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ECONOMIC COMMISSION FOR AFRICA

REPORT OF THE FOURTH MEETING OF THE  
INTERGOVERNMENTAL COMMITTEE OF EXPERTS  
FOR SCIENCE AND TECHNOLOGY DEVELOPMENT

(Addis Ababa, 24-28 January 1977)

CONTENTS

	<u>Paragraphs</u>	<u>Page</u>
<b>PART I: ORGANIZATION OF THE MEETING</b>		
Opening and duration of the meeting - - - - -	1 - 2	1
Attendance - - - - -	3 - 4	1
Election of officers - - - - -	5	1
Adoption of the agenda and organization of work - - - - -	6	2
<b>PART II: SUMMARY OF PROCEEDINGS</b>		
Approval of the report of the third meeting of the Committee -	7	2
Matters arising from the report of the third meeting of the Committee - - - - -	8 -12	3
Country reports - - - - -	13 -30	3
UNESCO - - - - -	31 -32	7
Review and recommendations for the future of the African Regional Plan - - - - -	33 -40	7
Progress report on follow-up to CASTAFRICA recommendations -	41	9
Co-operative technology projects in Africa - - - - -	42 -54	9
Critical areas of technology in Africa - - - - -	55 -66	11
International technology communication into and within Africa-	67 -77	13
Establishment of a Regional Technology Transfer Centre and possibly of national technology transfer centres - - -	78 -89	15
Progress report on the establishment of a regional remote sensing satellite ground receiving, data processing and training centre in Africa - - - - -	90 -91	16
United Nations Conference on Science and Technology for Development - - - - -	92 -99	17
The Committee's future role and agenda of the fifth meeting -	100 -108	19
Other matters - - - - -	109	20
Adoption of the report - - - - -	110	20
Closure of the meeting - - - - -	111	20

## PART I: ORGANIZATION OF THE MEETING

Opening and duration of the meeting

1. The fourth meeting of the Intergovernmental Committee of Experts for Science and Technology Development in Africa was held at the headquarters of the Economic Commission for Africa at Addis Ababa from 24 to 28 January 1977.

2. The meeting was opened by Mr. N.C. Otieno, Officer-in-Charge, Natural Resources Division, who addressed participants on behalf of the Executive Secretary, Mr. Adebayo Adedeji. He welcomed participants and expressed his appreciation for the continued support of their Governments and organizations to the work of the Committee. The attention of participants was drawn to ECA's effort in reorienting its work programme in line with the establishment of a new international economic order and its basis - a technological revolution - and invited participants to make concrete suggestions which could help Africa to embark on a real technological revolution. With regard to the ongoing development programmes in the various countries, he stressed the need for ensuring that science and technology were effectively used to realize the developmental goals of Africa. Although the value of science and technology was appreciated in Africa, there was need to direct Africa's attention to the issues of how the continent could apply science and technology to derive maximum benefit from its natural resources. That required a sound policy in training and the utilization of manpower resources, a deliberate Government policy to encourage technological activities within the various countries and a fresh look at improving Africa's own initiative in technological decision making and management. With regard to the forthcoming United Nations Conference on Science and Technology for Development he urged member States to prepare themselves fully in order to ensure that special issues of the continent would be brought to the various fora of that conference. The Intergovernmental Committee of Experts was expected to offer effective guidance on all those matters.

Attendance

3. The meeting was attended by representatives of the following countries: Algeria, Burundi, Egypt, Ethiopia, the Ivory Coast, Madagascar, Morocco, Senegal, Uganda, the United Republic of Cameroon, the United Republic of Tanzania and Zaire.

4. The following United Nations bodies were represented: United Nations Development Programme (UNDP), United Nations Children's Fund (UNICEF), and United Nations Industrial Development Organization (UNIDO). Observers from the following United Nations specialized agencies were present: Food and Agriculture Organization of the United Nations (FAO), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the World Intellectual Property Organization (WIPO).

Election of officers

5. The Committee elected Mr. Peter Mwombela, United Republic of Tanzania, as Chairman, Mr. E. Rakotomaria, Madagascar, as first Vice-Chairman, Mr. Jerome Mendouga, United Republic of Cameroon, as second Vice-Chairman, and Mr. Yousef Morsi Hussein, Egypt, as Rapporteur.

Adoption of the agenda and organization of work

6. The Committee adopted the following agenda:

1. Opening of the meeting
2. Election of officers
3. Adoption of the agenda and organization of work
4. Approval of the report of the third meeting of the Committee
5. Matters arising from the third meeting of the Intergovernmental Committee of Experts
6. African Regional Plan for the Application of Science and Technology to Development
  - (a) Review of secretariat activities since the third meeting
  - (b) Recommendations for future activity
7. Follow up to the CASTAFRICA recommendations: progress report
8. Co-operative technology projects in Africa
9. Critical development areas for technology
10. International technology communication into and within Africa
11. Establishment of a Regional Technology Transfer Centre and possibly of national technology transfer centres
12. Establishment of a Regional Remote Sensing Satellite Ground Receiving, Data Processing and Training Centre in Africa: progress report
13. United Nations Conference on Science and Technology for Development, 1979: report on developments and proposals for pre-conference activities in Africa
14. Discussion of the Committee's future role, and the agenda of the fifth meeting of the Committee
15. Other matters
16. Adoption of the report of the fourth meeting
17. Closure of the meeting

PART II: SUMMARY OF PROCEEDINGS

Approval of the report of the third meeting of the Committee (agenda item 4)

7. A representative of the secretariat noted that the report of the third meeting (E/CN.14/648) had been circulated to all members. In the absence of any comments, the Committee approved the report.

