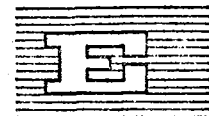


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HUMAN RIGHTS AND SCIENTIFIC AND TECHNOLOGICAL DEVELOPMENTS

Human rights and international machinery for technology
assessment

Report by the Secretary-General

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INTRODUCTION

1. The present report has been prepared in connexion with the studies on human rights and scientific and technological developments requested by General Assembly resolution 2450 (XXIII) of 18 December 1968 and subsequent resolutions of the General Assembly and the Commission on Human Rights.
2. Certain resolutions of the General Assembly and of the Commission on Human Rights specifically call for continuous studies of human rights in the light of scientific and technological developments and for strengthening co-operation and co-ordination between the bodies concerned. Thus, General Assembly resolution 2121 (XXV) of 15 December 1970 requests the Secretary-General "to continue to study the problems relating to human rights" in the light of scientific and technological developments; its resolution 3026 B (XVII) of 15 December 1972 invites him "to accelerate and complete preparation of relevant reports" in this field; Commission resolution 10 (XXVII) of 18 March 1971 requests that he should continue "his study of the consequences, for the observance of human rights, of current developments in science and technology"; Commission resolution 11 (XXXII) of 5 March 1976 requests the Secretary-General to continue collecting documentation on the development of new technology as it pertains to human rights, and requests him "to continue and, if necessary, strengthen co-operation and adequate co-ordination between United Nations organs and the specialized agencies with regard to the impact of science and technology on human rights, in particular with a view to the proposed conference on science, technology and development".
3. The General Assembly in the preamble to its resolution 3150 (XXVIII) noted the unprecedented acceleration of the rate of scientific and technological developments. In the preamble to its resolution 3268 (XXIX) it expressed its conviction that the implications of these developments, which cannot always be clearly foreseen, are international in character and call for both national and international solutions. The Commission in the preamble to its resolution 10 (XXVII) noted that in the future such developments will raise more and more complex problems, especially with regard to their consequences for human rights, if only because of their rapidity and their partly unpredictable nature.
4. There is a growing conviction that in view of the rapidity of scientific and technological developments, the decreasing interval between new scientific discoveries and their practical application through technology and the important implications of these developments for Man, which are hard to predict, there is an increasing need for continuing assessment machinery, not only on the national, but also on the international level, to examine new avenues of scientific research and new technological innovations, with a view to promoting those which offer benefit for mankind and to drawing attention to those likely to constitute threats to human rights, including harmful side effects and unfavourable long-term effects.
5. The statement of the group of eminent international experts who met in Geneva in September 1975 at the invitation of the Secretary-General to consider aspects of human rights and scientific and technological developments recommended in its paragraph 4 that international machinery should be entrusted with technological

assessment for mankind as a whole; this assessment would include the assessment of possible side effects and long-range effects of particular innovations and would aim at determining whether the time is right for such innovations and whether their advantages outweigh the discernible disadvantage. In relation to both the national and the international machinery for technological assessment which were recommended, the statement added that it was "a basic human right to have a voice in such decisions" and that these decisions "must be made on the basis of the considered opinion of bodies of experts and laymen who represent the interests of all the people as well as of future generations". 1/

6. The present report has been prepared in the spirit of these resolutions and with the above-mentioned considerations in mind. It contains a description of existing international machinery for the assessment of scientific and technological developments and of various proposals which have been made for the establishment of further international machinery for the assessment of science and technology. Emphasis has been placed upon continuing machinery for assessment, as distinct from the making of ad hoc studies.

7. Substantive replies to enquiries made in connexion with the preparation of the report were sent to the Secretary-General by the following specialized agencies on the dates indicated: International Atomic Energy Agency (6 June 1976), World Meteorological Organization (17 June 1976), International Telecommunication Union (23 June 1976), World Health Organization (3 September 1976) and the Food and Agricultural Organization (30 November 1976).

8. Further material was collected for the present report by research in published material independent of these requests.

1/ See E/CN.4/1199, para. 4. See further paragraphs 59-61 below.

I. EXISTING INTERNATIONAL TECHNOLOGY ASSESSMENT MACHINERY

1. United Nations Scientific Committee on the Effects of Atomic Radiation

9. The United Nations Scientific Committee on the Effects of Atomic Radiation is a standing committee of the General Assembly established by its resolution 913 (X) of 3 December 1955. The terms of reference of the Committee were set out in paragraph 2 of the above-mentioned resolution, by which the General Assembly requested the Committee: (a) to receive and assemble in an appropriate and useful form radiological information furnished by States Members of the United Nations or members of the specialized agencies, in particular, reports on observed levels of ionizing radiation and radioactivity in the environment and reports on scientific observations and experiments relevant to the effects of ionizing radiation upon man and his environment already under way or later undertaken by national scientific bodies or by authorities of national Governments; (b) to recommend uniform standards with respect to procedures for sample collection and instrumentation, and radiation counting procedures to be used in analyses of samples; (c) to compile and assemble in an integrated manner the various reports, referred to in sub-paragraph (a) above, on observed radiological levels; (d) to review and collate national reports on scientific observations and experiments referred to in sub-paragraph (a) above, evaluating each report to determine its usefulness for the purposes of the Committee; (e) to make yearly progress reports and to develop a summary of the reports received on radiation levels and radiation effects on man and his environment together with the evaluations provided for in sub-paragraph (d) above and indications of research projects which might require further study; (f) to transmit from time to time, as it deems appropriate, the documents and evaluations referred to above to the Secretary-General for publication and dissemination to States Members of the United Nations or members of the specialized agencies.

