77	131	66	134
RAPA	152	144	130	114	129	116	74	71
REUR	12	11	32	7	19	19	20	2
RLAC	107	47	58	74	141	35	21	25
RNEA	138	183	215	114	106	155	161	98
TOTAL	484	480	532	445	472	456	342	330

* For FAO staff only time spent in the field; for consultants entire duration of assignment

Table 4.6: Technical Backstopping of Field Projects
Major Programmes: 2.1 Agriculture, 2.2 Fisheries, 2.3 Forestry
(Headquarters and Regional Offices)

Programme	Number of Experts and Consultants				Work Months of Backstopping*			
	1984-85	1986-87	1988-89	1990-91 Est.	1984-85	1986-87	1988-89	1990-91 Est.
2.1.1 Natural Resources	882	870	880	724	413	406	340	284
2.1.2 Crops	2 590	2 235	2 104	2 007	591	683	554	517
2.1.3 Livestock	937	1 064	1 010	961	279	310	298	292
2.1.4 Research and Technology Development	349	608	704	379	370	545	400	309
2.1.5 Rural Development	1 073	896	1 206	1 342	579	640	456	786
2.1.6 Nutrition	274	246	252	289	159	176	202	199
2.1.7 Food and Agricultural Information and Analysis	182	240	286	348	94	107	116	143
2.1.8 Food and Agricultural Policy	588	725	942	968	269	331	424	474
2.1 Sub-total	**	**	**	**	2 754	3 198	2 790	3 004
2.2.1 Fisheries Information	15	52	51	29	3	30	18	24
2.2.2 Fisheries Exploitation and Utilization	680	671	613	814	318	321	228	249
2.2.3 Fisheries Policy	107	86	99	95	77	110	98	75
2.2 Sub-total	**	**	**	**	398	461	344	348
2.3.1 Forest Resources and Environment	583	566	572	595	61	69	51	90
2.3.2 Forest Industries	240	205	184	190	71	59	56	50
2.3.3 Forest Investment and Institutions	304	170	430	445	81	32	76	80
2.3.4 Forestry for Rural Development***	253	243	-	-	67	50	-	-
2.3 Sub-total	**	**	**	**	280	209	183	220
TOTAL	**	**	**	**	3 432	3 869	3 306	3 572

* Professional staff only

** Not additive as many experts and consultants are backstopped by more than one Programme. As more than one Sub-programme within a Programme may backstop an expert or consultant, these figures also contain an element of double counting

*** As of the 1988-89 biennium activities for Programme 2.3.4 have been integrated under the three Programmes 2.3.1, 2.3.2 and 2.3.3

**Table 4.6a: Technical Backstopping of Field Projects
(Regional Offices)**

Major Programme	Number of Experts and Consultants				Work Months of Backstopping*			
	1984- 85	1986- 87	1988- 89	1990- 91 (Est.)	1984- 85	1986- 87	1988- 89	1990- 91 (Est.)
2.1 Agriculture								
RAFR	126	107	134	99	73	67	52	44
RAPA	161	205	182	208	75	124	114	142
REUR	11	103	102	-	8	48	24	-
RLAC	166	216	158	217	60	136	82	90
RNEA	236	276	254	265	121	112	116	91
Sub-total	**	**	**	**	337	487	388	367
2.2 Fisheries								
RAFR	10	24	10	7	2	5	5	18
RAPA	36	49	18	21	15	15	15	11
RLAC	12	26	22	14	6	10	8	5
RNEA	4	7	11	11	2	22	25	7
Sub-total	**	**	**	**	25	52	53	41
2.3 Forestry								
RAFR	38	15	5	15	4	3	2	6
RAPA	42	36	43	44	14	17	14	12
RLAC	18	26	19	28	7	11	7	9
RNEA	28	65	72	-	8	10	11	-
Sub-total	**	**	**	**	33	41	34	27
All Regions								
RAFR	174	146	149	121	79	75	59	68
RAPA	239	290	243	273	104	156	143	165
REUR	11	103	102	-	8	48	24	-
RLAC	196	268	199	259	73	157	97	104
RNEA	268	348	337	276	131	144	152	98
TOTAL	**	**	**	**	395	580	475	435

* Professional staff only

** Not additive as many experts and consultants are backstopped by more than one Programme. As more than one Sub-programme within a Programme may backstop an expert or consultant, these figures also contain an element of double counting

Databases

- 4.17 As a major international centre of global food and agricultural information, data in computerized storage and retrieval systems play an important role in FAO. Table 4.7 shows the list of the computerized databases developed and maintained under the three Major Programmes. The importance and size of these data bases continue to grow over the years. In 1990-91, these contained some 10,000 million megabytes of information, of which nearly 7,000 megabytes is numeric data. Work on WAICENT, the World Agricultural Information Centre, including the Geographic Information System (GIS), has helped to reduce overlaps and inconsistencies among the various individual databases.
- 4.18 The largest data bases are found under Research and Technology Development (especially AGRIS, CARIS, ARTEMIS) and Food and Agricultural Information (AGROSTAT). Other major databases include FISHDAB, which contains fisheries statistical data, and Forest Products Directions of Trade. A number of smaller but equally important specialized databases are found in all technical divisions at Headquarters and in the Regional offices. These data are made available to internal and external users in various formats; including on-line through the telephone lines, CD-ROM compact disks, diskettes, or tapes.

Table 4.7: Current Computerized Databases by Programme/Operational Unit

<u>Programme Code</u>		<u>Operational Unit</u>	<u>Title of Databases</u>
2.1.1	Natural Resources	AGL	- Agro-ecological Zones (AEZ) - Population Potentials - Geographic Information System - Crop Water Irrigation Schedule - Fertilizer Programme Trials and Demonstrations
		RAPA	- Natural Resources Statistics - All RAPA countries and world - FAO Fertilizer Programme Data (BGD, INS, NEP, PAK, PHI, THA) - Fertilizer Response - Thailand (9 crops) - Organic Recycling Network
2.1.2	Crops	AGS	- International Directory of Agricultural Engineering - Farm Equipment Specifications - Farm Machinery Manufacturers
		AGP	- Code of Conduct on Pesticides - Plant Quarantine System - Information System for Improved Plant Protection - Seed Information System
		RAPA	- Selected Indicators of Crops Production in Asia-Pacific Region 1961-87
2.1.3	Livestock	AGA	- Animal Health - Tropical Feeds
2.1.4	Research and Technology Development	GI	- AGRIS - CARIS - FAODOC
		AGR	- ARTEMIS - Agro-climatic Data System - Agro-meteorological Data Systems
2.1.5	Rural Development	ESH	- Socio-Economic Indicators WCARRD

Programme Code	Operational Unit	Title of Databases
2.1.6 Nutrition	ESN	- FAO/WHO Food Additives - Nutrition Country Profiles
	RAPA	- Asian Network for Food Nutrition on the Progress of Nutrition Improvement - Towards Nutrition Adequacy in Asia-Pacific Region - Training Package for Dietary Guidelines for Food and Agriculture Planning
2.1.7 Food and Agricultural Information and Analysis	ESC	- Raw Material Information System - Cereals System Food Security (GIEWS) - Food Cereal Balance Sheet - Oils, Oilseeds, Fats System - Fibre Consumption
	ESS	- AGROSTAT - World Census of Agriculture - Fertilizer Data - Socio-economic Indicators (see also WCARRD ESH above) - Demographic Estimates and Projections - Food Consumption Income and Expenditures - Trade Matrices - External Assistance to Agriculture
	RAPA	- Agricultural Censuses in Asia-Pacific Region - Their Design, Operations and Methodological Problems
	RLAC	- AGROSTAT - JLAC/ESS
	JEUR	- Average prices paid and received by farmers in Europe and North America
2.1.8 Food and Agricultural Policy	ESD	- Global Perspective Study
	ESP	- SOFA - World and Regional Review
	ESC	- World Food Model - Food Consumption Surveys and Income - Elasticities - Compendium of Macro-economic Indicators
2.2.1 Fisheries Information	FIDI	- Fishery Statistics Database (FISHDAB) - Fishery Management Information System (FIMIS) - Aquatic Sciences and Fisheries Abstracts (ASFA) - Fishery Project Information System (FIPIS)

<u>Programme Code</u>		<u>Operational Unit</u>	<u>Title of Databases</u>
2.2.2	Fisheries Exploitation and Utilization	FIRM	- SPECIESDAB
			- Joint Database on Living Aquatic Resources in Collaboration with ICLARM (FISHBASE)
		FIRI	- Lista de Acuicultores Latino-Americanos (LISTAL)
		FIRI/ FIIT	- Sistema de Información para la Planificación de la Acuicultura Latino-Americano (SIPAL)
		FIIT	- Research Vessel Database (RVD)
		FIIT/ FIRI	- Database on Fishing Technology and Aquaculture Equipment Suppliers, Aquaculture Institutions, and Aquaculture Experts (Clearing House)
2.2.3	Fisheries Policy	FIPP	- Fishery Policy and Planning Data Bank (FIPDAT)
2.3.1	Forest Resources and Environment	FORP	- Forest Resources Information System (FORIS)
		FORW	- Forest Wildlife Conservation Information System (FOWCIS)
		RAPA	- Forest Resources
2.3.2	Forest Industries	FOP	- Tropical Forestry Products World Trade
			- Projected Pulp and Paper Mills in the World
		FODP	- Forest Products Directions of Trade
		RAPA	- Forestry Production and Trade
2.3.3	Forest Investment and Institutions	FODP	- Forestry Production, Consumption, Trade
			- Forest Product Prices
			- Pulp and Paper Capacities
			- Wood-based Panels
			- Forest Resources
		JEUR	- Timber
			- Timtrade
			- Forest Resources
			- Forest Fires

CHAPTER FIVE

TECHNICAL COOPERATION AND DEVELOPMENT SUPPORT

- 5.1 This chapter reviews the activities of the Development Department, which cover the Technical Cooperation Programme (Major Programme 4), Field Programme Planning and Liaison (Major Programme 3.1), Investment (Major Programme 3.2), Special Programmes (Major Programme 3.3) and FAO Representatives (Major Programme 3.4). The operations under the Technical Cooperation Programme from 1986 to 1990 are reviewed in Chapter Three of the Review of Field Programmes 1990-91. Similarly, field operations are covered in details in Chapter Two of the Review of Field Programmes.

I. TECHNICAL COOPERATION PROGRAMME Major Programme 4

Objective

- 5.2 The Technical Cooperation Programme (TCP) was established in 1976 to provide a quick response to requests for urgent or unprogrammed assistance. The Programme gives emphasis to increased food and agricultural production in developing countries and in raising the income of small producers and rural workers through small-scale projects which fall within seven categories: training, advisory services, emergencies, investment, formulation/programming missions, TCDC and support to development.
- 5.3 The TCP unit within the Field Programme Development Division (DDF) is responsible for day-to-day management of the programme, appraisal of incoming requests, liaison with the technical and operations units at Headquarters and field support during implementation.

Progress and Achievements

- 5.4 The budgetary appropriation for the 1990-91 biennium amounts to US\$ 67.8 million or 11.9 percent of the Regular Programme resources. It represented a programme increase of US\$ 1.75 million over the allocations for the previous biennium. During 1990, US\$ 42.4 million of the total appropriation for the biennium was committed to 289 approved projects. This represented an increase of about 10% over 257 projects approved in 1988. By March 1991, a further 71 TCP projects were approved for a total of US\$ 9.0 million.
- 5.5 During the biennium, the most important areas for TCP assistance have continued to be the provision of advisory services - 48.2% (up from 32.6% in 1989) and training - 27% (up from 22.6% in 1989). Although varying from year to year, these two

categories alone account for over 75% of TCP allocations. On the other hand, allocations for emergency and investment support have declined from 26.1% and 9.9% in 1988-89 to 8.2% and 6.9%, respectively, during 1990-91.¹ The low allocation to projects in emergency category reflects relatively fewer reports for this type of support as well as the fact that TCP projects supporting the screwworm operations have been classified under other categories.

- 5.6 TCDC, a category included in the Programme since 1986, received 3.1% of the resources in 1990-91, a slight increase from 2.6% in 1988-89. Expectations for a rapid increase of funding for this category have not materialized because of difficulties in complying with the strict criteria set by the TCP Programme that the concerned governments must agree to meet local costs, leaving only external inputs to be covered by TCP. The allocation to the formulation/programming missions category has remained at 5.6%, without any change for the previous biennium.
- 5.7 Regional distribution of funds under the TCP Programme during the biennium has increased for Latin America and the Caribbean and decreased for the Near East. Africa received 40.0% of TCP funding, followed by Latin America and the Caribbean (23.0%), Asia and the Pacific (22.5%), Near East and North Africa (12.5%) and Europe (2.0%), particularly Eastern Europe.

Outlook and Issues

- 5.8 TCP activities will continue to be pursued during the next biennium, especially in support of activities linked with the priority areas in the Regular Programme, including sector/sub-sectorial policy and planning works. Increased involvement of FAO representations at the country level for the screening of incoming requests and the monitoring of progress achieved under the TCP will be further pursued (see also conclusions and issues on the subject in Chapter Three of the Review of Field Programmes 1990-91).

II. FIELD PROGRAMME PLANNING AND LIAISON

Major Programme 3.1

Objective

- 5.9 The main purpose of the Major Programme is to assist member governments in assessing their technical cooperation needs and identifying relevant programmes and projects in accordance with their national priorities for implementation under FAO's Field Programme.

¹ Figures cover the period January 1990 to March 1991.

- 5.10 The Field Programme Development Division (DDF) is responsible for the implementation of this Major Programme through: the development of programme and project pipelines meeting recipient country requirements; the mobilization of extra-budgetary resources; liaison with bilateral and multilateral organizations on field operations; monitoring of FAO Field Programmes; coordination of FAO support to WFP activities; the promotion of technical cooperation among developing countries (TCDC); management of the Technical Cooperation Programme (TCP); and support to FAO representations at country and regional levels.
- 5.11 During the 1990-91 biennium, Regular Programme resources allocated for the Major Programme amounted to US\$ 6.8 million, with extra-budgetary resources totalling US\$ 10.4 million.

Level of Field Activities

- 5.12 The Major Programme provided support to over 2,250 projects with a total donor allocation of US\$ 2.1 billion as of April 1991. Overall field programme delivery in 1990 reached US\$ 406.7 million compared with US\$ 358.0 million in 1989 and US\$ 341.5 million in 1988. The focus of the overall field programme has remained on Africa with 46% of total expenditures, followed by Asia and the Pacific 22%, Near East and North Africa 13%, Latin America and the Caribbean 9%, and Europe 2%. The remaining 8% were for inter-regional and global activities. The share of project approvals reflected the same geographical distribution.
- 5.13 UNDP-financed projects decreased in number from an annual average of 905 in 1987-88 to 881 in 1989-90. However, the expenditures increased from US\$ 283.4 million to US\$ 340.3 million. The high level of approvals experienced during the first years of the Fourth Cycle (1987-91) continued during 1990-91 at around US\$ 180-200 million per year.
- 5.14 The overall financial situation of UNDP has remained stable during the biennium at about US\$ 1 billion in 1991, and total UNDP delivery is expected to grow during the fifth cycle with an estimated annual growth of 8 percent in contributions. The share of the agricultural sector is also expected to remain around 25 to 26 percent of funding. The future FAO share, which has declined from about 21% during 1984-85 to 17% in 1990, remains uncertain, however, due to the increased recourse by UNDP to the national executive modality. Various policy and operational issues arising from this matter are reviewed in detail in Chapter One of the Review of Field Programmes.

- 5.15 Project expenditures under Trust Fund totalled US\$ 312.2 million² in 1989-90, a slight increase over the 1987-88 expenditures of US\$ 307.5 million. During the biennium, the Netherlands became the largest single donor to the Programme covering 15% of the Trust Funds, followed by Italy with 14% and Saudi Arabia with 6%.
- 5.16 Much of Trust Fund support has been linked with field activities in the areas of priorities established under the Regular Programme. A notable feature within the TF Programme during the biennium has been the establishment of a new programme for the fight against screwworm infestation, together with the closing of the ECLO in 1990. The new programme, which is operated by the emergency centre for the fight against screwworm (SECNA), recorded a total delivery as at April 1991 of about US\$ 5 million.
- 5.17 Expenditures under Unilateral Trust Funds have shown a slight increase from US\$ 60.8 million in 1987-88 to US\$ 63.7 in 1989-90, of which US\$ 30 million have been for projects linked to investment projects supported by the World Bank. The increase reflects greater efforts mounted at the country level by the FAO Representations and the Development Department in intensive monitoring of World Bank loans and in following up with Host Governments the services that could be provided by FAO. The World Bank issued in 1990 a publication explaining the procedures to be followed to contract specialized UN Agencies and this could open further opportunities for FAO involvement in this type of projects in future.

Progress and Achievements

- 5.18 During the biennium, considerable efforts have been made in streamlining the management of upstream activities in the project cycle, including further integration of country policy advice in FAO's field operations. Several improvements have been introduced, notably: standardized project formulation formats (for both UNDP and TF projects), increased project appraisal at the country level and in-depth country information systems. Environmental impact assessment procedures developed by the IDWG on Environment and Energy were also introduced in 1990 on a trial basis. Steps were also taken to prepare comprehensive project formulation guidelines as well as a field programme manual to bring together the relevant guidelines, instructions and manuals currently in use throughout FAO.
- 5.19 In order to strengthen the formulation and monitoring of FAO country programmes, "Country Programme Monitoring Reviews" (CPMR) were initiated in close collaboration with FAO Representatives, particularly for the preparation of the

² Reporting on expenditures under Trust Fund is being realigned as from 1990 to conform to that used for UNDP, which includes commitments. On this basis, i.e. including commitments of US\$ 46.4 million for 1990, the project expenditures under Trust Fund in 1989-90 were US\$ 358.6 million.

comprehensive "Country Information Briefs". Twenty-three such country reviews were completed during the biennium. The systematic inclusion of DDF participants in special training workshops on project formulation and gender issues has also contributed to enhance quality of the backstopping provided by the Development Department (DD) to field programme activities.

- 5.20 The first issue of a Yearbook of on-going FAO field projects was distributed in 1990 and the second issue is due in mid-1991. A booklet has also been prepared, entitled "FAO Services for Development", for publication in 1991.
- 5.21 Close collaboration has been maintained with UNDP both at Headquarters and country levels, and DDF staff and FAO Representations participated in some 50 mid-term reviews of UNDP country programmes and other activities related to the preparation of the Fifth Cycle 1992-96. In collaboration with donors under the FAO/Government Cooperative Programme, greater emphasis has been given to monitoring of Trust Fund activities at periodic joint review meetings. In reviewing future development programmes with various donors, particular attention has been given to planned activities under the FAO's Special Action Programmes.
- 5.22 During the 1990-91 biennium, matters concerning the UNDP support costs successor arrangements, due to be implemented from 1992 onwards, absorbed significant resources under the Major Programme, including numerous meetings and consultations during 1990-91 in an effort to define and elaborate the structure of the new support costs arrangements: FAO has been providing the Chairmanship of the joint agency group, the CCSQ (OPS) Task Force on Support Costs, dealing with this subject. Detailed information on this is given in Chapter One of the Review of Field Programmes 1990-91.
- 5.23 The Field Programme Committee (FPC), which represents the senior inter-departmental mechanism for the coordination of FP activities in FAO, has been reinforced with an enlarged membership, now covering representations of several units of AF and PBE. This is expected to facilitate more systematic deliberations of policy-related matters relating to the field programme by the Committee, such as the issues regarding support cost successor arrangements and the Field Programme Information System.
- 5.24 Technical support to the World Food Programme has continued under the coordination of the FAO/WFP Liaison Unit within DDF, covering all stages of the project cycle: planning, formulation, appraisal, implementation, evaluation. During 1989-90, FAO participated in 101 WFP missions for project appraisal and evaluation and provided assistance in the preparation of 92 projects for a total cost of US\$ 1.018 million. The higher volume of FAO technical services during 1990 reflected a slight improvement in the situation of WFP resources which, during 1989, showed acute shortages.
- 5.25 The main thrust of TCDC activities for the biennium has continued to be focused on: promoting the use of networks through the Regular and Field Programme activities;

assisting countries in identifying capacities and needs for TCDC in the fields of agriculture, forestry and fisheries; and exploration of possible funding sources for TCDC activities. National TCDC papers have also been elaborated through FAO Representations and the semi-annual TCDC newsletter has been regularly distributed to sensitize FAO staff and to inform government authorities of innovative approaches as well as to disseminate experiences in TCDC activities. Although many countries remain interested in the programme, some reluctance is noted on the part of many governments to use their own resources for TCDC.

Outlook and Issues

- 5.26 FAO's field programme has continued to evolve, with an increasing diversification in the services expected from FAO by developing countries and donors alike. In meeting new challenges, DDF has taken a series of steps to further strengthen the services to be provided by FAO in field programme development, project formulation and appraisal. However, many of the initiatives planned for the biennium have not been implemented fully, due primarily to resource constraints. Similarly, the lack of resources has hampered DDF in carrying out country programming missions and other important activities. Furthermore, the planned introduction of the national execution modality in 1992 by UNDP has introduced uncertainties regarding the nature and structure of future FAO field operations in cooperation with UNDP. The issues involve not only the role of FAO Headquarters units, but also that of FAO country offices. Altogether, these indeed represent a serious challenge to the Major Programme and to FAO, especially under the current circumstances of severe financial constraints.

III. INVESTMENT

Major Programme 3.2

Objective

- 5.27 The objective of the Major Programme 3.2 is to mobilise domestic and external resources for agricultural and rural development, including fisheries and forestry, through the formulation of investment projects for presentation to international and regional financing institutions. Emphasis is given to investments aimed at rapidly increasing the production capacity, efficiency and export earnings of member countries. Support is also provided in the form of sector and sub-sector studies in order to establish investment priorities and provide a basis for policy dialogue between governments and financing institutions. The Regular Programme allocation for the 1990-91 biennium was US\$ 23.6 million.
- 5.28 The Major Programme is implemented by the Investment Centre (DDC), comprising the FAO/World Bank Cooperative Programme (CP) established in 1964 and the Investment Support Programme (ISP) established in 1970. Seventy-five percent of the CP is paid for by the World Bank, while missions mounted on behalf of financing

institutions cooperating with the ISP are reimbursed in part through cost-sharing arrangements. During the biennium, the World Bank's allocations (US\$ 17.6 million) and reimbursements from other financial institutions have remained at much the same level as in previous biennia.

Investment Support Activities

- 5.29 During 1990, 38 investment projects, prepared with the assistance of FAO's Investment Centre, were approved by financing institutions for total investments of US\$ 2,588 million, including US\$ 1,490 million in external loans: in 1989, 43 projects were approved, for investments of US\$ 3,864 million including external loans of US\$ 1,782 million (the exceptionally high figures in 1989 were due to the financing of a very large project in Turkey). During 1990, the Investment Centre was involved in identifying or preparing 108 investment projects and 14 sub-sector and area development studies in 67 countries. Preparation was completed for 44 projects, with estimated total investment requirements of US\$ 2,605 million (53 projects with investment requirements of US\$ 3,500 million in 1989). This work entailed a total of 191 missions under the Investment Centre's technical responsibility and participation in 37 missions under the responsibility of financing institutions.
- 5.30 Work with the World Bank and IFAD continued at a high level and cooperation with the Asian Development Bank was resumed on a modest scale. In 1990, there was a slight decrease in project work undertaken with the African Development Bank (AfDB) and the United Nations Capital Development Fund (UNCDF). In the case of AfDB, this was due mainly to the reorganization within the Bank itself, and also because in several countries, mission work was prevented or postponed for security or macro-economic reasons. Joint activities, however, returned to their former levels during 1991. For UNCDF, 1990 was the last of its three-year programme cycle and the Investment Centre had completed most of its work in support of UNCDF's agricultural lending programme during the first two years. A full programme of work has been scheduled for 1991 and 1992.
- 5.31 The new FAO/AfDB Cooperative Agreement and Memorandum of Understanding were finalized during 1990: if approved by the Bank's Board of Governors and by the FAO Council and Conference during 1991, it should be applied as from 1992. A new agreement between FAO and the Inter-American Development Bank for cooperation in the field of investment is expected to be finalized during 1991. It is hoped that this will lead to an increase in Investment Centre activities in Latin America and the Caribbean.
- 5.32 Efforts continued to increase investment follow-up to FAO/UNDP technical assistance activities. Fifteen possible investment projects were identified during 1990 for estimated investment requirements of US\$ 600 million (in 1983, 13 for US\$ 147 million). Of particular interest was the general identification mission to Viet Nam which sought out investment possibilities based on review of the entire FAO/UNDP programme in the country. Another initiative was the study in Indonesia, funded by

UNDP, which reviewed the climate for private sector investment in agri-business and, in particular, the development of the horticulture sector.

- 5.33 In view of the relatively small number of TA projects with investment potential in FAO's field programme, a Task Force was established in the Investment Centre to consider how the Centre could contribute further to ensuring that more technical assistance is designed and implemented leading to investment. This resulted in proposals for a considerable expansion of on-farm testing of technologies to generate technical information on which to base the design of investment projects.
- 5.34 To improve the quality of project preparation, the Investment Centre has prepared new guidelines for the design of agricultural investment projects and for financial and sociological analysis in agricultural project preparation. The papers are being published as part of the Investment Centre series of Technical Papers.
- 5.35 Efforts continued to adjust the mix of skills of the Investment Centre staff to changing requirements by increasing its forestry staff, and slightly decreasing its fisheries specialists. The number of rural sociologists is also being increased in response to the rising demand for work on beneficiary identification and people's participation.
- 5.36 The Investment Centre's Trainee Programme was revived in 1990 and three trainees from developing countries were in place during 1991, participating in Investment Centre missions and report writing. Staff training has continued throughout the biennium with a combination of seminars given within the division and attendance at training courses organized by the World Bank and other cooperating institutions.

Outlook

- 5.37 Demand for the services of the Investment Centre, from both developing countries and financing institutions, can be expected to remain strong during the 1992-93 biennium, with continuing urgent need of increased agricultural investment in most developing countries. The World Bank has reiterated its support for the FAO/World Bank Cooperative Programme and agriculture continues to be a priority in the lending policies of the other major financing institutions cooperating with FAO.
- 5.38 While the bulk of the Investment Centre's work will, as in the past, focus on projects that will increase food production and raise incomes of the rural poor, the proportion of projects for forestry, environmental protection and land management is expected to increase. Particular attention will be given to social and institutional considerations and to improving the technical basis for the design of investment projects.

**IV. FREEDOM-FROM-HUNGER CAMPAIGN/ACTION FOR
DEVELOPMENT
Programme 3.3.1**

Objective

- 5.39 The Special Programme "Freedom-from-Hunger Campaign/Action for Development" (FFHC/AD) represents the key component of FAO's cooperation with NGOs (of both developing and developed countries) at national and regional levels, in promoting self-reliant development action by the rural poor of developing countries. It is aimed at mobilising resources and technical cooperation among NGOs, taking advantage of technical experience of FAO in rural development. Its assistance includes: formulating development projects geared towards attaining food security and self-sustaining agriculture; mobilizing resources from NGO donors and other partners in developed countries through soundly designed projects; providing technical and organisational training for NGO staff and peasant organisation leaders; and promoting exchange of information and experience among NGOs in developing and developed countries. In this context, the Programme participates in the promotion of public debate on poverty-oriented rural development and dissemination of information on development issues and educational material in food, agriculture and rural development.
- 5.40 Regular Programme allocations for Programme 3.3.1 for the 1990-91 biennium amounted to US\$ 1.5 million, with extra-budgetary support of US\$ 0.35 million. The Programme has been implemented until the current biennium by a unit (DDA) located in the Office of ADG/DD, which comprises 3 professional staff and 6 GS staff.

