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UNITED NATIONS CONFERENCE ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

Draft outline of the programme of action

Note by the Secretary-General

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I. INTRODUCTION

1. Since the proposal for the United Nations Conference on Science and Technology was first advanced, there has been continuing emphasis that it should be action-oriented. The Economic and Social Council, in its resolution 2028 (LXI) of 4 August 1976, as endorsed by the General Assembly in its resolution 31/184 of 21 December 1976, emphasized that the Conference should be oriented towards the elaboration of methods of action and that it should make recommendations for concrete action at the national, regional and global levels. The objectives of the Conference are all concerned with action for applying science and technology to development. In Assembly resolution 3362 (S-VII) of 16 September 1975, section III, which relates science and technology to the new international economic order, this necessity is also emphasized.

2. At its first session, the Preparatory Committee for the United Nations Conference on Science and Technology for Development decided, in relation to the work programme for the preparatory period for the Conference, that documentation for it should include documents to be prepared by the Conference secretariat on each of the items of the agenda for the Conference, including a plan of action. 1/ The Secretary-General of the Conference was requested to submit a draft plan of action to the Preparatory Committee in February 1979.

3. At its second session, the Preparatory Committee adopted resolution 4 (II) 2/ requesting that action-oriented recommendations should be developed within spheres of activity at the national, regional and international levels. In the same resolution, it decided to begin at its third session and on the basis of documentation requested, including the recommendations of regional meetings, substantive work on a programme of action to be adopted by the Conference, whose concerted implementation should provide the basis for the solution of problems or obstacles affecting the application of science and technology to the development of developing countries; it accordingly requested the Secretary-General of the Conference to submit to the Preparatory Committee at its third session a draft outline of a programme of action based on the reports of regional meetings and national summaries to be submitted. In the decision on Conference documentation adopted by the Preparatory Committee at the same session, 3/ it was decided that a tentative outline of the programme of action should be prepared on the basis of national and regional inputs received in due time and submitted to the third session of the Preparatory Committee while a draft programme of action consisting of a synthesis of the action proposals presented by Governments in the national papers and in the reports of the regional meetings was to be presented to the Preparatory Committee at its fourth session.

1/ Official Records of the General Assembly, Thirty-second Session, Supplement No. 43 (A/32/43 and Corr.3), annex II, decision 1 (I), sect. F.

2/ Ibid., Thirty-third Session, Supplement No. 43 (A/33/43 and Corr.1), annex I.

3/ Ibid., annex II, decision 4 (II).

4. In considering the report of the Secretary-General of the Conference on the state of preparations for the Conference, the Economic and Social Council at its second regular session in 1978 decided (resolution 1978/70) to request the Preparatory Committee at its third session to give careful consideration to the substantive issues, and particularly to the draft programme of action which would be dealt with by the Conference, bearing in mind the principles of the new international economic order. It also requested the Secretary-General of the Conference to convey the draft outline of the programme of action to the General Assembly at its thirty-third session for consideration, together with the Secretary-General's progress report, under item 70 of the Assembly's provisional agenda for that session.

5. A draft outline of a programme of action based on the reports of regional meetings and national summaries and papers received by the Conference secretariat up to 28 August 1978 was submitted to the General Assembly at its thirty-third session (A/33/303). In spite of the large number of papers on which this draft outline of the programme of action was based, documentation from the regions was not complete at that stage and a significant number of national papers and summaries had still to be analysed. In addition a number of countries had indicated that they would be submitting revised national papers. The draft outline was therefore to be regarded as tentative and subject to revision.

6. Following consideration of the draft outline of the programme of action, the Second Committee of the General Assembly, at its 61st meeting, on 13 December 1978, adopted draft resolution A/C.2/33/L.39/Rev.2, as orally amended and recommended it for adoption to the General Assembly (see A/33/516, para. 12). Under the terms of the draft resolution, the Assembly would, inter alia, request the Secretary-General of the Conference to prepare for submission to the Preparatory Committee, at its third session and for its consideration:

(a) An up-to-date draft outline of the programme of action consolidating recommendations put forward by Governments at the national and regional levels by incorporating those which have not yet been included;

(b) A preliminary draft programme of action containing, on the basis of an analysis of the information contained in the document mentioned above, a theoretical and conceptual framework and recommendations for concrete measures for action at the national, subregional, regional, interregional and international levels covering the items of the agenda of the Conference and, in particular, the development, adaptation, application and transfer of science and technology for development of developing countries, in order to facilitate negotiation and achievement of maximum possible agreement on substantive issues prior to the Conference.

7. The present document, prepared by the Conference secretariat, responds to the request in paragraph 6 (a) above and takes into account the Second Committee's discussion. It is based on the analyses of national papers and summaries and recommendations from regional meetings received up to and including 14 December 1978. These included recommendations from the meetings convened by the five regional economic commissions and 105 national papers and summaries. The preliminary draft programme of action called for in the draft resolution adopted by the Second Committee (see para. 6 (b) above) is available as document A/CONF.81/PC.21.

8. In preparing the present outline, national papers and summaries, and the regional recommendations for action have been carefully analysed by the Conference secretariat and the recommendations identified and recorded. The selection of recommendations from the totality identified for inclusion in the draft outline has presented some difficulties. In some papers recommendations are specifically defined; in others they are implicit in the treatment. The proportionate weight given to the same idea by different papers has had to be considered as has the number of papers supporting substantially the same proposal. The principal criterion for the selection of recommendations has been their action orientation.

9. As far as the structure of the draft outline is concerned, it has been felt preferable to follow the Conference agenda items and subitems as set out in Economic and Social Council resolution 2028 (LXI) and approved by the General Assembly in its resolution 31/184, rather than arrange it on the basis of "horizontal" questions or according to national, regional and international action. This has the advantage of consistency with the guidelines decided upon by the Preparatory Committee for the preparation of national papers.

10. In its resolution 4 (II), the Preparatory Committee requested the Secretary-General of the Conference in preparing the draft discussion papers, and especially the draft programme of action, within the framework of the Conference agenda, to take fully into account areas in which obstacles might arise in the adaptation and application of science and technology for development of developing countries, and which during the preparatory process should be the object of study and require action at the national, regional and international levels. While the Preparatory Committee's request has been kept constantly in mind in the preparation of the draft outline, it should be pointed out that the approach by most Governments in the preparation of their national papers has been to deal implicitly with obstacles throughout their papers. Accordingly, the Secretary-General of the Conference has adopted the same approach in the outline of the programme of action; as a result, the number of obstacles treated explicitly under the heading "Elimination of obstacles to the better utilization of knowledge and capabilities in science and technology for the development of all countries, particularly for their use in developing countries" (subitem 1 (b) of the Conference agenda; see sect. II below) has necessarily been limited.

11. In the case of the subitem relating to new science and technology for overcoming obstacles to development (1 (d)), the treatment adopted has been to present recommendations under the five subject areas selected by the Preparatory Committee at its second session: food and agriculture; natural resources including energy; health, human settlement and environment; transport and communication; and industry, including production of capital goods. Many countries have in fact dealt with the need for "new science and technology" or opportunities for "new" application of existing scientific or technological knowledge in relation to the five subject areas, and with reference to countries' specific needs.

12. It should be noted that there may appear to be some duplication of action proposals under different headings of the draft outline, for example, as in the case of the need for manpower development through improved education and training

or for institutional infrastructure. Concern with this question is common to most items of the Conference agenda; similarly, this applies to a number of other fundamental issues, such as the role of women in development or the liberation of resources for development through disarmament, which implicitly pervade most national papers and which are also currently under active consideration in the United Nations and other international forums.