10. General Assembly resolution 3154 C (XXVIII) of 14 December 1973 added to the responsibilities of the Committee by authorizing it, in response to a request by the Government of a country which is situated in an area of nuclear arms testing or which considers that it is exposed to atomic radiation by reason of such testing, to appoint a group of experts from among its members for the purpose of visiting that country, at the latter's expense, and of consulting with its scientific authorities and informing the Committee of the consultations. According to the interim procedure for the appointment of groups of experts elaborated by the Committee, in the event of such a request the Chairman of the Committee shall by correspondence: (a) notify members of the Committee that such a request has been received and inform them of the circumstances of it; (b) ask members whether they agree to the appointment of such a group and that it should be set up prior to the next meeting arranged for the Committee; (c) propose the names of up to five State members of the Committee each of which might be asked to provide one member of such a group; (d) in the light of the expertise required in the particular situation, suggest the names of individuals from such States members who might valuably form such a group. In the event of a majority of the Committee's replying in support of the appointment of a group, as in sub-paragraph (b) above and of a majority agreeing to the proposed names of States members to form this group, as in paragraph (c) above, the Chairman shall proceed with the appointment of this group. In view of the importance of an

appropriate balance of expertise the Chairman may, if he deems necessary, discuss with these States members the fields of expertise of members to be appointed. If no majority for the selection of members can be obtained, he is to circulate alternative proposals for membership until a majority is obtained for the membership of the group. After its consultation the group is to submit a report on its consultations to the Committee for review at the next meeting of the Committee. 1/

11. The Committee has discussed at its sessions, inter alia, sources of irradiation, and levels of natural irradiation and of environmental contamination and other man-made sources of radiation exposure; biological, genetic and somatic effects of radiation, including experimental results and risk assessments in man; methods of measuring levels of radiation; the effects of irradiation by internally absorbed isotopes; disposal of radioactive wastes in the seas and oceans; the physical aspects of fall-out; physical and biological problems concerning the transmission of fission products through food chains; physical and biological problems concerned with carbon-14; physical and biological aspects of the interaction of ionizing radiation with matter; hereditary effects of radiation; dose-rates and comparative risks due to irradiation from various sources; effects of ionizing radiation on the nervous system; irradiation induced chromosome aberrations in human cells; radiation carcinogenesis in man; exposure of populations to environmental contamination due to nuclear explosions, and power production by nuclear fission; occupational exposure to radiation, and medical irradiation.

12. In view of the tendency of the long-lived radioactive isotope of strontium (strontium-90), resulting from tests of nuclear weapons or from radioactive wastes, to become deposited in human bone, the Committee devoted particular attention to the quantitative measurement and significance of the levels of strontium-90 in: the stratosphere; deposited radioactive fall-out; air, water, soil and herbage; bones, especially those of children; human urine, and the principal calcium contributors to human diet. Other topics which have attracted the special attention of the Committee include: measurement of the levels of caesium-137 in the stratosphere, in the lower atmosphere, in water, on the ground, in foodstuffs, and in man; levels of shorter-lived radio-isotopes in fall-out; measurement and evaluation of the doses received by the germinal tissue of persons irradiated during medical procedures, as in certain countries these are known to constitute one of the largest artificial contributions to the irradiation of these tissues; biological effects of small doses of radiation and related fundamental radiobiological research; aspects of oceanography and marine biology relevant to possible sea disposal of radioactive wastes, and present disposal practices.

13. The Committee has used as sources of information the reports received from States Members of the United Nations and members of the specialized agencies and of the International Atomic Energy Agency (IAEA), as well as from these agencies themselves and from various other non-governmental bodies, such as the

1/ See A/9632, Annex.

International Commission on Radiological Protection (ICRP) and the International Commission on Radiological Units and Measurements (ICRU) and from national scientific organizations. The Committee addressed special invitations to Governments, governmental and non-governmental organizations and scientists in the radiation field to send information sought by the Committee. To mention only a few of the reports submitted in response to invitations by the Committee, the Food and Agriculture Organization (FAO) submitted a report on the radioactive contamination of the food chain and the World Health Organization (WHO) a report on questions relating to the hereditary burden of human populations, while ICRP and ICRU prepared a report on the exposure of man to ionizing radiations arising from medical procedures, with special reference to radiation-induced diseases; and IAEA a series of reports dealing with the problem of disposal of radioactive wastes. The World Meteorological Organization (WMO) organized a panel discussion with a number of leading meteorologists on the factors governing the distribution of nuclear debris in the atmosphere. In response to General Assembly resolution 1376 (XIV), which invited the Committee to consider appropriate arrangements for encouraging genetic, biological and other studies that would elucidate the effects of radiation exposure on the health of human populations, the Committee addressed a letter to States Members of the United Nations and members of the specialized agencies and of the IAEA, outlining the type of data on environmental contamination needed from certain areas, and mentioning those fields of biological research in which large-scale collaborative investigations were required. The various reports received by the Committee are supplemented by scientific literature and by unpublished personal communications from individual scientists.

14. The Committee is assisted in its work by a scientific staff provided by the United Nations Secretariat, which is responsible for presenting to the Committee in a useful form the data submitted by Governments and other bodies, and for seeking relevant information from individual laboratories and scientists. As requested by the Committee, the scientific staff has been recruited for short-term appointments; which procedure enables highly qualified scientists actively engaged in research to assist it and ensures, through rotation of assignments, a broad geographical distribution among Member states. A number of experts have acted as consultants for shorter periods of time and many scientists have contributed to the work of the Committee on a voluntary basis.