Progress and Achievements

- 5.41 Project approvals for FAO execution under the FFHC/AD increased from US\$ 5.2 million during 1986-88 to US\$ 8.7 million in 1990. During 1989-90, over 50 organisations in Africa, Asia and Latin America were assisted by FFHC/AD in project formulation and evaluation. Over 65 operational projects were being backstopped through the Programme in 1990. NGO contributions to FFHC/AD projects have increased steadily over the past two biennia, averaging US\$ 1.8 million per year as compared with US\$ 0.45 million per year during the first half of 1980s.
- 5.42 FFHC/AD projects are aimed at addressing development constraints identified by local farmers through maximum use of local resources. Concerns addressed through the Programme vary according to the specific needs of NGOs in each region; for example, agro-ecology and food security in Latin America, the impact of structural adjustment in Africa, environmental degradation in Asia. In Ethiopia, the FFHC/AD programme since 1988 has mobilized over US\$ 5 million in donor contributions to help peasant associations in drought-prone areas for rehabilitating their agricultural production and for reducing its vulnerability to climatic changes. In South East Asia,

the Programme has been assisting local NGOs in the inter-country exchange of experiences and approaches to sustainable development. In Latin America, a consortium of national and local NGOs working in the field of agro-ecology has been supported in the formulation of integrated programmes involving research, training and the transfer of appropriate technologies for increased food production in marginal areas.

- 5.43 The IV International FFHC/AD Consultation, originally foreseen for 1990, has been delayed to the 1992-93 biennium due to budgetary constraints. The meeting will provide a forum for discussion with representatives of NGOs, from both the North and the South, on joint concerns and activities. Sustainable rural development has been identified as the key issue to be discussed through specific NGO interest groups in biogenetics, food security, the transfer of appropriate technologies, etc. A bi-monthly publication "Development Education Exchange Papers" (DEEP) has been continued to promote the diffusion of new ideas and relevant experiences in agricultural and rural development among NGOs, from both the North and the South. During the biennium, DEEP was distributed to approximately 9,000 readers in most member countries.

Outlook

- 5.44 In order to enhance and strengthen FAO's work with NGOs on issues of relevance to the Organization's mandate, FFHC/AD is proposed to be merged, from 1992-93, with IAA to form a consolidated Office for External Relations. The merger should result in strengthened links with official decision-makers and in-house technical expertise, and enhance FAO's liaison with various categories of NGOs, both in the North and the South. Work will be carried out under the new Sub-programme 1.4.1.2 - Non-Governmental Organizations.
- 5.45 Within the UN system, FFHC/AD's long-standing relations with the NGO sector are recognized by agencies seeking to include NGOs in the development planning process and in the formulation and implementation of village-level activities. Increased demand for its services is expected to continue throughout the next biennium both from the developing regions and from donor partners. New dimensions of multi-bi cooperation will be sought with increased involvement of NGOs and donor governments to enable FAO to achieve maximum access to grassroot levels and the innovative approaches being developed through NGOs.

V. FAO REPRESENTATIVES

Major Programme 3.4

Objective

- 5.46 The objective of the Major Programme is to facilitate direct and effective dialogue with Member Governments, especially on FAO's activities at the country level, and to guide and support FAO's programmes/activities at the country level, including coordination with other international agencies.

- 5.47 The Regular Programme appropriation for the 1990-91 biennium for this Major Programme amounted to US\$ 55.2 million, with host country contributions to the Programme at the total of US\$ 2.2 million.

Progress and Achievements

- 5.48 The number of FAO Representations during the biennium has remained unchanged at 74, covering over 100 countries through double/special accreditation. Twenty-nine countries are covered by double accreditation and by the liaison officers with the host countries in the Regional Offices. Two Programme Officers and two Senior Advisors were outposted to countries covered by double accreditation or in countries where the scale of FAO-sponsored activities warranted more intensive support.
- 5.49 During 1990-91, 150 professionals were working in FAO Representations, supported by 661 locally-recruited and 10 internationally-recruited general service staff in addition to 150 government-provided national staff. The total personnel working in FAO Representations thus numbered 971.
- 5.50 Measures are under review and, in some cases, implemented, to reinforce the role of the FAO Representations in technical advice and/or channel of communication for the identification of available technical expertise. The grading structure of Programme Officers has been reviewed in the light of different requirements of individual offices and, in many cases, the posts of Programme Officers have been upgraded to recruit more experienced personnel. In Zimbabwe, also covering Botswana, and in Yemen, Senior Advisors are in post. Six new posts, established during the biennium, of which three at senior level, will continue in the next biennium.
- 5.51 The role of the FAO Representations in project and programme development continued to expand, especially with regard to the screening of requests and the monitoring of the TCP projects. They have been playing an increasingly active role in the preparation and appraisal of project requests, streamlining FAO's country project pipeline, and in the preparation of Country Intelligence Briefs as part of monitoring of FAO country programmes. In addition, they have also played a key role in support of staff security in the field.
- 5.52 The role of FAO Representations is increasing in importance, in support of National Project Directors in countries with a large share of nationally-executed projects, especially in Asia and Latin America. A total of 41 FAO Representations are now providing administrative and financial support to all country projects financed under Trust Fund arrangements. The trend is expected to continue with the planned introduction of the national execution modality by UNDP in 1992, with a greater demand on FAORs to provide such support services.
- 5.53 Mainly as a result of the budgetary constraints under which FAO has operated during the last two biennia, various activities originally planned under the decentralization programme could not be carried out. Most administrative training seminars have been suspended for the past two biennia. These training courses, which were meant to

suspended for the past two biennia. These training courses, which were meant to familiarize national and international staff with FAO rules and regulations in administration and finance, have been essential to the decentralization programme given the high turn-over of administrative/ programming staff at the country level.

Outlook and Issues

- 5.54 Support to member countries through the FAO Representations has proven to be a valuable tool for the provision of timely technical advice at the country level. They have continued to function as a valuable source of information for FAO technical divisions and operations units. Their involvement in country programme development as well as in the operational backstopping of projects, especially for those under national direction, has also increased. Other responsibilities such as the screening of incoming requests for technical assistance have continued to expand, placing additional demands on the capacity of staff in the Representations. Improvements introduced in the upgrading of existing posts and the establishment of the post of senior officers in countries with large technical assistance programmes are aimed at strengthening FAO's decentralization process. However, after a period of their virtual suspension, there is a pressing need to reactivate training programmes for the FAOR staff to ensure their effectiveness in meeting the growing demand on their services.

CHAPTER SIX

SUPPORTING SERVICES

- 6.1 The chapter covers administrative and support services provided to FAO Regular and Field Programme activities under Major Programme 5.1 - Information and Documentation - and 5.2 - Administration.

I. INFORMATION AND DOCUMENTATION

Major Programme 5.1

- 6.2 The objectives of this Major Programme are:
- to contribute to greater public awareness of the world food and agricultural problems and increased public and institutional support to FAO programmes (Programme 5.1.1);
 - to ensure timely provision of up-to-date technical material and bibliographic information in support of all programme activities both at FAO Headquarters and in the field; to coordinate the inter-library cooperative network AGLINET; to provide training in the management of agricultural libraries in FAO projects and FAO Representatives' offices (Programme 5.1.2);
 - to ensure that the Organization's needs for publications, periodicals, main documents, working papers and information material are met promptly and economically (Programme 5.1.3).

Progress and Achievements

Programme 5.1.1: Public Information

- 6.3 During the period under review, the focus was mainly on world food security, the screwworm threat to Africa as well as FAO's regular assessments of the world food situation.
- 6.4 Current Information: Press releases and news features concentrated on the food security situation and particularly highlighted the deteriorating food supplies in Africa. Most Africa-related material was released in Nairobi for wider use by media. A special information initiative was launched to support the multi-donor campaign to eradicate the New World Screwworm from North Africa. Press briefings, including a major press conference at Rome's Foreign Press Association, were held to increase public awareness and mobilize support for the campaign, and to draw attention to the

coordination and technical support provided by FAO's newly created Screwworm Emergency Centre for North Africa (SECNA). Altogether, 350 video copies in various languages were supplied to television outlets worldwide to mobilize support for this campaign.

- 6.5 Other important topics included sustainable development with special reference to the Tropical Forestry Action Plan (TFAP), genetic resources, biodiversity, climate change, and depletion of plant nutrients. Special media campaigns supported major events such as the World Forestry Congress and the FAO/Netherlands conference on Agriculture and the Environment.
- 6.6 Regional Conferences were given wide coverage. Contacts with regional and sub-regional news agencies were maintained and expanded for coverage of FAO field activities, and reportage missions were re-introduced to ensure extended coverage of FAO's priority themes by media outlets. Regional news features gave prominence to the themes of World Food Day for exclusive placement with the media in developing countries.
- 6.7 Some 250 radio programmes were produced in various languages and approximately 1,500 video programmes transferred and despatched. Topics covered included the Conservation and Rehabilitation of African Lands, Codex Alimentarius, Genetic Resources and Biotechnology, and the New World Screwworm. In addition, approximately 250 press releases and other news material were issued. The installation of new computer-operated facsimile machines permitted the direct delivery of written materials from the Press Section.
- 6.8 In cooperation with the Italian State Television (RAI) and the Ministry of Foreign Affairs, a 90-minute television programme "Linea Verde" was produced, which also transmitted a one-hour live programme on World Food Day. Media arrangements were handled for a charity football match in Rome in 1990 with proceeds going to World Food Day. Joint ventures with some shortwave networks, such as RFI, BBC and Afrique No.1, led to increased media interest in FAO's themes and activities.
- 6.9 Briefings were organized for groups and individuals, totalling 20,000 persons. Some 6,000 requests for information and material were also handled.
- 6.10 Information Materials: The wider use of computer-based techniques for the production of information materials continued. The expansion of computer facilities included a computer room and graphics studio, in order to strengthen the capacity for visual and multimedia presentations and pre-press preparation of materials for publication. This was accompanied by a strengthening of the Branch with the recruitment of professional staff with computer skills.
- 6.11 This strengthening has enhanced the capability to produce a range of quality products in a timely and cost-effective way. Highlights of the production included an audio-visual programme and display for the Regional Conference for Africa, an illustrated booklet on the multi-disciplinary Keita project, the FAO staff newsletter "Newslink", a booklet on the locust campaign, "new style" fact sheets, and annual reports on the

activities of FAO. Exhibits were prepared for exhibitions and conferences in Paris, Geneva, Verona and FAO Headquarters.

- 6.12 Twenty-four technical units were provided assistance in the presentation and preparation of information materials, including audio-visual presentations, displays, pamphlets, newsletters and booklets. Particular support was given to the Screwworm Emergency Campaign in North Africa (SECNA) in the production of display materials, graphics and a regular newsletter. Advice was given to technical divisions and external consultants on a wide range of computer applications.
- 6.13 Traditional activities included the preparation of features on FAO priorities and over 50 entries for national and international yearbooks. Assistance and advice was also provided on the content and style of major documents and technical papers for meetings. The Photo Library continued to receive visitors and requests for materials from external organizations, authors, publishers and television stations. During the biennium, some 60,000 slides and prints were distributed. In 1991, an appraisal of the Library's collection was begun for introducing computerization of the collection and captions so as to reinforce the Library's record of FAO's work.
- 6.14 A significant initiative was the organization of a three-day briefing for 25 science writers (over half of them from developing regions) on the role of science and technology in the work of FAO, held in connection with the 1990 World Food Day celebration. This marked the beginning of increased cooperation between science writers and FAO.
- 6.15 Ceres: Production was resumed in late-1990. Two issues were published in 1990 and six scheduled for 1991. The relaunch provided an opportunity to improve the magazine, and in particular to solicit contributions from well-reputed writers.

Programme 5.1.2: Library

- 6.16 User Services: The David Lubin Memorial Library which comprises the main Library and four branches continued to offer information retrieval and document delivery services to FAO staff at Headquarters and in the field as well as to external users. In 1990, nearly 25,000 visitors including 4,300 external users were received, more than 40,000 queries answered, nearly 2,900 bibliographic searches performed, more than 300,000 pages of photocopy made, and some 47,000 documents supplied on loan.
- 6.17 The bi-monthly current bibliography with indexes in English, French and Spanish was sent regularly to 3,200 recipients. The List of Selected Articles and New Books in the Library were incorporated in one document and sent to 900 recipients at FAO Headquarters and in the field. Document delivery was speeded up through the introduction of electronic mail for inter-library loans and document requests.
- 6.18 The FAO Representative offices continued to receive technical support for their libraries: a microcomputer package was prepared for the management of their

collections, and relevant subsets of microfiches of documents related to the respective countries were made and dispatched.

- 6.19 Collection, Building and Maintenance: The collection, indexing and microfiching of FAO's documents remained an important task of the Library. Some 4,000 documents produced at Headquarters and in the field were added in 1990 to the FAODOC database which constitutes a major repository of the Organization's institutional memory. Due to relatively modest price increases for both books and periodicals during the biennium, some subscriptions cancelled in 1988 could be resumed, and the level of acquisitions was generally improved. A computerized system was installed in 1991 in order to further rationalize serials record management.
- 6.20 Coordination of AGLINET (International Network for Agricultural Libraries): The Library continued to function as the international AGLINET centre. Representatives of 16 member libraries met in Rome in May 1990 in conjunction with the AGRIS/CARIS Technical Consultation. The meeting recommended a further extension of the network to include major agricultural libraries in the Near East, Asia and Latin America. Preliminary contacts with potential new members are being established.

Programme 5.1.3: Publications

- 6.21 Documents and Publications: Approximately 11,000 requests for document and publication processing were handled in 1990, a recovery from the low figures of the preceding biennium. This number was, however, still below the average of earlier biennia, in line with the Organization's policy to reduce the length of documentation.
- 6.22 The smaller number of publications and technical papers produced between 1987 and 1989 due to the Organization's financial constraints, had negative consequences for the Publications Revolving Fund, the sales revenue of which fell to US\$ 800,000 in 1990 from US\$ 1 million in 1989.
- 6.23 Two of FAO's technical periodicals, Unasylva and World Animal Review, which were suspended during the previous biennium, were re-launched during the biennium. The production was modernized through the use of computerized layout.
- 6.24 In 1990-91, FAO's subsidies for promoting the co-publication of documents and publications in non-FAO languages passed the US\$100,000 mark for the first time. New focal points for copublishing were set up in Laos, Malaysia, Nepal and Pakistan. Overall, around 100 FAO titles were published world-wide in local languages in 1990-91.
- 6.25 Following the conclusion of FAO's Management Review, the recommended reduction in internal printing capacity was initiated in 1990. The same review also recommended improvements in the External Printing section which were begun to be implemented in 1991. A review of distribution services led to the signing of a new contract for bulk dispatch of documents. An appraisal of FAO's depository libraries

was undertaken and plans prepared for the creation of new depository libraries in hitherto uncovered member countries.

- 6.26 Staff and Technical Innovations: Although recruitment of new staff resumed in 1990, several positions remained vacant and thus continued to hamper quality and quantity of work, delaying on occasion the distribution of meeting documentation.
- 6.27 The computerization of the production process was continued during the biennium with the introduction of FAO standard word processing software, expansion of the use of standard layouts for FAO publications, preparation of the first elements of a system for control of publications stock as well as a general accounting system, and initiation of a Terminology Data Bank. The latter, initially to be used by translators, will eventually be made accessible to other users in FAO Headquarters.
- 6.28 In line with the above innovations, the Publications Division initiated in 1990-91 a restructuring exercise so as to better adapt to the computerized work environment and to streamline the Division's structure. This will eventually result in a reduction of lower-graded General Service posts and a general revision of post descriptions.

Outlook and Issues

- 6.29 During the biennium, the staffing and financial situation of most units improved, facilitating a smoother workflow and permitting the resumption or initiation of previously cancelled or planned activities. The computerization of technical and administrative tasks has enabled significant progress in certain fields, but further development work and increased provision of equipment is needed to utilize fully the new facilities.
- 6.30 Library user support to field projects and FAO Representatives' offices was slightly improved during the biennium with the provision of a microcomputer package for library management, but other technical support was at an inadequate level due to funding constraints in the Field Programme.

II. ADMINISTRATION

Major Programme 5.2

- 6.31 The objectives of this Major Programme are:
- to provide efficient administrative and support services to all units of the Organization at Headquarters and in the field (Programme 5.2.1);
 - to maintain and increase further the efficiency and effectiveness of the Organization's financial services, while providing for full implementation of FAO's financial management system FINSYS (Programme 5.2.2);

- to assist programme managers and technical staff in the effective use of modern information tools and techniques, to facilitate the Organization's task of collecting, analysing, interpreting and disseminating information, and to advise on relevant applications in administrative programmes (Programme 5.2.3);
- to develop, recommend and administer personnel policies consonant with service by competent and motivated staff (Programme 5.2.4).

Progress and Achievements

Programme 5.2.1: Administrative Services

- 6.32 Administrative backstopping of field projects and FAO representations remained at a low level during the biennium. While requests for backstopping visits had been received from 98 projects, only 52 projects and 6 FAO Representations could be serviced during 1990 as only one Headquarters-based Field Liaison Officer post was filled due to financial restrictions. This, in addition to the gradual decrease in number of resident Administrative Officer posts (from 25 in 1982 to 16 in 1989 and 15 in 1990), as well as the trend to national execution and increasing use of National Project Directors, gives rise to concern as demand for administrative support is likely to grow. Priority will have to be given by AFS in the future to this important task in order to fulfil its mandate and provide quality administrative support to the field programme.
- 6.33 Procurement: The filling of vacant posts and the introduction of a more powerful computer had a positive effect on the workflow in the unit. There was, however, a decrease in overall procurement value from US\$ 77.5 million in 1988 to US\$ 60.9 million in 1989 and US\$ 51.6 million in 1990, and a corresponding decline in the number of transactions.
- 6.34 In view of the continuing difficulties encountered in the timely procurement of equipment and supplies, partly due to insufficient forward-planning or lack of clearly-defined specifications, AFS has increasingly participated in Project Task Force meetings in order to provide accurate information on specifications, costs and delivery time.
- 6.35 Contracts: While the total value of contracts committed in 1990 (just under US\$25 million) stayed approximately level with the amounts committed in 1988 and 1989, the actual number of transactions processed by AFSC decreased by 20% from 481 in 1989 to 386 in 1990. A review of the unit has begun with the aim of merging or integrating more closely AFSC and AFSP, in order to rationalize procurement activities.
- 6.36 Buildings: Major works related to the Headquarters Accommodation project were initiated during the biennium. Phase 1 - construction of parking lots - was being completed in 1991. Phase 2 - construction of foundations and walls for the new Building "F" - commenced in mid-1990 and is scheduled for completion by mid-1992. Preparations for Phase 3 - expansion works in Building "A" - began in Spring 1991.

Apart from the delay and subsequent change of construction plans experienced in Phase 1 due to archaeological finds, works have proceeded according to schedule.

- 6.37 The recommendations of FAO's Management Review continued to be implemented, particularly with regard to employing external contractors for maintenance functions. As a result, considerable savings were realized by not filling several General Service posts vacated during the biennium. The unit remained constrained, however, by the delayed recruitment of the Branch Chief and several professional vacancies.
- 6.38 Communications: The biennium saw a drastic increase in the use of facsimile transmissions, while telex traffic decreased. Despite the allocation of 23 facsimile machines to divisions, central facsimile traffic increased by as much as 129% in 1989 and 25% in 1990.
- 6.39 Studies on the computerization of communication systems in FAO were undertaken in consultation with AFC, and communication links with the FAO Liaison Office in Washington and the World Bank have been improved during the biennium. This work, and in particular the implementation of automated telex operations gained new momentum with the filling of the vacant Branch Chief position in AFST in late-1990, and the increased involvement of AFC in this field.

Programme 5.2.2: Financial Services

- 6.40 During the biennium, implementation and enhancement of FINSYS continued to receive priority. The implementation of several sub-systems encountered difficulties, requiring progressive refinements through action on change requests and problem reports received from users. Design improvements were added to the Reports and Inquiry units and to travel modules so as to ensure greater support to users in the interpretation of data and simplification of data entry.
- 6.41 FINSYS/PERSYS Payroll (Phase I) was operating efficiently and effectively, meeting all operational demands resulting from changes (both current and retroactive) in salary scales, pensionable remuneration, BMIP, MMBP, and numerous other changes to entitlements and deductions.
- 6.42 The FINSYS Phase II subsystems for Project Maintenance, Budget Maintenance, Payments Authorization, General Ledger, Treasury and Financial Reports and Inquiries became fully operational in January 1990. In the same month, the FINSYS Accounting Reference Manual (FARM) was published and distributed to Headquarters' staff and field offices to introduce the new FAO chart of accounts and related accounting attributes.
- 6.43 In February 1990, the FINSYS Travel subsystem (Phase III) was implemented, thus completing full implementation of the FINSYS project. Over one thousand FINSYS users are accessing the FINSYS database on a daily basis. Through the on-line inquiry facility, more accurate and timely information is available to the responsible

Headquarters staff. Also, more effective control is being exercised over the Organization's financial resources.

- 6.44 The implementation of FINSYS was achieved partly at the expense of diverting staff from their normal functions. Moreover, the Division continued to suffer from the staff reductions which took place during the recent years. As a consequence, backlogs accrued in a number of processing areas and the Division had to resort to temporary staff and overtime to overcome the problems.
- 6.45 An automated imprest accounting/financial monitoring system for use on personal computers was developed to be demonstrated at Regional Offices, large FAO representations and selected field projects. Once implemented, the system will speed up considerably the processing of field returns at Headquarters. Work is progressing on further FINSYS improvements, including the development of interfaces among the various sub-systems (field returns, treasury, travel, personal accounts) and interfaces with the Organization's banks, as well as the development of additional training/instruction materials for users.

Programme 5.2.3: Computer Services

- 6.46 Use of mainframe computer resources increased substantially during the period with the installation of FINSYS/PERSYS (see para. 6.43). Most of the FINSYS/PERSYS users were directly attached to the Amdahl mainframe, though an increasing number are accessing the system through the network installed in the House. The increased demand on mainframe processing capability led the Organization to consider the need for upgrading the mainframe installed in 1989 to be used for transaction-based administrative systems.
- 6.47 During the biennium, a new DBMS (Data Base Management System) was procured for immediate use for WAICENT and for future use on planned applications. The DBMS was selected after a rigorous evaluation of alternatives and a complete analysis of user requirements.
- 6.48 Office automation facilities were enhanced with the installation of an Ethernet network backbone in the main buildings. Approximately 400 PCs and work-stations are connected to the network. The Organization is in the process of considering an Integrated Communications Network, including both a digital PABX and, possibly, an enhanced computer networking capacity, for offices in the main buildings in Rome.
- 6.49 During the biennium, all departments completed medium-term computerization plans, with some already updating their plans for the next planning period. Some functions of the former Communications and Records Branch (AFST) were transferred to the Computer Services Centre (AFC) in order to improve the integration of similar activities.

Programme 5.2.4: Personnel Services

- 6.50 Following a period of reduced activities, the number of vacancy announcements and staff recruited during the biennium more than doubled over the annual levels of the previous biennium. During 1990, 167 vacancy announcements were issued and 143 cases presented to the selection committee for the General Service category, and 229 vacancy announcements issued and 173 cases presented to the Selection Committee for the Professional category. Notwithstanding its own limited staff resources, Central Recruitment handled this increased level of activities and was also able to resume recruitment missions for General Service and Professional staff. With regard to the latter category in particular, efforts were made to increase the share of staff recruited from under- and non-represented countries, as well as the share of female staff members in the Professional and higher categories.
- 6.51 A number of major classification reviews were initiated. A trial Draft Classification Standard for General Service Posts in Rome was developed and approved for testing by the Establishments Committee. In addition, classification reviews of existing General Service posts in several countries were undertaken as a result of salary revisions.
- 6.52 In the area of salary administration, the results of the comprehensive review for staff in the Professional and higher categories were introduced in July 1990. Following the review, a place-to-place cost-of-living survey was carried out and its recommendations were implemented in January 1991. A General Service salary survey was undertaken in Rome, on the basis of which a salary scale with all biennial steps was introduced.
- 6.53 Various social security measures were reviewed and implemented in consultation with the representatives of active and retired staff. A new Group Life, Accident and Disability Insurance Plan (GLADI) was introduced on 1 April 1991. A Group After-Service Medical Scheme, with automatic premium deductions from UNJSPF (United Nations Joint Staff Pension Fund) pension payments, started on 1 May 1990. The Joint Advisory Committee on Medical Coverage (JACMC) reviewed in depth the group medical insurance plans (BMIP/MMBP, MCS/MCNS), including cost-containment features for a new contract to become effective on 1 January 1992.
- 6.54 The FAO Staff Pension Committee contributed to the comprehensive review undertaken by the UN Joint Staff Pension Board on the methodology to establish the levels of pensionable remuneration and pensions for staff in the Professional and higher categories, and to the extension, in a modified form, of transitional measures for pensions established in local currency in high cost-of-living areas. A similar review for staff in the General Service category started in 1991.
- 6.55 Several enhancements to PERSYS were developed and implemented in 1990, e.g. the Rental Subsidy/Deduction Scheme Module. The various on-line modules for Position Classification and Control, Staff Member Servicing and PERSYS Inquiry Sub-systems reached an acceptable operational level in 1991. Major improvements were required in PERSYS to implement the comprehensive Review of Conditions of Service for

staff in the Professional and higher categories in July 1990, the Salary Scale with biennial steps for General Service staff at Headquarters in January 1991 and the new Group Life, Accident and Disability Insurance Plan in April 1991. Preparations have begun for the implementation of a microcomputer-based Senior Management Information System to improve access to personnel information and statistics.

- 6.56 The core programme of Staff Development was maintained, including training in the areas of Project Formulation, Briefing of National Project Directors, Electronic Data Processing, Retirement Seminars and Registry Procedures, and the organization of language examinations and language recruitment tests. Much of the work is carried out on a cost-sharing basis. Funds were made available to resume the External Training Programme and reinstate the Language Training Programme. Additions to the core programme are planned to meet priorities identified in the FAO Management Review of Personnel Practices and Procedures.
- 6.57 Various sections in the Administration Manual were updated and a study was carried out on the possible rationalization of the Manual.
- 6.58 The workload of the Medical Service has not changed substantially. The number of medical evacuations declined during the biennium.

Outlook and Issues

- 6.59 The concentration of efforts and resources on the implementation of FINSYS/PERSYS constrained the discharge of other administrative functions. Certain functions and sub-systems within FINSYS/PERSYS still have to be completed. The system has, however, stabilized during the biennium and is expected to bring full benefits to users once the computerization of FAO Headquarters is completed.
- 6.60 In order to take account of the changing workload and work profile of staff in administrative units following the increased usage of computers, plans are being developed for a restructuring/streamlining of certain administrative units. Overall, this is expected to result in a lower ratio of General Service to Professional staff, and selective abolishment of some lower-graded General Service posts.

PART TWO

Part Two of the present Review is an in-depth review of selected Sub-Programmes. The subjects covered are:

Chapter Seven	:	Natural Resources - Assessment and Planning (Sub-programme 2.1.1.1)
Chapter Eight	:	Crop Improvement and Management (Sub-programme 2.1.2.2)
Chapter Nine	:	Remote Sensing and Agrometeorology (Sub-programme 2.1.4.4)
Chapter Ten	:	Forest Food, Fodder and Fuelwood Systems (Sub-programme 2.3.1.4)

In all the in-depth reviews, both Headquarters-based activities and their related field components are covered. This makes it possible to treat the subject-matter in a comprehensive way, focusing on achievements and potential impact. The time-span of the in-depth reviews covers performance in the past five to six years.