II. CONSOLIDATION OF RECOMMENDATIONS PUT FORWARD AT THE NATIONAL AND REGIONAL LEVELS

1. Science and technology for development

(a) The choice and transfer of technology for development

National policy for choice and transfer of technology for development

13. Most countries, having regard to the technological dependence of developing countries, recommend that Governments should formulate a comprehensive and coherent national science and technology policy as a fundamental prerequisite for achieving self-reliance and should effect its integration into the national socio-economic policy through specific measures and legal and institutional machinery which will ensure their implementation and their continuous evaluation and readjustment. Such a science and technology policy should aim at fulfilling individual, social and national needs and acquiring autonomous technological capabilities based on indigenous research and development as well as transfer, adaptation and assimilation.

14. The science and technology policy should be consistent with development priorities and emphasize such matters as research and development policy, productive utilization of human and material resources and their distribution, integrated rural development, efficient scientific and technological information systems, educational and training policies. A particularly important component of science and technology policy is the undertaking of comprehensive surveys of national resource endowments and their implementation.

National infrastructure for the assessment and choice of technology for development

15. The creation and the strengthening of the scientific and technological infrastructure of developing countries to facilitate, inter alia, the technology transfer process, are generally recommended.

16. Many developing countries recommend that the research and development institutes of developing countries should acquire the capability to assess, adapt and, in particular, unpackage imported technologies, forming a technological mix, consistent with the resource potential and the national development objectives.

17. Most developing countries recommend setting up national centres for transfer and development of technologies for the co-ordination and promotion of all relevant activities. These centres should regulate technology transfer agreements, have the required scientific, technological, legal and economic competence so that technologies imported by developing countries are acquired on favourable terms and consistent with the national development objectives and priorities. They should also be closely linked with the national science policy and research and technological development (R and D) organs.

Assessment and choice of technology for development

18. Some countries, both developing and developed, recommend that the concept of "technologies appropriate for development" should be defined on a universal basis.

19. Most countries recommend strongly that appropriate technology, given the diverse needs and conditions of countries, has to be country-specific, resource-specific and product-specific. It can thus range from the most advanced, sophisticated technologies to the traditional; it should be an optimal combination of the most advanced and non-capital-intensive technologies.

20. Many developing countries and some developed countries recommend that developing countries should devote attention to the selection, adaptation and development of technologies specifically related to the needs, conditions and requirements of the rural areas, as an integral part of a balanced rural-urban strategy of development.

21. The same countries propose the establishment in developing countries of programme circuits for technological innovation conceived as instruments for participation and reciprocal action among all economic and social institutions and agents responsible for developing technologies in specific fields, those who use these technologies or are affected by them, such as small farmers, women and local craftsmen. In this connexion, support to creative micro-economic groups should be provided by different means, such as the granting of invention patents and registration certificates, prizes and other similar incentives.

22. The importance of mounting a major effort to graft more advanced technologies on to the traditional processing technologies based primarily on rural resources and local skills, particularly for the least developed countries, is also emphasized.

23. Most developing and a number of developed countries recommend that technologies imported from developed countries should be assessed and evaluated from the viewpoint of recipient countries and that industrial projects should, in particular, be assessed with due regard to local conditions.

24. Many developing countries recommend that besides economic criteria, the assessment of technologies should include social, cultural, environmental and political factors, having due regard to the need for the creation of an export-oriented industrial sector.

25. Many developing countries recommend the planning, selection and evaluation of bilateral and multilateral co-operative projects with emphasis on the assessment of technologies from the point of view of over-all national development objectives.

26. Many countries also recommend that the role of foreign experts, engaged in evaluation and assessment of technologies, should be reviewed with the aim of replacing them gradually by suitably qualified nationals and, further, that universities and other local institutes should be fully associated with the process of technological evaluation.

27. One region recommends strong encouragement and support for machinery to finance technological development by the public and private production sectors, whose specific function would be to provide the risk capital required for generating local technological innovation. Such machinery should be constituted by contributions from the public and private sectors.

Technology transfer for development

28. Most developing and many developed countries recommend that, having regard to the monopolistic character of the international technology market, transfer of technology from developed to developing countries should be:

(a) On fair and equitable terms and carried out in a manner conducive to easy assimilation and adaptation;

(b) Free from conditions and clauses inhibiting or restricting the autonomous scientific and technological capabilities of developing countries.

29. Many developing countries recommend that developed countries should facilitate fuller access to technologies which are generated as a result of international collaborative efforts and also to technologies whose transfer is not subject to private entrepreneurial decisions.

30. Developing countries and many developed countries recommend the adoption of an effective international code of conduct on transfer of technology, 4/ with adequate mechanisms for its implementation. Many developing countries recommend further that such a code of conduct should be legally binding.

31. Many developing and some developed countries recommend the formulation of a code of conduct for transnational corporations 5/ and, in particular, that these corporations should undertake and stimulate research activities in their subsidiaries located in developing countries. Many developing countries recommend that transnational corporations should establish training centres in developing countries in order to assist these countries in the adaptation, utilization and development of technologies. They also recommend that transnational corporations should encourage local subcontracting.

32. With a view to giving preferential treatment to developing countries and to strengthening their autonomous scientific and technological capabilities, many developing countries recommend the revision of the Paris Convention for the Protection of Industrial Property. A number of developed countries also emphasize the importance of current negotiations on this subject. 6/

4/ This code is being considered by the United Nations Conference on an International Code of Conduct on the Transfer of Technology.

5/ This code is being considered by an Intergovernmental Working Group on a Code of Conduct.

6/ The revision of the Paris Convention is the object of the Diplomatic Conference on the Revision of the Paris Convention, to be held from 4 February to 4 March 1980.

33. One developed country recommends that industrialized countries should introduce regulations to facilitate the transfer of appropriate technologies to developing countries.

34. One region recommends policies providing for an active role of the State in establishing regulations in the national interest. The basic objective of such regulatory activity should be to intervene between purchasers and sellers of technology in order to avoid inappropriate or unnecessary purchases, excessive expenditure or clauses harmful to national interests. It further recommends the study of the use of mechanisms already part of the government apparatus for the handling of imports with a view to regulating the acquisition of technology incorporated in goods, particularly intermediate and capital goods.

35. Many developing countries recognize the fundamental need to stimulate the internal diffusion of technology from the R and D institutes to the ultimate user as well as among the indigenous enterprises. It is recommended that G vernments of developing countries should play a more active role in stimulating such diffusion by promoting research and development institutes, technological associations, technical conferences and journals, as well as extension services.

36. Many countries recommend that suitable mechanisms should be established to provide developing countries with adequate information on alternative sources of technology and terms of transfer and that technology transfer agreements, including model contracts, and data on transactions between developed and developing countries should be systematically published and disseminated.

Manpower for the choice and transfer of technology for development

37. Many developing countries recommend the creation and strengthening of a suitable cadre of scientific and technological personnel required for assessment, selection, adaptation and development of technologies. It is recommended that the local science and technology personnel should also be trained in the analysis of technology transfer contracts and related negotiations with Governments of developed countries and private corporations.

Regional and subregional co-operation and the role of international organizations in the choice and transfer of technology for development

38. Many developing and some developed countries recommend that the United Nations system and its organizations should play a more active role in advising and assisting developing countries on aspects related to transfer of technology in order to enable them to obtain more favourable terms.

39. Many countries recommend that the United Nations organizations should pool their resources to train nationals of developing countries in the complex task of selecting and acquiring technologies on equitable terms.

40. Many developing countries recommend that the United Nations organizations should promote the development of suitable agencies in the developing countries to maintain and regulate technology transfer transactions.