Matters arising from the report of the third meeting of the Committee (agenda item 5)

8. A representative of the secretariat reported that, soon after the third meeting of the Committee, ECA, in collaboration with UNDP and UNESCO, had reviewed the regional project for the promotion of the African Regional Plan referred to in earlier meetings. Subsequent to that review, the project had been redrafted and presented to UNDP and other funding groups. No response had been received.
9. In line with the CASTAFRICA recommendation, the fourth intersecretariat meeting to review the implementation of CASTAFRICA recommendations had been held in Addis Ababa during December 1975 at which the representatives of ECA and UNESCO had exchanged views. It was unfortunate that OAU had not been represented at that meeting.
10. On the question of holding country seminars to publicize the African Regional Plan, a representative of the secretariat reported that he was not aware of any seminar having been organized in an African country for that purpose since the last meeting of the Committee. A small fund had been set aside by ECA to render assistance in organizing such seminars but as those finances had not been utilized by the countries concerned, the offer had lapsed.
11. A representative of UNESCO reported that a subregional seminar on co-operation in science and technology mentioned in paragraph 18 of the third CESTD report had been held in Nairobi in November 1975 and attended by several countries from the eastern and southern African subregion. Similar seminars had been held for countries in the Central and North African subregions and proposals were in hand to hold a similar one for the West African subregion.
12. One representative expressed dissatisfaction about the secretariat's communication convening the meeting which, some, had thought to be cancelled because of cables, in fact, cancelling a meeting of ECA's Technical Committee of Experts. In reply, a representative of the secretariat promised to seek ways to avoid confusion in future; and regretted any inconveniences that might have been caused.

Country Reports

13. Before concluding the Committee decided that representatives of the various Governments should present brief reports on developments in science and technology in their countries since the third meeting.

Madagascar

14. The representative of Madagascar informed the Committee that important changes had taken place in his country, including the setting up of a Ministry of Scientific Research early in 1976. Before 1972, Madagascar had had only a small service called the "General secretariat for scientific and technological research", which, between 1972 and 1975 had been replaced by a directorate of scientific and technological research.
15. At the present time, problems relating to science and technology were given to the independent ministry, which had three directorates and nine services. Since its inception, the Ministry had taken many measures to strengthen the national scientific

research system including in particular the creation of a national centre for pharmaceutical research, a project for a national centre for industrial and technological research, and the introduction of training for research workers in applied biology in conjunction with the University of Madagascar.

16. The representative of Madagascar reiterated that oceanography was one of the fields in which his country would like to collaborate with other African countries. His delegation intended to submit to the Committee detailed documents on the creation of a regional centre for training and research in oceanography in Madagascar. In conclusion, he reaffirmed his country's determination to strengthen its scientific and technological capacities.

#### United Republic of Tanzania

17. The representative of the United Republic of Tanzania outlined a number of projects which had been launched under the auspices of the Tanzania Scientific Research Council. They included the inoculation of legumes with a view to improving production; survey of the effectiveness of measles inoculation in children of varying ages, study of weaning habits and the development of suitable weaning diets, research on medicinal plants, bio-gas production in which working models were being propagated in the rural areas; monitoring of environmental pollution under the East African Community Natural Resources Research Council, and the establishment of a Documentation Centre which was an approved project in the third five-year plan. He reported that a National Institute for Standardization and an Industrial Consultancy Centre had been established, and an environmental sanitation project on compost latrines being carried out with the support of IDRC would be completed in 1977. A project for the establishment of a Marine Science Development Centre under the University of Dar es Salaam had been formulated but the project had not got off the ground.

#### Egypt

18. The representative of Egypt reported that since the beginning of 1976 the Academy of Scientific Research and Technology has made progress in the following major areas: Firstly, the elaboration of a scientific and technological research strategy that served the comprehensive development plans, the main items of which were: (1) technology transfer and adaptation (2) food and agriculture (3) natural resources (4) health and environment (5) energy (6) human resources and training (7) administration development (8) co-ordination and integration of national science and technology activities. Secondly, the definition of priorities of national R & D programmes in the framework of the above-mentioned strategy and scrutinizing the current contract-research projects sponsored by the Academy, which were now the responsibility of a newly established office for R & D programming. In the meantime preparations were being made for holding a national seminar on transfer of technology and production in 1977. Thirdly, supporting bilateral joint research projects with other countries especially in the fields of remote sensing, water management, the Lake Nassir Research Project, solar energy, more and better food, bilharzia and endemic diseases, metallurgy and petroleum. Fourthly, supporting the establishment of specialized research institutes.

19. The National Research Centre was devoting extensive efforts to implement its new policy for recruiting scientists for the solution of certain national problems. Progress had also been made in its five main R & D programmes of (1) food and agriculture (2) health and environment (3) natural resources (4) energy and (5) transfer of technology.

### Ethiopia

20. The representative of Ethiopia informed the meeting that his Government had created a framework for science and technology by establishing a National Science and Technology Council to serve as the government organ responsible for promoting, strengthening and guiding research and experimental development at the national level. It carried out that task through the activities of sectoral Research Sub-Councils. Six Research Sub-Councils had already been organized: (1) food and agriculture, (2) health, (3) industry and technology, (4) natural resources, (5) housing and construction, and (6) education and manpower development. Two more Research Sub-Councils proposed for creation were: (1) socio-economic studies and (2) natural sciences. In addition, the Council had established a Department for Scientific Information and Documentation and a Department for Science Popularization.

21. To strengthen and co-ordinate the country's effort in high-level manpower development, the Government had recently created a Commission for Higher Education. Other important decisions taken by the Government in recent months were to reorganize various ministries, to create a new Ministry of Industry, and to include a research function in the terms of reference of all development-oriented ministries. All those would, no doubt, enhance the development of a sound structure for a strong science and technology programme appropriate for the country's needs, and hopefully would be of significant importance in the implementation of the relevant objectives put forward in the African Regional Plan for the Application of Science and Technology for Development. One other new development was the proposed project for the establishment of a Marine Science Research Centre to be established at the Red Sea Port of Assab under the auspices of the Addis Ababa University.

### Algeria

22. The representative of Algeria stressed that the Committee's meetings offered an opportunity for an exchange of experience in science and technology development. African countries had to strengthen their solidarity by making known their achievements or failures.