15. A primary objective of establishing the Committee was to assess the effects of radiation on the world population. Radioactive contamination of the environment resulting from testing nuclear weapons constituted a growing increment to world-wide radiation levels. This involved new and largely unknown hazards to present and future populations; these hazards, by their very nature, were beyond the control of the exposed persons. One of the conclusions of the Committee was that all steps designed to minimize irradiation of human populations will act to the benefit of human health. Such steps include the avoidance of unnecessary exposure resulting from medical, industrial and other procedures for peaceful uses of atomic energy on the one hand, and the cessation of contamination of the environment by testing nuclear weapons, on the other. The Committee always stressed that considerations involving effective control of all these sources of radiation involve national and international decisions which lie outside the scope of its work.

16. It has been clearly established that exposure to radiation, even in doses substantially lower than those producing acute effects, may occasionally give rise to a wide variety of harmful effects including cancer, leukaemia and inherited abnormalities which in some cases may not be easily distinguishable from naturally occurring conditions or identifiable as due to radiation. Even the smallest amounts of radiation are liable to cause deleterious genetic, and perhaps also somatic, effects. Both natural radiation and radiation from fall-out involve the whole world population to a greater or lesser extent, whereas only a fraction of the population receive medical or occupational exposure. However, the irradiation of any groups of people, before and during the reproductive age, will contribute genetic effects to whole populations in so far as the gonads are exposed. Because of the delay subject to which the somatic and genetic effects of radiation may appear, the full extent of the damage is not immediately apparent. It is, therefore, important to consider the speed with which levels of exposure could be altered by human action. It is clear that medical and occupational exposure, and the testing of nuclear weapons, can be influenced by human action, but not natural radiation and the fall-out of radioactive material already injected into the stratosphere.

17. The Committee has evaluated comparative risks of biological damage to the whole world population by means of "dose commitments" derived from the sum of radiation doses received and expected to be received by the world's population as a result of the nuclear explosions which have already taken place. Dose commitments have been estimated for the gonads, for cells lining bone surfaces and for the bone marrow, as these are the tissues whose irradiation may give rise to hereditary effects, to bone tumours and to leukaemias, respectively. The Committee has not made special dose commitment estimates applicable to limited populations, such as those in individual countries, except in a few cases of populations with much higher than average exposures.

18. The Committee has emphasized the need that all forms of unnecessary radiation exposure should be minimized or avoided entirely, particularly when the exposure of large populations is entailed; and that every procedure involving the peaceful uses of ionizing radiation should be subject to appropriate immediate and continuing scrutiny in order to ensure that the resulting exposure is kept to the minimum practicable level and that this level is consistent with the necessity or the value of the procedure. As there are no effective measures to prevent the occurrence of harmful effects of global radioactive contamination from nuclear explosions, the achievement of final cessation of nuclear tests would benefit present and future generations of mankind.

19. The Committee's conclusions, evaluations and recommendations, as well as indications of the fields for further research, are contained in reports of the Committee prepared in 1958, 1962, 1964, 1966, 1969 and 1972. ^{2/} The seventh report will be prepared for the thirty-second session of the General Assembly in 1977. The years not covered by these comprehensive reports were covered by progress reports of the Committee giving account of its annual sessions. The General Assembly, especially in resolutions 1347 (XIII) of 13 December 1958, 1764 (XVII) of 21 November 1962, 2258 (XXII) of 25 October 1967, 2382 (XXIII) of 1 November 1968, 3154 (XXVIII) of 14 December 1973 and 3226 (XXIX) of 12 November 1974, commended

^{2/} See A/3838, pp.36-42, A/5216, pp.31-35, A/5814, pp.4-8, A/6314, p.9, A/7613, pp.3-11, A/8725 and Corr.1, pp.4-17.

the Committee for its work and for the valuable reports it had presented and requested it to continue its assessment of radiation risks as well as its review of those studies and further investigations that should be undertaken in the interests of increasing man's knowledge of the effects of radiation. The Committee plans to continue its assessment of doses, effects and risks of radiation from all sources and to review in its next comprehensive report the genetic and somatic effects of ionization radiation, environment radioactivity, occupation exposure and medical irradiation. It will report annually to the General Assembly on its progress.

2. Committee on Science and Technology for Development and the Advisory Committee on the Application of Science and Technology to Development

20. In accordance with Economic and Social Council resolution 1715 (LIII) of 28 July 1972, which defined the mandate of the Committee on Science and Technology for Development (CSTD), one of the functions of this standing Committee of the Council is keeping under review, with the help of expert bodies concerned, new developments in science and technology, evaluating their implications and making recommendations to the Council on practical measures to maximize their contribution to development (paragraph 2 (g) of the resolution). The subject of technology assessment was on the agenda of the CSTD from its first session in March 1973, for which an introductory note entitled "International co-operation in new technologies: technology assessment and perspectives" was prepared by the Secretary-General.^{3/} However, because of lack of time the Committee decided to defer consideration of the subject until its second session.

21. At the second session of the CSTD in March 1974 the Committee requested the Secretary-General to arrange for the preparation of a further report on technology assessment.^{4/} Accordingly, the Secretary-General initiated a preliminary study of the subject and a report was prepared by a consultant, Professor Lyndon K. Caldwell, Director of Advanced Studies in Science, Technology and Public Policy in Indiana University, United States of America, entitled "Integrating science and technology into development planning: the applicability of systems approaches and technology assessment as aids to decision-makers".^{5/} The report summarized the current state of knowledge regarding the uses of systems approaches and technology assessment to assist the integration of science and technology into development planning.

22. In October 1974 the report was submitted to the twentieth session of the Advisory Committee on the Application of Science and Technology to Development (ACAST) which furnishes expert advice to the CSTD in accordance with Economic and Social Council resolution 1621 B (LI) of 30 July 1971 and which has displayed continuing interest in the subject of technology assessment since 1973. ACAST stressed the need for a thorough study of technology assessment, systems analysis and integration of science into development planning.^{6/}

^{3/} See E/C.8/7.