41. Many developing countries are strongly in favour of regional and subregional co-operation in the area of choice and transfer of technology and recommend:

(a) Establishing/strengthening regional and subregional technology transfer centres;

(b) Establishing/strengthening regional and subregional data banks to facilitate the task of selection and adaptation of technology by developing countries;

(c) Strengthening on a regional and subregional basis research and development institutes, consultancy organizations and institutes for the development of scientific and technological manpower;

(d) Establishing regional and subregional mechanisms for technology assessment.

Role of developed countries in the choice and transfer of technology for development

42. Many developing countries and some developed countries emphasize the need for action by Governments of developed countries in order to facilitate transfer of technology appropriate to needs and on favourable terms. The following measures are recommended:

(a) Establishment of appropriate data centres and industrial information banks to identify suppliers of technology and joint-venture partners;

(b) Provision of incentives to private companies to pay attention to the special needs of developing countries and to adapt their industrial projects in developing countries to local conditions;

(c) Subsidizing the payments of developing countries on patents as a form of aid;

(d) Ensuring that technology transfer contracts embody provisions for the "unpackaging" of technologies supplied and for the maximum utilization of indigenous manpower and local raw materials;

(e) Encouragement of joint-venture arrangements between small and medium-sized enterprises in developed and developing countries;

(f) Helping developing countries to promote their own research and development and engineering facilities by making suitable financial and hardware contributions;

(g) Removing the secrecy surrounding those inventions that can contribute to the development of developing countries.

(b) Elimination of obstacles to the better utilization of knowledge and capabilities in science and technology for the development of all countries, particularly for their use in developing countries

43. Most developing countries recognize that a variety of obstacles, internal as well as external, would need to be eliminated in order to ensure better utilization of science and technology for their development and that systematic analysis and study of these obstacles is required as a prerequisite for their elimination.

44. Many developing countries consider that the absence of an awareness of science and technology, often in the context of the social structure, cultural heritage, value system and religious traditions of a country may constitute an important obstacle to the application of science and technology.

Education and training

45. A majority of countries recommend reorientation of the formal and informal education systems to make them more relevant and responsive for meeting national needs through the application of science and technology, and recommend that proper linkages should be created between education and training, research and development and the users in the productive sector, that is, of agriculture and industry.

46. Most countries also recommend that national systems of education and training should ensure the availability in sufficient numbers of adequately trained scientific and technological personnel with a practical and vocational bias, particularly in relation to rural needs; mass media could play a crucial role in this regard.

47. Most countries recommend that managerial skills in research, development and production systems in both agriculture and industry should be developed and strengthened.

48. Other recommendations relating to manpower development include the following:

(a) Determination of technological manpower requirements in different sectors;

(b) Encouraging more women to pursue careers in science and technology;

(c) In-service and in-plant work study or holiday job programmes supported by industry;

(d) Encouraging and training people without formal qualifications but having technical creativity;

(e) Better co-ordination between selection of candidates for programmes of study or training abroad and the specific manpower needs at the national level;

(f) Modification of the traditional wage and incentive system so as to provide an appropriate material reward for scientists and technologists;

(g) Adequate provision in technology transfer contracts for training of sufficient numbers of local personnel, including relevant research and development staff;

(h) Provision for training in administration and handling of technology;

(i) Strengthening of science teaching at the secondary level;

(j) Provision of equal reward structures for scientific and technical personnel, whether in research or management.

Measures to deal with the brain drain

49. Most developing countries recommend that an over-all strategy should be drawn up to halt the brain drain and also to repatriate their trained personnel. This problem has been particularly emphasized by the least developed countries.

50. Among other recommendations made in this regard by several countries are the following:

(a) Examination of the possibility of introducing legal measures to prevent the exodus of certain categories of scientific and technological personnel;

(b) Persuasion of developed countries not to employ nationals of less developed countries without the consent of the Governments concerned;

(c) Provision of incentives to technical and professional personnel in order to motivate and induce them to remain in their countries in their chosen fields of specialization. Such incentives would include raising their salaries, improving their working conditions and environment, introduction of bonus system, merit-based promotion and in-service training;

(d) Examination of other mechanisms to counteract the emigration of trained personnel;

(e) Study of the causes, scope, and repercussions of the drain of qualified personnel from developing countries in order to develop the appropriate policy measures.

51. Many countries recommend that the United Nations system should concern itself more actively with the question of the brain drain. Some countries recommend that, as a compensatory measure for the brain drain, recipient developed and more affluent developing countries should establish an international fund under United Nations auspices which would be used, inter alia, for strengthening the training and other infrastructures in the developing countries concerned.

52. One developing country calls for an international programme of co-operation for advanced education abroad of nationals of developing countries in areas which are of critical importance but which may not necessarily be pertinent to the education of students from the host countries themselves.

53. One developing country recommends that a special international fund should be created to establish programmes to train manpower for technological research in the third world in such a way that each country can direct the training of human resources in the priority areas for its research.

Increasing the awareness of science and technology in developing countries

54. Many countries emphasize and recommend that special efforts should be made to create more receptive social and cultural conditions for better application of science and technology to development. Such a change can be achieved through, inter alia, greater application of science and technology in rural areas, increased literacy, and promotion of scientific and technological awareness in the life and culture of the people, particularly among the poorer sections of the population.

Regional co-operation and the role of international organizations in the elimination of obstacles to the better utilization of science and technology

55. Most countries recommend that the United Nations system and other international organizations should perform a more substantial role in the training of scientific and technical personnel in developing countries through a network of programmes at the subregional, regional and interregional levels.

56. Many countries also recommend that there should be greater international and regional co-operation in the areas of education and research and, at a more specific level, in compiling regional rosters of engineering, design and consultancy firms and in maintaining an inventory of experts, research and development institutions and available technologies.

(c) Methods of integrating science and technology in economic and social development

Science and technology as a tool of socio-economic development

57. Many developing countries and a number of developed countries recommend that the national development strategy should be based on the recognition of the close interdependent relationship between the processes of development through the application of science and technology and the economic, social, political and cultural structures of society.

58. They also recommend that opportunities arising from the application of science and technology should be available to the common man, be instrumental in the reduction of inequalities in society, help satisfy national needs and increase employment opportunities.

Technology and development planning

59. Many developing and developed countries recommend that the science and technology policy should be fully integrated into the over-all process of national planning. Science and technology policies should be made compatible with fiscal, investment, taxation and distribution-of-income policies, harmonizing the short-term needs as well as the long-term imperatives. Integration should also embrace standardization, quality control, metrology and other related services.

60. Several developed and developing countries consider the process of planning as the main method of integrating science and technology into social and economic development.

61. Some countries, developing and developed, recommend that, in the process of integrating science and technology with socio-economic development, due importance should be given to such internal socio-economic transformations as agrarian reforms, nationalization of the means of production, redistribution of income and nationalization of foreign enterprises.

62. Many developing and a number of developed countries recommend that the national Governments should take full responsibility for the effective integration of science and technology into national development.

63. They recommend further that the national Governments should establish clear priorities in development with matching financial, human and material resources.

Improvement of the science and technology system

64. Several countries, both developing and developed, recommend that special attention should be paid to the need for the speedier diffusion of innovations and, in particular, the strengthening of the functional linkage between existing research centres and educational institutions on one side and the production, distribution and services sectors on the other.

65. Many developing and developed countries recommend the creation and strengthening of extension services, agricultural as well as industrial, in order to integrate science and technology into national, social and economic development.

66. A number of countries emphasize the need for allocation, within the national plan, of a minimum percentage of the gross national product (GNP) for research and development.

67. The countries of one region recommend that subsidies to the private sector should be provided towards the generation of local technological know-how. State policy should formulate both suggestions regarding national priority areas of research to be undertaken by that sector and an explicit pattern of areas of research that must be explored directly by the public sector and by institutes financed by funds from the Government budget.