The basic format followed in each chapter is as follows:

- Rationale: A brief analysis of the global problem which is addressed by the Sub-programme;
- Objectives: the objectives set by FAO in tackling the problem, the main activities covered, the linkage with other FAO programmes, and the results and impact expected;
- Resources: The Regular Programme resources devoted to the Sub-programme and the volume of extra-budgetary resources attracted. The profile of field projects is given;
- Activities and Output: The nature of the outputs produced by the Sub-programme and the appropriateness and utility of the outputs;
- Effects and Impact: The use of outputs and the results generated by the Sub-programme. This section also describes impact to the extent possible, including the results of the field projects associated with the Sub-programme;
- Outlook and Issues: The outlook for the Sub-programme and the major issues which emerge from the in-depth assessment.

CHAPTER SEVEN

NATURAL RESOURCES - ASSESSMENT AND PLANNING

Sub-programme 2.1.1.1

Rationale

- 7.1 Soil nutrients and moisture and a climate which provides suitable temperatures and water are essential requirements for plant growth. If soil and water are not appropriately used, production cannot be optimized and the land resource will gradually be destroyed. In most developing countries, as population pressure on land increases, greater productivity is required of existing farmed areas for food and income, while at the same time more marginal and environmentally fragile lands tend to be brought under cultivation. In order to devise sustainable and environmentally sound approaches to land use within this scenario, accurate data on natural resource potentials and constraints are needed at all levels, from the individual farm to country or sub-regional levels.
- 7.2 FAO has taken the lead in developing common definitions and methods for natural resources surveys and data analysis, maintaining a global data base, and in incorporating natural resources considerations into the development planning process. Most of these achievements have taken place within the Assessment and Planning Sub-programme 2.1.1.1, which is primarily concerned with soil and water assessment. In many areas, the Remote Sensing and Agrometeorology Sub-programme 2.1.4.4 has provided complementary inputs, especially information on climate. Other Sub-programmes, particularly within the Natural Resources Programme¹ 2.1.1, build further on the information and methodologies generated by the Assessment and Planning Sub-programme. At the same time, the Sub-programme itself provides for collaboration with other units and institutions to collect information on all aspects of the physical environment necessary for land use planning.
- 7.3 The initial emphasis on the documentation of the world's soil resources, which culminated in the FAO-Unesco Soil Map of the World completed in 1978, has gradually led to other priorities: such as, the better integration of basic data on soils and water with information on physical conditions like topography and climate, the assessment of land suitability for various purposes, and finally land use planning. This development has been facilitated by advances in technology which have permitted digitized mapping and the superimposition of maps. At the same time, software packages have been developed which can relate this information to parameters such as plant nutrient and irrigation requirements.

¹ 2.1.1.2 Farming Systems Development; 2.1.1.3 Soil Management and Fertilizers; 2.1.1.4 Water Development and Management; 2.1.1.5 Conservation and Reclamation; and 2.1.1.6 Sustaining Resource Potentials.

Objectives

- 7.4 The Sub-programme is designed to contribute to the optimal use of land and water resources for present and future generations. Specific tasks, as indicated in the 1990-91 Programme of Work and Budget, thus "include the systematic assembly and analysis of information on land and water resources and crop requirements, and incorporation into data bases and geographical information systems for the determination of alternative land use policy options. Emphasis will be given to: the needs for improved use of scarce land and water resources in both irrigated and rainfed areas; integrated land and water planning; and optimum resource management, taking into full account comparative advantages. Detailed water resources assessments, also at national and sub-regional levels, will be undertaken and contribute to water development and management policies and strategies". The Sub-programme thus works towards:
- (i) provision of a world data base on land and water resources and their productive potential for crops and livestock;
 - (ii) consensus on standard definitions and methods used in natural resources classification, assessment and planning;
 - (iii) development and application of improved methods for classification of soils, land suitability assessment and land use planning; and
 - (iv) strengthening developing countries' institutional capability to classify, assess and develop their natural resource base.
- 7.5 Within this framework, the agro-ecological zone (AEZ) methodology has been adapted and tested as an input to national planning. The Sub-programme has given particular emphasis, in recent biennia, to the development of a flexible Geographic Information System (GIS) which allows various parameters to be derived from the agro-ecological zones information developed earlier. Popular versions to publicise the advantages of these approaches have been developed. Countries are provided training and assistance in their practical applications, and in land use planning at national level.

Resources and Organization

Organization

- 7.6 Work under the Sub-programme is carried out within two services of the Land and Water Development Division (the Soil Resources, Management and Conservation Service - AGLS, and the Water Resources Management and Development Service - AGLW). The work on the GIS has continued during the current biennium as an integrated effort serving all Major Programmes. With the impending completion of the development phase, the GIS is now expected to have focused organizational support. The Regional Offices are also closely associated with the work of the Sub-programme.

- 7.7 The Sub-programme's work is tied closely to, and guided by, the Inter-Departmental Working Groups (IDWG) concerned with Land Use Planning and with Environment and Sustainable Development. Sub-groups of the IDWG on Land Use Planning have developed guidelines and overseen the development of the GIS (see paras 7.32-33 below).
- 7.8 Activities have been shaped by various expert consultations and international meetings. Work in refining the use of the legend for the soil map of the world was, for example, assisted by an expert consultation in 1989. Other expert consultations, during the period under review, have dealt with land use planning, climate change and the environmental requirements of crops. Close working relationships, particularly in the joint preparation and organization of publications, meetings and training activities, have been maintained with the International Soil Science Society (ISSS), the International Soil Reference and Information Centre (ISRIC) and the International Board for Soil Research and Management (IBSRAM).
- 7.9 Examples include a joint meeting in Rome organized by ICARDA in 1986, which provided guidance to CGIAR institutions on the potential applications of the agro-ecological zone assessment methodology. The resulting proceedings and conclusions were issued as a commercial publication by the Commonwealth Agricultural Bureau. Meetings on application of the revised legend of the soil map of the world were held in conjunction with ISSS Congresses in 1986 and 1990.

Resources

- 7.10 Table 7.1 below summarises the Regular Programme Allocations to the Sub-programme during the six-year period under review. In both the 1986-87 and 1988-89 biennia, substantial programme increases were budgeted. This reflected the priority given to the Sub-programme as a whole, and in particular, the establishment of the Geographic Information System. Apart from the introduction of the GIS as a separate programme element in the 1988-89 biennium, relatively little change in the distribution of resources between the main areas of work has taken place. There has been a very slight decline in the share of assessment of water resources and a minor increase in the share of agro-ecological zone studies. An additional post of soil resources officer with particular responsibility for the Near East and North Africa was established in 1988. This replaced a post which previously had been covered by Funds in Trust.
- 7.11 Due to budgetary income shortfalls in the 1986-87 and 1988-89 biennia, expenditure was well short of the allocations at respectively, 86% and 79% of the planned figures. It is, however, estimated that with savings elsewhere in the Natural Resources Programme, expenditure will slightly exceed the planned budget during the current biennium. There are currently six established professional posts in AGLS, two professional posts for water resources planning in AGLW, and one long-term consultant funded largely by this Sub-programme for GIS. After a period of understaffing in the preceding biennia, staff in post in the 1990-91 biennium, including Associate Professional Officers have been slightly above the planned level.

Table 7.1: Resources Allocated to Sub-programme 2.1.1.1 (1986-91)

	1986-87	1988-89	1990-91
Total Allocation US\$ (000)	1 753	2 216	2 459
Real Programme Change in Allocation*	+ 203	+ 273	- 23
US\$ (000)	(+14%)	(+16%)	(-1%)
in percentage			
Proportion of the Budget Allocated to Each Programme Element (%)			
Land Resources Inventories and Evaluation	12.6%	14.8%	13.7%
Land Use Planning	32.6%	8.9%	9.2%
Agro-ecological Zones Studies and Population Potentials	28.8%	28.3%	29.8%
FAO Geographic Information System	**	23.2%	23.7%
Assessment of Water Resources for Irrigation Planning	26.0%	24.8%	23.6%
TOTAL	100.0%	100.0%	100.0%

* Increase/decrease from previous biennium at constant prices.

** Not funded as a separate programme element, work on GIS largely funded from Land Use Planning.

Technical Backstopping of Field Projects

- 7.12 As can be seen from Table 7.2, a substantial field programme has been supported. Some 50 expatriate project staff have been backstopped at any one time as well as 70-90 consultants each biennium. Many of the consultants were working in multi-disciplinary projects with broader aims than natural resources assessment and planning *per se*. Also the number of countries with nationally-executed projects (without resident expatriate staff) has grown steadily from 15 in 1986-87 to 27 during the current biennium. The pattern of assistance has also gradually evolved within this six-year period. The concentration throughout has remained on land resource assessment, but countries which had benefited from the assistance of FAO and other agencies in establishing soil mapping capabilities gradually shifted their attention to the application of land resource survey results, together with other information in land use planning and the application of agro-ecological zone methodology. Thus, the number of countries with nationally-executed projects dealing with land use planning rose from one in 1986-87 to eight in 1990-91, and also many land resources projects were gradually devoting more attention to this aspect. Table 7.2 also shows the distribution of projects by region. Africa, with all types of projects, has accounted for nearly half of all projects, while the Near East has had several large scale soil survey projects. In particular, Saudi Arabia unilaterally financed the national soil survey project, which had some 20 full-time expatriate staff at its peak (see also para 7.20 below). There were only three projects in Latin America and the Caribbean, which had been a priority area in the 1960s and 1970s when soil survey capabilities were

being established with FAO assistance. However, field activities may increase once more as two of the projects were for the development of comprehensive geographic information systems which are of interest also to other countries in the Region. The development of GIS was also an important activity in Asia and the Pacific.

Table 7.2: Projects Receiving Substantial Technical Support from Sub-programme 2.1.1.1 (1986-91)

Number of On-going Projects by Region	Total	Land Resources	Land Use Planning	AEZ-Geog. Inf. Sys.	Water Resources
Africa	27	16	7	2	2
Asia and Pacific	9	2	2	4	1
Near East and North Africa	9	4	2	0	3
Latin America and Caribbean	3	0	0	2	1
TOTAL	48	22	11	8	7

Activities and Outputs

Land Resources Inventories and Evaluation

- 7.13 In 1987, the revised legend for the FAO-Unesco soil map of the world was completed in cooperation with ISRIC and the ISSS. The revised soil classification criteria introduced practical factors of importance for land use and took account of knowledge gained as new areas were mapped; thus new soil classes were introduced. Among the important improvements was the incorporation of guidelines for classification of soils at the detailed level needed in local surveys (third-level sub-units). The effects of climate which are now covered through the agro-ecological zone methodology were totally removed from the soil criteria for soil description. Some soil factors which have an effect on environmental fragility were better taken account of, particularly in relation to drainage and waterlogging. The legend has now been released in six languages (Chinese, English, French, Portuguese, Russian and Spanish).
- 7.14 Together with ISRIC and field projects, a micro-computer programme for a soils data base has been developed, which can facilitate the organization, storage and retrieval of soil data. The programme was released on a trial basis in 1989, together with an instruction manual. Loose-leaf guidelines for soil description, originally issued in 1978, were revised during the period under review and continue to be widely used and produced in other languages.

- 7.15 Using the revised legend, an updated soil map has been produced for the Nile Basin countries at a scale of 1:1 million. With field project assistance, Botswana² became the first country to apply the legend for a full national soil map. Work was completed on mapping two thirds of the country with greatest production potential at the scale of 1:250,000; the remaining third of the country was mapped at 1:1,000,000. This has been followed up with a land systems map which shows the major land features associated with soil types as well as vegetation. A computerized national soils data base has been established and national staff trained in its use as well as in the application of a linked programme for assessing land suitability for various crops. The next stage of the process, using the outputs for land use planning, is assisted through a FAO-TCP project and a planned extension of FAO/UNDP cooperation.
- 7.16 In support of work by an IBSRAM research network, FAO completed a study using the GIS, which gave more specific information on the 2.3 million square kilometres in the developing world covered by vertisols. Although crop production is difficult on these soils, 80% of them are located in areas where climatic conditions would permit greater use for productive purposes with appropriate soil and crop management. The soils data base was also used by the Soil Management and Fertilizers Sub-programme 2.1.1.3 to make a preliminary assessment of soil constraints and management options, starting with Africa.
- 7.17 FAO has assisted UNEP and the International Soil Reference and Information Centre (ISRIC) in the design of the legend for the Global Assessment of Soil Degradation (GLASOD) and development of a complementary World Soils and Terrain Digital Data Base (SOTER). This study has resulted in the first comprehensive picture of actual soil degradation that has occurred in the last 50 years. FAO completed with TCP resources a pilot study in soil erosion mapping for an area in Parana state, Brazil. Using agro-ecological zone and soils data, together with remote sensing information from satellites and aerial photographs, land use and erosion maps were produced for two areas, each covering 3,600 km². The study established that a wider range of data was needed so as to make the approach generally more applicable, including agro-climatic information and more ground truth data.³ The study is a small, but important aspect of the larger Brazil Amazon study (see para 7.26 below).
- 7.18 Following the nuclear accident at Chernobyl, a publication was released in 1989 in cooperation with the IAEA Joint Division, which reviewed the behaviour and significance of radioactive fallout over pasture and cultivated soils. A description was provided of detection and measuring procedures, and possible measures suggested for the decontamination of affected soils. This is being followed up with studies, under the Joint Division's leadership, of radio isotope retention in various soil types.
- 7.19 Beginning with a framework guideline in 1976, a series of land evaluation guidelines was completed with the publication of guidelines on land evaluation for extensive grazing in 1991. The series now includes volumes on rainfed and irrigated

² BOT/72/001, BOT/80/003, BOT/85/011.

³ Checks of remote sensing information against data found at the same point on the ground.

agriculture, published between 1984 and 1986 under the Natural Resources Sub-programmes, and on forestry. A popular introductory publication on land evaluation has also been released (see para 7.49 below).

- 7.20 Field projects during the period under review have included a major unilateral trust fund project for Saudi Arabia⁴. The project completed a 1:2 million map of desertification for the whole country and a soil potential map at 1:1 million. Using the soil potential and water resource maps together with information on road communications, etc., high potential sites were selected for the development of irrigated agriculture. An area of 6,000 km² was mapped in detail at a scale of 1:25,000. Other projects which have produced substantial land appraisal outputs include those in Bangladesh, Botswana, Ethiopia, Malawi and Oman.

Agro-Ecological Zones Studies and Population-Supporting Potentials

- 7.21 The basic agro-ecological zone methodology for developing countries was completed as early as 1978. Land potential has been assessed on the basis of agro-ecological zones using 11 crops, and this was expanded to 15 in the study of population-supporting capacities. The methodology has gradually been extended and with the help of other technical units, fuelwood and livestock supporting capacity have been included. A more quantified approach, aimed at provision of decision-support systems is being developed, and was discussed at a workshop attended by interested CGIAR and national institutions as well as the WMO. Using a crops data base, simulation models are being developed. The potential effects of climate change on conditions in agro-ecological zones and on cropping patterns are now being examined. In the Sahel the effects of climate change regarding the length of the crop growing period were compared for two different periods (1960 and 1985), and the potential impact on the population-supporting capacity was assessed. Basic information on these models has been provided in a bulletin on the subject completed in 1991.
- 7.22 During the period under review, priority has been given to the adaptation of the AEZ methodology for use in national-level assessments. A bulletin on this subject was completed in 1988, followed by a revised version in 1991, and a pilot study has been undertaken for Kenya. In particular, the potential was examined of satisfying the food and fuelwood needs of deficit areas through production in logistically appropriate areas with a surplus potential. The need for soil conservation and the potential for increases in sorghum and millet production as compared with wheat was documented by the International Institute of Applied Systems Analysis (IIASA), which cooperated in the study. It was originally intended that the AEZ methodology would be demonstrated in different land use planning applications for Kenya. This phase of the work could not be undertaken as a result of resource limitations, but illustrative exercises have been carried out for a few selected districts.

⁴ UTFN/SAU/015/SAU.

- 7.23 A population-supporting capacity study was completed for every state of Nigeria, using the GIS and FAO's agro-ecological zone software. In 1988 work was begun on the installation of a GIS in Nigeria⁵, including local training as well as the provision of equipment. Assisted by Regular Programme resources initial needs assessments for national agro-ecological zone systems were made in Malaysia, Philippines and Thailand, and work has been continued by the countries themselves. Using the computerized land evaluation system, models have been completed by projects in Botswana, Liberia and Malawi, and are being developed for Mozambique⁶.
- 7.24 Through a series of UNDP-funded projects⁷ beginning in 1961, FAO has assisted in building up the soil survey and land evaluation capability of Bangladesh. Recently, this has included work begun in 1982, to draw all the existing information together in a computerized land resources data base, and in 1988 with Regular Programme support, a 27-volume series of reports and coloured maps was issued, describing the country's 30 agro-ecological regions, and giving hydrological, climatic and land resource inventories. The suitability of land was assessed for 48 crops. The computerized system was installed at the Bangladesh Agricultural Research Council for application in land use planning. During the project and after its completion training was provided to more than 100 local staff in application of the methodology. A follow-up project is in preparation to help institutionalize the application of the data base and introduce a GIS which will optimize its usefulness.
- 7.25 In China, with UNDP⁸ assistance, a national land information centre is being established, together with two provincial-level centres in Nanjing and Harbin. The FAO GIS was used to complete initial work until Chinese facilities become fully operational. The agro-ecological zone and GIS software have now been transferred to the centres where national staff are being trained in their use. Outputs will include crop suitability assessments for 15 key crops at different levels of technology, and population-supporting capacities at 1:5 million scale for the whole country, and at 1:1 million for the two provinces. China will be the first country to apply the agro-ecological zone and crop potential assessments to combine information on population, production systems and natural resources in comprehensive planning at both the national and provincial levels.
- 7.26 Following preparatory work by FAO, a project (with a budget US\$ 9.6 million) for the ecological-economic zoning of the Brazilian Amazon will commence in 1992. Through the project, which will use remote sensing and ground truth data, the whole area will be mapped at a scale of 1:2.5 million, followed by a more detailed mapping of selected catchments at a scale of 1:500,000.

⁵ TCP/NIR/8951.

⁶ LIR/87/010, MLW/85/010, MOZ/86/010. For Botswana, see also para 7.15.

⁷ Including PAK-6/506, BGD/72/018, BGD/78/014, BGD/81/023 and BGD/81/035.

⁸ CPR/87/029 Agro-ecological Zones for Land Use Planning.

Assessment of Water Resources for Irrigation Planning

- 7.27 One of the first applications of the FAO Geographic Information System was the identification and delineation of areas in Africa, suitable for large scale intensive and small-scale dispersed irrigation development. The extent of land suitable for irrigation was determined from the FAO/Unesco Soil Map of the World. Crop water requirements were overlaid on this and with a rainfall map the water surplus or deficit was obtained. Surface and groundwater resources were compared with requirements. Where requirements exceeded water supply, this meant that the potential irrigated area was decreased. Where there was water in excess of potential needs, the supply potentially available to downstream areas could be calculated. Thus a comprehensive picture of African water resources was built up.
- 7.28 Preliminary results were presented in 1986 to an Intergovernmental Consultation on Irrigation held in Togo. Results of the preliminary assessment in Africa which was completed in 1987 covered 55 countries and 355 hydrological basins. It was found that water resources were sufficient to irrigate over 200 million hectares compared with the 30 million hectares presently covered. Since then, further detailed sub-regional studies and a water resources map for Africa have been produced. While findings indicate that water resources in Africa would be sufficient to bring a substantially greater area under irrigation, it is also apparent that economic, social and institutional constraints reduce considerably the actual potential for irrigation development. At the same time, water scarcity in some countries in the Near East and North Africa has reached a point where irrigation is competing with drinking water requirements and irrigated agriculture in its present form will be sustainable for only a limited period. Both findings also stress the importance of rationalizing and improving currently practised irrigation techniques, and underline the strong link between Assessment and Planning (Sub-programme 2.1.1.1) and Water Development and Management (Sub-programme 2.1.1.4).
- 7.29 The approach has been further refined, and emphasis is now being given to the development of methodologies for evaluating small basin surface water potential, incorporating more detailed national-level data and taking advantage of GIS and satellite imagery interpretation technology. Field investigations are being undertaken in several West African countries under contract with FAO by an African research institute (Comité Inter-africain d'Etudes Hydrauliques). An expert consultation which examined water constraints in Africa departed from the emphasis on only physical aspects and explored the relationship between population change and long term demands for water.
- 7.30 Wider initiatives such as work on the international scheme for the conservation and rehabilitation of African Lands, and the inter-agency ten-year Mar del Plata follow-up action plan on water resources and sustainable agriculture included components of water resource assessment and planning.
- 7.31 Similarly, water resource and irrigation planning often forms an input into land use planning projects; but also specialized projects have been implemented. A

UNDP/FAO project⁹ assisted the joint Nigeria/Niger commission for economic cooperation by providing an inventory of physical and socio-economic conditions for four hydrogeological basins common to both countries, identifying development potentials and implementing pilot projects. Two projects in Ethiopia¹⁰ are aimed at strengthening the capacity of development authorities to plan and design irrigation strategies and projects. Similarly, the Indonesian government's technical and coordination capacity in the field of water resources planning was strengthened by providing advice on technical, financial and managerial aspects¹¹. A large-scale project financed by USAID¹² started in 1990 on monitoring, forecasting and simulation of the Nile River. It forms part of the multi-donor financed Nile River Basin Programme¹³ which aims to establish a Nile Forecast Centre in Cairo and to develop a system that would provide more reliable hydrological and hydro-meteorological forecasts for the region. In particular, the Centre is expected to give advanced estimates of the Nile in-flow to Lake Nasser. Under a complementary TCP project¹⁴, FAO organized in March 1991 a seminar on monitoring, simulation and forecasting of river basins for agricultural production.

FAO Geographic Information System (GIS)

- 7.32 Significant development work on the Geographic Information System (GIS) began in 1986 with a major financial input from the Sub-programme. The system is intended to gradually integrate FAO geographic information from all technical programmes into a computerized system which permits exchange of local data bases and from which maps can be generated. Prior to the advances of modern information technology, the only way to correlate maps with statistical information and with each other was by making transparent drawings and viewing one superimposed upon the other. All initial work on population-supporting capacities was done in this tedious and time-consuming way.
- 7.33 A major contribution by the Sub-programme to the GIS is the Land Resources Data Base. The data base contains more than two million records, one third of which relate to African countries, and gives by country and by region the extent of soil units subdivided by slope and texture as they occur in each major climate and length of growing period. Interpretation of the data provides estimates of the extent of land by country and by region suited to the production of major crops (the first 11 crops used

⁹ RAF/79/030.

¹⁰ ETH/88/001, ETH/88/013.

¹¹ INS/83/028.

¹² GCP/EGY/018/USA.

¹³ Covering Burundi, Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, Uganda and Zaire.

¹⁴ TCP/RAF/8969.

were the food crops: millet, sorghum, maize, rice, wheat, phaseolus beans, soyabeans, potatoes, sweet potatoes and cassava, and cotton) under three levels of inputs. This information can be further interpreted in terms of potential population-supporting capacities. The digitized land resource maps for China were completed using this data base and maps for the Nile Basin may be installed. Building upon the data base, the digitalized soil map of the world was completed in 1991. It can now be updated with ease and can be compared and combined with other data on agriculture, soil degradation, land use, etc.

Land Use Planning

- 7.34 The Inter-Departmental Working Group on Land Use Planning, established in 1983, has provided an organization-wide focus for work in this area. With major inputs from the Sub-programme, the IDWG oversaw the production of the Guidelines for Land Use Planning which were released in 1989. The Guidelines were finalized following a period of intensive field testing, which substantially involved field projects backstopped by the Sub-programme. They underscore the need for a comprehensive step-by-step approach, emphasizing the analysis of the physical environment together with the consideration of economic and social factors. The participation of end-users in the process is stressed as well as the incorporation of an environmental sustainability assessment. The inter-disciplinary approach advocated in the Guidelines has led the Sub-programme to strengthen the link between land evaluation and farming systems analysis.
- 7.35 A microcomputer-based package has also been developed, the "Agricultural Planning Toolkit," (which is backed by explanatory manuals) for land use planning applications. It is an adaptation to personal computers of applications originally on mainframe computers for Agro-ecological Zone (AEZ) analysis. The scope of these micro-computer packages and their mainframe counterparts has been expanded through the link to the GIS data bases. The Toolkit was recently enriched with modules developed in Bangladesh and China, and now consists of seven application systems written in Fortran:
- (i) a climatic data analysis sub-system which uses basic weather station data to calculate evapotranspiration, the length of growing period, etc.;
 - (ii) a gross biomass yield estimation system, which also provides information on economic yield potential;
 - (iii) a crop modelling sub-system which provides a link to other packages such as the FAO CROPWAT system used for modelling irrigation water demand;
 - (iv) an AEZ sub-system which compiles a computerized land resources inventory and estimates agro-climatic and land suitability for crops at specific input levels. It is most suited for use at scales of 1:200,000 to

1:1,200,000 and thus appropriate for national and in-country regional planning;

- (v) a land productivity programme that draws input data from the results of the AEZ sub-system and provides crop productivity assessments, taking account of such factors as cropping pattern, soil degradation, fallow period, seed requirements and waste losses;
- (vi) an optimum crop mix programme which computes the population-supporting capacity of land; and
- (vii) a Land Evaluation Computer System (LECS) which analyses agro-ecological and agro-economic crop suitabilities down to scales as detailed as 1:50,000. The LECS sub-system was developed by an FAO-assisted project in Indonesia¹⁵. It performs both agro-ecological and agro-economic crop suitability assessments, including soil degradation assessments and the identification of conservation options¹⁶.

- 7.36 A series of case studies are currently planned to test further the use of FAO's Land Use Planning Guidelines in practice, particularly as they relate to semi-arid areas. A methodology for the case studies has been developed to monitor the appropriateness of the Guidelines and their actual impact on land use. The methodology was finalized for field testing following an expert consultation in 1990.
- 7.37 Long-term field projects have tended to move from establishing a basic data base and strengthening organizational capability in soil survey, to giving emphasis to the use of soil survey data in land use planning. Regular Programme funds have been used to support field activities in land use planning, for example in Bangladesh, Ecuador, Sri Lanka and Zimbabwe, and these in turn have fed-back to the Regular Programme.
- 7.38 In Oman, a project¹⁷ has completed a 1:250,000 soil atlas of the country. In the two major agricultural production areas of the country, pilot studies on 4,200 ha are now under way which integrate documentation of the physical environment with farming systems analysis and provide a basis for land use planning. Detailed designs are being prepared for irrigation and cropping schemes on 100 farms varying from some 0.5-4.0 ha. The methodology has been computerized with the establishment of a GIS and can be applied elsewhere. To date, the project has trained 22 technicians and engineers in the country and two more senior staff on fellowships, and has produced training manuals in Arabic and English. The project, however, still relies heavily on 22 UN Volunteers for its current work programme.

¹⁵ INS/83/028.

¹⁶ A commercial package developed by scientists at Cornell University has many similar features and is currently under assessment by FAO with a view to making the most appropriate package available to countries and projects.

¹⁷ OMA/87/011.

Institutional Strengthening

- 7.39 Training courses and meetings have generally been organized in cooperation with other organizations such as IBSRAM, reducing both the administrative load on, and cost to, the Sub-programme. Generally, one training course per year has been funded primarily from the Regular Programme during the period under review, and approximately the same number from extra-budgetary resources. Courses catered on average for 25-30 higher technical level participants and were sub-regional in scope. Most training has been on application of the agro-ecological zone methodology. Training kits on AEZ and GIS land resource methodology have been developed which are frequently being updated and improved. A course for 15 participants from the Near East held in cooperation with ACSAD and ICARDA in 1990 emphasized the interface between agro-ecological zone information and work in farming systems. In Latin America, materials for a two-week course organized by RLAC were translated into Spanish by a cooperating Chilean institution. Regular Programme staff have also assisted some field project training in, for example, Mozambique and Sri Lanka.
- 7.40 Courses have also covered other areas of the Sub-programme's work, in particular soil classification using the Revised Legend of the Soil Map of the World. This was the topic of two recent courses for Anglophone and Francophone Africa, which were organized by IBSRAM and FAO, respectively.
- 7.41 Two FAO-sponsored committees dealing with soils began their work some 20 years ago for West Africa and East Africa (including Angola and Sudan): In particular the Regional Office has covered the costs of one participant per country for their bi-annual meetings. These meetings, which have frequently been attended by other international agencies, have improved contacts between countries, and stimulated follow-up visits and the sharing of each other's analytical facilities between participants. Contacts made in this way facilitated the award of a contract to Côte d'Ivoire for soil survey in Burkina Faso and analysis of Liberian soil samples in Ghana. The meetings have also helped FAO in identifying potential needs for projects or training courses of the type discussed above. The African Soil Science Society, which held its first meeting in Uganda in 1988 with support from FAO and other international organizations, is a development from these meetings.