^{4/} See E/5473, para. 111.

^{5/} See E/AC.52/XX/CRP.5.

^{6/} See E/C.8/30, para. 62.

23. In response to a request made to the Secretary-General by the CSTD at its second session to arrange for the preparation of a report on the subject of technology assessment for the Committee's future consideration, a small international expert group was convened in New York in June 1975 to consider this subject which is of permanent concern to the CSTD. The report of the Expert Group 7/ analysed main trends in technology assessment in developing and developed countries and the role of technology assessment in the planning and decision-making processes. In the opinion of the Expert Group, technological evaluation proper, i.e. analyses focussing on purely techno-economic factors, is itself minimally utilized in many developing countries, while the broader process of the "societal assessment of technology (SAT)" remains to be discovered.

24. The report of the Expert Group was considered at the twenty-first session of the ACAST in November 1975.8/ The ACAST was in general agreement with it and recommended that the report be transmitted to the third session of the CSTD with a number of comments. Particular note was taken of the Expert Group's considerations concerning SAT. The ACAST stressed the importance of appropriate assessments of possible social consequences of scientific and technological developments. There was an important role for the United Nations and its specialized agencies in producing an independent assessment of technology and trends which can assist the more objective decisions being adopted by developing countries. Efforts on the part of the United Nations specialized agencies as well as other international organizations, including non-governmental organizations, were needed to establish a methodology of technology assessment both for developed and developing countries. The Advisory Committee also pointed out that one important matter was missing from the expert group's report. This was technological forecasting which cannot be separated from technology assessment in the process of economic planning and development.

25. The third session of the CSTD considered the report of the Expert Group in February 1976, together with the report of the ACAST and the report of the Secretary-General on the role of an international technological information system in the transfer and assessment of technology and in the indigenous growth of appropriate technologies in developing countries. The view was expressed that technological assessment should be applied principally to specific projects, in a decentralized way and in co-ordination with national networks for the dissemination of technological information. Technology assessment should include technological forecasting, and the relevant recommendations of the ACAST were endorsed in that connexion. Most representatives concurred in the view expressed in the report of the Secretary-General that the best way to achieve progress would be to rationalize and systematize initiatives already taken at the national and international levels rather than to create a single international information system. Maximum use should be made of existing centres inside and outside the United Nations system. There was general agreement that any future initiatives in the area of information should place emphasis on the needs of developing countries. 2/

7/ See "Report of the Expert Group on Technology Assessment" (New York, 23-27 June 1975).

8/ See E/C.8/30, paras. 63-67.

2/ See E/5777, paras. 106-107.

3. International Atomic Energy Agency (IAEA)

26. According to its Statute 10/ the Agency is authorized to establish and administer safeguards to ensure that fissionable and other materials, services, equipment, facilities, and information made available by the Agency or at its request or under its supervision or control are not used in such a way as to further any military purpose; and to apply safeguards, at the request of a State party to any bilateral or multilateral arrangement, or, at the request of any State, to any of that State's activities in the field of atomic energy. It is also authorized to establish or adopt, in consultation with, and where appropriate in collaboration with, the competent organs of the United Nations and with the specialized agencies concerned, standards of safety for the protection of health and the minimization of danger to life and property (including such standards for labour conditions), and to provide for the application of those standards to its own operations as well as to the operations making use of materials, services, equipment, facilities, and information made available by the Agency or at its request or under its control or supervision; and to provide for the application of these standards, at the request of the parties, to operations under any bilateral or multilateral arrangement, or, at the request of a State, to any of that State's activities in the field of atomic energy.

27. When any member or group of members of the Agency desiring to set up any project for research on, or development or practical application of, atomic energy for peaceful purposes requests the assistance of the Agency in securing fissionable and other materials, services, equipment, and facilities necessary for this purpose, the Agency is authorized to send into the territory of the member or group of members making the request a person or persons qualified to examine the project. For this purpose the Agency may, with the approval of the member or group of members making the request, use members of its own staff or employ suitably qualified nationals of any member. Before approving a project, the Board of Governors is to give due consideration to inter alia the usefulness of the project, including its scientific and technical feasibility and the adequacy of proposed health and safety standards for handling and storing materials and for operating facilities.

28. With respect to any Agency project, or other arrangement where the Agency is requested by the parties concerned to apply safeguards, the Agency is authorized to examine the design of specialized equipment and facilities, including nuclear reactors, and to approve it from the viewpoint of assuring that it will not further any military purpose, that it complies with applicable health and safety standards, and that it will permit effective application of the safeguards provided for in the Statute. The means to be used for the chemical processing of irradiated materials are subject to the approval by the Agency to ensure that this chemical processing will not lend itself to diversion of materials for military purposes and will comply with applicable health and safety standards.

29. The Agency has the right to send into the territory of the State or States receiving materials or assistance from the Agency inspectors, designated by the Agency after consultation with the State or States concerned, who are to have

10/ See United Nations, Treaty Series, volume 276, pp.4-41.

access at all times to all relevant places and data and to any person who by reason of his occupation deals with materials, equipment, or facilities which are required to be safeguarded and to determine whether there is compliance with the undertaking against use in furtherance of any military purpose, with the health and safety measures and with any other conditions prescribed in the agreement between the Agency and the State or States concerned. Inspectors designated by the Agency are to be accompanied by representatives of the authorities of the State concerned, if that State so requests, provided that the inspectors are not thereby delayed or otherwise impeded in the exercise of their functions. The inspectors are to report any non-compliance to the Director General who is thereupon to transmit the report to the Board of Governors. The Board is to call upon the recipient State or States to remedy forthwith any non-compliance which it finds to have occurred. The Board is to report the non-compliance to all members and to the Security Council and General Assembly of the United Nations. In the event of failure of the recipient State or States to take fully corrective action within a reasonable time, the Board may take one or both of the following measures: direct curtailment or suspension of assistance being provided by the Agency or by a member; and may call for the return of materials and equipment made available to the recipient member or suspend any non-complying member from the exercise of the privileges and rights of membership.