68. A few countries recommend the fostering of basic research as an important basis for indigenous scientific and technological development. Several countries recommend a more utilitarian rather than an academic approach to the results of scientific research and underline the special importance of applied research and technological development for countries with limited resources.

69. Several countries, both developed and developing, recommend that communication between members of the scientific and technological community and decision makers responsible for economic and social planning be greatly improved. More generally, public awareness of the importance of science and technology for development should be improved in order to facilitate its integration into economic and social planning.

70. Many developing countries recommend greater mobilization and manifestation of the national political will so as to bring about greater integration of science and technology into societal development.

(d) New science and technology for overcoming obstacles to development

71. Developing and developed countries make a number of specific proposals, recommending either research for new knowledge or intensification of efforts in the application of existing knowledge.

72. Food and agriculture

(a) Application of new or improved scientific or technological methods of cultivation for the modernization of agriculture in developing countries to increase agricultural productivity;

(b) Improvement of traditional and indigenous technologies in farming and agricultural production; improvement of nitrogen fixation through the introduction of rhizobia in non-leguminous crop varieties; new food crops; drought-resistant strains; introduction of modern technology for improved animal husbandry; innovation in the development of new technologies such as low cost and low fuel consuming tractors;

(c) Development of new or improved methods of breeding and selection of high-yielding and disease and drought-resistant varieties of plants and animals, including establishment of appropriate national and regional centres for multiplication and distribution of such selected varieties of seeds and breeds;

(d) Increased research in biochemistry and genetics and its application in improving plant and animal species; application of irradiation techniques in agriculture for the development of improved strains of crops;

(e) Use of radioactive isotope techniques in such fields as phytophysiological studies, monitoring fertilizer application, ecological studies of insect pests and monitoring utilization of water;

(f) Development of better methods of treatment and control of plant and animal pests and diseases, including biological control; development of animal vaccines that can be locally manufactured;

(g) Development of better irrigation techniques and improved water management systems; better methods for conservation and improvement of soil for agricultural and pastoral use; development of improved fertilizers which can be locally produced;

(h) Improvement and modernization of traditional post-harvest crop storage and protection methods, including search for new methods of storage; better pest and rodent control systems; improved methods for drying, processing and preserving food; research into use of agriculture residues and waste from agro-industries;

(i) Development of deep-sea and fresh-water fisheries, including development of new technologies for processing, preserving, transporting and marketing fish and other marine resources; development of fish-farming techniques;

(j) Development of better methods of conservation and management of forests, including research into fast-growing trees and new techniques of reafforestation;

(k) Research into desalination of sea water for agricultural use;

(l) Research into the agricultural productivity of arid and semi-arid areas, and new methods of combating the problem of drought;

(m) Utilization of modern techniques in agricultural practices such as assessment of the cultivation potential of land, improvement of irrigation potential and establishment of crop forecasting and early warning systems for natural disasters;

(n) Selection, acclimatization and development of wild plants for production of food and animal feed;

(o) Improvement and diversification of the cultivation of beverage crops, spices and essential-oil crops and medicinal plants through use of better and newer technologies to meet the indigenous requirements of the consumer and industry, and for export.

73. Natural resources including energy

(a) Development and application of remote sensing and other space techniques for such uses as geological surveying, classification of soils and vegetation, assessment of air and water pollution, preparation of agricultural inventories, and more effective disaster warning systems;

(b) Development and application of different modern technologies for survey extraction, processing and conservation of natural resources including protection of the environment;

(c) Research and development on the resources of the arid zones and their economic utilization, for example, steroids, fibres, oils and pharmaceutical raw materials;

(d) Development of alternative sources of energy for use at the village level - for example, solar energy, bio-gas, water and wind power, waves energy, geothermal energy, vegetable oil, alcohol, wood, charcoal - for domestic, commercial and agricultural uses;

(e) Development of improved methods of managing and conserving non-renewable sources of energy such as fossil fuels and natural gas;

(f) Research and development into petrochemical technologies consistent with the interest of developing countries;

(g) Further development and utilization of nuclear energy.

74. Health, human settlement and environment

(a) Intensification of scientific research on causes, prevention and treatment of diseases which affect large parts of the population in developing countries, such as malaria and schistosomiasis and diseases associated with malnutrition;

(b) Studies on traditional health practices including the use of local medicinal plants with a view to development of local industries; collaboration between developed and developing countries in the systematic screening and development of such natural products; development of better methods of international monitoring of research on all drugs of particular interest to developing countries;

(c) Development of improved health care and management techniques and better health delivery systems adapted to the conditions of developing countries and development of better health education systems;

(d) Research into preventive and curative measures to combat malnutrition; development of techniques for processing and preserving locally available food-stuffs, including the elimination of aflatoxins; improvement of nutritional status of mothers and children; and development and utilization of highly nutritious food such as protein substitutes;

(e) Intensification of research in chemical and industrial toxicology, particularly in relation to problems in developing countries;

(f) Strengthening research into requirements of the human habitat in developing countries; increased utilization of locally designed and fabricated material and equipment in the construction of rural and urban houses, hospitals and health units, school buildings, etc.

75. Transport and communication

(a) Application of modern technologies to the improvement of road, rail, air and sea transport systems, including communications networks in developing countries;

(b) Development of improved technologies to increase rural mobility through simple transport systems, for example, modified cars, bicycles, motor cycles and improvement of traditional vehicles;

(c) Development of cheaper methods of rural road construction using locally available resources;

(d) Improved methods of communication in rural communities through increased use of radio links, pedal-operated short-wave radio transmitters/receivers etc.;

(e) Improved and effective communication systems such as direct trunk telephone and telex connexions among neighbouring developed countries;

(f) Research into new communication technologies for developing countries, especially electronic communications and computer technology;

(g) Provision of improved and appropriate port facilities and better technology for fast transportation and lifting of goods, with particular regard to land-locked countries.

76. Industry, including production of capital goods

(a) Applied research and development in important industrial sectors, such as fertilizers, pesticides, pharmaceuticals, pulp and paper, textiles, steel and food processing; use of local manpower resources; increased domestic processing of raw materials in developing countries;

(b) Industrial research aimed at facilitating the development of complete manufacturing industries through upgrading of present packaging and assembling plants in developing countries;

(c) Studies in chemical engineering processes that will lead to new or improved technologies and increased utilization of raw and recycled waste material for production of by-products preferably aiming at import substitution;

(d) Modernization and expansion of traditional labour-intensive village industries such as handicrafts, weaving, bamboo and cane works, and wood and stone carvings. Creation of appropriate institutions and provision of incentives and legislative support for the development of such traditional technologies;

(e) Development of rural, mass-based, inexpensive, practical and employment-generating technologies for cottage and small-scale industries, communal irrigation, potable water supply; development and production of inexpensive

building and road construction material and methods and utilization of local expertise and resources to the fullest possible extent;

(f) Improved methods and legislative measures for controlling environmental pollution in developing countries;

(g) Research and development programmes including collection of information on economically viable technologies from published and unpublished sources for the promotion of intermediate and capital goods industries in developing countries.

2. Institutional arrangements and new forms of international co-operation in the application of science and technology

(a) The building up and expansion of institutional systems in developing countries for science and technology

77. Many developing and some developed countries recommend that institutions should be created or strengthened in developing countries to achieve the following objectives:

(a) Identification and categorization of manpower, material and financial resources available for the application of science and technology for national development;

(b) Formulation of a plan consistent with national development objectives and realistic in economic and political terms, for the application of science and technology;

(c) Formulation of specific co-ordinated programmes based on this plan;

(d) Implementation of the programmes and their continuous review both at the micro-level and the macro-level;

(e) Strengthening of the legal and institutional mechanisms for promoting the increasing use of science and technology in the economic and social development process, reinforcing the role of the State and the national systems for generating, disseminating and transmitting scientific and technological knowledge. This should be carried out by linking the latter closely to the productive and educational systems.