23. He explained the philosophy of Algeria's scientific and technological policy: Scientific research was a strategic sector for national development. It was a social activity aimed at developing knowledge and its practical application. It had a double function as an instrument for cultural development and an instrument for economic and social development. Therefore in Algeria it was considered a strategic sector as it was at the crossroads of all social activities.

24. The guidelines for the national science policy in Algeria were as follows: Algerianization of research: Research should portray a national character through its participants and subject matter. That was essential if national research was to contribute to the development of global knowledge.

25. Research should be linked to training and integrated into development. The highest priority was given to training. However, the development of research was considered essential for the development of education, for the training of research workers and specialists; and for the reform of educational programmes. He explained that research and development could be integrated into development by defining national research priorities which correspond to economic and social development priorities.

26. With regard to planning for research, the necessary conditions should be created for making optimal use of existing human and material resources by defining objectives. Research should be specified in national development plans and ways sought to make up for scientific backwardness in the shortest possible time. He stressed that an equilibrium should be established between basic and applied sciences and between natural- technical sciences and social sciences. There was a need to create the best possible material conditions for scientists and scholars.

27. The fields of approach for the above should be to develop natural resources, to master technology as a matter of priority in strategic sectors of the economy, and to explore new forms of energy. Also, in agriculture, science and technology should be made to contribute to the green revolution to achieve self-sufficiency in food. Finally, in the social sciences, it should give a scientific bent to the process of social development.

28. He then explained two aspects of the democratization of research:

(a) Making science and technology a powerful tool for development by disseminating the spirit of science and technology among the broad masses by teaching science to all students, encouraging workers to innovate, and popularizing science; and

(b). Ensuring that the research systems operated with participation of the workers in planning and management.

29. The Algerian representative then described the responsibilities and structure of the research system in Algeria. The National Council for Scientific Research (CNR) was the institution responsible for advising the Government and studying the organization, plans, and orientation of research. The Council was composed of representatives of university faculties, research workers, and of political, administrative and economic organs. The Council was presided over by the Minister of Higher Education and Scientific Research. The National Agency for Scientific Research (ONRS) was responsible for implementing research policy. It came under the Minister for Higher Education and Scientific Research. The task of the agency was to encourage the development of research in the University and develop research in the centres under its responsibility. There were 12 research centres dealing with university science and technology, arid zones, oceanography and fisheries, land biology, meteorology and geophysics, physical planning, architecture and town planning, applied economics, scientific information and technology transfer, agronomy, anthropology and prehistory. There was also a university centre for research on solar energy.

30. The Algerian representative concluded his statement by a brief analysis of the main problems faced in Algeria in science and technology development. Notwithstanding rapid advances, experience had revealed various difficulties which were basically connected with the weakness of the country's scientific and technological potential. In particular, he stressed how important it was to create agencies capable of giving a scientific judgement on the quality of research work and the research workers themselves. That need was felt acutely in Algeria. He also noted that international co-operation might be very helpful in the form of missions by scholars and research workers of international repute for the purpose of assessing research work and existing laboratories.

UNESCO

31. The UNESCO representative outlined a number of ongoing activities which were of particular relevance to the African region. The UNESCO Special Fund for African R & D Development had already received contributions amounting to \$US 125,000, and he urged members to impress on their Governments the importance of that project and to solicit their Governments' contributions to the fund. He also drew the attention of the Committee to the guidelines governing the operation of the Fund.

32. In the field of training scientific and technical manpower, UNESCO had undertaken extensive consultations in Africa regarding the establishment of an African Network of Institutions for Research and Training in Science and Technology. Following such consultations UNESCO had prepared a plan to launch one such network in basic sciences, and preliminary consultations were under way for a network in environmental sciences.

Review and recommendations for the future of the African Regional Plan (agenda item 6)

33. A representative of the secretariat introduced document S&T/CESTD/4/5 and gave the background to Economic and Social Council resolution 1900 (LVII) which called for a periodic review and appraisal of the World and Regional Plans for the Application of Science and Technology to Development.

34. One member drew attention to the fact that the World and African Plans were meant to serve as guidelines and he felt that that purpose was being fulfilled. The main thrust of the plans was expected to take place at the national level and it was there where each country was expected to direct its resources, both manpower and financial, towards their technological development activities. He wanted to know what role ECA might play in the review and appraisal exercise, in addition to publicizing the African Plan and soliciting funds for the Plan. In reply the secretariat said that efforts by ECA to secure funding had not been fruitful in spite of encouragement from many quarters and he drew the Committee's attention to the difficulty of funding within and outside the framework of the United Nations system. He noted that incorporation of the review exercise into the future preparations for the United Nations Conference was quite feasible.

35. The UNESCO representative stated that the chapters on science education and science policy would remain largely unchanged, though suggestions would be taken into account. He stressed that the urgent task was for individual countries to execute projects rather than spend too much time on a review of the guidelines.

36. One representative remarked that the World and African Plans were conceived rather more from the viewpoint of the developed countries. The fields covered were important but not many countries could implement the various good projects contained in the African Plan because of financial limitations. He pointed out that the choice of technologies to day for development projects whose impact would become significant in the medium and long terms, was posing serious dilemmas because of the soaring costs of petroleum and equipment imports. For example, the cost of a bus which, if priced at \$US 50,000 to day would cost \$US 3.2 million by the year 2000 at the 20 per cent per year rate its price was now rising. The cost of fuel to operate it would have risen from \$US 0.20 per litre on the Ethiopian market to \$US 3.2 per litre in the same period, which created serious problems for the African region generally. He also stated that



many of the projects in the African Plan implied technology and financial investment of a magnitude beyond the meagre resources available. He suggested that the validity of the African Plan in the long term needed to be seriously questioned, and suggested that strenuous effort be made in R & D into alternative options available to Africa in all sectors, so as to generate appropriate technologies to suit Africa's financial and human resources capabilities now and in the near future. He stressed that Africa had to adopt a programme of self-reliance in its scientific and technological planning which would seek a viable path to solving Africa's problems. He felt that it was logical to integrate that task with preparations for the forthcoming United Nations Conference. On the need for new technologies suitable for Africa, the truth was that African countries must start work, because many were not available in the world market.