Effects and Impact

- 7.42 The effects and impact of the Sub-programme are evident at several levels. At the international level, globally applicable standards have been developed and accepted, and information and data bases provided by FAO are widely used. At the country level, field projects have served as a channel for directly disseminating methods, technology and experience as well as for obtaining feedback. Within FAO itself, Sub-programme outputs have been incorporated into the work of several other programmes.

- 7.43 The Revised Legend of the Soil Map of the World is recognized as a common standard for soil classification, and the Soils Map through the FAO GIS provides the only global international reference source for soils. The Revised Legend, for example, has been applied by the EEC in drawing up a 1:1 million map for Europe. The World Resources Institute used the soils data base to examine physical and chemical constraints to production in Latin America, and the World Bank relied on the system in a study of land and water potential in the Mediterranean Basin. The Technical Advisory Committee of the CGIAR used the agro-ecological zones data base and approach for a new emphasis on natural resources in the CGIAR Planning Strategy for the Nineties.
- 7.44 Information on agro-ecological zones and population-supporting capacities has formed a basic input into many wider studies, including the FAO studies *African Agriculture: the Next 25 Years* (1986), and *Potentials for Agricultural and Rural Development in Latin America and the Caribbean* (1988), and the updated projections in *Agriculture Toward 2000*. The basic agro-ecological zone methodology has gained wide acceptance, and the descriptors have, for example, been applied by the EEC in developing a digitized geographic information system for Western Europe. Results on population-supporting capacities have facilitated more informed international thinking on development strategy, both for economic development and the environment. A case in point is the UNFPA decision to give priority in population education to semi-arid and mountainous zones and to small islands which are most at risk from population growth and have least capacity to feed growing populations.
- 7.45 The most visible impact at field level has been through the field projects which form an integral part of the work under the Sub-programme. FAO projects have been active in building up soil services in a large number of developing countries. Most of these projects were originally expected to undertake soil surveys with secondary emphasis on institution-building. However, by the period under review, more attention was generally being given to the establishment of national capability (see Boxes 1 and 2 for summaries of recent evaluation mission findings). For example, in Yemen a soils data base has been set up and a soil survey unit established with trained staff. Workshops conducted by projects in Botswana, Malawi and Mozambique have made agricultural staff more aware of the uses of soils information. The projects have set up computerized soils data bases, and have helped to establish soil survey and mapping units which can now function without project assistance.
- 7.46 At the same time, progress in applying the agro-ecological zone methodology at national level has been relatively slow. As discussed above, assessments have been completed at detailed level for Bangladesh and very recently for Kenya, and similar projects are under way in China and Brazil. Malaysia and the Philippines have completed some work on their own. However, national agencies in general have not yet gained the capability to apply the methodology and computer technology without FAO assistance. Outputs of the work have been used passively in agricultural planning in the sense that national and international agencies and private sector enterprises consult FAO maps in making decisions on investment. There have been few examples of systematic application of the data base in land use planning or wider applications, such as, the calculation of areas which could most effectively feed others

in terms of distances and existing infrastructure. The project in China referred to above (para 7.25) is expected to give an example of comprehensive use of the methodology.

Box 1

LIR/87/010: LAND RESOURCES ASSESSMENT FOR LAND USE PLANNING

Budget: US\$ 1,997,955 (UNDP)

Duration: August 1987 to August 1992

The project was intended to: (i) compile an inventory of the land resources of Liberia; (ii) carry out land resources surveys and prepare land use plans; (iii) standardize the methodology used in Liberia for land resources survey, soil classification, land evaluation and land use planning; (iv) develop guidelines and criteria to enable the Ministry of Agriculture to design its own studies or assess studies undertaken by external consultants; and (v) create an institutional capability within the Land Development Division (LDD) of the Ministry of Agriculture.

A mid-term evaluation mission in 1989 found that the project had undertaken a useful review of past work on land resources assessment in the country, produced some methodological and training guidelines, set up a computerized data bank, and made progress on soil association mapping. There were methodological problems in swamp mapping, and progress had been slow in work on land systems mapping and on land suitability. Similarly, the technical capabilities both of the LDD and the Central Agricultural Research Institute needed further strengthening, including a clearer organizational structure in LDD, and coordination between the project and the LDD needed to be improved.

The evaluation recommended that: (i) the LDD should be organized into five well-defined technical units; (ii) the project's institutional linkages and collaboration with other Government units should be improved; (iii) the work on sample area land use plans should focus on two areas with the aim of integrating data on physical resources, socio-economics, and agriculture. It also provided a work plan for the remaining project period and technical recommendations on specific aspects like swamp mapping.

- 7.47 The FAO Land Use Planning Guidelines have provided a basis for national guidelines in Sri Lanka and Ethiopia. In Sri Lanka¹⁸, a project helped to establish a land use planning division, improve cooperation between relevant departments, and activate land use planning committees in key districts. Training to make senior staff more aware of the potential of land use planning was coordinated with training for specialist staff and training for agricultural field staff in order to establish a national capability at all levels. A computerized land information system was developed, and plans were drawn up for pilot areas which responded to specific urgent needs such as erosion control and land settlement. The Asian Development Bank has now funded an expansion of this work, building on the foundation provided by the FAO project.
- 7.48 Through a series of projects¹⁹, Ethiopia succeeded in the completion of a reconnaissance soil survey at a scale of 1:1,000,000 and the formulation of a national land use master plan. A computerized geographic information and land evaluation system was established. Land use planning pilot exercises were undertaken in three important districts at a scale of 1:250,000. Not only were crop capability assessments made for 33 crops using the agro-ecological zone methodology, but also the socio-economic characteristics of 21 farming systems were identified. Recommendations were made on crop suitability, cropping patterns, agro-forestry, forage development and soil and water conservation. An evaluation mission to Ethiopia in 1989, however,

¹⁸ SRL/79/058.

¹⁹ ETH/78/003, ETH/82/010, ETH/82/011, ETH/87/006.

identified difficulties in making practical use of project outputs. These findings are also borne out by the evaluation missions to Liberia and Malawi presented in Boxes 1 and 2.

Box 2

MLW/85/011: LAND RESOURCES EVALUATION

Budget: US\$ 2,122,900 (UNDP)

Duration: January 1986 to December 1991

The project was aimed to: (i) enhance the capability of the Land Husbandry Branch (LHB) of the Ministry of Agriculture in a wide range of tasks, from production of thematic maps needed for project planning, to coordination of activities with other Government departments and institutions involved in natural resources planning and data collection and analysis; (ii) strengthen the capability of the Soil Survey Section of the Department of Agricultural Research (DAR) to identify, analyze and correlate soils as required for specialist support to data collection; and (iii) strengthen the capability of the Land Resource Planning Unit of the LHB.

The evaluation in 1990 found that the project had succeeded in: (i) producing a large number of land evaluations at various stages of completion (covering 60% of the country); (ii) strengthening national staff capabilities with on-the-job and overseas training; and (iii) compiling basic materials for a land use evaluation manual. However, a national capability in land resource assessment had not been firmly established and it was doubtful if without further assistance, the type of information generated by the project could be useful for either macro or micro-level planning.

To ensure sustainability of positive results, the evaluation stressed the need for the full-time availability of counterpart staff and improved status of the unit within the Ministry of Agriculture. It also recommended that land evaluations should cater to the operational needs for direct use in land use planning and that a follow-up project which should be considered to strengthen the national capability in using the land evaluation results in planning and extension.

- 7.49 The Sub-programme has started to produce easy-to-read information materials in order to make decision-makers and the wider public aware of the potential of the methodologies. To date two booklets have been published, "How Good the Earth?" and "Land Evaluation for Development". "How Good the Earth?" introduces the agro-ecological zone and crop suitability assessment methodologies in simple terms and describes how these can be applied in practice. "Land Evaluation for Development" summarizes FAO's methodology for land evaluation and land suitability assessment.

Outlook and Issues

- 7.50 Resource constraints: FAO has established a leading role in the development of standards and methodologies for soils and land classification in the context of agro-ecological zones. It also maintains the world's most complete data bases on natural resources. These achievements have been made possible through very close cooperation with other international organizations, in particular the International Soil Science Society (ISSS) and the International Soil Reference and Information Centre (ISRIC). For example, the world assessment of soil degradation funded by UNEP is being undertaken by ISRIC with close involvement by FAO in the study design. Such cooperation cannot, however, overcome all resource constraints. Although the resources for this Sub-programme were originally planned to increase in the 1986-87 and 1988-89 biennia (see table 1), the severe budgetary income shortfalls in both biennia have slowed down the development of the GIS and the operationalization of

the agro-ecological zone methodology as a practical planning tool at country level. Funding problems also led to the cancellation or postponement of complementary activities to the work on hydrology of small basins. Despite the increasing emphasis being placed on sustainable development, there is thus the risk that budgetary limitations may affect the Sub-programme's capacity to provide adequate contributions to this priority area.

- 7.51 Institutionalization and Application of the Geographic Information System: The Geographic Information System, built up with considerable inputs from the Sub-programme, is widely used by many units within FAO. So far, it has evolved as an integrated effort reporting to the current chairman of the GIS Sub-group of the IDWG on Land Use Planning. Only one consultant and one general service staff member have been assigned to the GIS central unit while user divisions have supplied their own staff to work on particular problems. Consideration is now being given to institutionalizing the GIS as a Service within the Research and Technology Development Division. Plans are also being prepared for strengthening of the central services while providing on-line access to the user divisions. The latter plan is particularly important if knowledge of the system's potential and use of its data bases is to be maximized. Other key questions concern which data bases should be made available on the central system. This is at the moment limited by computer capacity, and divisions can utilize the Organization's main statistical data bases within the GIS environment. There are exceptions, however: for example, no easily used link at present exists with the remote sensing data bases, that on forest cover, or that on fertilizer response.
- 7.52 The Assessment and Planning Sub-programme 2.1.1.1 has incorporated most of its primary and secondary data bases in the GIS, but these are not being fully exploited by other potential users within FAO, including those in the Natural Resources Programme. Work on fertilizers, trace elements and erosion control has moved relatively independently of information contained in the soils, agro-ecological and crop potential data bases. Valuable insights could potentially be obtained from information correlation, particularly that on fertilizers. This would require greater resources, increased consultation on the most useful forms of information and clearer definition of common priorities. Practical programmes may need to be developed to collate soils data on the basis of economically important characteristics (e.g. fertilizer response) and those characteristics important for the environment such as susceptibility to erosion or salinization.
- 7.53 As discussed above, the GIS has been used to service projects and other international agencies. There is a growing demand for the information it offers. However, the present procedures for making electronic data available to outside users on computer tapes and diskettes do not cover the Organization's direct costs, and alternative ways are being studied of charging developed country and major international institutional users while providing a more flexible service to developing countries. Services will need to include standard packages of data with accompanying user guidance aids as well as a capacity to handle individual requirements.

- 7.54 Use of remote sensing: Land appraisal has for many years used aerial photographs to provide a basic framework for sampling on the ground and designation of main physical features. Satellite imagery has now come to play a much more important role and reflection outside the visual spectrum can provide additional information on soils and vegetation. Satellite imagery will thus play a major role in the work now starting to map the Amazon region of Brazil. This experience could provide valuable information which will reduce time-consuming and expensive ground truth survey, and joint work in this methodological area may need to be stepped up with the Remote Sensing and Agro-meteorology Sub-programme 2.1.4.4.
- 7.55 Geographic concentration: In line with the Organization's priorities, recent assistance has been concentrated on establishing natural resources assessment and planning capabilities in Africa, while relatively few activities have taken place in other regions. For example, FAO and other agencies assisted countries in Latin America and the Caribbean at an earlier stage in the development of soil survey facilities, but since the 1970s there has been relatively little field activity in that Region. As a result, the recent progress, as noted above, in soil classification, methodologies for agro-ecological zone definition, crop suitability assessment and land use planning has not yet been fully transferred to policy-makers and relevant institutions. Thus, increased emphasis may need to be placed on awareness building in the Region.
- 7.56 A revised approach for greater impact at national level: In general, although the Sub-programme has an impressive record of development of methodologies and institutional capability to its credit, the impact on national planning and on intervention programmes for the farmer has been limited. Agro-ecological zone methods provide countries with a potentially valuable tool for developing strategic priorities. The availability of sophisticated and low cost computer technology has placed it within reach of all countries. However, there is a high initial investment in system development and data collation, and in many countries this effort needs to be supplemented by substantial data collection. Most countries have also not as yet acquired the indigenous national capacity to apply the system, together with a lack of awareness among decision-makers and planners of its potential. Completion of the projects in China will allow a much better assessment of the likely cost-effectiveness in future national applications. However, FAO may need to distinguish between those countries which can and should develop their own institutional capability and those where FAO and other agencies should assist in developing that capability.
- 7.57 A major output of the Inter-Departmental Working Group on Land Use Planning has been the Guidelines for Land Use Planning which integrate physical, economic and social criteria as well as emphasizing the necessity for environmentally sound and sustainable development. As noted above, the integration of land use planning into the overall planning process has so far only been successful in limited contexts. Generally, successful examples can be found in the planning of new irrigation and settlement schemes and in estate development. In most other contexts, decision making was influenced by the information provided on land potential and current land use rather than actual land use plans.

- 7.58 At the national level, there is a need for defining broad strategic options as well as providing detailed information. In most situations land use is determined pragmatically, by a mixture of market forces, historical practice and short-term production potential. The land use planning approach is accordingly shifting from the concept of a comprehensive planning exercise, whether at national or village level, to the formulation of strategic priorities and the capacity to provide a comprehensive response to specific questions (including environmental considerations). This entails the existence of an extensive data base, and a capability to collect information at the local level as required. Thus, in addition to identifying the areas with the greatest economic potential and the highest environmental risks, etc, the land use planning system must be able to advise on detailed planning. This happened, for example, in projects in Sri Lanka and in Indonesia, but data bases, guidelines and institution-building (including training) could be more clearly geared with these purposes in view.

CHAPTER EIGHT

CROP IMPROVEMENT AND MANAGEMENT

Sub-Programme 2.1.2.2

Rationale

- 8.1 Agriculture in developing countries continues to be characterized by low productivity per unit of land and labour. This particularly applies to food production, leading in a number of developing countries to a persistent food deficit. While crops remain the major source of food in developing countries, various technical factors continue to impede crop production development. The magnitude of production problems is such that continued external assistance is needed to complement national efforts, including support to agricultural research through the network of the International Agricultural Research Centres and national agricultural research systems. In particular, there is an urgent need for tangible improvements in production, especially through more efficient use by small farmers of their meagre resources. Special efforts are needed to strengthen technical services for farmers in order to increase basic food production within the framework of sustainable cropping systems.
- 8.2 Vegetables and hitherto neglected food crops can contribute to the diversification of food and farm incomes and meet an increasing demand for higher value food in urban and rural areas by providing fresh vegetables and fruits. Substantial improvements in productivity are essential for cereals, legumes and other staple foods in most of the poorer and marginal areas, characterized by difficult soils and low rainfall. Furthermore, the potential for fruit and vegetable growing has not been exploited effectively.
- 8.3 Research results and technical information on improved production techniques are increasingly available in developing countries through the international and national agricultural research systems, together with a number of vigorous clones and crop varieties adapted to different ecological conditions. However, difficulties in adapting improved agronomic technology to local conditions continue to hamper crop production. For example, fertilizers are applied to high-yielding varieties without taking account of the need for economically optimum dressing for particular soil types. In many locations, increased farm productivity could also be achieved through better-integrated cropping systems, such as cereals-cum-grain legumes, vegetable crops and/or oil crops in intercropping with perennial cultures, or more intensive production systems, such as rice-cum-fishing culture, etc.
- 8.4 Increasing crop production also requires narrowing the gap between yields at experimental stations and farm level, through the development, transfer and wide adoption of adapted technologies. Such dissemination of technologies is promoted through training of extension staff, on-farm demonstrations, extensive training

programmes for farmers and the dissemination of suitable extension materials on under-exploited as well as more conventional crops and cropping systems.

- 8.5 The Crop Improvement and Management Sub-programme was established in 1978 with the merging of two previous programmes (Basic Food Crops and Industrial and Horticultural Crops) in order to cover, in a more integrated way, the technological areas aimed both at increasing production and improving the quality of agricultural crops within the framework of more appropriate cropping systems.

Objectives

- 8.6 The main objective of the Sub-programme is to assist Member Nations in their efforts to improve, develop, intensify and diversify crop production through the identification and adoption of better techniques and more sustainable and stable agricultural production systems. Particular emphasis has been given to collaborative work with the international and national agricultural research systems and to the promotion of under-utilized, so far relatively neglected crops.
- 8.7 Sub-programme activities have followed a balanced strategy toward crop improvement and management with focus on:
- (a) promotion and dissemination of locally-adapted production techniques related to staple food crops, horticultural and cash crops;
 - (b) development of efficient cropping systems and of crop diversification programmes, including the development of traditional food crops;
 - (c) assistance to national crop development programmes in defining, verifying and disseminating low-risk technologies for rainfed agriculture and sustainable cropping systems for areas prone to environmental degradation;
 - (d) support to national programmes for accelerated adoption of crop technologies, mainly through intensive training of crop production specialists;
 - (e) strengthening the links between national, regional and international agricultural research institutions as well as between national research centres and extension services in the transfer of improved production technologies to farmers; and
 - (f) promotion of regional coordination and inter-country cooperation networks linking national crop development programmes, with emphasis on exchange of technical knowledge and TCDC.
- 8.8 The Sub-programme has a large field component with projects exclusively concerned with crop improvement and management or with crop production as a component.

Much of the Regular Programme work has consisted of direct support to member countries for developing projects or for technical backstopping of field projects. In addition, many of the Regular Programme activities represent follow-up to completed field projects or continuing support to institutions established under previous FAO projects.

8.9 The Sub-programme also contributes to the priorities as established by the FAO Governing Bodies, namely:

- . production of food, with the focus on deficit developing countries and deficit areas;
- . sound management of land and water resources through sustainable cropping systems and appropriate production technologies;
- . food and income earning activities aimed at integration of women into agricultural and rural development;
- . development of appropriate biotechnologies and plant breeding that meet the requirements of agricultural production in developing countries and monitoring of their impact;
- . promoting integrated and diversified cropping systems with special attention to home gardens, agro-forestry and agro-aquacultural activities;
- . strengthening of research and development capability, including inter-country cooperation and information exchange; and
- . support member countries in crop production aspects of policy analysis and planning.

8.10 Given its multi-disciplinary nature and scope, the Sub-programme's implementation strategy has reflected closer links with other FAO activities covering all the major components of crop production and utilization processes. This involves: distribution and use of appropriate technological inputs, production and use of quality seeds of superior varieties, improvement of agronomic practices as well as improvement of harvesting, storage, handling, processing and marketing methods. Accordingly, the work of Sub-programme 2.1.2.2 must be seen in relation to other FAO activities conducted under a very large number of Sub-programmes. These include:

2.1.1.1 Assessment and Planning: for providing guidelines on crop and cropping pattern management to land-use planning, aimed at developing sustainable farming systems. This Sub-Programme is reviewed in-depth in Chapter Seven of this Review;

- 2.1.1.3 Soil Management and Fertilizers: for integrating better tillage and fertilization practices within the framework of sustainable crop production;
- 2.1.1.4 Water Development and Management: for improving crop irrigation techniques and better water management methods at the plot and the farm levels;
- 2.1.1.6 Sustaining Resource Potentials: for developing and disseminating sustainable cropping systems and farming practices, including contributions to definition of policies for the introduction of sustainable technology;
- 2.1.2.1 Genetic Resources: for strengthening national capabilities to improve plant breeding and to make the best use of available plant genetic resources;
- 2.1.2.3 Seeds: for selecting, promoting multiplication and use of quality seeds and planting materials;
- 2.1.2.4 Crop Protection: for integrating disease and pest management methods within the overall framework of the crop cultural process;
- 2.1.2.5 Agricultural Engineering and Prevention of Food Losses: for improving mechanized practices in soil preparation/conservation, planting, irrigation/drainage, and harvesting;
- 2.1.2.6 Food and Agricultural Industries: for selecting crop varieties and cropping patterns well adapted to specific industrial requirements, including the production and processing of vegetable oils, protein concentrates, spices, aromatic and medicinal plants as well as natural fibre crops;
- 2.1.3.1 Grassland, Forage and Feed Resources: for integrating forage crops within traditional or improved agricultural crop systems and for diversification of traditional monocrop systems;
- 2.1.4.1 Research Development: for strengthening national and regional research programmes on crops;
- 2.1.4.2 Agricultural Applications of Isotopes and Biotechnology: for supporting plant breeders efforts on specific crop germplasm improvement programmes, and for assessment of biological nitrogen-fixation by legume crops;
- 2.1.4.4 Remote Sensing and Agro-meteorology: the agro-meteorology work was part of the Crop Improvement and Management Sub-programme until 1989 when it was transferred to this Sub-programme in order to

rationalize and integrate agro-meteorological services with satellite monitoring of all environmental elements. Sub-programme 2.1.4.4 is reviewed in-depth under Chapter Nine of this Review;

- 2.1.4.5 Environment and Energy: for incorporating environmental dimensions into the crop management process, especially within the framework of the FAO's Inter-departmental Coordination Programme on Environment;
- 2.1.5.1. Agricultural, Education, Extension and Training: for providing technical guidance and support to extension and training activities, including the preparation of training materials and curricula as well as extension materials on crops and cropping techniques;
- 2.1.5.4 Women in Agriculture and Rural Development: for promoting agricultural production activities aimed at better integration of women with production and income generating activities at the farm and village levels;
- 2.1.6.1 Food and Nutrition Assessment: for promoting production of traditional and neglected food crops within the framework of existing cash crop production systems;
- 2.2.2.2 Inland Fisheries and Aquaculture: for integrating aquacultural production into the traditionally irrigated crop systems, in particular in flooded rice systems; and
- 2.3.1.4 Forest Food, Fodder and Fuelwood Systems: for designing well-adapted agro-forestry production systems as an alternative to shifting cultivation. This Sub-programme is also reviewed in-depth in Chapter Ten of this Review.

Resources

- 8.11 During the six years (1986-91) under review, the Regular Programme resources allocated to the Sub-programme amounted to approximately US\$ 12.9 million. Although in nominal terms the resources grew at an annual average rate of about 2 percent there has been a relative decline in real terms (Table 8.1). It should be noted that a large share of resources has gone to Field Programme support, due to the requirements for technical backstopping of the large number of field projects. In addition, the FAO Regional Offices have devoted annually about 40 work/months of the plant production officers and consultant services to crop improvement and management activities, including some travel funds.

**Table 8.1: Sub-Programme 2.1.2.2 - Regular Programme Resources
by Programme Element
(1986-91)**

	1986	1987	1988	1989	1990	1991*	TOTAL
Budget Allocations (US\$ '000)	2 250	1 416	1 902	2 454	2 440	2 465	12 927
of which %:							
Food legumes, grain and oilseed legumes	10	...	8	9	10	10	9
Improvement of rice and ricebased farming system	22	23	23	18	23	22	22
Improvement and transfer of cereal production technology	11	20	6	10	7	7	10
Improvement and intensification of vegetable production	13	7	11	14	7	9	10
Root and tuber crops	9	10	13	11	10	10	10
Development of fruit production	13	7	11	14	7	9	10
Crop diversification and intensification of mixed cropping systems	3	1	2	3	2	2	2
Development of oil crops	9	15	12	10	11	9	11
Fibre crops development	4	5	6	4	4	4	4
Alternative to shifting cultivation	2	6	4	3	4	4	3
Industrial crops diversification	4	6	4	4	5	4	5
Promotion of plant bio-technology/policies for sustainable production systems	-	-	-	-	10	10	4
Technical staff (w/m)	107	107	108	110	109	114	665

* Provisional estimates.

- 8.12 In the period under review, the Sub-programme has supported 457 field projects either entirely concerned with crops and cropping systems development (218 projects) or with a crop development component (239 projects). The budgets of these projects have amounted to US\$ 165 million, with 34.8 percent for Africa, 36.7 percent for Asia and the Pacific, 5.1 percent for Latin America and the Caribbean and 23.4 percent for the Near East and North of Africa (Table 8.2).

Table 8.2 Sub-Programme 2.1.2.2 - Field Component
(No. of Projects and Percentage Distribution during 1986-91)

	1986	1987	1988	1989	1990	1991*
Total Number of Projects**	215	225	220	228	191	136
of which %:						
Food legumes, grain and oilseed legumes	17	17	20	19	13	15
Improvement of rice and ricebased farming system	11	10	10	8	9	12
Improvement and transfer of cereal production technology	10	11	13	16	17	19
Improvement and intensification of vegetable production	8	7	9	12	12	10
Root and tuber crops	14	14	11	10	11	12
Development of fruit production	7	9	9	11	12	6
Crop diversification and intensification of mixed cropping systems	6	6	8	9	11	7
Development of oil crops	6	6	5	4	3	3
Fibre crops development	5	5	3	2	1	1
Alternative to shifting cultivation	-	-	-	-	-	-
Industrial crops diversification	16	15	12	8	9	12
Promotion of plant bio-technology/policies for sustainable production systems	-	-	-	1	2	3

* Provisional estimates

** On-going projects during each year

Activities and Output

- 8.13 The overall achievements of the Sub-programme during 1986-90 are summarized in Table 8.3, covering training activities, technical meetings, publications, direct support to member countries and assistance to crop improvement and management field projects. These figures exclude similar achievements under field project resources. Declines in the activities from 1987-89 were due to the financial difficulties facing the Organization.

Table 8.3: Sub-Programme 2.1.2.2 - Activities and Outputs (1986-91)

Activities and Outputs	1986	1987	1988	1989	1990	1991*
Number of training activities	17	6	4	4	9	5
Number of trainees	430	263	304	81	276	101
Number of technical meetings	6	6	5	9	13	12
Number of participants	196	115	714	764	994	519
Number of publications	17	13	14	8	9	18
<u>Direct Support</u>						
Number of assistance missions	65	48	49	59	57	62
Number of countries assisted**	122	87	100	100	107	115
<u>Technical Backstopping</u>						
Number of projects**	215	225	220	228	191	136
Number of experts/consultants**	242	290	306	323	279	263

* Provisional estimates.

** The number of countries assisted, the number of projects and the number of experts/consultants are not additive.

A. Development of Food Legumes

- 8.14 These activities cover the group of annual crops producing grain legumes or oilseed legumes, that represent a major source of dietary proteins and calories as well as of edible oil. These crops are especially important as basic food in countries where animal proteins are scarce or where poverty, religious or ethnic preferences preclude the consumption of meat or animal fat. Besides, biological nitrogen-fixation by legume crops contributes to the reduction of the fertilizer component of the farm budget.
- 8.15 The principal food legumes receiving attention under the Sub-programme are: groundnut, pigeon pea, chickpea, soybean, lentil, lupins, lima bean, common bean, pea, winged bean, faba bean, black grain mung bean and cowpea.
- 8.16 Since 1978 a continuous effort has been made to apply and develop the concept of FAO research networks bringing together individual research scientists or institutions for information exchange, reducing the duplication of effort and allowing research workers to benefit from progress made elsewhere. These activities have also

bottlenecks and policy advice. Support continued to the networks on food legumes (one in Latin America and the Caribbean and the other for Asia and the Pacific) in cooperation with RLAC and RAPA, respectively. In 1989 preparatory activities were carried out for the establishment of a Global Coordination Network for Tropical and Sub-tropical Soybean, with sub-networks for Africa, Asia and Latin America and the Caribbean. For the Latin America and the Caribbean Sub-network a planning workshop was organized in 1990 at the Soybean Research Center of EMBRAPA (Brazil) with 25 participants from 17 countries to establish cooperation work mechanisms. A similar workshop was held for African countries at IITA in Nigeria (1991) with 200 participants from 13 countries. The same approach is under implementation with the Soybean Research Networks for Sub-Sahara Africa and for Asia and the Pacific regions.