30. Activities of the IAEA dealing with technology assessment are numerous and increasing. In the field of food and agriculture it develops programmes dealing with undesirable side-effects of agrochemical residues, tracing contaminants in edible seeds and oils, the conservation and fate of useful nitrogen residues in soil and the protection of food, soil and inland water quality. For example, the IAEA is sponsoring a programme to study problems of the fate and significance of pesticide residues and other chemical and radioactive contaminants of food and the agricultural environment with the help of radioisotope methods at Makerere University, Kampala, Uganda. In combating the tsetse fly, radioactively-labelled insecticides are sprayed under different conditions and their fate in the environment is determined over the next weeks and months. The Agency's Programme for 1977-82 envisages a special sub-programme on chemical residues and pollution consisting of three components: isotope-aided studies of the origin, fate and biological significance of chemical residues in food and agriculture, isotope-tracer-aided studies of microbiological interactions involving chemical residues in aquatic ecosystems and collection and dissemination of comparative information on the fate and significance of foreign substances (including radioactive substances) in food and agriculture.^{11/} The agricultural activities are carried out through a joint FAO/IAEA Division of Atomic Energy in Food and Agriculture.

31. In the field of life sciences one of the Agency's sub-programmes deals with health-related environmental research. Activities in 1977-82 will aim at contributing to studies, using nuclear methods, on non-radioactive contaminants of man, in particular in relation to radioactive contamination. Having started with neutron activation analysis of human hair, the work will be extended to other tissues, excreta and the immediate environment of man. As data on concentrations of contaminants are compiled and a scientific basis for comparing hazardous effects of radioactive and non-radioactive pollutants is worked out at the Radiation Biology Section, an attempt will be made to compare the relative ratios of man's

^{11/} See The Agency's Programme for 1977-82 and Budget for 1977, CC(XX), 567, pp.49-51.

body burdens of pollutants coming from nuclear and conventional industries. This sub-programme consists of two components: (i) nuclear methods in environmental research for determining the chemical composition of human hair and other human tissues as an indicator of environmental pollution of man, research which will be carried out in co-operation with WHO, UNESCO and UNEP, and (ii) comparative body burdens of radioactive and non-radioactive pollution; this component is aimed at collecting, assessing and disseminating data on the comparative burdens of radioactive and non-radioactive pollutants for the population with the purpose of predicting environmental quality as a function of the development of nuclear power and technology. The work will be carried out in co-operation with WHO, UNESCO and the Scientific Committee on Problems of the Environment. 12/

32. The IAEA use for assessment analysis the Agency's Laboratory. It is installed partly at Seibersdorf, near Vienna (the Physics Section, the Chemistry Section, including Low-Level Radioactivity Group and the Agricultural Section), and partly at Headquarters (the Isotope Hydrology Section, the Medical Applications Section and the Dosimetry Section). The interest of the Physics Section centres around the development of absolute measurement methods for the standardization of radionuclides widely used for scientific and industrial applications. The Dosimetry Section is dealing with the absolute measurement of absorbed doses of high-energy radiation, by calorimetric and chemical dosimeters. A Calibration Service for dose-measuring devices was inaugurated in 1966. The Chemistry Section is largely interested in the realm of the analytical chemistry of nuclear material, in particular the inter-laboratory comparison of the accuracy and precision of techniques of trace analysis, with a view to establishing recommended methods. The Low-Level Radioactivity Group, in co-operation with other sections of the Laboratory, is responsible for the administration of analytical quality control services and for determination of radionuclides in environmental or bioassay samples. The Agricultural Section is concerned with the use of isotopes and radiation in soil-plant relationship investigations, in entomology, in plant breeding, in animal metabolism and in food preservation. The Medical Applications Section deals with inter alia the measurement of natural or artificial radioactivity in the human body. The interest of the Isotope Hydrology Section lies in the determination of tritium and carbon-14 in natural waters and in water-tracing techniques using tritium or other isotopes. 13/

33. In the field of nuclear power and reactors much attention is paid to nuclear power plant operating experience. The objective of this component of the Agency's programme is to collect, evaluate and publish annually data on initial experience with nuclear power plants in Member States. Another component dealing with nuclear power plant systems, technology and reliability is aimed at collecting, evaluating and disseminating information on the operation of power plant systems and components, in particular pressure vessel systems and control and instrumentation systems. 14/

34. In the field of nuclear safety and environmental protection three sub-programmes are carried out: radiological safety, waste management, and nuclear safety. 15/ The objective of the radiological safety

12/ See Ibid., pp.73-75.

13/ See IAEA Services and Assistance, IAEA, Vienna 1974, pp.25-27.

14/ See The Agency's Programme for 1977-82, op.cit. pp.132-133.