37. Another representative pointed out that it was not the African Regional Plan which posed problems, but rather its implementation. The problem in fact went back to the crucial question of the obstacles to science and technology development in Africa and it was that question which should be central to the Committee's concerns. Whilst the problems of financial resources should not be underestimated as far as the implementation of national science and technology development plans were concerned in each African country, the basic constraint was still the question of developing capabilities, and the highest priority of all should be accorded to training. The African Regional Plan was nevertheless of some interest in that it contained a number of guidelines. It should be neither underestimated nor overestimated. To put the question of the Regional Plan on the agenda for every Committee meeting was not very effective when the real problem was to study the reasons for the difficulties encountered in the implementation of the Plan and, more generally, in scientific and technological progress in Africa.

38. The attention of the Committee was drawn to the general agreement that scientific and technological development could not be considered outside the framework of general plans for economic and social development. Since there were problems of finance and manpower hindering development generally, it was necessary also to stress co-operation among the African countries in their solution. He appealed to United Nations agencies to give assistance especially in the design of science and technology plans. He saw that regional plans were important for international development, but each country had to choose specific projects suited to its own interests.

39. The WHO representative reported that his organization emphasized the country approach method of action. He pointed to the meagre participation of African countries in over-all world production which needed to be drastically upgraded to bring Africa into the technological arena. WHO was redirecting its resources to the needy masses who were often bypassed by many developmental activities. Innovations and political will were critical in consideration of the technological development envisaged. He also gave information on the activities and plans of his organization in disease control, medical research and other related aspects.

40. It was generally agreed that there was no need to review the African Regional Plan, but rather to choose specific projects and incorporate them into national scientific plans. It was also suggested that countries might wish to take up the matter of review within the framework of the preparations for the forthcoming United Nations Conference.

Progress report on follow-up to CASTAFRICA recommendations (agenda item 7)

41. The representative of UNESCO reported on the implementation of the CASTAFRICA recommendation based on paper 19C/80 presented to the General Conference of UNESCO in Nairobi in 1976. He drew attention to the UNESCO Special Fund for African R & D Development, noting that some donor countries preferred to finance specific projects rather than making contributions to the general Fund. Other points highlighted were the brain drain and scientific and technological co-operation in Africa.

Co-operative technology projects in Africa (agenda item 8)

42. A representative of the secretariat drew the attention of the Committee to the need to direct Africa's effort to those projects which were of economic value and which were likely to attract scarce finance. He invited participants to suggest to ECA the kinds of projects which would bring such value to the African countries.

43. One participant asked about the outcome of earlier initiatives with regard to regional projects concerned with marine science and technology, information and documentation and solar energy on which the secretariat had not provided progress reports. He therefore wondered whether it was necessary for ECA to introduce new projects. The secretariat representative explained that the projects were brought to the attention of the member countries but there was a poor response, and the various new projects suggested in the paper were not to be imposed on member States but rather they were ideas for discussion among technologists in the Committee. With regard to documentation he pointed out that work was moving ahead at ECA with the rental of a new larger computer and the establishment of a data bank group. The same participant expressed the opinion that the new secretariat proposals were valuable projects and should be pursued to a state of reasonable completion.

44. The UNESCO representative reiterated that his organization was closely concerned with the projects on documentation, solar energy, and marine science and technology and was prepared to co-operate fully with ECA in their promotion and implementation. UNESCO had suggested the establishment of a joint unit with ECA in the areas of science and technology and he wished the meeting to pronounce itself on the issue.

45. The Algerian representative noted that it was pointless to be drawn into the debate on whatever problems might exist among the various administrative machineries of ECA, UNESCO and other United Nations agencies.

46. He felt that a positive way of discussing the question of the respective agencies' competence in science and technology was to identify the real root of the disputes about competence. He showed that the real problem was that the role of science was twofold: it was an instrument for cultural development and an instrument for economic development. Hence it concerned both UNESCO and ECA. The problem of the demarcation of the various sectors of research (university research, basic research and technical research) was a universal one resulting from the very nature of scientific activity. The demarcation between the three sectors was not clear and was the result of a historical process during which science had increased its role in social activities and in particular in production. It would continue to evolve.

47. The representative of Madagascar described the efforts his country was making in the sphere of maritime and oceanographic research and outlined the reasons in favour of the establishment of a marine sciences centre in West Africa. He also gave all the details (buildings, staff, financing, etc.), concerning the proposed establishment of Regional Oceanographic Training and Research Centre in Nosy-Be (Madagascar). The representative of the United Republic of Tanzania stated and others concurred that, while ECA could take on a co-ordinating role in the African region, he could not see how it could take up executing roles in the absence of sufficient funds available to the secretariat. He felt that projects like those in S&T/CESTD/4/7 could be better presented if reference were made to related efforts and activities by other organizations. He supported Madagascar's point on marine science and would like to co-operate in the field of establishing an East Africa Centre.
48. A representative of the secretariat said that he would like to see technology blossom in the region but, without resources, ECA could hardly be of much practical assistance. The problem was to reorient ECA and the United Nations generally to reallocate resources to the technology sector of the secretariat's efforts. He thought a lot of resources were spent on political and diplomatic issues and little was left for the crucial questions of promoting technological development.
49. Another participant saw the role of the secretariat as focusing the attention of the Committee on real problems at the grassroots level. He however was unsure that ECA could be involved in carrying out the projects as they require a large range of technological and management expertise. There was also a problem of defining priorities among the various competing demands. It was necessary to decide on criteria to guide project selection.
50. With the agreement of the Chairman, a representative of the secretariat briefed the meeting on the results of the founding conference of the African Regional Organization for Standardization (ARSO) which had taken place in Accra from 10 to 17 January 1977. Nineteen African countries had participated together with many other representatives from international organizations. Seventeen countries had signed the constitution which established ARSO. He suggested and it was agreed that the suggestions on the standardization and manufacture of electrical and telephone equipment in document S&T/CESTD/4/7 could be recommended to that body for implementation.
51. One representative felt that the concrete projects suggested by ECA like electrical and telephone standardization were valuable, but perhaps subregional consultations would be the best way to begin. In view of their apparent value, he would like more, meatier analyses of that type of problem. He suggested that further work on the school technology equipment project should be undertaken with UNESCO, and thought that primary school curricula revision though important, should be done by UNESCO. Concerning road-building equipment, he said that Africa was very dependent on expensive imports, and accordingly, it was a worthwhile venture. One should also consider maintenance training for machines. Many such projects were valuable and he wanted ECA to co-ordinate Africa's effort in that area.