- 8.17 In cooperation with the International Agricultural Research Centres (IARCs) national food legumes programmes have been assisted in technology generation and transfer. These include joint activities with IITA for cowpea and soybean technology in African countries, with CIAT for beans technology in countries of Africa and of Latin America and the Caribbean, with ICRISAT for Asian countries, and with ICARDA for countries of North Africa and the Near East.
- 8.18 Direct support to national research and extension institutions has been an important activity to complement activities under field projects. In 1986 Sri Lanka was assisted in the promotion of soybean production and processing. In Africa, varietal evaluation trials and on-farm demonstration of food legumes were carried out in Ethiopia, Kenya, Cape Verde, Mozambique, Nigeria, Zambia and Zimbabwe in order to adapt the new intensive production techniques developed by CIAT, ICRISAT and IITA. Such direct support also included assistance in identifying and formulating projects. An exploratory mission assisted, in 1989, six countries in West Africa in identifying and designing pilot projects to demonstrate the agronomic, economic, and nutritional benefits from the introduction of small-farmer based soybean production coupled with village level processing. Formulation missions were subsequently sent to the Cameroon, Côte d'Ivoire, Ghana and Nigeria in 1990 and again in 1991. Finalized project documents are being submitted by the respective countries to UNDP for implementation in the 1992-97 project cycle.
- 8.19 In-service training of extension staff on improved food legumes production technology was conducted in Ethiopia and Zimbabwe during 1986 for 30 extension officers in each country. During 1986-87 "learning by doing" courses on lentils, broad beans and beans were carried out in Chile, Peru, Honduras and El Salvador in cooperation with RLAC and the research institution of these countries.
- 8.20 Direct support activities also included cooperation in the organization of international meetings on selected aspects of these crops. These comprised: the First International Food Legume Research Conference on Pea, Lentil, Faba Bean, and Chickpea held in Washington, USA (1986), attended by approximately 400 participants from 48 countries; and a series of support provided for the preparation, implementation and follow-up of the World Soybean Research Conference IV held in Buenos Aires, Argentina (1989), attended by over one thousand scientists from all over the world.

- 8.21 As part of support to production system diversification, a technical paper was produced in 1990 on food legumes in rice based farming systems. Studies on cotton/legume systems are being promoted in Africa where cowpeas, and dwarf pigeon peas are being intercropped with cotton: all three crops are subject to serious insect damage in Africa and the studies will determine if the insecticide protection regime being applied to cotton will provide adequate protection to the legumes in the intercrop system. Because the presence of these legumes in the intercrop system has little effect on cotton production, there is hope that the legumes could be incorporated, providing diversification to the farming system and take double advantage of the insecticide already being applied.

B. Improvement of Rice and Rice Based Farming Systems

- 8.22 Rice has been one of the major areas of work because of the special attention required by this crop (over 145 million hectares of farming, with more than 500 million tons of paddy produced annually, involving two and a half billion people). The production of rice is still well below potential in many developing countries where even in the most favourable rice ecologies, the yield of irrigated rice remains 3-4 t/ha., despite the potential yield of 6-8 t/ha. with the application of the existing improved crop technologies. The FAO activities on rice have paid particular attention to rice production under sub-tropical, temperate and upland conditions, which have not been adequately covered by IARCs, especially IRRI.
- 8.23 On-farm demonstrations of low-risk technologies for rice have received priority attention, covering the introduction, testing and multiplication of appropriate biofertilizers, identification and introduction of varieties with multiple disease and pest resistance, use of non-toxic locally produced botanical pesticides, improving land preparation, improved nursery and irrigation management for timely and efficient weed control. Azolla technologies were tested and promoted in eight African countries¹ and in Guyana and Haiti. Azolla not only replaces half of the required nitrogen for high-yielding rice, but also reduces weed infestation and can provide feed for fish culture and livestock. In Haiti, the use of blue-green algae is being promoted as is *Sesbania* sp. in Bhutan and Nepal.
- 8.24 In many African countries, FAO has been promoting inland swamp rice development and hydromorphic rice as a better alternative to "slash and burn" upland rice production systems: the former yields two to three times more than the latter with the same input. Improvement of upland rice is being pursued by extending drought and blast-tolerant varieties and more appropriate cropping practices. In Vallée du Sourou, Burkina Faso, supplementary irrigation of upland rice is being introduced in rotation with irrigated wheat. An assessment in 1986 of constraints for swamp rice development in the Gambia, Ghana and Liberia led to proposals for improved models to develop lowland rainfed rice in West Africa. Similar activities were conducted in Mozambique, Uganda, Zambia and Zimbabwe within the framework of the

¹ Burkina Faso, Burundi, Chad, Guinea Bissau, Madagascar, Rwanda, Sierra Leone and Tanzania.

preparation of the East and Central Africa Network on lowland rainfed rice. High altitude swamp rice improvement was carried out in Burundi and Rwanda with new material and technology from Yunnan, China and Tsukuba, Japan.

- 8.25 Intensification and diversification of rice-based farming systems has been another key area, and assistance was provided in 1986 and 1987 to develop rice-cum-fish production systems in swamp rice areas of Sierra Leone and Burundi. This innovation can provide 250-1,000 kg. of fish per ha. Improvement of rice farmers' income was also demonstrated in Burkina Faso, Guinea, Guinea Bissau, Mali, Niger and Sierra Leone, with the introduction of the "Thriving/Prosperity with rice" concept. The four-pronged strategy of a rice-based mixed farming and processing at the village level, aimed to provide rice at a low cost by using locally-produced inputs, increased substantially the income of farmers and generated rural employment opportunities.
- 8.26 The International Rice Commission (IRC), membership of which includes all major rice-growing countries, was established by FAO in 1949 and since then the Sub-programme has provided a permanent Secretariat. During the period under review the 17th Session of the IRC was held in Brazil (1990) to consider new orientations in rice production and research in the 1990s. The Report and Proceedings have been published in three languages. The Secretariat services also include the preparation and dissemination of the IRC Newsletter (two issues each year)² and monitoring the follow-up of rice action programmes according to IRC recommendations. During 1987, an *ad hoc* Sub-committee for Rice Development in Latin America and the Caribbean carried out, with FAO assistance, a regional study on "Irrigated Rice in Latin America: production, constraints and improvements", followed recently by a regional review of upland, rainfed and irrigated rice research and development in the Pacific Islands.
- 8.27 To support the establishment of a network of FI Hybrid Rice in Asia, technical and financial assistance was given to India, Indonesia, Korea (Republic of), and Viet Nam on a new innovative "two-way method" (two parents breeding techniques) to replace the labour-intensive three-way hybrid development method in China. In the future, it will be extended to European, Near East and Latin American irrigated rice. The yield of hybrid rice will be enhanced through the incorporation of wide compatibility genes, given higher heterosis on crossing indica and japonica types. In 1991, work was initiated to develop technology for non-flooded irrigated rice in the Near East and European countries under the Rice Research Network on Mediterranean Climate.
- 8.28 Rice biotechnology units in some Asian countries have been supported since 1988 in creating true breeding lines through apomixis, accelerated rice seed improvement through anther culture, embryo rescue and protoplast culture. In 1991, assistance was provided for the training of scientists from China and Democratic People's Republic of Korea in new rice biotechnology techniques for genetic engineering aimed at providing more stability against biotic and abiotic stress and raising rice yields.

² This publication was reduced to one issue per year during 1987 and 1988 because of the FAO's financial crisis, and in 1989 it was decided that one yearly trilingual issue be published.

- 8.29 Training support included cooperation with IRRI for one-month courses on upgrading rice programmes of national research institutions of Guinea, Haiti, Mauritania and Sierra Leone (1986) and in-depth training of one rice scientist from Senegal on prosperity rice programmes, multi-cropping system and off-farm rural employment in China (1988). A training workshop (including on-farm demonstrations) on swamp and irrigated rice with low-cost technologies was held in Guinea for 25 national research and extension workers (1989) and the workshop on the new concept of "Thriving Rice" was extended to Guinea Bissau (1990).

C. Improvement and Transfer of Cereal Production Technology

- 8.30 These activities cover the entire cereal sub-sector, excluding rice. The principal cereal crops are: wheat, maize, sorghum, millet (pearl millet and minor millets) and barley.
- 8.31 The main thrust has been on assisting the transfer and dissemination of improved cereal production technology through on-farm demonstration. Since 1986, research and extension staff in Burundi, Ethiopia, Kenya, Niger, Rwanda, Somalia and Zimbabwe have been assisted in designing and implementing on-farm demonstrations for maize, sorghum and millet. In each country, between 20 and 25 officers participated in these activities conducted in 15-30 locations. This also included, apart from grass-root level training of farmers, two week intensive training for extension staff on food crop production technology (e.g. in Ethiopia, Kenya and Zimbabwe).
- 8.32 Another area of emphasis has been the development of integrated and diversified cropping systems, involving cereal crops. This included an analysis of the role of legumes in enhancing cereal production systems with the assessment of various cereal-legumes rotations in several West African countries. In cooperation with the Instituto Nacional de Tecnologia Agropecuaria (INTA of Argentina), a study was made of the potentials for improving sustainability of cereal production in grazing land ecosystems, through integration of cereals in rotation with pasture. Between 1986 and 1988, assistance was given to Viet Nam in transferring the transplanted maize technology developed in Democratic People's Republic of Korea to the national maize improvement programme. This technology, which permits the harvest of maize at approximately 60 days post-transplant, has made possible the incorporation of maize feasible in rice-based farming systems.
- 8.33 During the period reviewed, training activities have focused on intensive grass-root training workshops associated with on-farm demonstrations. In addition, support was provided to the preparation and implementation of the FAO/SIDA training programme, including trainees' follow-up, on Field Food Crops for Africa and the Mediterranean countries. This also included the organization (1987) of the FAO/SIDA Seminar on Increased Food Production through Low-cost Food Crops Technology. Technical documents on wheat, maize and agro-ecological zoning were published with financial support from SIDA. Similarly, in cooperation with ICARDA and CIMMYT, a workshop on rainfed wheat and barley crop production

was organized in Turkey (1989) for 21 research and extension officers from 10 Near East and North African countries.³

- 8.34 Close collaboration with the International Agricultural Research Centres has been an important aspect of work on cereal crops. Consultations were held during 1989 and 1990 with ICRISAT (on sorghum and millet), IITA (on maize in Africa), CIMMYT (on maize and wheat), and ICARDA (on wheat and barley in North Africa and the Near East). At the same time, cereal programmes in several countries⁴ were reviewed to determine the constraints in production and to identify new approaches for appropriate assistance.

D. Improvement and Intensification of Vegetable Production

- 8.35 During the period covered, development of vegetable production has been promoted through: (i) support to increasing the productivity of traditional tropical vegetable crops; (ii) intensification of vegetable production in irrigated land and in areas with limited water resources; (iii) promotion of special campaigns for home and school garden development involving active participation of youth and women; (iv) development of intensive vegetable production under controlled environment; (v) promotion of production and consumption of traditional under-exploited food plants, including mushroom production.
- 8.36 In 19 countries,⁵ support was provided to national programmes of small-scale production units and green belt development for tropical vegetables in sub-urban areas. These activities ranged from strengthening national and inter-country research and extension programmes (Malawi, Kenya, Uganda) to the analysis of problems related to the establishment, expansion and organization of vegetable production in peri-urban areas (Côte d'Ivoire, Gabon) and to vegetable variety improvements (Burundi, Comoros, Gabon).
- 8.37 Particular attention has been given to promoting the production and consumption of traditionally under-exploited food plants and to developing sustained garden cropping systems for improved nutritional status of rural population and for increased women and youth involvement in horticulture. These activities ranged from establishing and monitoring of national programmes for small-scale home and school gardens (Ghana, Kenya, Liberia, Togo), to the establishment of reference plant collections on traditional horticulture, including growing practices and propagation methods (Malawi and Tanzania).

³ Afghanistan, Algeria, Egypt, Iraq, Jordan, Libya, Morocco, Syria, Tunisia and Turkey.

⁴ Argentina, Burundi, Côte d'Ivoire, Ethiopia, Guatemala, Guinea, Nepal, Nicaragua, Rwanda and Yemen.

⁵ Belize, Benin, Bhutan, Burundi, Cameroon, Chad, Comoros, Côte d'Ivoire, Gabon, Guatemala, Iran, Kenya, Malawi, Saint Kitts and Nevis, Sri Lanka, Thailand, Togo, Uganda, Zaire.

- 8.38 In several countries,⁶ specialized production and propagation technologies were introduced for vegetable production in a controlled environment, including soil-less culture and biotechnology. Surveys on possibilities for protected vegetable cultivation were carried out to analyse problems and constraints in the intensification of vegetable production, under protected cultivation, in North Africa and Near East countries. To support these activities, work started during this biennium to review current bibliography and to assess organic and inorganic substratum for use in soil-less culture.
- 8.39 This component of the Sub-programme has been promoting two regional networks working in the selection, breeding, multiplication, conservation and dissemination of improved vegetable varieties, one for West Africa supported by a field project and the other in South-east Asia. Regular Programme support has been continued to these networks, primarily through advisory visits to participating network institutions.
- 8.40 Since 1986, training workshops to disseminate technical information on better use of plastics for intensive vegetable production, as well as for efficient use of protected vegetable cultivation, have been organized in several countries of North Africa, the Near East, Latin America and the Caribbean and East Africa in cooperation with the national agricultural research institutions. In particular, a workshop, organized in 1990 in Peru for national scientists and policy makers, assisted in defining strategies and concrete actions to promote horticultural crop production of lesser-known species to improve the rural population diet.
- 8.41 Collaboration with the Food Policy and Nutrition Division (ESN) has been developed for the promotion of Vitamin A rich horticultural food plants to combat malnutrition and vitamin deficiencies with special reference to the ten-year UN Vitamin A Action Plan. Since 1986, 17 countries⁷ have been assisted in identifying, designing and implementing special programmes and projects to develop appropriate cropping systems and to improve the diets of the population at risk. The joint work with ESN has also covered assistance to women groups of Kenya and Uganda in producing traditional, lesser-known horticultural food plants as well as in assessing potential horticultural crop production development in Nepal. Another joint activity with ESN supported the promotion of women and youth participation in sustained cropping systems for horticulture in Burkina Faso and Mauritania.

E. Promotion of Root and Tuber Production and Improvement for Smallholdings

- 8.42 The principal crops included in this programme element are: cassava, potato, sweet potato, yam and aroids. These crops are commonly grown by subsistence farmers in mixed cropping systems, often under marginal conditions. Root and tuber crops hold important niches in the cropping systems of the regions where they are grown

⁶ China, Cyprus, Democratic People's Republic of Korea, Egypt, Lebanon, Thailand and Turkey.

⁷ Bangladesh, Benin, Brazil, Burkina Faso, Chad, Haiti, India, Indonesia, Malawi, Mali, Mauritania, Nepal, Niger, Philippines, Tanzania, Viet Nam and Zambia.

extensively. Cassava is grown on poor soils; it can survive droughts and can be stored unharvested in the ground. Sweet potato is also tolerant of drought, demands little from the soil and has the advantage of a short growing period. Potato, cultivated in traditional highland ecologies is increasingly extending into tropical areas. Activities under this topic have focused on assisting developing countries in identifying and formulating appropriate programmes and projects for external funding and in strengthening their capacity for research and dissemination of an appropriate technological package for crop production.

- 8.43 During the period reviewed, direct assistance was provided to 32 countries⁸ for the identification of suitable cropping areas and the preparation of programmes and projects for intensification of root and tuber production. Several of these activities in Asian countries were implemented in close cooperation with ESCAP and the Asian Potato Association.
- 8.44 Inter-country cooperation through networks has been the key vehicle for strengthening national research and development programmes on root, tuber, banana and plantain crops, including better organization of the extension services. During the period under review, a group of Caribbean countries (Antigua, Dominica, Guyana, Grenada, Jamaica, Montserrat, Saint Kitts and Nevis-Anguilla, Saint Lucia), were supported in formulating and implementing sub-regional research programmes on root, tuber, banana and plantain varieties, including exchange of technical information and planting materials. Similar support was given to several Asian countries (Bangladesh, Bhutan, Laos and Nepal) under the network activities and inter-country project activities were formulated for Tanzania, Zambia and Zimbabwe to improve root crops production.
- 8.45 Assistance provided at the national level included: China (the evaluation of potato clones suited to different inter-cropping and mixed cropping systems), Jamaica (to improve Minisett technology in yams), and Nigeria (in cooperation with IITA, for the formulation of research and development activities on tropical root and tuber crops programme). Advice was also given to Indonesia, Sri Lanka and Viet Nam regarding their national crop diversification programmes involving root and tuber crops.
- 8.46 The Sub-programme organized, or contributed to, several international seminars and workshops. These included: an international seminar on root crop production constraints and strategies for improvement of production in developing countries (1986), a regional workshop for Africa on "Tropical root crops development" (1986), the International Symposium on Tropical Root Crops Development (1988), and an FAO/IAEA regional workshop on Root Crop Improvement in Africa (1990). A regional workshop is planned for 1991, in cooperation with the West Indies University in Trinidad for the countries of the Caribbean on small farmers' production.

⁸ Anguilla, Bangladesh, Barbados, Belize, Benin, Bhutan, Cameroon, China, Congo, Costa Rica, Côte d'Ivoire, Dominica, Egypt, Ethiopia, Gabon, Ghana, Honduras, Indonesia, Liberia, Libya, Malaysia, Myanmar, Nigeria, Panama, Philippines, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Sierra Leone, Sri Lanka, Sudan and Tunisia.

F. Development of Fruit Production

- 8.47 Tropical and sub-tropical fruits occupy an important position in the economy of many developing countries, both as a source of cash income and food. Direct advisory support to countries has been an important activity. Advice was given to Fiji, Samoa, Vanuatu, Cook Islands and other countries in Asia and the Pacific on production improvement of papaya, pineapple and other tropical and sub-tropical fruits, with attention to the technical problems under island and atoll ecological conditions. Technical missions were also fielded to assess the needs and potentials in intensive production of banana and other minor fruit crops and helped to prepare development programmes and projects in African and Asian countries.⁹
- 8.48 Support to research and development of tropical fruits also received priority. Several countries¹⁰ were assisted on the topic of banana research and development. A joint review study was carried out in cooperation with Australia, China and India to identify priority research and development activities on Banana and Plantain Production. In Latin America and the Caribbean, several countries¹¹ were assisted in identifying constraints and issues for fruit crop improvement and in preparing related strategies for research and development. In cooperation with the International Centre for Advanced Mediterranean Agronomic Studies, a programme has been started for collection and maintenance of virus-free Mediterranean fruit tree varieties and rootstocks as well as for the implementation of post-graduate training on production of Mediterranean fruit crops for scientists from developing countries.
- 8.49 Similarly, in support of improving fruit plant propagation through use of tissue culture and micro-grafting, a technical manual on tissue culture of tropical fruit plants was published. Surveys of the need for producing high-quality plant material through micro-propagation were carried out in 13 countries.¹²
- 8.50 Activities under the subject included the promotion of promising minor tropical fruit crops for agricultural diversification, particularly for South East Asia. Technical publications on litchi, carambola and rambutan have been prepared, and support was given to a symposium organised by the International Society for Horticultural Science on research on these fruit crops (1991, Thailand). This has led to a regional project proposal on research and development on these minor tropical fruit crops, endorsed by scientists from interested countries in the region (Bangladesh, Indonesia, Malaysia, Philippines, Sri Lanka, and Thailand). A survey, undertaken with assistance from

⁹ Benin, Burundi, Central African Republic, Indonesia, Malaysia, Myanmar, Sri Lanka, Togo and Uganda.

¹⁰ Indonesia, Jamaica, Myanmar, Philippines, Trinidad and Tobago and Venezuela.

¹¹ Barbados, Costa Rica, Dominican Republic, Grenada, Honduras, Jamaica, Mexico, Trinidad and Tobago.

¹² Côte d'Ivoire, Gabon, Ghana, Kenya, Democratic People's Republic of Korea, Indonesia, Malaysia, Philippines, Senegal, Sri Lanka, Thailand, Uganda and Zambia

the Sub-Programme in Eastern Africa, identified a regional programme for promoting tropical fruit production for local consumption and export.

- 8.51 On citrus, strategies for appropriate citrus production improvement were identified and the specific development proposals were discussed by the FAO Inter-governmental Group on Citrus during its 8th meeting in Montevideo (1989). This led, inter alia, to the establishment of the Inter-American Citrus Network among the research institutions of citrus-producing countries in the region. A proposal for inter-governmental cooperation on citrus improvement in the Mediterranean countries was also prepared.
- 8.52 In the field of temperate fruits, advice was given to nine countries¹³ on the intensification of species adapted to hilly and mountainous regions, including the necessary research and development programmes. In collaboration with the International Society for Horticultural Science, regional workshops were held (in Thailand and Venezuela) to disseminate the experience of the cultivation of temperate zone fruit trees in mountainous regions. Based on a series of studies on production constraints for almond, hazelnut, pistachio and walnut in countries in Europe, the Near East and North Africa, an expert consultation was held in Turkey (1990), at which an inter-country network for tree nut research and production improvement was established.
- 8.53 The Sub-programme has given emphasis to the promotion of regional and sub-regional networks and working groups on fruit crop research and development. In cooperation with ACSAD/RNEA, a pistachio improvement cooperation programme for pistachio-producing countries was prepared (1986) and a network on tropical fruits in the South Pacific countries was established, for which guidance was given to the preparation of a regional technical cooperation programme.

G. Crop Diversification and Intensification of Mixed Cropping Systems

- 8.54 Crop diversification and development of intensive and sustainable mixed cropping systems have been, since 1988, one of the top priorities under the Sub-programme. The focus has been on the promotion of mixed and balanced cropping systems, especially those involving horticultural crops, through direct support to national institutions for the design and implementation of appropriate interventions for farm diversification and intensification.
- 8.55 Such direct assistance has included:
1. the preparation and implementation of horticultural crop diversification projects, in particular for the promotion of cut flower and ornamental plant production for export (East Caribbean countries);

¹³ Afghanistan, Bhutan, China, Ecuador, India, Laos, Madagascar, Nepal and Peru.

2. preparation of programmes for the development of horticultural mixed cropping, involving roots, tubers, bananas and plantains (Indonesia, Malaysia, Myanmar, Papua New Guinea, Philippines, Sri Lanka and Thailand);
3. preparation and implementation of programmes for subsistence horticultural crops in appropriate cropping systems in poor areas (Angola, Botswana, Lesotho, Sudan and Swaziland); and
4. preparation of a national programme for women's involvement in horticultural products' activities (Sri Lanka).

8.56 During 1989 inter-disciplinary studies were carried out to define appropriate FAO interventions for the promotion and development of diversified and sustainable cropping systems with emphasis on the role of horticultural crops in small farmer production systems. The findings were used in providing advice to smallholders on appropriate cropping patterns for introducing high value commercial fruit and horticultural crops (selected countries of Asia, Central America and the Caribbean as well as to Benin, Jordan and Togo). In 1990 another study examined constraints and outlook for horticultural and mixed cropping with special relevance to Sub-Saharan Africa, and its results have provided a basis for establishing policy and programme guidelines for crop diversification. Similar studies are on-going for South Asia and the Caribbean countries. The preparatory work on guidelines for Special Action Programmes to upgrade hill agriculture in Asia through crop diversification is also under way.

8.57 Mushroom production has been promoted as a supplementary food item and income source for smallholders. Assistance was provided to 14 countries¹⁴ in assessing the feasibility of developing a small-scale mushroom production unit and in preparing national programmes with emphasis on women's involvement in production and marketing activities. On-going activities are aimed at establishing an international mycelium bank for mushroom species suitable for the tropical and sub-tropical regions. The work is carried out in cooperation with the University of the Philippines - Los Baños. Guidelines for mushroom growing in the tropics were published in 1990.

H. Development of Oil Crops

8.58 This programme element deals with perennial oil crops (mainly oil palm and coconut) and with the major oil seed crops (sesame, safflower, sunflower, rapeseed and groundnut). Most of the developing countries of Africa and Asia have acute deficits in vegetable oil production. Activities have aimed at assisting the upgrading of crop technology and improving varieties and plant materials, with focus on the promotion of inter-country cooperation to stimulate exchange of information on improved techniques, seeds and plant materials.

¹⁴ Albania, Bangladesh, Bhutan, Democratic People's Republic of Korea, Laos, Mauritius, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Uganda, Viet Nam and Zambia.

- 8.59 Special emphasis has been given to the development of oil palms since it is the highest oil-yielding crop per unit area. This included cultivation packages based on improved varieties and the use of improved extraction techniques at village level. A number of countries in Africa have been supported in formulating oil palm development projects along this line but donor response has been poor. Technical support was provided to the World Bank in introducing a change in its policy in oil palm fruit processing in favour of small, low-cost, labour-intensive but efficient palm oil factories rather than larger and expensive factories. Advice was also given to the African Oil Palm Development Association (10 countries participating) to stimulate TCDC among its members.
- 8.60 Assistance has been continued on coconut development. This included support to a regional coconut TCDC project for Asia and the Pacific (19 countries), which has promoted a cooperative network. Eleven countries were also assisted in a wide variety of subjects, ranging from establishment of seed gardens, replanting, smallholder advice, establishing coconut research stations, disease control to preparing a proposal for new coconut based cropping systems.
- 8.61 Assistance in improving the oilseed crops was focused on Africa, including sesame and groundnut production. Another set of activities comprised support to 13 countries¹⁵ in establishing on-farm demonstration and evaluation plots for improved varieties, especially for sesame, sunflower and other oil seeds.
- 8.62 For all vegetable oil crops, a major thrust has been the strengthening of inter-country cooperation networks, as well as the promotion of improved varieties, new crop technologies and more intensive cropping systems. Technical, and modest financial assistance has been provided to increase inter-country exchange of breeding materials, information and expertise, as well as to organize technical meetings and training activities. In particular, support was given to 12 Latin American countries to investigate the prospects of a coconut network which could overcome many common problems and the shortage of funds for research and development.
- 8.63 The promotion of inter-country cooperation has included support to various international meetings; the sesame expert meeting organised in Vienna (1987), the organization of the Second International Safflower Conference (1988), the Fourth IDRC Oil Crops Network Workshop for member countries of the East Africa/South Asia network in Nairobi (1988), and a meeting of the IDRC Sunflower and Sesame Sub-networks for East Africa and Asia in Egypt (1989).
- 8.64 Under the Regular Programme, seed samples of selected varieties of sesame and other oil crops were distributed to more than 100 institutions cooperating within Latin America and the Caribbean, Africa and Asia networks. Assistance was given to the South American Research Network for Soybean and Other Oil Seeds (SURCOSOL) in 1990 for the evaluation of sunflower varieties from the South America Southern Cone (Argentina, Brazil, Chile, Paraguay, Uruguay). The Sub-programme has

¹⁵ Cuba, Dominican Republic, Guatemala, Honduras, India, Indonesia, Iraq, Nicaragua, Sri Lanka, Sudan, Thailand, Tunisia and Uganda.

supported over the last six years the publication of regular newsletters on sesame and safflower and useful palms of tropical America.