15/ Ibid., pp.141-164.

sub-programme is to provide safety standards, recommendations, guidance, assistance and services to Member States aimed at ensuring the protection of man, his property and the environment against any possible harmful effects of radiation arising in the expanding nuclear industry. One basic field of work is risk assessment and its relationship to decision-making. The Agency's safety standards comprise basic safety standards for radiation protection, specialized regulations and codes of practice which are approved by the Board of Governors and are mandatory for the Agency's own work and for work in Member States for which the Agency provides assistance. They are also recommended for adoption by Member States and international organizations. These safety standards are defined and their mode of application prescribed in the Agency's Safety Standards and Measures.^{16/} One of the components of the waste-management sub-programme is the treatment and disposal of radioactive wastes. Its objective is to review, evaluate and disseminate information on waste management technology, procedures and practices; to develop standards of safety for the treatment and disposal of wastes aimed at ensuring the long-term protection of the public and the environment, and to encourage the development and use of appropriate waste management practices. The objective of the sub-programme's nuclear energy and environmental impact component is to evaluate the potential impact on man - and other sensitive organisms - of ionizing radiation, radioactive materials and other related stresses arising from the applications of nuclear energy; to develop analytical techniques suitable for the assessment and formulation of national and global waste management policies and practices; to develop methods for establishing authorized discharge limits for radioactive and non-radioactive contaminants from nuclear activities, and to support research on the behaviour of radionuclides in the environment, including their transfer through food and other ecological chains. The sub-programme on nuclear safety deals with safety evaluations of nuclear installations in respect of their design and siting, safety in operational procedures, associated environmental monitoring and emergency planning and safety evaluations of radioactive waste storage or disposal projects and of associated monitoring. A component of the sub-programme consists of advisory missions and safety evaluations of nuclear reactors including nuclear merchant ships. Safety assessments of research reactors have been made since 1960 and advice has been provided on the safety levels achieved at nuclear centres. Safety assessments of nuclear power plants have been made at either the pre-construction or construction phase. Since 1963 twelve countries have been assisted in the selection of sites for nuclear plants. Twenty-two Agency projects have been evaluated from the nuclear safety point of view before submission to the Board for approval in accordance with statutory requirements. Standards relating to nuclear safety and environmental protection are published in the Agency's Safety Series which at present number 41 issues.^{17/}

4. World Health Organization (WHO)

35. According to the Statute of the WHO ^{18/} the organization is authorized to study and report on, in co-operation with other specialized agencies when necessary, administrative and social techniques affecting public health and medical care

^{16/} See IAEA, INF/CIRC/18/Rev.1.

^{17/} See IAEA publications catalogue 1976-1977, Vienna, 1976, pp.184-186.

^{18/} See United Nations, Treaty Series, V.14, pp.185-222.

from preventive and curative points of view, including hospital services and social security. It is also authorized to develop, establish and promote international standards with respect to food, biological, pharmaceutical and similar products. The Health Assembly has authority to adopt regulations concerning: (a) sanitary and quarantine requirements and other procedures designed to prevent the international spread of disease; (b) nomenclatures with respect to diseases, causes of death and public health practices; (c) standards with respect to diagnostic procedures for international use; (d) standards with respect to safety, purity and potency of biological, pharmaceutical and similar products moving in international commerce; (e) advertising and labelling of biological, pharmaceutical and similar products moving in international commerce.

36. Important functions of WHO connected with assessment are also based on many resolutions of the World Health Assembly and in particular on resolution WHA 23.59, which envisages inter alia analysis and evaluation of information on environmental health.

37. In its contribution to the present study WHO indicated that, in recent years, extensive planning and management analyses of health and environmental programmes had been conducted within WHO. Efforts had been made to include technological assessment in a number of the Organization's activities, and more recently in the special programme for research and training in tropical diseases. There were a number of other mechanisms for technological assessment within WHO, including the Organization's activities in the field of vector biology and control, and of prophylactic, diagnostic and therapeutic substances etc. Active steps were being taken to develop a valid system of health programme evaluation, so that evaluation could be applied on a continuing basis throughout the implementation of WHO's programme.^{19/}

38. Much assessment work is carried out in the course of research. Most of this research is carried out by means of a network of about 500 collaborating centres throughout the world. These centres are chosen from within existing national institutions and selected on the basis of their aptitude and willingness to contribute to the solution of specific health problems facing WHO. WHO headquarters are also directly engaged in research.

39. In accordance with the recommendations of the seventeenth session of WHO Advisory Committee on Medical Research in June 1975 a Sub-Committee on Safety in the handling of micro-organisms and cells employed in research was established to keep under its purview, and report regularly to the AMCR, developments relating to the problem of safety for man in the handling of micro-organisms and cells employed in research and in public health practice.

40. One of the principal objectives of the Sixth General Programme of WHO for 1978-1983 adopted at the Twenty-ninth World Health Assembly in May 1976 ^{20/} is promotion of environmental health including promotion of recognition, evaluation

^{19/} Information forwarded by the WHO on 3 September 1976.

^{20/} See WHO, the Sixth General Programme of Work covering 1978-1983 inclusive, document A.29/6 and Corr.1 and 2 and resolution WHA 29.20.