52. Another representative, while sharing the view expressed above, wondered whether the ECA secretariat had clearly defined its role in science and technology development. He was of the view that the secretariat could not and should not become an international research agency or engineering firm.

53. One participant appreciated the document and felt the search for definite areas of project work was good. ECA should go further and also use other agencies to help plan and implement some of the suggestions, which involved a new approach.

54. In conclusion the Chairman stressed the necessity for a clear understanding of ECA's role as a co-ordinating body which would draw in other agencies for implementation of programmes, and stated that there was a consensus on the need for electrical and telephone standardization and manufacture, which should be tackled by ARSO.

Critical areas of technology in Africa (agenda item 9)

55. In introducing the item, the representative of the secretariat stressed that there was a number of key areas which could trigger or stimulate technological progress within the region. He requested participants to consider the ideas in the paper and to suggest whether they were valuable proposals or not and hence could form a basis for further follow up.

56. One representative wanted to know what ECA wanted to do following the debate on those issues. In reply, the representative of the secretariat suggested that the expression of opinion from the Committee would be taken into account by ECA and probably by member countries in their future action.

57. Another representative expressed some concern as to the ability of the Committee to recommend on issues which were more country specific and involved political ideologies. There were varying definitions of technology, which led to some difficulties in arriving at a consensus. He raised several questions on the various portions of the text where he made strong reservations as to their correctness and relevance to the topic under discussion. A number of participants queried the objective of the paper on "Critical areas of technology in Africa". In reply the representative of the secretariat assured members that the views and comments of the Committee members were very important to indicate to the secretariat which specific areas or issues were considered important to Africa's development.

58. Several representatives welcomed the secretariat's suggestion for mobilizing the general public with a view of obtaining their participation in and contribution to the development process.

59. A query was raised by one representative as to whether roads, transport and primary education were critical areas of technology or in fact critical areas of development. He wondered how special talents could be identified. Those questions veered more to the political angle than to the scientific angle. He further did not accept the idea of concentrating on technology at the expense of research, without which the African countries would be doomed to failure.

60. Another representative re-emphasized useful areas of agriculture, water, housing and energy which had been proposed earlier. He was still not sure whether the secretariat's proposals were concrete enough as they tended to be philosophical in nature. He warned against the ongoing idealization of intermediate technology since there were some tasks which of necessity required modern technology, and suggested that the secretariat should strike some balance in those matters. He outlined his country's plans and activities to bring about technological intervention in a number of areas of development. In agriculture he cited the efforts being directed to the production of manure, improvement of post-harvest technologies and food processing technologies to mitigate loss of harvest which amounted to 30 per cent in some areas. Housing particularly for rural communities was an important area for government action. Attention was directed towards the production of raw materials and components needed in the building industry e.g., bricks, tiles, etc.

61. With regard to energy, his Government was aware of the immense problem of bringing electricity to all rural communities as a long-term objective. In view of the fact that the majority of rural communities depended on wood fuel, the Government was concerned with re-forestation in order to ensure the renewal of that resource. He also referred to his country's effort in popularizing bio-gas production in the rural areas. He concluded by asserting that those and others were real critical issues for the country's development where technology could make an important contribution. He thought that for the first time the secretariat was directing the Committee's attention to some concrete action programmes, and appealed to all members of the Committee to acknowledge the fresh view on the part of the secretariat and to assist the secretariat in its important endeavour.

62. The representative of Madagascar spoke of the experience of his country concerning mobilization of the population in relation to scientific and technical research. He spoke of an information campaign carried out in the form of a "scientific research week", which had met with great popular success. The Ministry of Scientific Research had organized exhibitions, lectures held in public and broadcast on radio and television, and visits to research centres. The Ministry was currently planning a tour round the various provinces by a mobile exhibition.

63. He also cited the participation of the population in the gathering of traditional knowledge relating to medicinal plants. The responses obtained were numbered in hundreds, and the research centre could not keep up with them. He also spoke of the participation of the population in the study of traditional technologies. In that way the Ministry of Scientific Research had rediscovered, with the help of craftsmen, the traditional method for iron production using local ores.

64. The representative of WIPO made reference to the central activities of his organization in the protection of inventions. He referred to their programme to patent indigenous inventions which, if valuable, could be offered to the world. His organization had contacted developing countries seeking out information on inventions which would then be examined and disclosure papers prepared by the Austrian Government and passed on to the inventors. After a satisfactory passage through those scrutiny exercises patents could then be issued. He concluded that, if any African countries needed further information on that matter, his organization would be prepared to offer the needed assistance and advice.

65. Stress was placed on the necessity to master modern technologies, and to understand the various components which made up whole industries. That type of approach was likely to benefit the technological advancement of the African countries. However, there were problems of getting hold of the appropriate literature which would be a basic necessity of would-be inventors.

66. In conclusion the Chairman thanked all participants for their contribution and hoped that the secretariat would ascertain what were indeed the critical areas of development and the types of technologies necessary in that regard.