I. Fibre Crops Development

- 8.65 Fibre crops, in particular cotton, jute and kenaf, continue to be an important source of income for small farmer and the rural population of the tropics of Africa and Asia. In many countries, cotton is also the main source of vegetable oil for human consumption and protein for animals. Support to improved fibre production has been continued primarily through the promotion of inter-country cooperation.
- 8.66 A regional workshop on cotton production was organised in Indonesia (1986) for research and development staff of ten countries,¹⁶ and in cooperation with the International Cotton Advisory Committee (ICAC) and INTA, two regional Latin American seminars on Cotton Production were organized in Argentina (for Latin America) and in Barbados (for the countries of the Caribbean sub-region). In addition, countries in the Central American and the Caribbean areas were supported in strengthening their national cotton development programmes.
- 8.67 Support continued to regional networks for Cotton Development in Latin America, Asia and Africa to assist in the implementation of technical activities: e.g. assessment of constraints for economic production of cotton in Mexico, Central America and Venezuela; organization of the regional meeting on cotton development for Africa; technical meetings on hybrid cotton for national coordinators of cotton research and development programmes in Asia.

J. Alternative to Shifting Cultivation

- 8.68 This programme element, established in the 1986-87 biennium, forms part of FAO's inter-disciplinary efforts to assist Member Countries in developing agro-forestry production systems with emphasis on mixed perennial cropping systems, which can provide, with low production costs, a stable, regular income and erosion control with minimal crop protection and tillage. Activities are carried out in close cooperation with Programme 2.3.1. Forest Resources and Environment, aiming to identify and demonstrate perennial crop-based food systems within forest development programmes and projects. In particular, demonstration activities were initiated in India, Indonesia and Sri Lanka.
- 8.69 To provide the framework for these activities, a publication is being prepared on mixed perennial cropping systems (MPCS) to quantify these systems in economic terms and to identify economically justified alternatives to shifting cultivation.

¹⁶ Bangladesh, China, India, Indonesia, Laos, Myanmar, Nepal, Philippines, Thailand and Viet Nam.

K. Industrial Crop Diversification, Illicit Drug Crop Substitution and Development of Under-utilized Plants

- 8.70 With the decline in world market prices in recent years, many of the traditional perennial smallholder commodity crops, such as cocoa, robusta coffee, coconut and pepper, have been losing their economic significance, except when there are large internal markets, e.g. coconuts in India and Indonesia. Support is provided under this programme element to help improve the competitive position of these crops, or to introduce alternative crops, in areas with ecological and infrastructural disadvantages.
- 8.71 Babassu palm (Orbygnia phalerata) covers about 8 million ha. in the dry North East of Brazil. The babassu nut provides a high quality, renewable source of charcoal from the shell and seeds with a high lauric oil content, which can replace copra of coconuts in dry areas. Research in Brazil revealed that palms with 22% kernel to fruit can be selected instead of the usual 7%. This greatly improves the economic returns of this crop. Assistance was given in introducing this crop in Ghana, Indonesia, Myanmar, Sierra Leone and Thailand to establish small seed gardens. Outlines for a babassu breeding strategy were prepared, Quassia glauca, a tree native to Nicaragua, Mexico and El Salvador, was successfully introduced in Myanmar for planting in waste land with a six-month dry season. The fat from the seed can serve as a substitute to cocoa butter and the press cake can be used in the pharmaceutical industry.
- 8.72 Medicinal and aromatic plants frequently produce high value crops requiring much labour. A number of these crops can be transformed on the farm by steam distillation with a considerable value added to the benefit of the farmer. The bottleneck, however, has been the marketing of these products to overseas buyers. Such marketing promotion was established with industries and research institutes in the France, Germany, Hungary, India, Italy, the Netherlands and Switzerland for FAO-assisted projects in Bhutan, Cuba, Nepal and Seychelles. A Newsletter of Medicinal and Aromatic Plants is now jointly published, with about 1,000 subscribers, by the Research Institute for Medicinal Plants in Hungary, the International Society for Horticultural Science and FAO.
- 8.73 Support was provided to 13 countries¹⁷ in the rehabilitation of cocoa and/or coffee cultivation. Similar support has been given through field projects for sugarcane (Belize, Cuba, Indonesia, Laos, Myanmar and Pakistan), rubber (Indonesia, Myanmar, Sri Lanka and Viet Nam) and tea (Sri Lanka and Thailand). Exchange of technical information has been promoted through several international meetings, including the Cocoa Breeding Symposium as part of the Tenth International Cocoa Research Conference, and an International Consultation on Plantation Crop Diversification (jointly with the Farming Systems and Soil Resources Institute in the Philippines).

¹⁷ Angola, China, Congo, Equatorial Guinea, Indonesia, Liberia, Madagascar, Malawi, Mexico, Sao Tomé and Príncipe, Uganda, Viet Nam and Zambia.

L. Promotion of Plant Biotechnology

- 8.74 In order to assess the relevance of new plant biotechnologies to the agricultural production needs of developing countries, an International Symposium on Plant Biotechnology for Developing Countries was organized in cooperation with the Technical Centre for Agricultural and Rural Cooperation (1989 in Luxembourg). It also considered the implications for long-term policy, and a related action programme for the use of these technologies. Following this, an Action Plan for FAO Plant Biotechnology has been developed, and a new activity has been initiated in the current biennium, to support the development of national and regional plant biotechnology capabilities in Africa, Asia and the Pacific, and in Latin America and the Caribbean.
- 8.75 During the current biennium, assistance was provided to India, Korea (Republic of) and Viet Nam in developing programmes on plant biotechnology. In 1990, in cooperation with RLAC, the formation of a Network on Plant Biotechnology Research Laboratories of Latin America and the Caribbean was promoted, and a Round Table on the subject is planned towards the end of 1991. FAO also co-sponsored a biotechnology workshop and training for African Biotechnologies at IITA, Ibadan, Nigeria. An Asian Plant Biotechnology Project was also formulated for eight countries of Asia.¹⁸ Work is on-going for analyzing the biotechnology component in the agricultural research systems of the Mediterranean countries.

M. Policies for Sustainable Production Systems

- 8.76 This programme element, newly established in 1990, supports inter-disciplinary activities, jointly with other Sub-programmes on policy advice and planning work in the Organization.
- 8.77 A preliminary methodological review and basic documents are under preparation, in order to design and provide support to developing countries in the analysis and formulation of sectoral and sub-sectoral policies and programmes. Work under the Sub-programme provided a major input to the preparation of one of the FAO Special Action Plans (Sustainable Crop Production and Development), which was adopted at the FAO/Netherlands Conference on Agriculture and Environment held in 1991. A demonstration programme of sustainable farming practices has been designed in cooperation with Sub-programme 2.1.1.6 - Sustaining Resource Potentials.

¹⁸ China, Democratic People's Republic of Korea, India, Indonesia, Iran, Korea (Republic of), Malaysia and Philippines.

Effects and Impact

- 8.78 As for other FAO programmes, concrete development effects of this Sub-programme must be sought at the field level. The limited resources of the Sub-programme have played a catalytic role in the promotion of crop technology improvements and the adoption of better varieties and cultural practices through formulation and implementation of specific crop development projects in developing countries. An impressive mass of technical information has been generated, processed and applied "in situ" or transferred to other areas or countries. The approach used for the transfer and dissemination of improved technologies also emphasized, with positive results, the interaction between the farmers on one hand and extension agents and research personnel on the other, in order to ensure two-way feedback in the process. Successful demonstration activities on a diverse range of crops and cropping practices were replicated under similar conditions in many developing countries.
- 8.79 One of the most striking cases of FAO's effective catalytic role can be observed in the success of the Sub-programme in establishing inter-country research and development networks in developing countries. In collaboration with the Regional Offices, over a dozen technical cooperation networks have been promoted and supported, covering all the developing regions and a variety of crops, such as rice, vegetables, oil seeds, tropical fruits and oil palms. These networks have facilitated active exchange of new technologies and planting materials among the participating institutions, often resulting in a wide-scale adoption of the improved technology (Chapter Eleven contains an in-depth review of technical cooperation networks promoted by FAO). As an example, the case of the Asian Network on Food Legumes and Coarse Grains, as evaluated by a UNDP/FAO mission, is given in the box below (RAS/82/002 project).
- 8.80 The Sub-programme succeeded in establishing closer working relationships with the International Agricultural Research Centres (IARCs), for research and development activities related to the major food crops and improved production systems. It has demonstrated that the IARCs system and FAO play complementary roles in assisting developing countries. The IARCs institutes have comparative advantages in technology generation and FAO has comparative advantages in technology testing and transfer both to national agricultural research systems and from national research to farmers. For example, FAO successfully transferred new intensive production techniques for the pigeon-pea crop developed by ICRISAT, resulting in an increase of more than 3,000 ha. of this legume crop in Cape Verde. Joint studies with IITA on cotton/legume production systems being carried out in several African countries are aimed at developing specific improvements in crop diversification/intensification. For example, in Malawi, the cowpeas and pigeon-peas inter-cropped with cotton should allow additional food production in monocrop industrial systems, without a negative effect on cotton yield and, virtually, utilizing the same commercial inputs. Similarly, FAO has assisted several countries in Africa in the adoption of IITA's soyabean varieties into their national programme, which has facilitated the rapid expansion of small farmer-based soyabean production.

RAS/82/002: REGIONAL COOPERATIVE PROGRAMME OF FOOD LEGUMES AND COARSE GRAINS IN ASIA

Budget: US\$ 1,331,448 (UNDP)

Duration: September 1983-June 1989 (Phase I and II)

This is a project supporting the establishment of a regional network on food legumes and coarse grains (FLCG) research and development in Asia. The underlying assumption of the regional approach to R & D of FLCG crops was that, since each country had its strengths and weaknesses in this area, every participating country had much to give and gain from the cooperative arrangement. Currently, UNDP co-funds the third phase with ICRISAT and CGPRT.

An evaluation in late 1989 found the single most important achievement of the project was the establishment of an emerging network linking national and regional research centres on R&D of FLCG crops. The project had succeeded in enhancing the priorities and resources to FLCG in the participating countries, thus building the momentum of the networks. Through TCDC, the project has been able to strengthen contacts among concerned researchers in member countries, train some 200 scientists and research staff, systematically organize information exchange and the exchange of 150 crop varieties' seed and promising genetic breeding materials. For example, a cold tolerant maize variety from Korea (Republic of) has been incorporated in Pakistan's maize improvement programme through exchange of breeding materials under the network. The evaluation recommendations, while supporting the TCDC network approach, pointed out the need for greater emphasis in the future on adaptive and socio-economic research aspects of FLCG crops, including marketing and processing.

- 8.81 Demonstrations on Azolla technologies, conducted in Africa, have led to great progress in rice production in many countries of this region. For example, at the Banzon Irrigation Project in Burkina Faso, the average yield for farmers was increased to 4 t/ha. without application of chemical nitrogen fertilizer. Improvement of existing irrigated rice technology have permitted, in the Chocoe Irrigation Scheme of Mozambique and in Zanzibar, the doubling of farmers' yields from 2.5 to 5 t/ha.
- 8.82 The support provided to China, the Democratic People's Republic of Korea and India for highly specialized training of scientists on new rice bio-technology and in genetic engineering have contributed to strengthening the Agricultural Research Systems of both countries. FAO's efforts to establish vegetable research and development centres in West Africa (Nigeria and Senegal) have contributed to creating the technical foundations for providing technical support to farmers in irrigated areas and to the development of national vegetable production programmes.
- 8.83 Activities in intensive vegetable cropping under protective cover have also attracted considerable interest. FAO's efforts in transferring between countries the most recent and relevant information on technologies is an example of continuing follow-up to Field Programme activities through the Regular Programme, often facilitating a considerable amount of investment from private sources in this promising sector. Another area of significant effects on vegetable crop development was the promotion of peri-urban green belts. An example of the achievements under a field project promoting vegetable production (GBS/86/012) is given in the box below.

GBS/86/012: STRENGTHENING OF VEGETABLE PRODUCTION IN THE GREEN BELT OF BISSAU CITY

Budget: US\$ 406,909

Duration: April 1987-March 1990

The project aimed at developing vegetable production in small peri-urban gardens through active involvement of women and within the framework of special programmes for small farmers' development.

The evaluation mission fielded in June 1989 found that the planned targets were considerably exceeded. Through a well-organized system of credit, input distribution and extension established by the project, more than 2,250 women were participating in the vegetable intensification and diversification process. The increased cropping surface reached 122 ha., producing more than 20 vegetable species. During the 1989 dry season the tomato production reached 770 tons, cabbage 240 tons, gumbo 104 tons and lettuce 100 tons. A new phase of external assistance was recommended in order to expand the project area and to consolidate the farmers/women organization to achieve autonomy for the farmers' group and sustainable development.

- 8.84 The work on small-scale mushroom production, initiated in the early-1980s with a single UNDP/FAO project in India, has spread to many other countries in Asia and Africa. Successful transfer of this high-protein, labour-intensive crop has created additional food, income and employment opportunities for the rural families. In addition these activities have generated strong participation of women.
- 8.85 In Viet Nam, the successful transfer of the transplanted maize technology, that had been developed in Korea (Republic of) to the maize improvement programme, allowed the incorporation of maize into rice-based farming systems. This innovation has resulted in an expansion of crop area of more than 20,000 ha. of maize in the Red River Delta.
- 8.86 In the Philippines, improved rice/legume-based farming practices were promoted in the valley-bottoms and the "Chinampa system" developed by the Aztecs of Mexico is used to maximize the potential of swamp areas with more intensive and diversified production systems. In the Chinampa system, soil from the long canals is used to develop raised-beds for rice, legume and vegetable crops. Fish are also produced by farmers in the canals.

Outlook and Issues

- 8.87 This review demonstrates clearly that the field of work of the Sub-programme is extremely vast, dealing with a wide range of crops and production systems under different environments, and involving an especially wide variety of problems and issues that are specific to locations. It is also clear that the effectiveness of FAO's activities in this sector under such varying circumstances must be demonstrated at the field level, where the accumulated technical knowledge and information in FAO could

be adapted to specific situations. Thus, it is logical that the focus of the Sub-programme has been concentrated on supporting a large number of field projects of a very diverse scope, nature, and size (the Sub-programme has the largest Field Programme component among all the technical Sub-programmes).

- 8.88 The limited resources available to the Sub-programme are a basic issue in relation to its scope. A continuing managerial challenge is to ensure a clear focus and balance in resource allocation among the several crop sub-sectors and programme elements, in order both to reflect FAO's comparative advantages in various sub-sectors and to respond to existing and potential demands for assistance from developing countries. For example, the Regular Programme resources allocated to the rice crop element have accounted for over one-fifth of the total budget for the Sub-programme during the period reviewed, a share larger than those allocated to vegetable and fruit programme elements combined. This leaves relatively small shares of resources for many other priority activities under the Sub-programme. Although the importance of the rice sub-sector is beyond doubt, this requires continuous balancing of resource allocation over many competing priority areas.
- 8.89 Some overlappings and duplications are also apparent; for example, between food legumes, grain and oilseed legumes activities as well as those between the improvement and intensification of vegetable production and the development of oil crops programme elements. Such duplications are partly due to the structure of various programme elements, which are defined on conflicting criteria: i.e. potential utilization of the output (food legumes, oilseed legumes, oil crops) on one hand and agronomic characteristics of the crop (horticulture, cereal crops, arboriculture) on the other. This problem is recognized by the managers of the Sub-programme, and efforts are being made to streamline the structure of the Sub-programme as well as the programming and work planning process.
- 8.90 The Sub-programme has stressed correctly, as a priority area, technical support to strengthening the capacity of national institutions for improved crop technology adaptation and transfer, including support to the development of international networks in cooperation with the CGIAR. In fact, it is in a good position to assemble and synthesize research findings throughout the world and to make them available to research and development institutions in developing countries through various Regular Programme activities (meetings, training courses, advisory missions and publications) as well as through well-designed field projects. A balanced distribution of Sub-programme resources between monitoring research results, testing and dissemination, and support to field projects will continue to be essential to maintain the strong linkage between Regular Programme and Field Programme activities.
- 8.91 A body of valuable technical information on the more important or promising crops and crop production practices is being accumulated for the more important ecological systems of the world. If this information is well-organized, combining the production of economic data on those crops and the information on cropping techniques, it will give FAO a stronger basis for responding to Member Countries' needs in an efficient and expeditious fashion. It will require additional resources of a modest nature but the benefits in relation to the cost will be very high. This will also facilitate optimal

use of the strength of the Sub-programme by providing a framework for better internal coordination and for mobilizing the contribution of staff from other technical units of the Agricultural Department. In this way, progress can be made in ensuring a multi-disciplinary approach to the complex problems of crop improvement and management.

- 8.92 Experience shows that economic and financial factors are critical to adoption by producers of improved technology for production and that the technical packages for crop improvement have to be underpinned with a sound economic and financial analysis, demonstrating that the proposed improvements are clearly profitable to farmers; i.e. they provide them with a substantive increase in crop production return and farm income, with no additional risks to the farmer. The need for such micro-economic analysis could be more explicitly and systematically built in the Sub-programme's work, especially with a close link with the farming systems work. Such economic considerations should be an essential pre-condition for crop technology as well as for validation and selection of appropriate cropping patterns, and in any case, these considerations are of greater concern in terms of ensuring sustainable farming systems.
- 8.93 In addressing the points raised above, it cannot be ignored that other programmes and units in the Organization, with which the Sub-programme needs to cooperate, are also confronted with resource limitations. In view of its extensive links with many other programmes, the future expansion and strengthening of this Sub-programme would have to be approached from a broad perspective, including the overall staff and resource constraints affecting the related technical programmes as a whole. In this connection, it is welcome that the concerned managers have been reviewing in-depth both the Sub-programme structure and its links with other activities in Programme 2.1.2 (Crops) in order to strengthen its coherence, to clarify priorities and to ensure balanced resource allocation.

CHAPTER NINE

REMOTE SENSING AND AGROMETEOROLOGY

Sub-Programme 2.1.4.4

Background

- 9.1 Developments in food and agriculture, both at global and local levels, are conditioned by the natural environment in which they evolve, including land, water, climate and other natural resources directly linked to food and agricultural production. Reliable information on the extent and distribution of these resources, together with knowledge of their potential use, is essential for their sound management. Growing appreciation during the recent decades of the finite nature of these resources as well as the organic inter-relationships between them and human development endeavours have given urgency to the monitoring not only of the changes in resource situation, but also of the dynamics of important resource factors.
- 9.2 Since its inception, FAO has played an active role in these fields, both in the collection, analysis and dissemination of information on the main food and agriculture resources at the global level and in assisting developing countries in improving their capacity and information in resource inventories and land-use planning. Despite this, the available information has remained incomplete or/and outdated in many countries, due partly to their limited capacity for, and the time-consuming nature of, traditional ground-based surveys, as well as partly to difficulties of physical access caused by remote terrain and security problems. These constraints have also impeded efforts in monitoring and surveying, through traditional methods, not only the resource situation but also of food production at the farm level.
- 9.3 In this context, remote sensing technology using satellite-based information has introduced a new dimension and new possibilities in many fields of FAO activities, including the speed, accuracy, comprehensive coverage and cost-effectiveness presently required for their undertaking. Apart from its use for a rapid appraisal of the status of natural resources and planning of their potential uses, the technology has shown to be a powerful tool, especially in coordination with ground observation methods, for monitoring various phenomena of interest to FAO, including food crop production, desertification and other forms of environmental degradation and climate changes. The scope for using satellite-based information has been greatly enhanced with the combined use of several types of satellite images, such as: LANDSAT and SPOT with high resolution useful for more detailed land-use/land-cover mapping; and NOAA and METEOSAT with high-frequency large-area coverage suitable for environmental monitoring.
- 9.4 Advice on the selection of the most appropriate remote sensing tools and technologies in this highly competitive area is crucial. The rapidly expanding applications of satellite-derived data and interpretation software make it difficult to select the most

appropriate tools available on the market. Moreover, increased use of satellite-derived data depends for a large part on its cost-effectiveness and the capacity of the country to rapidly integrate its information into the various end-user information channels.

- 9.5 In order to assist member countries in strengthening their national capabilities in mapping, assessment and monitoring of their natural resources, FAO established in 1980 the **Remote Sensing Centre** following recommendations of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS). The Centre was also designated as the UN focal point for remote sensing applications to renewable natural resources.
- 9.6 Formerly included in Sub-programme 2.1.1.1 "Assessment and Planning of Natural Resources" within the Land and Water Development Division (AGL), the Centre is now situated within the Research and Technology Development Division (AGR) of the Agriculture Department. The transfer emphasized its **inter-departmental function in the provision of a wide range of remote sensing and, since 1990, agrometeorological services** to many FAO technical divisions in the Departments of Agriculture, Development, Economic and Social Policy, Fisheries and Forestry.
- 9.7 FAO activities in **agrometeorology** originated in 1960 with an agreement between FAO and WMO to undertake a series of agro-climatological surveys in regions where future agricultural development was envisaged. The Inter-Agency Group for Agricultural Biometeorology was established in 1968 as a yearly forum of discussion on agro-meteorological matters between FAO, WMO, Unesco, UNDP and, later, UNEP. The Secretariat of the Inter-Agency Group has been financed by FAO since 1976 and is located within the Agrometeorology Group. Two International Conferences have set the priorities for FAO agro-meteorological activities: (a) The United Nations Conference on the Human Environment in Stockholm, 1972; and (b) The World Food Conference in Rome, 1974. The first one determined the need to study the agricultural potential of developing countries through "agro-ecological" zoning. The second one established the concept of and the need for "Global Information and Early Warning Systems" (GIEWS). A third level of activities has been recently introduced in this area, i.e. assessing the potential impact of climate change in agriculture.
- 9.8 Formerly under Sub-programme 2.1.2.2 "Crop Improvement and Management", activities in this area have been transferred since 1990 from the Plant Production and Protection Division (AGP) to the Remote Sensing Centre (AGRT) in order to foment a greater integration of agro-meteorological and environmental monitoring activities. Given the extreme importance of weather variability and climatic change on agricultural production trends, activities in the field of agrometeorology will continue to gain momentum in the coming years.

Objectives and Priorities

- 9.9 The main objective of Sub-programme 2.1.4.4 is to "develop and support the application of remote sensing technologies and agro-meteorological technologies and

data to improve the quality of geographically-referenced information related to agriculture, forestry and fisheries, both within FAO and in developing countries". The applications cover: mapping and assessment of land use; food security, especially agricultural crop assessment and production forecasts; assessment and monitoring of forest and grassland; survey of coastal zones and inland water resources; and forecasting, monitoring and assessment of natural disasters. The integration of agro-meteorological work with the remote sensing activities is aimed at broadening the scope of the services of the Sub-programme through rationalization of complementary activities, especially in support of the Global Information and Early Warning System (GIEWS).

- 9.10 The Remote Sensing Centre provides the focal point and coordination of all remote sensing and agro-meteorological activities in FAO. The major in-house user units are represented in the **Inter-Departmental Remote Sensing and Agro-meteorological Data Users Committee** established in 1988. The membership of the Committee includes all FAO major users listed in para. 9.14 below. Through the Committee, the Centre's services and the end-user requirements are harmonized, and the exchange of related technical information is facilitated.
- 9.11 As the UN system focal point for remote sensing applications to renewable natural resources, the Centre acts as a clearing house among UN agencies for information related to the applications of remote sensing to development, management and protection of renewable natural resources. This function is implemented through provision of information and advisory services in these applications and through operating the World Index of Space Imagery (WISI), the World Aerial Photographic Index (WAPI), at present available only for Africa, and developing a reference library focused on remote sensing applications to renewable natural resources.
- 9.12 Another important aim of the Centre is to assist developing countries in the application of remote sensing technologies for mapping, assessment and management of their renewable resources. The assistance covers manpower development, strengthening of the institutional arrangements, advisory services and pilot project activities. Particular emphasis has been given to remote sensing applications to the monitoring of food production and food security aspects in the least developed countries, environmental monitoring and the transfer of appropriate technologies. Similar assistance is also provided in the application of agro-meteorological techniques for forecasting and monitoring of basic food crops production, especially in the countries of Africa south of the Sahel and on the Indian sub-continent.
- 9.13 The major components of the Sub-programme over the recent three biennia have been:
 - Coordination of space activities within FAO, as well as liaison with other organizations concerned with the development of space applications and the participation in the ACC inter-agency mechanism which coordinates UN activities on the peaceful uses of outer space.

- Advisory services on space applications and pilot studies to provide developing countries with appropriate remote-sensing techniques, systems and data with a view to strengthening national capabilities in the use of remote-sensing technology.
- Remote-sensing education and training mostly done through co-sponsoring with other international organizations and host countries.
- Agrometeorology primarily focused on crop/weather monitoring, including the collection analysis and dissemination of agrometeorological methods and data; and participation in international agro-meteorological and agro-climatological initiatives undertaken with other UN organizations such as WMO, Unesco, UNEP and UNCED.
- Satellite monitoring of environmental conditions, including the generation of ten-day precipitation and vegetation estimates. Expert consultations on agricultural drought assessments, based on agrometeorology and remote sensing data, are also organized under this programme element.
- Information and support services to the Field Programme covering over 60 field projects. Dissemination of information on remote sensing development and applications is also covered under this Programme element.

9.14 As the Sub-programme represents a service function in the application of two main sets of technologies relevant to many aspects of FAO's work, it interacts with a number of Programmes and Sub-programmes in the following divisions: Global Information and Early Warning Service (ESCG); Food Security Assistance Group (ESCF); Agrarian Reform and Land Settlement Group (ESHL); Locust Group of the Plant Protection Service (AGPP); Office for Special Relief Operations (OSRO); Soil Resources, Management and Conservation Service (AGLS); Water Resources, Development and Management Service (AGLW); Forestry Resources Division (FOR); Forestry Operations Service (FODO); Statistical Development Service (ESSS); Animal Health Service (AGAH); Food Security Service (ESCF); Investment Centre (DDC); Inland Water Resources and Aquaculture Service (FIRI); Marine Resources Service (FIRM).

Resources

9.15 Over the last three biennia, a total of US\$ 5.6 million has been allocated to the Sub-programme, steadily increasing from US\$ 1,621,000 during 1986-87 to US\$ 2,116,000 during 1990-91 (see Table 9.1). The Sub-programme, however, has been depending on a significant amount of extra-budgetary resources (accounting for 59% of the total funds available in each biennium) during the period under review. Extra-budgetary resources, totalling US\$ 8.2 million, have been funded mainly from four

large-scale projects¹ located at the Centre, each supporting a key programme element of the Sub-programme.

Table 9.1: Sub-Programme 2.1.4.4: Resources Allocated During 1986-91 *
(Percentage Distribution and Amount in US\$'000)

Programme Element	1986-87	1988-89	1990-91**	Total
Coordination of Space Activities	16%	12%	7%	11%
Advisory Services and Pilot Studies	14%	15%	14%	14%
Training	13%	14%	11%	13%
Agrometeorology	35%	31%	34%	33%
Environmental Monitoring	8%	14%	19%	15%
Information and Support Services	14%	14%	15%	14%
Regular Programme Funds	1 621	1 874	2 116	5 611
Extra-budgetary Funds	2 347	2 709	3 096	8 152
Total Funds	3 968	4 583	5 212	13 763

* The allocations for agrometeorology between 1986 and 1989 were included under Sub-programme 2.1.2.2. They have been added to the budgetary allocations for Sub-programme 2.1.4.4 for the purpose of analysis in this Chapter.

** The figures for 1990-91 are estimates.

- 9.16 The regular budget provision has been almost entirely taken up in staff costs with little room for coverage of maintenance and operations of the systems above and beyond present levels. Basically all costs for publications, travel, contracts and consultants are supported through external funding. Only two of the Sub-programme elements, "Coordination of Space Activities" and "Information and Field Programme Support", are completely financed through Regular Programme funds.
- 9.17 The extra-budgetary resources have made an important contribution in funding activities for environmental monitoring, training, advisory services and pilot studies as well as for agrometeorology. Furthermore, these resources provided the major support to the upgrading of its facilities and to the development of new applications for satellite-derived and agro-meteorological data to Environmental Monitoring and Early Warning Information Systems.