78. Some developing countries recommend specifically that the United Nations system assist them in the creation and strengthening of these institutions; others recommend that support for this task be provided by institutions functioning at the regional level.

79. The countries of one region recommend that effective machinery be established for joint financing by the public and private sectors of technological development. The function of this machinery would be to provide the risk capital required for generating local technological innovation in both sectors.

80. The countries of one region recommend the establishment of a system by means of which the relatively less developed countries can have access to technologies available in other developing countries under just and favourable conditions.

81. Many developing countries recommend that a national authority for national science and technology policy be established at the highest possible political level.

82. Many developing countries also recommend that a broad-based national council for science and technology (NCST), consisting of high-level representatives of the different sectors should be established so as to advise on all matters pertaining to science and technology, including national priorities for research and development.

83. Many developing countries and one developed country recommend that national financial institutions should be established to provide capital for projects with a high science and technology component and for the creation/strengthening of the human and physical infrastructure. They should also provide adequate funds for joint projects between developing and developed countries.

National institutional systems for research, development and consultancy

84. Many developing countries recommend the establishment of a body consisting of the directors of all the research and development institutions in the country to co-ordinate national research and development activities. Such a council should also establish linkages with international research institutes that focus on the problems of developing countries.

85. Many developing countries recommend that industrial enterprises both in the private and public sectors and universities be encouraged to undertake research and development on urgent national problems.

86. Some developing countries recommend that increased importance should be given to the role of industrial survey and promotional institutes, as well as to institutes for standardization and quality control.

87. Many developing countries and a few developed countries recommend the establishment of appropriate national institutions having the responsibility for translating the results of laboratory research into commercial use. Such national institutions should co-operate with counterparts within their region.

88. Many developing countries and a few developed countries recommend the establishment or strengthening of national and regional centres for technology transfer. These centres, besides the regulation of technology transfer agreements, should also undertake the assessment and evaluation of technologies.

Institutional mechanisms for training and manpower development

89. Many developing countries and some developed countries emphasize the importance of restructuring and reorienting the educational, training and

manpower development institutions of developing countries, so as to make them consistent with the development objectives of national self-reliance and autonomous technological capabilities.

90. Many developing countries recommend that the system of teaching science in schools should be drastically altered so as to reorient it increasingly towards science and technology.

91. A developing country recommends the establishment of a national institute for maintenance and repair of machinery in the country. Many developing countries emphasize the importance of the training of technicians in developing countries, including basic training and training in the maintenance and repair of scientific equipment. Some developed countries recommend that greater efforts should be made to increase training within the country rather than training overseas.

92. A group of countries recommends the setting up of institutions for the training of scientific and technological personnel. In addition, centres and programmes for professional and technical updating should be systematically organized on all levels to train specialized personnel to provide satisfactory coverage of all links in the chain that associates scientific and technological research with the problems of production.

(b) Research and development in the industrialized countries in regard to problems of importance to developing countries

Utilization of developed countries' research and development potential for the benefit of developing countries

93. Several countries recommend that access to the results of research and development carried out in the developed countries be facilitated and that a co-operation mechanism be created between the innovation system in developed countries and the productive system of developing countries.

94. Many developing countries recommend that research and development institutions in developed countries should:

(a) More effectively co-ordinate their activities in order to maximize their scientific and technological potential for the benefit of developing countries;

(b) Devote a portion of their research and development expenditures to solving the problems of developing countries and actively associate the scientists from developing countries in such activities. One developing country recommends that this proportion be increased to 0.05 per cent of the developed countries' GNP.

95. Many countries also recommend that R and D institutions in developed countries should carry out research work to enable adaptation of existing

technologies and development of new technologies which are consistent with developing countries' needs, conditions and priorities, and take appropriate measures to transfer the results of such research to the ultimate users in the developing countries, particularly to the needs of the poorest strata of their populations.

96. Several developing countries propose a reduction in developed countries' expenditures on armaments research and development and call for directing a proportion of these expenditures towards financing R and D activities for socio-economic development of developing countries.

97. Many countries, both developed and developing, recommend the intensification of the research and development efforts of developed countries in the following areas, of crucial importance to developing countries: food and agriculture; conventional and non-conventional sources of energy; development of natural resources and water resources; housing and building materials; public health; and industrialization.

Regional and international co-operation in research and development for the benefit of developing countries

98. Many countries recommend that industrialized countries should be invited to participate in the financing and establishment of regional and international interdisciplinary research institutes/centres in the developing regions as foci for collaborative work.

99. Several other countries recommend the linkage of R and D institutions to form an international network with the aim of strengthening R and D in developing countries, to conduct research programmes related to their developmental problems, to promote exchange of scientific and technological information and to disseminate the results of such research.

100. One country recommends the development of an international R and D programme in the medical research field for the collective benefit of developing countries.

(c) Mechanisms for the exchange of scientific and technological information and experiences significant to development

National policy and infrastructure for scientific and technological information

101. Most countries, recognizing that scientific and technological information is a basic requirement for the application of science and technology to development, recommend that information matters be accorded due importance in national development plans and policies. A considerable number of countries further recommend the formulation of national information policies, compatible with development priorities, which set out explicit objectives and programmes of action for their implementation.

102. A number of countries recommend that a national body should be established or

designated which would plan and co-ordinate information systems and activities as well as advise Governments on information policy. It should also co-ordinate national participation in regional and international co-operative systems.

103. Most countries recommend building up and strengthening a strong national information structure, capable of gathering, storing, processing, retrieving and disseminating scientific and technological information, supported by the required personnel, resources, material and equipment.

104. Many countries recommend the development of nation-wide co-operative information systems that conform to national needs, capabilities and resources. They should serve the decision makers, researchers, entrepreneurs and other users, especially in rural areas, and function at an appropriate level of technological advancement.

105. Many developing countries recommend that priority should be given to industrial technological information systems which should cover statistics on science and technology, information on sources of technology, on experts, engineers and consultants, on patents and other aspects of the choice, assessment, transfer and development of technology.

106. Many countries, recognizing the benefits of participating in regional and international information systems, recommend that national systems should be compatible with international standards and procedures to facilitate the exchange of information.

107. Some countries recommend the development of a national bibliographic service to organize locally produced material and a referral service to direct users to the appropriate information source.

108. Many countries recommend that programmes be arranged for the training of librarians and information scientists to manage the national information systems and services, including the training of extension personnel.

109. Many countries urge the strengthening and co-ordination of extension services for agriculture and industry to disseminate practical information in assimilable form to the end users, particularly in rural areas, and for the feedback of information to R and D institutions.

110. A number of countries recommend the regular publication of abstracts and excerpts of relevant world scientific and technological literature, as well as information on major innovations, in the national language. Some recommend that the publication of national scientific journals should be encouraged.

111. A large number of countries recommend that developing countries should promote direct personal contacts between their scientists and technologists, among themselves as well as with those in developed countries, through conferences, meetings, visits, study tours and scientific and professional associations.

International co-operation in the exchange of scientific and technological information

112. Most countries recommend increased regional and subregional co-operation for setting up and strengthening regional information centres and systems, regional data banks, regional training centres for librarians, information specialists and extension workers.

113. Most countries recommend greater exchange of information at the regional and subregional level, in particular through the establishment of rosters on engineering design and consultancy services and on machinery, equipment and instruments manufactured in developing countries, as well as through the sharing of information on available technologies, experts, the activities of research and development institutions, contracts involving patents and licences, and marketing opportunities. Many also recommend the organization of conferences and the publication of books or periodicals on topics of subregional and regional importance; co-operation for the technical translation of relevant literature; and the publication of regional collective catalogues of reports, journals and other relevant publications.