International technology communication into and within Africa (agenda item 10)

67. The representative of ECA recalled that the General Assembly had in the last five years adopted 20 resolutions calling for the provision of an information system particularly geared to benefit the developing world. The General Assembly's effort had led to the establishment of a task force to look into the problem and recommend an international technology information transfer network which would assist the developing countries and particularly reach the users of technology. The Committee was being invited to: (1) analyse the problem of delivering technological information to the users; (2) to identify the needs in that area; (3) to identify the appropriate channels; and (4) to consider what assistance African countries might provide in that endeavour. He assured the Committee that the views emanating from the meeting would be of great value to the task force in its future deliberations.

68. One representative stated that information was basic to the transfer of technology and he saw three stages in the information provision process:

- (a) Transmission of information
- (b) Circulation of information
- (c) Utilization of information

He agreed that the barriers to transfer of technology were usually economic or political. There were also further complex problems to utilization which included the possession of related technical skills suitable industrial capacity, and availability of materials. There were many links in the chain and training was a specially significant one. Countries must also be receptive to technology.

69. The representative of UNESCO referred to his organization's effort to establish a data-bank in Africa as a pilot project. Consultations with the Nigerian Council for Science and Technology had secured a commitment on the part of Nigeria to host the centre.

70. The representative of UNIDO gave a short review of his organization's activities. With regard to technological information, UNIDO had an industrial clearing house which covered over-all industrial sectors including agriculture. One of the ideas emerging out of the Lima Conference was the creation of an Information Bank which would provide information to the various countries on various types of technologies in response to the requests of the developing countries.

71. The representative of UNIDO pointed out that the first task was to identify the users in the countries concerned. They were the Governments, industry and research and development institutions. They were both sources and users of technological information and were capable of communicating among themselves within a country-based system. In addition there was a vast array of external sources of information, e.g., the United Nations, usually providing free information. Purchasable information for most purposes was the most important. Other external sources would include world general literature, patent literature, and scientific literature. Thus the users within a particular country could tap both the internal and the external sources given appropriate mechanisms for transfer. He suggested that it might be advisable for African countries to establish contacts with special technology information offices already existing in some developing countries, e.g., in Latin America. With reference to African R & D institutions, it was apparent that they were not particularly geared to assist their local industries.

72. One representative stressed that there was a need to set up a national mechanism to work out how information from outside could be communicated to users. There was also a lack of explicit policies in the area of the transfer of technology in many African countries, which had led to a meagre capability to analyse the available technical information before passing it on to the users.

73. During the discussion, the need to establish national institutions to co-ordinate the information obtained from outside and from internal sources and to respond to the needs of users was greatly stressed. That was crucial in order for any impact to be had in the various countries. The discussion on the various types of information sources had been going on in various forums. The question which was pertinent was to discover what role ECA was expected to play in that technology information exchange. One suggestion was that ECA secretariat could be a co-ordinator to establish a network. It should ascertain how national systems spread and assist where needed.

74. A representative of the secretariat urged the Committee to use the democratic political processes at the United Nations so that the United Nations would direct its resources to more meaningful technological endeavours which were being demanded by the African countries. Political pressure ought to be exerted at the appropriate time and place to ensure that ECA obtained the requisite resources in addition to staff salaries to undertake promotional activities in that field, and provide some material facilities.

75. Consideration was then given to the steps needed to assist member States to play a meaningful role in the technological information exchange network. The establishment of technical libraries was one specific activity on which African countries could make a firm beginning. It was important to provide technical sources at the national level, and leave the task of a technical informational centre to the regional level. Regional institutions for that purpose would assist in directing users to sources of information which were the generators of particular technologies and where information about these technologies could be found.

76. One representative informed the Committee that his country had carried out a survey of information available in the country and it had been discovered that there was a great abundance of information which was not being utilized, partly because of the lack of personnel to analyse the bulk of information available and present it in suitable form to the users. Another, supporting that view, stressed that

much of the information barrier were at national levels and that ECA should devote some attention to solving those grassroots problems, for example, by assistance in setting up public technology libraries. It was not wise to focus attention exclusively at the international level.

77. The representative of WIPO informed the meeting of an expert group meeting convened by his organization to consider patent information, and described how this information could lead to promotion of technology transfer. The special problems and needs of developing countries were to be given particular attention.

Establishment of a Regional Technology Transfer Centre and possibly of national technology transfer centres (agenda item 11)

78. The representative of UNIDO presented a project proposal and cost estimate and briefed the Committee on the origin of the project for establishment of a regional centre for the development and transfer of technology, tracing it back to African ministerial decisions taken in the recent past; the Lima Declaration, the sixth and seventh special sessions of the General Assembly and the fourth session of UNCTAD held in May 1976. He elaborated on features of the Africa scene in respect of technology which called for new activities to stimulate technological development. These could be conceived as national technological institutions linked to a regional centre. Special stress had to be given to the strengthening and/or establishment of national centres, without which much of what was envisaged would not bear fruit. He indicated that an exploratory mission was planned by ECA to visit a number of African countries to seek their views on the role and mode of operation of such a centre. The findings of such an expert group would then be placed before a meeting of plenipotentiaries expected to set up the proposed centre.

79. A representative of the ECA secretariat welcomed UNIDO's presentation of the project and welcomed the Committee's views on how best the countries could assist the proposed mission which would shortly visit a number of African countries.

80. The UNESCO representative urged the Committee to hold concrete discussions which could help Africa make real progress in technology. He reiterated that the regional centre had entrusted to various agencies by UNCTAD and it was pertinent that the execution of the project must continue to be regarded as a joint one. He informed the Committee that decisions had already been taken on the countries to be visited by the exploratory mission which would commence in April 1977.

81. Commenting on the statement by the representative of UNESCO, the representative of UNIDO remarked that it was the first time UNIDO had been informed that decisions had been taken as to the countries to be visited by missions. Furthermore, it was not clear to him who had taken those decisions.

82. The ECA representative introduced a paper on the terms of reference of the exploratory mission referred to earlier. He hoped the Committee would look at the terms of reference and offer its views which might be incorporated in the final document before it was distributed to other agencies. He drew the attention of Committee to the outputs expected from the mission, and reported that ECA had embarked on locating persons who might serve as consultants to the mission and appealed to members of the Committee to propose the names of suitable persons they might know.