¹ "Programme de Collaboration FAO/France en Matière de Télédétection" GCP/INT/458/FRA; "Renforcement de la Composante Agro-Météorologique du Système Mondial d'Information et d'Alerte Rapide" GCP/INT/439/BEL; "Establishment of an Operational Satellite Environmental Monitoring System to Support Agricultural Production and Desert Locust Monitoring and Forecasting" GCP/INT/432/NET; "International Programme on Remote Sensing Training to Assist National Development" GCP/INT/411/ITA.

- 9.18 The Centre comprises 17 professional and 10 support staff, distributed in four groups closely linked to the main programme elements, i.e. field programme support, environmental monitoring, technology transfer and agrometeorology. The high dependency on external funding prevails within each group. In fact, only a third of the 12 professional posts within the Remote Sensing Group and only two of the 5 professional posts under the Agrometeorology Group are being funded under the Regular Programme.

Activities and Outputs

A. Coordination of Space Activities and Information Services

- 9.19 Regular participation has been maintained in the yearly meetings of the Scientific and Technical Sub-Committee of the UN Committee on the Peaceful Uses of Outer Space.
- 9.20 As a follow-up to the Forty-fourth Session of the UN General Assembly, which endorsed in 1989 the initiative of international scientific organisations and bodies to designate 1992 as International Space Year (ISY), FAO has been participating in the preparation of ISY activities related to its mandate. An exhibition devoted to the ISY has been developed by the Centre to highlight FAO involvement in the peaceful uses of outer space.
- 9.21 An important part of the **information support** activities of the Centre focuses on its publications. Basically all remote sensing applications developed and most of the proceedings of its training courses are available through its Remote Sensing Series. To date, 62 specialized documents have been published, 27 of which during the period under review. Demand for these publications has generally exceeded the resources allocated to this activity. In most cases, funding has been sought in connection with the field projects they were intended to support. The high demand for the publications of the Centre not only indicates their technical validity, but also emphasises the extent of the information gap the Centre is called to fill. Although re-editing and publication of old and new texts has been limited during the period under review due to inadequate Regular Programme funding, a major effort was made during 1990 to update the Series.

B. Advisory and Backstopping Services

- 9.22 Advisory services are regularly sought from the Centre for the selection of the most appropriate remote sensing tools and technologies. Within this framework, the Centre is presently assisting Argentina, Bangladesh, China, Côte d'Ivoire, Egypt, Hungary and Viet Nam in the establishment or strengthening of their Remote Sensing Centres. It also assists in strengthening the Regional Remote Sensing Centre for East Africa in Nairobi.

Effects and Impact

- 10.41 The effects and impact of Regular Programme activities have been constrained during the reporting period as many activities had to be cancelled or curtailed. A 50% cut in non-staff allocations during much of the review period affected especially the publications output of the Sub-programme. This has serious effects as there is a particular need to distill the various experiences of Sub-programme 2.3.1.4 and other related Sub-programmes into general lessons for broader application in the field. Planned activities which were not completed included a study on the effects of land clearing and forest fallows on soil nutrients, erosion and crop yields, case studies on agroforestry systems for urban and peri-urban areas and guidelines for evaluation and monitoring of people's participation in watershed management projects.
- 10.42 The main impact of Regular Programme activities has been to enhance interest in non-timber uses of trees and in agroforestry. The networks created in Latin America and the Caribbean and now being started in Asia and the Pacific are proving to be effective means of information exchange on successful agroforestry experiences. In those same regions, agroforestry has been the subject of secretariat papers and discussions, especially in relation to TFAP. However, it is clear that there is scope for much greater FAO involvement, especially in the context of greater attention given to issues of environmental and sustainable agriculture.
- 10.43 During the last three biennia, the focus of the Sub-programme has been on field activities, as FAO and other international bodies have gathered information and experience on the multi-purpose use of trees in farming systems. It is thus at field level where the most direct effects and impact of FAO interventions can be noted, as mentioned above under specific programme elements. Projects have used different approaches, ranging from interventions of direct support to efforts at institution-building, all aimed at enhancing the supply of food, fodder and fuel on a sustainable basis.
- 10.44 Pilot activities have been an important element of the Sub-programme in identifying and testing approaches which may be replicable, especially in such new and diversified areas as agroforestry. The pilot nature of activities relates both to the use of new or adapted technologies and to the approaches in working effectively with target groups. For example, under a UNDP-funded project, a major pilot watershed management activity was implemented in Myanmar. It emphasized local planning and people's participation in identifying needs and opportunities for the diversification of the economy through income-generating activities and the introduction of multiple forest land-use options. When the project was evaluated in late 1990, it was found that a good start had been made on environmental protection of the watershed through tree planting in degraded areas, establishment of village woodlots and construction of small multi-purpose dams to provide irrigation water and arrest silting. Income-generating activities, such as mushroom cultivation and beekeeping, and incentives such as improved fertilizer distribution have been successfully introduced, enhancing the project's economic impact. However, the project's experience highlighted the need to give more attention to upland farmers who are poorer and practice shifting

cultivation. The project has served as a successful model and, in a follow-up phase, has been expanded to cover three new watershed areas.

- 10.45 Similarly, a project in Thailand assisted in the design and implementation of an integrated land use plan for a watershed in order to stabilize the forest boundary, prevent deterioration of upland catchments and diversify the rural economy through creation of new income sources. The project undertook surveys of the attitudes of villagers in order to ascertain their use of and attitudes toward the forest and its protection. Community-level planning and education/extension campaigns were mounted, aimed at sustainable production from forest lands. New activities, such as sericulture, fruit trees and fish ponds, were successful in increasing and distributing more evenly cash income, which had previously come largely from monocropping of cassava. The project, although implemented only on a pilot scale, brought significant benefits to local farmers. International assistance has now been terminated, but project operations continue with local staff and resources. The project can continue to serve as a model for future experiments, particularly in agroforestry, aimed at environmental and socio-economic objectives.
- 10.46 Some activities under the Sub-programme deal directly with the target population and training plays a key role in generating impact. A successful approach has been demonstrated by a UNDP-funded project aimed directly at reducing shifting cultivation in Laos. This project, implemented in an area of the north with difficult access and few facilities, had considerable success in tree planting and soil conservation. According to a project evaluation, this was largely attributable to the project's strategy of intensive training of farmers, with benefits especially notable in villages at lower and middle altitudes. Another project in Haiti created a Watershed Management Training Centre. The Centre, supported by Swiss trust funds, is now responsible for training national staff working on watershed management projects, as well as students of agriculture and engineering. Training under the Sub-programme is thus broadly based, involving different target groups depending on the nature of the activity being pursued.
- 10.47 Institutional strengthening is another area in which the Sub-programme has had an impact. A good example of FAO's work in this area is the building-up of the Department of Soil Conservation and Watershed Management in Nepal, supported by UNDP-funded projects. Initial activities were aimed at awareness-building and starting up of the institution. A major benefit of the FAO interventions has been that other donors began funding specific watershed management projects. The latest UNDP/FAO project has moved away from major field implementation activities towards strengthening and consolidating the Department's institutional capacity to plan and implement its activities. The Department's performance, according to a 1988 evaluation mission, had been enhanced significantly by the latest project (see box) and Nepal is now recognized as a leader among developing countries in addressing the needs of soil conservation and watershed management. The achievement is all the more impressive when it is considered that, as late as 1974, the Department had only three professionals. It now has over 100 fully-trained professional staff and serves as a source of expertise for other countries implementing activities in this area.

- 10.48 These examples illustrate the approaches under the Sub-programme's field activities and their results. The common emphasis is on sustainable development, with involvement of local people in planning and implementation of activities, introduction of new income-generating enterprises, soil conservation measures and tree planting for multiple purposes. While the approach has been generally successful during the project period, there is as yet insufficient information on the benefits of projects in the longer term. Part of this is due to the fact that the approach is relatively new, but there is also a need to ensure that relevant information is gathered on a long-term basis.

NEP/85/008: WATERSHED MANAGEMENT PROJECT

Budget: US\$2,224,316 (UNDP)

Duration: April 1986-March 1991

This project was aimed at strengthening the capacity of the Department of Soil Conservation and Watershed Management at central and district level. Such plans were to be compatible with proper protection and management of the environment and involve local people at all stages of the planning and implementation process.

An evaluation of the project in December 1988 found that the project had made considerable headway in the areas of planning and extension education. However, the strengthening of the planning function at district level had not taken place as staff had not been appointed by the time of the evaluation. In view of this, the evaluation recommended a re-design of the project's objectives and outputs. It also made recommendations for strengthening the work planning process within the Department and for enhancing the presence of extension at District level.

Outlook and Issues

- 10.49 The Sub-programme includes elements which are, to a large extent, inter-related and closely linked to other Sub-programmes. In some cases, there would seem to be justification for combining closely-related programme elements and, in fact, some rationalization of programme elements has already taken place. This process began with the absorption of the former programme 2.3.4 Forestry for Rural Development into other Forestry programmes in 1978. Within Sub-programme 2.3.1.4 itself, the mangrove management component has been transferred to Development and Management of Forests (Sub-programme 2.3.1.1). The Programme of Work and Budget for 1992-93 proposes combining the programme element on trees as support to agricultural production in arid zones with that on fuelwood resources development. This reflects the particularly acute fuelwood situation in arid zones, where supplies do not regenerate as quickly as in humid and temperate zones. Furthermore, in recent years, most of the work in these programme elements has been concentrated on the Sudano-Sahelian zone.
- 10.50 There appears to be some scope for further rationalization in the future. Some programme elements under this Sub-programme are, as noted above, very closely related to others in different Sub-programmes, most of which are managed by the Forest Resources Division. Examples would include the work mentioned in the

previous paragraph, which is linked to the work on arid zone forestry and desertification under the Sub-programme on Conservation and Wildlife. Another would be the activities on diversified mountain economy systems which have much in common with the work on watershed management under the same Sub-programme. Sub-programme 2.3.1.4 can be viewed as an effort to develop techniques, complementing those found under the Conservation and Wildlife Sub-programme, and to formulate approaches which incorporate their related socio-economic dimensions. This is an issue of securing a balanced approach between technical and socio-economic aspects not only in relation to activities under the Conservation and Wildlife Sub-programme, but also in relation to Community Forestry Development and other rural development and land use planning programmes.

- 10.51 The importance of agroforestry for agriculture development in most developing countries and the likely development of FAO's work in this field are the main justifications for the continuation of this Sub-programme. In this context, perhaps the most important area of the Sub-programme to be strengthened in the near future is the work on shifting cultivation and agroforestry, a subject of increasing international attention as reflected in the priority placed on it in Tropical Forestry Action Plans. The importance of agroforestry at international level was enhanced recently when the Consultative Group for International Agricultural Research (CGIAR) accepted in its membership the International Centre for Research on Agroforestry (ICRAF). Appropriate agroforestry systems, combining trees and shrubs with annual crops and livestock production, are important as they represent sustainable farming systems consuming less land per production unit than traditional shifting cultivation systems. Their adoption permits a control over the area under cultivation, a primary cause of deforestation in developing countries.
- 10.52 FAO's accumulated experience in this area, acquired largely through projects, is reflected in project reports. However, there has been relatively little synthesis of this experience thus far and this needs to be done. This will have to be an interdisciplinary effort, involving both the Agriculture and the Forestry Departments. The recent move to establish a Working Group on Synergic Land Use under the Inter-Departmental Working Group on Land Use Planning is an initial step in this direction. Priorities and activities still need to be decided. Work which could be envisaged includes assistance to national institutions in identifying systems through surveys and applied research; disseminating these systems through training and extension; designing necessary institutional and legislative measures; preparing state-of-the art reports; and promoting exchange of information between countries.
- 10.53 Besides arid zones, fuelwood remains a problem in the rapidly-growing urban and peri-urban areas of the developing world. Some work has been done for these areas but the problem is recognized as acute. The emphasis should be on sustained management of forests for fuelwood production, through inventories and plans made at local level, and on the establishment and management of fuelwood plantations.
- 10.54 Irrespective of its location in the programme structure, the work on diversified mountain economy systems should continue as these areas are often neglected in favour of the generally more productive lowlands. Priority within this Sub-programme

should remain on participation of upland communities in planning and implementing development schemes and on quantification of economic and financial benefits.

- 10.55 In this respect, it would seem that in field activities to date, experience has been limited in working with the poorest farmers, those who occupy the higher slopes in mountainous areas and whose activities contribute heavily to soil erosion and deforestation. One reason for this is that they are less accessible both physically and culturally, and it is more productive to work in the initial stages with a more receptive target group. Nevertheless, Sub-programme activities need to concentrate more on the developmental constraints of the poorest farmers and improvement of their production systems.
- 10.56 The Sub-programme will continue its support to the TFAP. Previously, this support was not specifically budgeted, although it required considerable time. For the 1992-93 biennium, Sub-programme 2.3.1.4, like other Forestry Sub-programmes, is proposed to have a specific element of staff time for support to the TFAP.
- 10.57 During the period under review, the Sub-programme, like many others, was adversely affected by the financial crisis of the Organization. At the same time, there were increases in the work load for technical backstopping of field projects and TFAP exercises, a considerable constraint on a Sub-programme which has only 2.5 professional posts devoted to it. Furthermore, not all posts were always filled, thus leading to a "start/stop" situation in certain programme elements. It is hoped, however, that problems of erratic funding and recent staff turnover will be overcome and that the substantive work can be continued on a more assured basis.

PART THREE

This part of the review deals with a topic which cuts across all FAO's Programmes. In this issue, the topic selected and covered in Chapter Eleven is technical cooperation networks promoted by FAO.

The chapter is arranged as follows:

- Introduction: A brief background is presented with a discourse on the evolution of the network concept;
- Definition: The definition used for this review;
- Methodology for the Review: A brief presentation of the methodology, especially the information basis;
- Network Coverage and Scope: An overview analysis of networks promoted by FAO, including their distribution by FAO technical programmes, types and by geographical regions;
- FAO Support to Networks: The extent and type of support given by FAO, including estimated resources devoted to network support under the Regular Programme;
- Network Activities and their Results: An overview analysis of activities and achievements under various types of networks;
- Critical Factors in the Promotion of Networks: The major factors affecting the success of network evolution, with particular attention to the role of FAO and other external donors;
- Summary of Conclusions: Major findings and conclusions, including key lessons, arising from the analysis.

CHAPTER ELEVEN

TECHNICAL COOPERATION NETWORKS

I. INTRODUCTION

Evolution of the Network Concept

- 11.1 Since its inception, the Organization has promoted technical cooperation between countries. Initially, the main focus was the promotion of coordinated approaches in selected technical areas, such as, through the Regional Fishery Commissions, the Codex Alimentarius Commission and Commodity Groups. There have also been long-standing arrangements, such as in relation to veterinary reference laboratories and cooperative work under various conventions, such as that on plant protection. These inter-country cooperative activities were carried out primarily in the context of FAO's technical work, with relatively limited inputs from the developing countries, especially in the early years. However, as the capacity of developing countries has increased steadily in providing technical input and resources, networks came to be promoted as a more distinct and self-reliant form of cooperation primarily for and among developing countries.
- 11.2 The Twenty-seventh Session of the UN General Assembly in January 1973, which recognized Technical Cooperation among Developing Countries (TCDC) as an integral part of international cooperation and development, within the framework of the New International Economic Order, has given particular impetus to this process. At its Eighteenth Session in November 1975, the FAO Conference supported the UN General Assembly Resolution 3362 (S-VII) which, *inter alia*, urged the UN system "to provide support and assistance to developing countries in strengthening and enlarging their mutual cooperation at regional, sub-regional and inter-regional levels". In August 1978, the United Nations Conference on Technical Cooperation Among Developing Countries accepted TCDC as an important development tool for achieving national and collective self-reliance and adopted the Buenos Aires Plan of Action, which was endorsed by the UN General Assembly. FAO and other UN specialized agencies were requested to promote TCDC activities. At the same time, networks were increasingly seen in FAO as a suitable mechanism through which the relatively limited funds could be used effectively in reaching and mobilizing the technical experiences and knowledge of numerous institutions in developing countries.
- 11.3 Networks have since become an important means of action for FAO. There are now some 135 technical cooperation networks promoted by FAO as well as a growing number of networks of limited duration, set up to carry out specific tasks, especially in research. FAO's long experience in networks has been periodically monitored by the TCDC/ECDC focal point in the Development Department and the semi-annual TCDC newsletter gives frequent examples of network activities. Broad guidelines were also produced by the TCDC focal point in 1987, and the Regional Offices for Latin America and the Caribbean and for Africa, respectively, in 1988 and 1989. It

should be noted, however, that technical cooperation networks are not necessarily synonymous with TCDC, although the former often contribute to the aim of the latter. While the majority of networks involves primarily developing countries with strong TCDC orientation, some others cover both developing and developed countries, with emphasis on dimensions other than TCDC.

- 11.4 The wealth of experience now justifies a review to assess achievements and effectiveness of networks and to draw the lessons meriting wider application. The results of this review would be of interest not only to FAO, but to all those concerned with the development potential of networks. The Chapter presents the experience with networks, their structure, operations, and effectiveness and FAO's role and support over the 1986-89 period. The Chapter is structured as follows:

- definition;
- methodology;
- network coverage and scope;
- FAO support to networks;
- network activities and their results;
- critical factors in the promotion of networks:
 - . planning
 - . institutional arrangements
 - . the role of FAO and other external support;
- summary of conclusions.

II. DEFINITION

- 11.5 A large number of institutional arrangements often bear the title "network" but many of these have little or no institutional structure. For the purposes of this Chapter a **technical cooperation network is defined as a voluntary cooperative arrangement among institutions and/or individuals in two or more countries, set up for a period of at least several years, to carry out jointly certain specified activities (information exchange, research, training, exchange of personnel etc.) for the purpose of direct exchange of relevant technologies and experience on common development issues.** The network need not be self-sustaining, but it must include the concept of membership, which contributes in some tangible way to its activities. It cannot be just a mailing list or a series of meetings for which FAO pays. Regional centres and economic groupings per se are not included in this definition, but some of these may promote networks jointly with FAO. Also excluded are FAO Regional Commissions as such but when they include network arrangements, often through

their subsidiary bodies, these are included. Clearly, "networks" composed entirely of FAO projects or FAO staff are excluded. Throughout the Chapter the term "network" is used to refer exclusively to technical cooperation networks falling within this definition.

11.6 Thus, networks include:

- a) the associations promoted by FAO with a formal structure, such as those for agricultural credit and marketing. These associations have a constitution or similar agreement with a management committee of some kind. Members pay contributions and their work programmes often include publications, newsletters, meetings for exchange of information, studies and a range of training activities;
- b) the less formal arrangements promoted by FAO, designed to facilitate the development of technical approaches and exchange of information through joint activities of a continuing nature, such as technology development and adaptive research trials. In this type of network, members work under an agreed work programme, make inputs in kind and may cover part of their own costs, but without formal dues; and
- c) informal associations, like those defined in (b) above, but set up for a relatively short duration to undertake specific activities of more limited scope. They are referred to here as "networks of limited duration". While most of the networks set up with FAO assistance meet a continuing need, those of limited duration provide a framework for specific collaboration, such as conduct of coordinated research or studies in a number of countries, while at the same time mobilising the participating national institutions. Thus their experience is covered in the analysis, although excluded from the statistical presentation.

11.7 All regional projects and FAO Regular Programme regional activities are designed to provide technical advice and facilities for a number of countries. An essential characteristic of networks, however, is that they are intended to mobilize the indigenous expertise and resources available among the countries themselves, with less reliance on external inputs. Networks vary in the extent to which they depend on the sponsors including FAO, but an end aim is usually greater self-reliance, especially by promoting direct collaboration among the existing national organizations. In contrast, many regional projects in the past attempted to set up regional centres which the developing countries often could not maintain. Also, such an approach often resulted in by-passing the growing wealth of national expertise and experience. Thus, networks between developing countries, as with other forms of TCDC, are believed to have particular advantages in bringing together experience which is appropriate to their practical needs and available capacity, i.e. technologies which are in line with the on-going development process, and institutional approaches which are in keeping with the traditions, administrative practices, economic potential and the existing pool of expertise.

11.8 Networks have been promoted with two primary functions in mind; firstly to bring about the more effective use and sharing of appropriate and easily transferable technical information, skills, resources and experience between countries; and secondly to act as a cost-effective two-way channel with FAO for communication of information and promotion of strategies. Networks have many potential advantages for the developing countries. They may:

- facilitate exchange of information, allowing countries to draw on each other's experience and to avoid repetition of work;
- allow joint programmes to be developed, economising on scarce resources, particularly of trained manpower;
- develop common standards for such diverse areas as agricultural exports and environmental risk assessment, facilitating the common use of information, and in some cases, trade;
- sometimes bring together developed and developing countries, allowing additional technical resources to be mobilised in support of developing country problems;
- provide a flexible, continuing and direct inter-face for external assistance on common problems, without the cumbersome internal administrative process associated with the traditional type of project;
- eventually lead to the formation of continuing arrangements for joint activities in such areas as research and training, technical cooperation on problem which cross national boundaries (e.g. food security surveillance) and economic cooperation (e.g. in the management of a common resource such as shared fish stocks).

11.9 In many situations, networks can prove more sustainable, cost-effective and pertinent to developing countries' perceived needs than other forms of regional intervention. Among the early major networks, which have provided to some extent a model for others, were the European research networks grouped within ESCORENA which began in 1974 and the Regional Agricultural Credit Associations which were set up following the 1975 World Conference on Credit for Small Farmers in Developing Countries.

III. METHODOLOGY FOR THE REVIEW

- 11.10 As a first step, a questionnaire survey was carried out to obtain basic information on all networks falling within the initial study definition¹. The survey was complemented by desk studies of a sample of 24 networks, representing a cross-section of networks in each region. The desk studies were supplemented by interviews with the officers concerned, both at Headquarters and in the Regional Offices and in some cases by additional information from the networks themselves. The Annex provides a list of the 135 continuing networks supported by FAO together with an indication of those subjected to desk review.

IV. NETWORK COVERAGE AND SCOPE

Statistical Summary

- 11.11 As can be seen from Table 11.1, networks play a significant role in all technical Programmes of FAO. Generally, they have been promoted especially by those technical programmes with a large component of field operations, which tend to work directly with national technical institutions. Networks are particularly promoted in the work of the following Programmes: Crops (2.1.2), Natural Resources (2.1.1), Rural Development (2.1.5), Fisheries (2.2) and Forestry (2.3). The number of networks under the Nutrition Programme (2.1.6), Food and Agricultural Information and Analysis (2.1.7) and Food and Agricultural Policy (2.1.8), are as yet relatively few.
- 11.12 In terms of regional distribution, 22% of networks are in the Africa region, 31% in Asia and the Pacific, 22% in Latin America and the Caribbean and 19% in the Near East, North Africa and Europe, with a further 6% being inter-regional or global. The geographical distribution of networks varies between Programmes. Given the particularly serious livestock problems in the Africa region, there is some concentration of livestock networks there. More than 40% of the networks under the Rural Development Programme (2.1.5) are found in Asia and the Pacific, which also accounts for significant shares in the Programmes for Natural Resources (2.1.1) and Crops (2.1.2). The distribution of networks under Fisheries and Forestry Programmes tends to be complementary to that under the Major Programme Agriculture, with a greater share in Latin America and the Caribbean, the Near East; North Africa and Europe as well as in inter-regional coverage.

¹ A group of institutions and/or individuals in two or more countries which work together in one more of the following areas: exchange of information; research; training; and /or exchange of personnel. There may be a central secretariat, but work will normally be carried out at several locations. Networks will usually be set up with an intention of continuity, i.e. should be intended to persist beyond one individual research project, series of workshops, etc.

Table 11.1: Number of Networks by Technical Programme and Region

Programme	Africa	Asia and Pacific	Latin America and Caribbean	Near East, North Africa and Europe	Global Inter-Regional	Total
<u>Major Programme 2.1 Agriculture of which</u>	<u>24</u>	<u>37</u>	<u>20</u>	<u>17</u>	<u>2</u>	<u>100</u>
2.1.1 Natural Resources	5	8	2	2	1	18
2.1.2 Crops	5	13	7	5	1	31
2.1.3 Livestock	5	2	3	4	-	14
2.1.4 Research and Technical Development	3	3	3	4	-	13
2.1.5 Rural Development	4	7	4	2	-	17
2.1.6 Nutrition	-	2	1	-	-	3
2.1.7 Food and Agricultural Information and Analysis	-	1	-	-	-	1
2.1.8 Food and Agricultural Policy	2	1	-	-	-	3
<u>Major Programme 2.2 Fisheries</u>	<u>3</u>	<u>2</u>	<u>5</u>	<u>3</u>	<u>4</u>	<u>17</u>
<u>Major Programme 2.3 Forestry</u>	<u>3</u>	<u>3</u>	<u>5</u>	<u>5</u>	<u>2</u>	<u>18</u>
TOTAL	30	42	30	25	8	135

- 11.13 The great majority (72%) of networks covered by this review were formed since 1980. Of these, 57% were formed prior to 1986; 18% in the subsequent two years 1986-87 and the remainder (25%) in the period 1988-89. Several of this latter group are in an early formative stage. A substantial number of networks were started in Latin America and the Caribbean before the other regions: 77% of the networks in that region began activities before 1986, as compared with about half elsewhere.

The Scope of Networks

- 11.14 Networks vary in geographical coverage as well as in their primary functions. They may be aimed at one or more longer-term goals, such as institution-building, while others may be intended to carry out finite tasks such as a research project (networks of limited duration). The Boxes (1-5) in the text provide examples of these different characteristics: Box 1 (following para. 11.39) illustrates regional market information services, particularly INFOFISH in Asia; Box 2 (following para. 11.41) deals with FAO/IAEA research networks of limited duration which bring together developing and developed country institutions; Box 3 ESCORENA (following para. 11.42), illustrates continuing research networks serving Europe and in several cases, the Near East and North Africa; Box 4 (following para. 11.45) provides an example of research and technology development networks in Latin America; and Box 5 (following para. 11.50) describes AFRACA, an institution-building network for agricultural credit in Africa.

11.15 Geographical Coverage: The great bulk of FAO-sponsored networks cover regions or sub-regions, and are intended to produce benefits in the region through sharing experience of common problems and sometimes working through training or joint programmes to overcome these problems. Only eight networks are inter-regional or global in scope. Of these four are in Fisheries where networks tend to be based on the need for cooperation in the management of Oceans rather than continental land masses. GLOBEFISH (see Box 1) is a global apex which serves as the link between the regional networks for fish marketing information and channels information obtained on markets in the developed countries to the regional networks. It is thus basically an FAO-run service to networks. A further two global networks are found in Forestry and these are Headquarters-based networks for forest genetic resources and forest trees and people. In addition, many of the 24 networks in the European and Near East and North Africa regions have inter-regional scope, addressing common problems of Mediterranean agriculture.

11.16 Network Functions: Networks undertake activities designed to strengthen national institutions in fields such as research, training and marketing. Institutional strengthening is achieved through a combination of exchange of experience, joint training, and sometimes, analyses of common issues in operational and management matters. Another major function is the joint development and promotion of technology and methods. This is done through meetings, publications, exchange visits, agreement on common standards and sometimes involves coordinated research programmes, usually supported by donor contracts. Networks may also specialise in the exchange of technical information or of market and other commercial intelligence. Few networks fall entirely into one functional category. Although many networks have broader aims than just information exchange with relatively passive coordination among the members, many have not as yet evolved beyond this point.