114. Most countries, both developed and developing, recommend that these national and regional efforts should be supplemented by the developed countries, the United Nations system and other appropriate international organizations. This form of support can be grouped broadly into three categories:

(a) Institutional and infrastructural: strengthening the national information infrastructure and extension services; development of national and regional information systems; establishment of sectoral or specialized data banks or information centres;

(b) Measures to increase the flow of scientific and technological information: facilitating access to R and D results; opening the information systems of developed countries to developing countries; making available scientific and technical literature at reasonable cost;

(c) Promotion of personal contacts and co-operation among institutions: organization of conferences in developing countries and provision of financial support for attendance at meetings abroad; exchanges of scientists and technologists.

115. Many developing countries recommend that the United Nations system should continue its efforts to establish a world technological information network and an industrial technological information bank to enhance the productive capabilities of developing countries through a better access to information on the technical, economic and legal aspects of the choice, transfer and development of technology.

116. A considerable number of countries recommend, in addition, that the United Nations system should take action:

(a) To improve the dissemination of information on its activities, including the results of its studies and experiences and the findings of its experts;

(b) To co-ordinate more effectively the activities of its organizations and specialized agencies in the field of scientific and technological information, and promote compatibility of international information systems through the development of international standards and guidelines.

(d) The strengthening of international co-operation among all countries in the field of science and technology for development

117. Most countries, developed or developing, recommend that existing links between Governments and/or professional organizations should be strengthened and that, where networks already exist, such networks should be expanded to involve increasingly developing countries.

118. A few developed countries state that a new international division of labour will require concrete readjustment measures, in the framework of active restructuring policies at the national level, on the part of industrialized countries. Such restructuring should be introduced by the industrialized countries, which should co-operate with each other in its implementation.

Bilateral co-operation

119. Many developed and a few developing countries agree on the importance of strengthening science and technology co-operation by means of bilateral agreements between Governments. It is recommended that a greater number of agreements should be concluded between developed and developing countries and among developing countries themselves. Such agreements should also make provision for co-operation with private enterprises.

120. A few countries recommend that developing countries make use of their missions abroad as a means of furthering co-operation in science and technology through the collection and dissemination of information. The posting of scientific attachés is recommended in this connexion.

121. A substantial number of both developed and developing countries call for efforts to improve and increase the links between the scientific and technological institutions of more advanced countries and those in developing countries. It is recommended that developed countries, within the framework of their assistance and co-operation programmes, increase resources to create bilateral or multilateral co-operative arrangements between research and training institutes in order to carry out joint programmes or studies with equal authority of the partners in their management. Such co-operation between institutions with the same objectives or activities should include provisions for the exchange of research personnel. It is further recommended that R and D activities relevant to developing countries should be based on the developing countries themselves.

122. Many countries recommend that developed countries should take measures to help

the developing countries in their efforts to set up a national policy in research-development, defining clear priorities to develop indigenous science and technology oriented to their own needs and conditions. These measures should take into account the national development objectives of the developing countries and contribute to the strengthening of their science and technology infrastructure.

123. Many countries recommend joint action by developed and developing countries to strengthen developing countries' R and D infrastructure by means of:

(a) Establishing twinning and R and D institutions of developed and developing countries;

(b) Mounting joint R and D programmes, parts of which should be carried out in developed countries and parts in developing countries;

(c) Assistance towards improving management and planning procedures in R and D and production institutions.

124. Many countries recommend that advanced training in science and technology offered in developed countries should be appropriate to the needs of developing countries and be consistent with their development priorities. They also recommend that developed countries should, in particular, increase the allocation in their science and technology budgets to the training of R and D cadres from developing countries.

125. Many developing countries and several developed countries recommend that developed countries should assist developing countries in establishing advanced training institutions so as to expand to a "critical mass" their science and technology manpower.

126. Some countries recommend that suitable international projects to train scientists and specialists in R and D should be developed within the framework of international scientific and technological co-operation.

127. Many developing countries and a number of developed countries recommend that non-governmental international scientific and technological organizations, such as professional organizations or unions, should involve themselves more actively in the application of science and technology for development. It is further recommended that such organizations should give urgent attention to increasing their presence in developing countries by intensifying their interaction with national counterparts, through meetings and other means.

128. Many developing countries and some industrialized countries recommend that new avenues of technology transfer should be explored, particularly through the small and medium-sized enterprises of developing countries and through the co-operatives.

129. Some developed countries recommend greater scientific and technological co-operation between "small and highly industrialized" countries and developing

countries, as well as between intermediate developed countries and developing countries.

130. Some countries recommend that developed countries should provide to developing countries the fullest and freest access to technologies generated through the use of public funds and controlled by the Government, whose transfer is not subject to private decisions.

131. A few developing countries recommend legislation that obliges foreign companies involved in technology transfers to train local personnel and to carry out research aimed at the use of locally available materials for their production.

132. A few developed countries propose the establishment of funds in industrialized countries for supporting the efforts of developing countries to expand their industrial capacity. The main purpose of such funds would be the provision of domestically owned manufacturing enterprises to the developing countries in keeping with their own plans and priorities.

133. A few developing countries propose that a proportion of the bilateral and multilateral financial resources provided for development projects should be set aside to create a national fund for R and D activities.

Multilateral co-operation

134. A number of developed and developing countries call for the setting up of major international institutes devoted to research and development in special fields and multidisciplinary in nature, similar to those set up by the Consultative Group on International Agricultural Research.

135. A number of developed countries recommend that international mechanisms be created to carry out evaluations of development co-operation projects giving special emphasis to the evaluation of the role - both current and potential - of science and technology in such projects.

136. A number of centrally planned economy countries call for increased co-operation in the field of science and technology between countries with different social systems.

137. A few developing and developed countries recommend that the latter, within the framework of their assistance programmes - and, if possible, in terms of a committed proportion of their total R and D expenditure - should increase resources for the building up of scientific and technological capacity in developing countries. Some countries, developed and developing, recommend establishment of such institutional mechanisms in developed countries as the Canadian International Development Research Centre (IDRC) or the Swedish Agency for Research Co-operation with Developing Countries (SAREC) to channel such funds to developing countries.

138. A regional group of developing countries recommend that regional technological policy-making organizations of developed countries explicitly take into consideration the interests of developing countries.

139. Two countries recommend setting up a Mediterranean regional centre on solar energy.

Disarmament and development

140. Many developed and developing countries recommend the redeployment of financial and manpower resources now engaged in the armament industry to development programmes.

141. Some developing and developed countries suggest the reallocation of funds from armament research and development to the development of technologies for civilian use. They emphasize the current resource imbalance between research and development for military purposes and research and development for development, and recommend that the former can have direct bearing on the latter in several areas such as health and environment. It is suggested that developed countries should divert scientific and technological manpower into development-oriented research and transfer the results thereof to developing countries.

142. Many countries recommend greater internal diffusion of technologies arising from military research and development to research and development for civilian use.

Least developed, land-locked and island developing countries

143. Many developing countries emphasize the need for preferential aid to the least developed, land-locked and island developing countries with a view of helping them to solve their immediate and crucial problems and recommend strengthening the existing forms of international co-operation in the application of science and technology for development through special measures. It is recommended that having regard to the specific problems of least developed, land-locked and island developing countries - such as the absence of scientific and technological infrastructure, insufficient "industrial intelligence", inadequate skilled manpower and geographic isolation - particular efforts should be made to establish new forms of international co-operation to assist these countries. Among the measures recommended are the following:

(a) Increased international co-operation in the establishment of new forms of manpower development of the least developed, land-locked and island developing countries, related in particular to their national resources;

(b) Ensuring the availability and training of national cadres as a prerequisite for the transfer of technology;

(c) Development and modernization of traditional technologies based on rural resources;

(d) Intensification of multidisciplinary research in the management of water resources, including the establishment of appropriate institutions;

(e) Improving means of access to the sea through greater application of science and technology;

(f) Development and strengthening of road and air transport infrastructure;

(g) Preferential assistance to countries stricken by drought so as to undertake studies and research to determine the various parameters of the drought-phenomena;

(h) Earmarking a specific percentage of aid funds in all aid projects for locally controlled research related to development programmes.