83. The representative of WIPO welcomed the ECA document and suggested two amendments which were accepted. His organization would do its best to assist in the identification of suitable consultants, and drew the attention of the secretariat to the fact that WIPO had been omitted from the list of organizations mentioned on page 4 of the document. In reply, the ECA representative said that the mistake would be corrected in the final document.

84. The representative of UNIDO suggested that the mission should have a comprehensive view of a Technology Transfer Centre before embarking on its task. Also a draft of the concepts of the centre should be sent ahead to the countries so that they could prepare their thoughts. He pointed out that UNIDO had a substantial amount of information on some countries, and was willing to make it available to the mission.

85. The UNDP representative indicated that UNEP might be interested in participating in the work of the mission and suggested that it should be contacted to that effect.

86. The Cameroonian representative felt that the terms of reference should include provision for African Governments' opinions and their experiences in the matter.

87. One participant wanted to know how the opinions of countries not visited would be taken into account. He informed the Committee that his country was interested in solidarity and so suggested that it would welcome the exploratory mission and wanted its name included among countries listed.

88. The ECA representative explained the logic of choosing the three most industrialized countries plus representative samples of others. He stated that the terms of reference would have added background and conceptual matter which would help when the project document was sent to different countries. Also the secretariat would gather material from different agencies interested in the subject. ECA was considering the inclusion of UNEP in the mission. He also said that the functions and design of the centre would be included. Countries not visited by the mission would not be deprived of the results of the mission because the report would be sent to all African countries for their comments. They would have an opportunity to send experts to a meeting which would review the report. He also recognized the advisability of including one island country among the countries to be visited by the mission.

89. The UNDP representative observed that a lot of preparatory work was still needed before the mission could start and that the time schedule in the document for commencement of the mission did not appear realistic.

Progress report on the establishment of a regional remote sensing satellite ground receiving, data processing and training centre in Africa (agenda item 12)

90. A representative of the secretariat informed the Committee that ECA activities in the field in question had been prompted by Conference of Ministers resolution 280 (XII) calling for the establishment of Regional Remote-sensing Satellite Ground Receiving and Data-handling Centres in Africa. That resolution called upon the Executive Secretary of ECA to take measures to implement the decision. ECA had therefore convened an inter-agency meeting which had recommended the setting up of an expert mission charged with the task of ascertaining the interest of African Governments. That mission had visited Kenya, the United Republic of Tanzania, Zaire, the Upper Volta and Egypt.

In September 1976 ECA, had convened an intergovernmental meeting which had considered the experts' report and decided to establish two ground receiving stations for satellite images at Kinshasa and Ouagadougou; five training and user-assistance centres at Cairo, Ouagadougou, Ile-Ife, Kinshasa and Nairobi; and a remote sensing council for Africa. The same meeting had authorized the convening of an expert meeting to draw up the constitution of the Remote Sensing Council, which had been held in Nairobi during January 1977. The secretariat hoped to convene a donors' meeting during February 1977 in Kinshasa to consider the proposed budget for the remote sensing programme. It was further hoped that a meeting of plenipotentiaries would subsequently be convened to conclude the necessary legal formalities for the establishment of the African Remote Sensing Programme.

91. Following the presentation, some participants raised a number of questions which were satisfactorily dealt with by the representatives of the secretariat. Finally, participants were invited to avail themselves the opportunity of contacting the experts on remote sensing available at the ECA secretariat during their stay in Addis Ababa.

United Nations Conference on Science and Technology for Development (agenda item 13)

92. The representative of ECA introduced the topic by drawing attention of participants to document S&T/CESTD/4/7 which had been circulated to the members. After the document had been prepared, the General Assembly had approved the Conference and appointed its Secretary-General. The secretariat regretted that it was unable to present more recent documentation on the Conference as the documents requested from New York had not yet been received. When they arrived they would be dispatched to African countries.

93. After the secretariat's presentation, one representative stressed that science and technology should not be considered outside the framework of general social and economic developments and suggested that the Conference should therefore direct its attention to identifying obstacles to the attainment of the objectives of the new international economic order. The Conference should also seek means to eliminate barriers to the use of science and technology in all countries and suggest new forms of international co-operation. He expressed strong dissatisfaction at the decision of the Committee on Science and Technology to limit the topics for the Conference to five areas and, he felt, thereby exclude pertinent questions which were of interest to the developing countries such as consideration of mechanisms of dependence and how the developing countries could rid themselves of that burden. With regard to the African regional preparatory meetings, he suggested that such meetings should have two roles: to permit an exchange of views on obstacles to scientific and technological development and how to overcome them and to explore new forms of co-operation among African countries in science and technology. The preparatory period was very important and he urged the secretariat to provide African countries with adequate information and assistance to enable them to participate meaningfully in these activities. He expressed reservations about the rather fragmented presentation of science and technology on page 2 of the document, and he was rather astonished by the idea, raised on page 7 of the same document, of creating standards for multinational investments in Africa.