and control of environmental conditions and hazards which may affect human health. WHO will participate in the evaluation of the effects of environmental factors on health, promote and co-ordinate relevant research and foster practical application of research findings. Collection, analysis, synthesis and dissemination of information on environmental health policies and services and on methodologies for environmental impact assessment will be conducted at all levels of the Organization. This information will be used for reviewing requirements periodically, for setting up or confirming priorities, for evaluation purposes and, in general, for assisting in decision-making. The Organization will develop a programme on criteria for environmental health, consisting in particular of the following activities: (1) review and dissemination, in collaboration with national centres, of scientific information on the effects of environmental factors on human health, and preparation of documents setting out the criteria to be applied; (2) development of information services and mechanisms for collaboration between WHO, national scientific institutions and other agencies; (3) using epidemiological and toxicological techniques, the promotion and co-ordination of research, particularly on harmful immediate and long-term effects, including combined effects, and on indices for measuring adverse effects of pollution on public health in general and on the health of high-risk groups; (4) promotion of and co-operation with other agencies concerned in the conduct of studies on the long distance spread and chemical transformation of pollutants in the environment and on the combined effects of multiple pollutants; (5) formulation, testing and publication of recommendations on maximum permissible limits. The Organization will promote the establishment of a food contamination and food-borne diseases information and monitoring programme to provide the necessary information for determining priorities and assessing the effectiveness of food monitoring activities. It will prepare codes, guidelines and manuals on food safety and related matters, including techniques for the preparation of various products and standards with respect to their related utensils. WHO will participate in activities for the evaluation of food safety such as the determination of food additives, pesticide residues and biological and chemical contaminants. It will also endeavour to promote the evaluation and development of safe methods of food preservation, packaging, storage and transportation. WHO will establish and improve international requirements and standards for the quality, safety and efficacy of prophylactic, diagnostic and therapeutic substances. Formulation or revision of international codes for production, quality control and certification of drugs in international trade will also be carried out by WHO, which will collaborate with countries in evaluating the safety and efficacy of drugs, including monitoring of adverse effects. The Organization will identify and quantify imbalances and inequity in the production and distribution of essential drugs.

5. Food and Agriculture Organization of the United Nations (FAO)

41. According to its Statute ^{21/} one of the functions of FAO is to collect, analyse, interpret and disseminate information relating to nutrition, food and agriculture, including fisheries, marine products, forestry and primary forestry products. FAO is the only international organization reviewing the state of exploitation of many resources continuously on a world-wide basis. One of the most pressing problems, as well as one of the greatest economic opportunities for

^{21/} See Basic Texts of the Food and Agriculture Organization of the United Nations, FAO, 1972, pp.3-19.

developing countries, is to raise the level of utilization of the tropical forests, which contain some 80 per cent of the world's broad-leaved resources but supply only 30 per cent of industrial consumption of broad-leaved wood. The Organization's programme of work for 1976-1977^{22/} envisages, *inter alia*, research on the effects of silvicultural treatments and exploitation methods in tropical-moist forests, on the qualitative composition and yield of the subsequent regeneration, on the impact of intensified forest exploitation on the silviculture and management of tropical moist forests and on the ecological effects of increasing human activities on tropical and sub-tropical ecosystems.

42. Much attention is paid to assessment of aquatic environment and control of aquatic pollution. For the establishment of water quality criteria for permissible levels of contaminants and for the standardization of methods for their detection and analysis, FAO channels its contributions through the Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP) sponsored jointly by several interested United Nations organizations. A manual on methods for detection, measurement and monitoring of water pollution has been issued, as Part 1 of the Manual on Methods in Aquatic Environment Research. In 1974-75 six working groups, subsidiary to the Advisory Committee of Experts on Marine Resources Research and GESAMP, were established and conducted meetings and correspondence covering the scientific basis for the disposal of waste into the sea, principles of developing coastal water quality criteria, impact of oil on the marine environment, biological effects of pollutants, biological accumulators, and ecological indices. Reports of these meetings were prepared and distributed. Jointly with WHO, a study was prepared on public health hazards arising from contaminated fish and shellfish.

43. In the field of food control and consumer protection FAO seeks to protect consumers against the hazards of unsafe or adulterated food through international evaluation of additives and contaminants, national and international programmes for monitoring and control of food contamination, and national, regional and international programmes in food control and consumer protection in developing countries. In 1974-75 "Guidelines for Developing an Effective National Food Control System" was drafted jointly with WHO, with the support of UNEP. Two meetings of the Joint FAO/WHO Expert Committee on Food Additives developed specifications of identity and purity and toxicologically evaluated a large number of food additives. The Joint FAO/WHO International Food Contamination Monitoring Programme was commenced with the support of UNEP. Thirteen countries were surveyed to determine the scope of their on-going monitoring programmes and expert meetings were held to identify contaminants most urgently needing attention, foods to be monitored, and methods of collecting, storing and processing data on food contamination from countries co-operating in the programme. The FAO/WHO Codex Alimentarius Commission created in 1962 is active in establishing internationally accepted food standards governing the composition of food and establishing limitations for food additives and pesticide residues, limits for contaminants such as heavy metals and microbiological contaminants, rules for labelling of foods and codes of hygienic practice.

^{22/} See the Director-General's Programme of Work and Budget for 1976-77
FAO, 75/3, 1975.

6. United Nations Environment Programme (UNEP)

44. The main purpose of UNEP is to ensure effective implementation by Governments and the international community of measures designed to safeguard and enhance the environment for the benefit of present and future generations of man. The General Assembly, by its resolution 2997 (XXVII) of 15 December 1972, established a Governing Council of UNEP and a secretariat to serve as focal point for environmental action and co-ordination within the United Nations system and to ensure a high degree of effective management in the field of environment. Under this resolution the Governing Council is inter alia to keep under review the world environmental situation in order to ensure that emerging environmental problems of wide international significance receive appropriate and adequate consideration by Governments and to maintain under continuing review the impact of national and international environmental policies and measures on developing countries. At its first session (1973), the Governing Council decided that one of the general policy objectives of UNEP should be the provision, through interdisciplinary study of natural and man-made ecological systems, of improved knowledge for an integrated and rational management of the resources of the biosphere, and for safeguarding human wellbeing as well as ecosystems.