144. One region recommends that the relatively less developed countries should have access under favourable terms to technologies already existing in other developing countries.

New forms of co-operation under the auspices of the United Nations

145. A number of developing and developed countries recommend that the focal points established by Governments for the purpose of the Conference should be given a continuing role in the organization of international science and technology co-operation.

146. One developing country proposes the setting up of an international system for the provision of experts by developed countries to developing countries on a voluntary basis.

147. Some developing countries recommend that economically developed and oil-rich countries, which have benefited from the immigration of trained manpower from developing countries should contribute to an international fund under United Nations auspices to be used, inter alia, for further training and for social/human/technological infrastructural development in the developing countries concerned.

148. Several developing countries recommend greater co-operation in and special attention to the exchange of experiences between countries on scientific and technological planning and methods of integration of science and technology into economic and social planning.

149. Some countries recommend that international financing institutions should increase their contribution to programmes of science and technology for development. One developed country proposes that at least 5 per cent of the total lending by the funding institutions within the United Nations system should be set aside to assist the developing countries in building up the human and material infrastructures necessary for the full exploitation of science and technology for development.

150. One developing country proposes that, apart from national and bilateral resources provided, a tax should be levied internationally on hardware purchased through international loans and grants. This should be paid by both the developing and developed countries and should form an international training fund controlled by an effective organ. The fund is to be used for the proper training of cadres who will run the machinery and plant purchased through these international loans and grants.

151. One region proposes the establishment of a self-regulating mechanism to provide financing for the generation and strengthening of the technological capacity of developing countries, individually and collectively. Such a mechanism should draw on regular transfers of funds from the developed countries, calculated on the basis of an agreed percentage of the average balance of trade deficit for manufactured goods.

152. Some countries recommend that, in order to assist developing countries in the more effective application of science and technology to development, the industrialized countries should co-ordinate their development programmes with those of the United Nations system, so as to reduce duplication and ensure optimum utilization of resources.

153. A few developing countries recommend that regional organizations increase their budget for scientific and technological research.

154. Industrialized countries with planned economies propose the establishment and maintenance of fair price ratios for all categories of exported goods in view of the need to establish a system for the international co-ordination and

regulation of the prices of manufactured products resulting from the application of complex technology, and placing these price ratios in relation to prices for raw materials, fuel and agricultural products.

155. A few developing countries recommend that the United Nations create mechanisms for effective early warning systems of technological changes and substitutions that could affect those commodity exports on which they critically depend.

156. Many countries recommend that the United Nations should examine the potential of tax instruments for the stimulation of scientific and technological research with a view to promoting their application in a greater number of developing countries.

(e) Promotion of co-operation among developing countries and the role of developed countries in such co-operation

Policies and measures to promote co-operation among developing countries

157. Most developing countries and many developed countries recognize that co-operation among developing countries should be regarded as a major factor in the successful application of science and technology to development and for the establishment of a new international economic order.

158. Most developing countries recognize that greater co-operation in science and technology among themselves could result not only in collective self-reliance, but also be instrumental in their achieving national self-reliance.

159. Many developing countries recommend that, as a prerequisite for achieving greater co-operation amongst themselves, a firm political commitment to the concept of co-operation among developing countries should be manifested in their internal policies as well as in their international commitments.

160. Many developing countries recommend that developing countries should harmonize their science and technology policies with their fiscal, monetary and development policies, so as to achieve greater socio-economic integration aimed at the solution of their development problems.

161. Some developing countries recommend that developing countries should aim collectively to achieve scientific and technological autonomy by pooling their financial, natural and human resources through the conclusion of appropriate co-operation agreements at the bilateral, subregional, regional and interregional levels.

162. A number of developing countries recommend that the developing countries should co-operate more intensively with each other in the establishment of scientific and technological infrastructure and capabilities.

163. Some developing countries recommend co-operation among themselves in setting up and strengthening scientific and technological innovation systems and joint investment programmes.

164. A few developing countries recommend co-operation among themselves in fundamental and applied research, such as in engineering industries, electronics, fertilizers and natural resource industries, as well as in consultancy and design organizations.

165. Many developing countries recommend greater co-ordination in their policies relating to the regulation of imported technologies and in the import of machinery and equipment from developed countries.

166. Some developing countries recommend greater research and development co-operation aimed at improving the economics of smaller scale production, so as to enable smaller developing countries to set up industrial projects of importance in their own countries; this could also generate technological independence for developing countries from advanced technologies of developed countries.

167. Some developing countries emphasize and recommend the promotion of subregional and regional consultancy, design and contracting associations, as a major instrument of reducing their technological dependence and in the development of more appropriate consultancy and design skills.

168. Many developing countries recommend that they should adopt a collective approach to the revision of international legislation on the protection of industrial property, including licensing agreements, patents, trademarks, etc.

169. To break the monopoly of foreign transnationals in selected areas, a few developing countries recommend greater co-operation in the establishment of joint industrial projects, which could, as it were, be called "multinational enterprises", as distinct from transnational corporations. These enterprises could be set up by optimizing the resources of a group of developing countries, with arrangements for appropriate market-sharing. It is emphasized that such arrangements would not only complement the respective needs of developing countries but also reduce their dependence on transnational corporations.

170. Some developing countries emphasize and recommend greater co-operation in the exploitation of common resources so as, on the one hand, to optimize their use and on the other, to ensure the application of more appropriate technologies.

171. Many developing countries recommend joint negotiations with developed countries and, in particular, transnational corporations, so as to achieve a better bargaining position and ensure the acquisition of more appropriate technologies on favourable terms. One developing country recommends that developing countries should exchange among themselves information on their completed transactions with transnational corporations.

172. A number of developing countries recommend improved communication among themselves and greater co-operation in the exchange of scientific and technological information and experience.

173. Some developing countries also recommend the establishment of regional and sub-regional information systems and networks as well as data banks based on the needs of the region.

174. Some developing countries endorse and recommend the need for greater integration in their educational policies and systems so as to ensure greater consistency with their socio-economic goals, and that such co-operation should include common training and fellowship programmes, exchange of students and scientists.

175. Many developing countries recommend greater sectoral co-operation in critical areas, such as food and agriculture, rural technology, industrialization, natural resources exploitation, health, communications and environmental pollution.

176. Some developing countries recommend greater research and development co-operation among themselves, including the mounting of common research programmes at all possible levels.

177. Some developing and developed countries recommend, as an instrument of the application of science and technology to development, triangular co-operative arrangements between a highly developed country, an advanced developing country and another developing country.

178. A few developing countries recommend greater scientific and technical co-operation among themselves, including the setting up of regional centres for servicing, renting, and so forth, of sophisticated laboratory and field equipment.

179. Many developing countries strongly recommend greater regional co-operation, as an important component of co-operation among developing countries, including the setting up of regional centres on a functional basis, not only for industrial projects or technology transfer centres, but also for training in specialized skills.

180. Many developing countries also recommend strengthening the mechanisms for subregional co-operation, having regard to the special characteristics of a subregion and the endowment advantages in such an area.

181. Most developing countries recommend the establishment of appropriate machinery to stimulate regional scientific and technological co-operation. Some countries recommend the establishment of a common fund for this purpose and propose that the more prosperous among the developing countries should contribute generously to such a fund.