94. One representative expressed agreement with the presentation by the secretariat and stressed that countries must be actively involved in the preparatory phase of the Conference. The preparations at the country level were extremely important and he fully concurred with the secretariat's statement at bottom of page 3 of document S&T/CESTD/4/6 that adequate funding be devoted to those vital activities. In that regard he urged the United Nations, ECA, UNESCO and other agencies to provide financial support for the national preparatory activities. He considered that provision of adequate information on planned preparatory activities was essential to ensure that the countries were kept fully informed on all important decisions concerning the Conference. He finally wanted the secretariat to inform the Committee of the main objectives of the preparatory committee meeting scheduled for 31 January to 11 February 1977 in New York.
95. He also regretted the absence of OAU from the present meeting, and mentioned that participants at the third committee meeting had asked the secretariat to facilitate the participation of OAU in meetings of the Committee. In answer to the question about the purpose of the preparatory Committee of the Conference scheduled for 31 January to 11 February 1977, the representative of the secretariat reported that according to Economic and Social Council resolution 2035 (LXI), the preparatory Committee meeting was expected, among other things, to establish guidelines for the preparation of national papers and to finalize the detailed programme of work for the preparatory period for the Conference.
96. The secretariat stated that it should be regarded that the preparatory period had started and thought must be given to communications between ECA and member States. He suggested that member nations appoint a liaison officer for direct communications concerning the Conference.
97. The representative of UNESCO informed the meeting that his organization attached great importance to the proposed United Nations Conference. He referred to the resolution of the Nairobi General Conference of UNESCO on that matter which called upon the Director-General of UNESCO to co-operate fully with the Conference secretariat and to offer assistance to countries in their preparations. He reiterated the importance of adequate preparations at the national level which necessitated the establishment or designation of institutional machinery. He informed the Committee that the Director-General of UNESCO had requested the UNESCO regional offices for science and technology in Africa at Nairobi and Cairo to devote 50 per cent of their staff time to rendering assistance to countries in their preparatory activities. Furthermore, the Regional Office in Nairobi was recruiting one additional staff member to co-ordinate UNESCO's assistance to the African countries. He expressed hope that both ECA and UNESCO would come together to see how they could co-ordinate their efforts to assist member States.
98. The pledge of support reported by the UNESCO representative was welcomed by the Committee and there was a consensus on the necessity for paying great attention to the national preparatory activities related to the Conference on science and technology. One representative expressed hope that more pressure could be exerted to secure larger conference budget funds for national and regional preparatory activities; and another asked that member States be informed of future United Nations meetings where pressure could be applied to mobilize funds for the preparatory period.

99. In conclusion, the Chairman reiterated the importance of the forthcoming United Nations Conference on Science and Technology for Development and the need for African countries to participate meaningfully in all its preparatory phases. Africa should know its needs. Accordingly, the studies and analyses at the national and regional levels should identify obstacles to the utilization of science and technology and suggest ways of removing them. The importance of social sciences in understanding human response to technological change was an important parameter to be borne in mind. He therefore appealed to all African Governments to create the necessary machinery for liaison with the Conference secretariat and other United Nations bodies and agencies during the preparatory phase and emphasized the need for member States to be provided with full information on the plans and activities relating to the preparatory phase of the Conference. Finally he appealed to the United Nations bodies and specialized agencies concerned to assist African Governments in the important task of preparing their national reviews and analyses.

The Committee's future role and agenda of the fifth meeting (agenda item 14)

100. The secretariat stated, there was a real need to define the role of the Committee since the original objective of the African Regional Plan had diminished in importance owing to lack of finance. There were thoughts of restructuring the Committee in order to narrow down and pinpoint its functions so that it could aid ECA, and ECA aid Africa in effective technology and science development.

101. One participant stressed that it was necessary to identify the kind of experts who would make up the Committee. There was no need for experts in extremely precise and narrow fields of science and technology, for then thousands of experts and a host of scientific congresses would be required on each topic. What was needed was experts in science and technology development since the task of the Committee was to define the relationship between science and technology and development, which was precisely how the question arose in Africa.

102. The Committee had not only to deal with the problems of science and technology development at the national level, but also to master the question at the international level. In that regard, he cited examples of the consequences of the scientific and technological revolution on international economic and trade relations, on education, industry, agriculture, etc.

103. The Chairman suggested that we the Committee could better understand its role by looking for defects in its present operation. They included a lack of country representatives with professional science-technology backgrounds, lack of a quorum at Committee meetings which necessitated continued reliance on representatives from embassies in Addis Ababa. That problem was partly one of communications, for example, one country had received a telegramme only a week before the meeting. It seemed that difficulties of communication and finance were among the reasons for the lack of participation by some countries.

104. The Committee was of the opinion that one of its important roles was to exchange experiences amongst member States. That exchange could also be carried on between meetings by the secretariat mailing out information and news. The main role should be related to understanding the principal problems of science and technology in Africa and

ECA should co-ordinate the continuous communication in that regard. Solidarity should also be a concern, for example, by exchanging experts among African countries before looking abroad. ECA should prepare a directory of African experts and scientists in different fields and make it available to the countries concerned. One representative suggested that every delegation should have one R and D expert among its members. He also questioned the existing contradiction whereby participation in the work of the Committee in order to render assistance to ECA in its work meant that Governments, and not ECA, had to incur expenses for sending participants to the Committee meetings.

105. There was a consensus among the participants that, in respect of the World Conference, CESTD could act as a preparatory Committee and provide liaison between the United Nations and member States and after the Conference, in 1979 the Committee could continue follow-up activities.

106. One representative pointed out that the suggestions and recommendations of the Committee are not followed up by the secretariat which influenced the efficiency of the Committee.

107. There was a consensus of opinion that the agenda of the fifth meeting should include the following items:

(a) A follow-up to the report of the fourth meeting:

- (i) Regional centre for transfer and development of technology;
- (ii) United Nations Conference on Science and Technology for Development;

(b) Exchange of views on the development of science and technology in individual African countries;

(c) Report on science and technology events in Africa between the fourth and fifth meeting of the Committee including OAU activities in this area;

(d) The African Regional Plan for the Application of Science and Technology Development.

108. The Chairman thanked participants for their contributions and informed the Committee that suggestions from member States for additional items could be sent to the secretariat.

#### Other Matters (agenda item 15)

109. No other matters were brought up.

#### Adoption of the report (agenda item 16)

110. The Committee considered the draft report which had been prepared by the Rapporteur, and adopted it subject to certain amendments.

#### Closure of the meeting (agenda item 17)

111. The Chairman thanked participants for their important contributions to the debates, and expressed the hope that all States members on the Committee would endeavour to participate in future meetings of the Committee. He also expressed appreciation to the secretariat and the technical personnel for their assistance in organizing the meeting, after which he declared the fourth meeting of the Committee closed.