11.17 Networks of Limited Duration: Not all networks are set up with the intention of continuing beyond completion of a particular identified task. The most common such networks are for experimental activities or coordinated field trials. Examples include those supported by the Joint FAO/IAEA Division which carries out much of its work through the network mechanism (see Box 2). During the period 1986-90, 36 FAO/IAEA networks were active. Each network is set up for five years for research on a particular scientific problem and brings together scientists from developed and developing countries. Another example is the Sulphur Field Trials Network which aims to assess the extent of sulphur deficient soils in the developing countries of Africa and Asia. With donor support from Finland, and sometimes in cooperation with national FAO projects, it has carried out trials in 13 participating countries.²

² Burkina Faso, Cameroon, China, India, Indonesia, Kenya, Nepal, Pakistan, Sri Lanka, Sudan, Tanzania, Thailand, Zaire.

V. FAO SUPPORT TO NETWORKS

Organizational Setting

- 11.18 A focal point for network promotion in FAO is provided by the TCDC/ECDC coordinating unit³ in the Office of the ADG, Development Department. On TCDC matters, including TCDC networks, the unit works closely with focal point officers designated in the technical units at Headquarters and in the Regional Offices. This unit, through its semi-annual newsletter and occasional publications, provides guidance and identifies examples of network successes. Network development is, however, a decentralised process with individual technical units and Regional Offices promoting networks where they consider that they can cost-effectively maximise development impact. A need for a network is often identified or promoted through a regional meeting, and the Regional Offices have played a very prominent role in both establishing and supporting networks. Regional Officers are usually in a better position to provide continuing network support than their Headquarters counterparts. Thus, the Regional Offices have played the primary support role in 58% of all the networks supported by FAO (66% of those in Africa, Asia and the Pacific and Latin America and the Caribbean).
- 11.19 The Regional Offices have been closely involved in the identification and implementation of many network support projects, and at Headquarters, one or two operations officers from each regional operations units have taken a special responsibility for regional projects, including those supporting technical cooperation networks.

Regular Programme Support

- 11.20 Regular Programme support for networks is generally modest in financial terms, but can be long-standing and provide catalytic follow-up to a project. Such support can be provided in a variety of ways and at all stages of network development. Normally FAO support does not cover all the cost of an activity, but members of the network make contributions in kind, such as their own travel and provision of meeting facilities. FAO sometimes provides nominal grants to networks, but the amounts have continued to decline in recent years, and increasingly specified to identified activities. As a general rule, FAO contributions are made in kind for specific purposes.
- 11.21 The Regular Programme support has included contributions of and/or for:
- staff and consultants to identify the need and to support proposals, for a network and to assist in various aspects of its development. This often extends to assumption of all or part of the secretariat function for the network by FAO;

³ TCDC/ECDC, Inter-regional and Global Programmes and Other Special Matters Unit.

- physical facilities including offices, telephones and access to common telex, pouch services etc. This is especially common in the Regional Offices;
- meetings for establishing networks, carrying out technical backstopping functions during the life of the network and administering the network;
- training through courses, study tours and staff exchanges;
- publications of all types, including newsletters, technical documents and meeting reports;
- guidance and support in research and studies carried out by network members as part of a joint effort;
- administration and organization of the network.

11.22 Table 11.2 summarises estimated financial support under FAO Regular Programme to networks during 1986-89. It excludes the cost of staff time, especially by the Regional Offices. Overall, network-related activities absorb about 5.8 percent of non-staff Regular Programme expenditure in the technical and economic programmes. As a proportion of total expenditure the figures are highest under Livestock (2.1.3), followed by Research and Technology Development (2.1.4), Natural Resources (2.1.1) and Forestry (2.3). The comparatively low figures for Crops (2.1.2) and Rural Development (2.1.5) are explained largely by the comparative success of those Programmes in mobilising extra-budgetary resources for their networks. Figures are low for the Programmes with few networks, i.e. Nutrition (2.1.6), Food and Agricultural Information and Analysis (2.1.7), and Food and Agricultural Policy (2.1.8).

11.23 The level of support to networks varies in relation to their significance in each programme where the networks also represents a means of implementing the Regular Programme work by directly involving several countries in a particular activity. Thus, the level of resources devoted to networks not only depends on the nature of network activities but also represent relative cost-effectiveness of networks in the programme implementation. The highest average expenditure per network has been in support of the Regional Commission on Food Security for Asia and the Pacific under Food and Agriculture Policy (2.1.8). The support level per network has also been relatively high under Livestock (2.1.3) and Forestry (2.3). The high figure for Livestock (2.1.3) is explained by the kind of inputs provided to the veterinary reference laboratories as well as to breeding work, including reagents and equipment. Average inputs per network were comparatively low under Crops (2.1.2) with US\$17,000; Rural Development (2.1.5) with US\$19,000 and Fisheries (2.2) with US\$24,000.

**Table 11.2: Regular Programme Expenditure excluding Staff Costs
for Networks during 1986-89**

Programme	Amount (US\$ 000)	Share of Programmes (%)	As ratio of total expenditure (%)*
<u>Major Programme 2.1 Agriculture</u> of which	<u>5,658</u>	<u>71.2</u>	<u>5.3</u>
2.1.1 Natural Resources	1,057	13.3	10.4
2.1.2 Crops	843	10.6	5.0
2.1.3 Livestock	1,612	20.3	16.1
2.1.4 Research and Technical Development	1,062	13.3	11.9
2.1.5 Rural Development	573	7.2	3.3
2.1.6 Nutrition	124	1.6	1.3
2.1.7 Food and Agricultural Information and Analysis	88	1.1	0.6
2.1.8 Food and Agricultural Policy	304	3.8	1.8
<u>2.2 Major Programme Fisheries</u>	<u>1,064</u>	<u>13.4</u>	<u>5.6</u>
<u>2.3 Major Programme Forestry</u>	<u>1,228</u>	<u>15.4</u>	<u>9.7</u>
TOTAL	7,950	100.0	5.8

* Refers to the share of support to networks in total Regular Programme expenditures for programmes (excluding staff costs).

Field Programme Support

11.24 Some 30% of networks have had substantial project support through FAO. Projects assisting networks provide the full range of inputs normally found in regional projects, including not only the types of Regular Programme support described above but also expert advisers, salaries for local secretariats and fellowships. Larger projects have usually included the employment of full time staff as well as local and fellowship training, meetings, travel and study and research costs. While most projects supporting network development have been specifically designed for that purpose, others include networking as just one of a project's aims.

11.25 The four networks on regional fish marketing information services represent one of the most substantial project-supported efforts ⁴. INFOPESCA was set up for Latin

⁴ INFOPECHE (Africa), INFOFISH (S.E. Asia and the Pacific), INFORSAMAK (Near East and North Africa), INFOPESCA (Latin America and the Caribbean).

America in 1977 followed by INFOFISH for Asia and the Pacific in 1981, for INFOPECHE for Africa in 1984 and INFOSAMAK for the Arab countries in 1986 (see Box 1). This effort, particularly in the case of INFOFISH has been largely successful in establishing an on-going network. Similarly, the Network of Aquaculture Centres of Asia (NACA), covering China, India, the Philippines and Thailand, has successfully become an autonomous inter-governmental body after ten years of support by a UNDP project.

- 11.26 Total Field Programme funding for networks has been running at the level of around US\$5 million per year, with two-thirds provided by UNDP. In terms of regional distribution, the Asia and the Pacific region where 63% of the network projects were located, accounted for 60% of the funds. The Near East, North Africa and Europe, with only 13% of the projects, received the second largest share (22%), reflecting the larger size of projects in the region. Africa with 7% of network projects received 10% of project funds.
- 11.27 Network development projects tend to be smaller than other regional projects. While some of the largest projects have had annual budgets in excess of US\$ 500,000 per year⁵, the great majority (77%) of them have had annual budgets of less than US\$200,000 (38% of projects under US\$ 100,000 per year). Initial duration of UNDP project-support networks have often reflected the maximum possible, i.e. five years, with the possibility of renewal. For example, the UNDP project supporting the Asian Network on Coarse Grains and Legumes provides some US\$3 million over ten years.

Coordinated Support by FAO and Other Agencies

- 11.28 Networks have succeeded in mobilizing resources from organizations other than FAO, for example the Regional Agricultural Credit Associations. FAO has also cooperated with other UN agencies in the development of networks; for example, the Asian Fertilizer and Advisory Development Network (FADINAP) is jointly sponsored with UNIDO and ESCAP. The important role of the Joint FAO/IAEA Division in supporting research networks has already been noted, and Unesco has cooperated with FAO in organizing grazing resources networks in Latin America.
- 11.29 The International Agricultural Research Centres (IARCs) have become increasingly active in sponsoring outreach networks for their research programmes. In a number of these networks, FAO has been cooperating with IARCs by providing complementary inputs. The Association of Agricultural Research Institutes in the Near East and North Africa (AARINENA) has been jointly promoted by FAO, ISNAR and ICARDA. Similarly, in the case of the Asian Network on Coarse Grains and Legumes, FAO and ICRISAT decided to combine promotional activities within the framework of one network.

⁵ GCP/RAF/258/SWE Farming Systems Programme, GCP/RAS/131/NET Regional Wood Energy Development Programme, RAS/86/013 (76/003) Establishment of a Network of Aquaculture Centres in Asia, RAB/86/013 INFOSAMAK, RAB/84/025 Rangeland Development.

- 11.30 In supporting networks, FAO has not always played the lead role. In the case of the Latin American Consortium on Agro-Ecology and Development (CLADES), much of the initiative has come from the member NGOs, including their success in ensuring not only the support of FAO-FFHC/AD, but also several North American NGOs. One original feature of this network is that it provides courses for donor NGOs to become better-aware of developing country needs and constraints.

VI. NETWORK ACTIVITIES AND THEIR RESULTS

Focus and Scope of Activities

- 11.31 As discussed above, networks often have several functions. However, based on the relative emphasis over their multiple functions, the following is noted: 40% of networks are primarily designed for institutional strengthening; 38% of networks for promotion of technology development and sometimes coordination in research and technology development; and a further 18% more narrowly for the exchange and dissemination of technical information. A relatively small proportion, 4% are concerned mainly with the exchange of market information.
- 11.32 Networks emphasising institutional strengthening are fairly evenly spread between Programmes, but the Rural Development Programme (2.1.5) accounts for 33% of the networks in this group. The institutional strengthening type of networks also tend to be relatively older, with three-fourths of these formed prior to 1986. Networks concerned with promotion of technology development, research and with the dissemination of technical information are concentrated in the technical programmes of the Organization (i.e. Programmes 2.1.1-2.1.4), Major Programme Fisheries (2.2) and Major Programme Forestry (2.3). Networks concerned with research and technology development tend to be relatively recent, 60% of them having been formed since 1986. This partly explains why the results of these networks are as yet less demonstrable.
- 11.33 Networks are not uniformly active. Thirty-one percent of networks had no activities at all during 1989, and a further 11% had only one activity. This varied from the conduct of a meeting to the issue of a publication or newsletter. On the other hand, 42% of networks undertook four or more activities in the year and 8% carried out three activities. In terms of type of activities, meetings and publications tend to be more common. While meetings were spread across all types of networks, newsletters were more common among networks concerned with technical information exchange. In 1989, 44% of networks held at least one meeting; 43% produced a publication other than a newsletter and 37% issued a newsletter. Twenty-three percent of networks undertook training activities and 18% organized some form of staff exchange. A further 20% played some role in organizing research.
- 11.34 Table 11.3 summarizes the level of activities undertaken by networks in various regions. As the data refer only to number of activities without any consideration of significance of different types of activities, the Table needs to be seen only as an

indication of the general level of networks' activities. The networks in Asia and the Pacific appear most active, with half of these conducting four or more activities in 1989, followed closely by those in Latin America and the Caribbean. Those in Africa and the Near East, North Africa and Europe had the least number of activities. The proportion of networks undertaking all types of activity was highest in Asia and the Pacific, with the exception of newsletters and exchange visits, for which the proportion was highest in Latin America and the Caribbean. Networks in the Near East, North Africa and Europe were the least likely to have carried out any of the types of activities, except joint research, where a slightly greater proportion were actively engaged than in Africa.

Table 11.3: Level of Activities of Networks in Different Regions
(percentage distribution in 1989)

Networks in regions

Activity Level	Africa	Asia and Pacific	Near East, North Africa and Europe	Latin America and Caribbean
High *	13	52	17	45
Medium**	47	23	43	30
Low ***	40	25	40	25
	100	100	100	100

- * four or more activities.
- ** between two to three activities.
- *** one or no activity.

- 11.35 These regional differences appear to be related to the length of time networks have been established and the level of active support provided by the Regional Office and by field projects. Also important in the case of networks in Africa is the relatively weak capacity of the national institutions and more severe financial constraints faced by countries involved. In contrast, the network members of Asian and Latin American countries are generally in a better position with manpower, financial resources and well-established national institutions which they can commit to regional endeavour.
- 11.36 It is difficult to assess the quality of work of networks through a desk review. However, as a rough indicator in this regard, it is notable that the supporting units in FAO reported that the quality of over 90% of network outputs were either adequate or good, with nearly 60% considered good. There was little difference in the quality of work reported between different types of networks.

Outputs and Effects

- 11.37 **Information Exchange:** While less than 20% of networks are designed principally for information exchange, this may be the main activity of many other networks as well (especially in the early years, when the concentration is on publications and meetings). Tangible progress has been made under those networks dealing with fish marketing information and agricultural research information, especially those under CARIS. Networking is also beginning to take off in food security surveillance, another important area for information exchange, for which a number of sub-regional systems are being established.
- 11.38 The very effective distribution of market information by the fisheries networks has been discussed in Box 1. INFOFISH disseminates regularly current information on world and regional fish markets through the publication of the English version of bi-monthly trade news and its own bi-weekly publication entitled **INFOFISH International** covering general information related to all post-harvest aspects of fisheries. Another important service provided is to match, using a computerised database, the requirements and export production of some 1,450 suppliers and importers. Other regional programmes, i.e. INFOPESCA, INFOPECHE and INFOSAMAK also provide similar trade information, trade promotion and technical advisory services. Bi-weekly trade news is issued in Spanish by INFOPESCA, in French by INFOPECHE and in Arabic by INFOSAMAK for the industry in the respective regions. INFOFISH International issues summaries in Spanish, French and Arabic and the translation of a full article can be requested. In addition, these networks are collaborating with each other in the conduct of training courses, trade meetings and conferences.
- 11.39 AGRIS (International Information System for the Agricultural Sciences and Technology) and CARIS (Current Agricultural Research Information System) are international networks for the exchange of bibliographic and current research information respectively. Coordinated by FAO, each consists of participating national, regional and international centres which supply their own data to the network and are free to draw from it as much information as they need. Four sub-regional networks are currently operating: one in the SADCC countries⁶; another serving Burundi, Rwanda and Zaire; for the South-east Asian countries⁷; and a fourth for the Caribbean. The Agricultural Information Bank for Asia provides an illustration of how sub-regional CARIS networks can assist national systems to mature. It was set up 15 years ago with the coordinating centre at the South-east Asian Regional Centre for Graduate Studies and Research in Agriculture (SEARCA) in the Philippines, and subsequently national CARIS systems were developed. One important achievement of the network is the establishment of its own CARIS database, which is based on micro-computer technology. The last output, CARIS-SEA inventory, covering over 7,000 on-going research projects, was published in 1986, and is now exchanged on computer diskette. The AIBA system is linked in to

⁶ Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe.

⁷ Indonesia, Malaysia, Philippines, Singapore, Thailand.

the international system at the CARIS Coordinating Centre in FAO which maintains a global data base.

Box 1

Regional Fisheries Marketing Information and Technical Advisory Services

The first of the regional programmes INFOPESCA was established in 1977 for Latin America and the Caribbean. After this followed INFOFISH in Asia and the Pacific (1981), INFOPECHE for Africa (1984) and INFOSAMAK for the Arab countries (1986).

The projects supporting these were designed from the start to establish self supporting institutions. The four networks are linked to an international market information service operated by FAO, GLOBEFISH. Although each of the networks had the same broad mandate, they evolved with slightly different emphases depending on the needs of the region. For example INFOSAMAK has taken a greater interest in investment promotion than the others and INFOFISH has provided substantial technical services.

INFOFISH is the most developed of the networks and has now been established as an autonomous inter-governmental organization with project support from Norway and UNDP. It currently has nine members for all of whom fisheries are important (Bangladesh, DPR Korea, India, Indonesia, Malaysia, Maldives, Solomon Islands, Sri Lanka and Thailand). In each country there is a national liaison office which is usually the national fisheries department. Local market information correspondents also send information to the regional headquarters.

Membership contributions and advertising revenue and subscriptions now cover the cost of the market information service. Members contribute according to a scale based on per capita GNP, fish export value and fish exports as a percentage of total exports. Minimum contribution is US\$5,000 and the maximum US\$ 25,000 subscriptions and advertising generated US\$152,000 in 1988/89. The network has been successful in attracting other donor grant assistance and in selling consultancy services. The Malaysian government provides accommodation to the organization free of charge.

INFOFISH provides regular information on world and regional fish markets through the publication of the twice weekly trade news and INFOFISH International produced once every two months which provides general information related to fish handling, processing and markets. The trade news is subscribed to by over 500 organizations of which 86% are private companies and 26% are members. The bulk of subscribers come from elsewhere in both the developing and developed world. Efforts are also made to identify market opportunities through the fish trade promotion service. A computerised data base is used to match the requirements and export production of some 1450 suppliers and importers. Around 250 requests for information per month were being handled in 1989 of which 70% came from developing countries. Technical advice is provided, but at the moment this depends largely on international assistance, although a register of locally available expertise has been compiled. In 1989 this advisory service was handling nearly 3,000 queries per year. Just over 70% of these came from industry. In addition to meetings of its governing bodies, INFOFISH has also organized various technical meetings, conferences and training courses usually with outside assistance.

Other regional programmes, i.e. INFOPESCA, INFOPECHE and INFOSAMAK also provide similar trade information, trade promotion and technical advisory services such as INFOFISH. The bi-weekly trade news are issues in Spanish by INFOPESCA, French by INFOPECHE and Arabic by INFOSAMAK for the industry in the respective region. As for INFOFISH International, summaries in Spanish, French and Arabic are included and the translation of a full article can be requested. In addition, these programmes are collaborating with each other in the conduct of training courses, trade meetings and conferences.

- 11.40 Research outputs, which are a result of the network and form part of an integrated whole, are most common in the networks of limited duration set up to carry out particular research programmes. Thus the Sulphur Trials network is building up a data base on sulphur response, and trials have shown significant benefits in parts of China, India, Indonesia and Nepal. In India the network has catalyzed funds for additional national work.
- 11.41 The networks sponsored by the Joint FAO/IAEA Division (see Box 2) have been designed to produce specific technical outputs under the common research

programmes. The networks' outputs have led to over 100 technical publications and a wide range of scientific results. The latter include numerous plant varieties, improvements in the sterile insect technique, particularly with respect to tsetse flies and now New World screwworm, and technical innovations in livestock breeding, feeding and disease control as well as improvements in food conservation. This appears to be a cost-effective approach to generating research results of common interest to several countries at low cost. At the same time the approach provides a stimulus to national agricultural research, mobilizing national scientists and physical facilities which may otherwise remain under-utilized due to lack of funds for recurrent expenditure.

Box 2

**Research Networks (of Limited Duration) Promoted by
FAO/IAEA Joint Division on Nuclear Techniques in Food and Agriculture**

IAEA provides about US\$1.1 million per year (excluding Joint Division salaries) for network support and a further US\$400,000-600,000 per year is mobilised from extra-budgetary resources. Topics for networks cover the full range of work carried out by the joint division, ranging through: the improvement of crop production on saline soils; nitrogen fixation; mutation and in-vitro plant breeding techniques; radioimmunoassay techniques for improving livestock production especially disease control and feeding; application of the sterile insect technique; detection of pesticide residues; and food preservation using irradiation techniques.

Thirty-six networks have been in operation in the period 1986-90, bringing together scientists from throughout the developed and the developing world. The life of a network and of a particular research programme is generally five years. At the end of this period a new network may be set up to carry the research further.

Each network has 10-15 participants of which 8-12 come from developing countries and 3-7 from developed. The members are selected on an individual basis, but must have the approval of their institution. Each scientist interested in participating draws up a proposal which is reviewed by the joint division. Developing country participants then receive a research contract which averages US\$5,000 per year. Developed country participants make an agreement and as a general rule no expenses are covered, except for attendance at meetings, for which all costs are met by the joint division. Research grants have few strings attached and can be used for equipment, supplies and salaries. The annual grant is only paid on the submission of a satisfactory report. Networks as a general rule hold 3-4 coordination meetings during their five year life of which one is an initial planning meeting and the final meeting discusses conclusions of the research. The participating scientists are expected to attend and are usually anxious to do so.

Coordination of the networks is carried out by the technical staff of the Joint Division, who spend about one-third of their time on this. The joint division's Seibersdorf Laboratory provides radio-isotope labelled materials, radiation treatments for seeds, sterile insects etc. Training is also provided for some developing country participating scientists.

The networks carry out a considerable body of research at relatively low cost and developed countries are motivated to work on third world problems at no cost. Network research has resulted in over 100 publications providing scientific results and new techniques. Work has contributed to new plant varieties now in common use and the development of the sterile insect technique in tsetse flies. Developing country scientists have also received training and have been brought into contact with other scientists. These contacts are believed to endure.

- 11.42 Where research needs are identified and implemented with the support of FAO and funding agencies, it is clearly pertinent to ask how much of this work would have been done in the absence of the network and to what extent national priorities and those of the supporting agencies have been modified. It is evident that, in general, networks have produced a greater awareness of common needs and often have facilitated exchange of information on findings as well as the testing and application of results achieved by one country in another. Examples of this include ESCORENA (see Box 3) and the Network for Cooperative Research Programme on Fish

Technology in Africa which has encouraged the testing of the Ghanaian Chorkor fish smoking oven in other countries, particularly Benin, and carried out socio-economic studies on its applicability elsewhere. Extension materials have also been produced and the results have been publicized of various trials on: insulated fish containers, including work funded by GTZ and ODA; fish drying including work funded by CIDA; and fish salting work funded by ODA.

Box 3

The European System of Cooperative Research Networks in Agriculture (SCORENA)

SCORENA has inspired many of the agricultural research networks now active in the developing countries. It was established at the initiative of the European Regional Conference and the European Commission on Agriculture. Work began with olives in 1974. There are now seven European networks*, three inter-regional networks**, which include countries of the Middle East and three ad-hoc groups. Two networks formed under the European System of Rural Energy Networks have now been also brought under the umbrella of SCORENA***. Over 400 institutions are involved and in recent years there has been increasing participation in many of the networks by countries outside the region, especially those from other parts of the Mediterranean. The whole SCORENA system is coordinated by the FAO Regional office for Europe. In each network one participating institution serves as coordinator. When more than one institution in a country participates in a network, a national liaison centre is agreed. Networks set up groups to carry out work on particular subjects and these groups last just for the duration of the task. Thus while the broad theme of each network remains constant, the work underway and the active membership changes over time. With evolving priorities and interests some networks have also been discontinued (durum wheat, pesticides and maize). The general trend has been towards greater flexibility. A European research networks advisory committee was recently established and this advises on the phasing in and out of networks, priority items of interest for working groups etc.. It has been decided that fewer network meetings should be concerned with administrative aspects and that emphasis should be on technical substance.

During the period 1974-89 networks produced a total of 127 publications. These were principally newsletters, and reports of meeting proceedings. All networks except that on sheep and goats currently issue an occasional newsletter. Other publications have included a bibliography of work on mountain pastures, a handbook on sunflower production, a listing of sunflower diseases, a manual on hygienic manure handling and guidelines on the economic use of manure. Exchange of information and sometimes genetic material through the network reduces duplication of effort and promotes a degree of coordination. The soyabean network has undertaken coordinated field trials and produced a map of suitable production zones and varieties. The network on trace elements completed an international comparison of methods of analysis. Results of sunflower trials in various countries were also compiled and the network has been involved in the preservation of genetic material.

SCORENA still depends to some extent on the FAO Regional Office which provides overall coordination. Financial support is made available in the order of US\$ 210,000 per year to support meetings, publications and administrative costs. Assistance is only provided however on a very exceptional basis for attendance at meetings. This FAO seed money has undoubtedly generated much greater resources in kind from the countries themselves and FAO's technical input is modest.

Although with expanded membership and associate membership of the EEC, there has been less need for some countries to work through SCORENA, it has provided a way of bringing together the countries of Western and Eastern Europe. It has also proved an important means of technical cooperation with non-European countries of the Mediterranean basin. Thus most of the networks are concerned with the crops of these zones rather than more temperate northern climates. In many cases research on these crops, which tend to be grown in the poorer areas, even of the most developed countries, has been less intensive and SCORENA has proved a way of stimulating as well as disseminating the results of research.

*Olives, soyabeans, sunflowers, pastures and fodder, animal waste utilization, sheep and goats and trace elements. ** Cotton, nuts and rice. *** Biomass for energy and Solar.

- 11.43 The Asian Network on Coarse Grains and Grain Legumes has facilitated the exchange of over 150 cultivars of breeding materials. Some are considered likely to contribute towards new variety releases in other countries. For example, an Indonesian maize variety is now being used to introduce earlier maturity in the breeding programme in

the Republic of Korea. The Minimum Tillage Network in Semi-arid Zones of Latin America, including institutions in Argentina, Bolivia, Paraguay and Venezuela, has been supported with FAO contracts since 1986 in research on conservation tillage practices. The dissemination of the technology verified in the preliminary trials is now under way with further grants from FAO.

- 11.44 It should also be noted that the impetus for and the effectiveness of network cooperation can be adversely affected by external factors. The European Rural Energy Networks provide an example of how changes in the economic and policy climate can alter the potential effectiveness of research networks. The networks were conceived at a time when oil prices had risen drastically and priority was being given to the development of alternative energy sources. As the networks came on stream this situation began to reverse, with a consequent decline in interest.
- 11.45 Development of Common Standards: Although a number of networks promote this function, tangible achievements to date have generally been limited. For example, the Southern Cone Grazing Networks have tried to ensure that common standards are applied for the evaluation of experimental results and in productivity estimates, including the development of a methodology for the evaluation of fodder shrubs (see Box 4). Similarly, the network of Latin American veterinary laboratories has been working towards common standards in diagnostic tests. ASOCON has been working to develop common methodological parameters for analyzing and improving soil and water conservation practices in the context of local farm management systems in Southeast Asia. On the other hand, substantial progress has been achieved by the various FAO regional fishery bodies and their working parties in the promotion of common standards for collection and reporting of fishery statistics and data. The standard classifications and definitions, developed by the Coordinating Working Party on Atlantic Fishery Statistics (CWP) in coordination with FAO, have now been widely accepted by developing countries.

Box 4

Regional Working Group on the Grazing Resources of the Southern Cone (Latin America)

Despite the importance of livestock to the region, research attention to pastures and fodder has been limited. As a series of FAO projects designed to strengthen national capability drew to a close in early 1970s, a study was made to determine how mutual cooperation could be strengthened for the future. The first meeting of the regional working group was convened by FAO in 1977. The Campos and Chaco regions are quite distinct ecologically and it was decided to launch two separate programmes. These have no constitution or formal structure, but one permanent coordinator has been appointed by each group from among themselves and a joint meeting is held annually. At that meeting the two groups discuss their national programmes and agree on work to be performed.

With assistance from FAO the working group has been successful in mobilizing funds from a range of agencies, including IICA and UNESCO/MAB. Various projects financed by the World Bank and IDB have also made funds available. FAO contributions have averaged some US\$15-20,000 per year to assist with meeting costs and some expenses of the coordinators. In 1987, when FAO was unable to provide funds, the annual meeting was held entirely at members' expense.

The members' enthusiasm for the annual meetings has been growing steadily and the number of participating countries has risen from only two at the first annual session to now cover all five countries of the southern cone. The network has allowed members to present papers on their work, exchange information and gain a status for their work which would have been difficult working solely within their national programmes.