182. One developing country recommends the adoption of a proposal by a group of countries that a "developing country skilled manpower pool" be constituted in order to optimize the use and exchange of human resources.

The role of developed countries in the promotion of co-operation among developing countries in the application of science and technology to development

183. Many developing countries and some developed countries recommend that developed countries should support co-operation among developing countries and integrate such a concept into their over-all policies, both domestically and internationally. Such policies should be aimed at the elimination of monopolistic or oligopolistic tendencies affecting international co-operation in science and technology.

184. Many developing countries recommend that developed countries should make a firm political commitment, embracing specific financial, fiscal and managerial policies, to the promotion of co-operation among developing countries in the sphere of science and technology.

185. Many developing countries recommend that Governments of developed countries should encourage their enterprises and organizations with science and technology activities in developing countries to promote and support the concept of co-operation among developing countries in their work.

186. Many developing countries recommend that developed countries should help developing countries in establishing appropriate co-operation mechanisms in the areas of communications, scientific and technological information exchange and management, including relevant training for such activities.

187. Some developing countries recommend that developed countries should help developing countries by enabling their existing "centres of excellence" to work on some specific common problems of developing countries and by setting aside a proportion of their research and development expenditure for such work. They also recommend that the results of co-operation through bilateral agreements between a developed country and a developing country should be made available freely to other developing countries by mutual agreement.

3. Utilization of the existing United Nations system and other international organizations

Review of the United Nations system and recommendations for improvement

188. Some developing countries recommend greater dissemination of information about the functioning of the United Nations system.

189. Most countries emphasize the paramount need to improve significantly the degree of co-ordination between the organizations and agencies of the system dealing with the application of science and technology to development, particularly in their work in individual countries.

190. A majority of countries recommend the need to evolve an over-all United Nations system policy for science and technology, in the context of a commonly accepted development strategy. Several countries emphasize that United Nations system projects should reflect more adequately the needs and priorities of Member States.

191. A number of developing countries recommend greater provision of funds for science and technology activities in the United Nations system.

The role of the United Nations system in helping developing countries

192. A majority of countries recommend that the United Nations system should play a more significant role in strengthening the science and technology capabilities of developing countries, taking into account social as well as economic considerations. It should stimulate technical co-operation among developing countries, make available technologies generated in private institutions and help to make industrial property more accessible to developing countries.

193. Most developing countries recommend that the United Nations system should increase its help to developing countries in the education and training of scientific and technical personnel at all levels (including personnel engaged in the decision-making process of technology transfer) and in this connexion should expand its national and regional training programmes.

194. Many developing countries recommend that the United Nations system should help developing countries in tackling the problem of the brain drain and a few countries recommend the establishment of a special fund to be used by the affected countries for strengthening their science and technology infrastructure in order to halt the brain drain.

195. One developing country recommends that at least 5 per cent of the total disbursements by the lending institutions in the United Nations system should be allocated to the developing countries for strengthening the human and material infrastructure necessary for the application of science and technology to development.

196. Many developing countries, having regard to the problems encountered in the recruitment and utilization of United Nations experts, including associated financial aspects, recommend that the present recruitment procedures of the United Nations system should be reviewed. It is also recommended that the United Nations should, to a larger extent, recruit experts from developing countries, particularly from the least developed.

197. Many developing countries recommend that international organizations should, rather than contracting consultancy services of developed countries, make greater use of local consultancy services and those of other developing countries on local development projects.

198. Most developing countries recommend that the United Nations system should assist developing countries in strengthening their national capacities for acquiring, processing, evaluating, retrieving and disseminating scientific technological information, particularly on the choice of available technologies.

199. A considerable number of developing countries also recommend that the United Nations should assist developing countries to promote a better information

exchange, especially between developing countries. A number of countries propose integrating existing international information systems or establishing a new international information centre or systems. A developing country, however, suggests that no single international organization could deal with so many different tasks.

Structural improvements and creation of new institutions

200. A considerable number of developing countries recommend that United Nations procedures for processing requests for aid and setting up projects in developing countries should be simplified.

201. Many developing countries and some developed countries recommend the need for the United Nations organizations and agencies to delegate their responsibilities for the implementation of science and technology programmes to the national, subregional and regional levels; the strengthening of the science and technology units of the regional commissions of the United Nations is specifically recommended by most developing countries.

202. A significant number of countries emphasize that the potential of the present institutional structures, if necessary through further development or restructuring, should be fully realized by harmonizing science and technology policies and improving co-ordination of science and technology activities in the United Nations system.

203. A developed country recommends the creation of functionally integrated organizations and administrative units in the fields of science and technology, energy and industrial development.

204. Some countries recommend that a few action-oriented international research programmes on specific areas of importance to developing countries, which could serve as pilot or demonstration projects, employing the integrated capacities of developed countries, should be designed and mounted. Such programmes should be consistent with the social/economic priorities of developing countries.

205. A few developing countries recommend setting up a fund for science and technology co-operation or for financing science and technology projects in such countries. A few others recommend the establishment of a central office for technology assessment in the United Nations system to co-ordinate national and regional efforts aimed at assessing the social, economic, cultural, environmental and institutional impact of technology. A group of countries also recommends the establishment of a subregional organization for technology assessment.

206. A few countries recommend the creation of an international centre to help in the development and choice of appropriate technologies for developing countries.

207. Many countries recommend the setting up of new institutions, programmes or funds with international or regional scope, for the purpose of increasing the application of science and technology for development. One developing country recommends the establishment of a specialized agency to be responsible for the application of science and technology to development; such an agency would include all units of the United Nations at present concerned with this function.

208. A developing country recommends that the United Nations Centre on Transnational Corporations accelerate its work in order to provide information on specific industrial sectors so as to foster their development in developing countries.

209. A group of developed and developing countries recommend that the United Nations should strengthen its structure for co-ordination and co-operation among agencies and bodies by using existing institutions rather than creating new ones. For the purpose of effective co-ordination and promotion of interagency co-operation, the necessity of setting up of a mechanism might be considered. In this connexion, consideration could possibly be given to the setting up of a United Nations Foundation for Science and Technology, with multiple functions such as formulating a harmonized science and technology policy, promoting interagency co-operation, implementing recommendations of United Nations conferences pertaining to science and technology subjects in consultation with national governments, acting as a "think tank" to bring together developed and developing countries, and obtaining financial support from international financial institutions.

210. One developing country recommends that specific action should be taken to make operational the United Nations Fund for Industrial Development (United Nations Industrial Development Organization) as an important instrument in achieving the 25 per cent Lima target (see A/10112, chap. IV) of world industrial production by the year 2000.

211. A number of countries recommend that the network of national focal points established for the Conference should be retained on a permanent basis so as to provide a system for the exchange of information and experience related to the application of science and technology to development.

212. Most developed and developing countries emphasize the need to ensure effective implementation of the action-oriented proposals of the Conference and the provision of adequate international mechanisms for this purpose. A number of countries recommend that the life of the secretariat of the United Nations Conference on Science and Technology for Development should be extended beyond the Conference for a three-year or five-year period to initiate, co-ordinate and monitor the implementation of the Conference recommendations and possibly serve as the nucleus of a future co-ordinating and policy-making organization for science and technology for development in the United Nations system. In this connexion, one developing country recommends that the secretariat of the Conference and the Office for Science and Technology should be merged.

213. The countries of one region recommend that the regional economic commissions of the United Nations should periodically review the programme of action which will be adopted by the United Nations Conference on Science and Technology for Development, so as to adjust or correct it wherever necessary. The countries of another region propose to organize a regional meeting several months after the Conference in order to assess results, discuss the implications for that region and adopt the necessary measures for the implementation of recommendations.