45. One of the priority subject areas of UNEP deals with environmental health. In the Programme 23/ adopted at the third session of the Governing Council in May 1975 it is pointed out that the concept on which UNEP is basing its strategy calls for a comprehensive "horizontal" approach to the study of the impact of chemical and non-chemical pollutants and of the pathways through which they reach the target. Such studies should go beyond the mere assessment of acute or chronic human toxicity to include all aspects of any environmentally significant effects, including the long-term effects of low doses. One of the main objectives of the programme is therefore to evaluate any harmful effects on human health caused by chemical and non-chemical pollution of air, water, food and the working environment, and to assess the total exposure resulting from the various media. In the assessment of occurrence of pollutants in all media and their effects on human health and the environment the following strategy was proposed: (a) small groups of experts, acting in their personal capacity, as well as experts representing United Nations agencies, will analyse the data now available. As a test, this analysis will first be made for some isolated pollutant in all media; (b) on the basis of the experience gained in this exercise, similar analyses will follow for other pollutants; (c) improved evaluations will be made later, as the programme gains its full momentum and when improved data become available under the Global Environmental Monitoring System (GEMS).

46. Another aspect of UNEP's activities is development of indices for monitoring environmental health and epidemics. The objective of this activity is to understand and quantify the linkages between specific environmental exposures and selected adverse health effects. The complexity of this problem can be appreciated by considering that acute or chronic damage to health may follow single or repeated peak short-term exposures or lower long-term exposures; furthermore, a single environmental agent may contribute either to inducing or to aggravating several different adverse health effects, and multiple environmental agents may contribute to increased risk for a single clinical entity. In this field a programme is envisaged to improve epidemiological surveillance of the health effects of adverse environmental conditions and the methodology for assessing epidemiological data in correlation with environmental data.

23/ See The Proposed Programme, UNEP/G.C/31.

47. In the field of pest management the objectives of the programme of UNEP include assessment of the environmental effects of agricultural chemicals and development and implementation of environmentally sound pest management systems for controlling certain pests affecting health and agricultural production. A multinational programme will be initiated for research on and application of environmentally sound systems for controlling cotton pests and vectors of malaria and schistosomiasis. The management of other pests could be included as the programme develops. Close contact will be maintained with FAO (for cotton pests) and WHO (for malaria and schistosomiasis) in the formulation and implementation of this programme. Activities in this field will be initiated by convening small task forces of experts on each of the three selected pests: insect pests of cotton, vectors of malaria and snail vectors of schistosomiasis. An international symposium for all interested Governments and regional and international governmental and non-governmental organizations is also envisaged.

48. UNEP is to play an active part in GEMS. The objectives of this multi-disciplinary effort, as defined by the Intergovernmental Meeting on Monitoring held at Nairobi in February 1974, are:

To provide information necessary to ensure, in conjunction with evaluation and research, the present and future protection of human health, wellbeing, safety and liberty and the wise management of the environment and its resources by:

- (a) (i) Increasing quantitative knowledge of natural and man-made changes in the environment and of the impact of these on man's health and wellbeing;
- (ii) Increasing understanding of the environment and, in particular, of how a dynamic balance is maintained in ecosystems, as a basis for managing resources;
- (b) Providing early warning of significant environmental changes (including natural disasters) in order that protective measures may be organized;
- (c) Making it possible to check the effectiveness of established regulatory mechanisms and to plan optimal technological development.^{24/}

Programme goals of GEMS include: (a) an expanded human health warning system; (b) an assessment of global atmospheric pollution and its impact on climate; (c) an assessment of the extent and distribution of contaminants in biological systems, particularly food chains; (d) an assessment of critical environmental problems relating to agriculture and land and water use; (e) an assessment of the response of terrestrial ecosystems to pressures exerted on the environment; (f) an assessment of the state of ocean pollution and its impact on marine ecosystems; (g) an improved international system allowing the monitoring of the factors necessary for the understanding and forecasting of disasters and the implementation of an efficient warning system.

^{24/} See UNEP/G.C./31/Add.2, Annex, para. 22.

49. In his report at the third session of the Governing Council the Executive Director of UNEP pointed out that when GEMS is fully under way it will need to receive, directly or indirectly, more detailed guidance from Member States than the Governing Council can provide during the necessarily brief debate that it can devote to problems of monitoring, and more consistent guidance than ad hoc groups of experts can provide. One way of obtaining this guidance would be to use a standing advisory group of experts on matters related to monitoring, appointed by the Executive Director in consultation with or on the recommendation of Governments. Alternatively a steering committee of Government representatives could be selected on a basis determined by the Governing Council. Whether an advisory group is appointed or a steering committee established, its main functions will be to set broad policies for GEMS within the UNEP programme as approved by the Governing Council and to review and analyse, on the basis of working documents prepared by or at the request of the GEMS staff, the results of monitoring operations performed by Member States. The purposes of the reviews will include: to provide the Governing Council with quantitative information on the state of the environment and on the trends it undergoes; to point out the flaws (gaps, redundancies, lack of calibration etc.) in current regional or global monitoring activities; and to make recommendations to the Governing Council on how to improve monitoring activities.25/

7. United Nations Industrial Development Organization (UNIDO)

50. UNIDO was established in order to promote industrial development and to assist in accelerating the industrialization of developing countries, with particular emphasis on the manufacturing sector. In fulfilling its functions UNIDO has to carry out certain assessment work. The plan for the biennium 1976-77 envisages preparation of a number of studies dealing with technology assessment, such as studies of the role played by the steel, aluminium and non-ferrous metals industries of the developing countries, studies aimed at evaluation of the potential of second-hand textile machinery for developing countries, particularly with respect to performance standards, availability and rigorous cost/benefit analysis of utilization, studies on assessment of the environmental impact of industrialization, publications on industrial decentralization, rural industrialization and adaptation of technology for small-scale industry.26/

51. An International Centre for Industrial Studies within UNIDO has been recently established. Among the subjects to be studied in 1977 are: (i) technology assessment as practised in both developed and developing countries as a basis for policy formulation; (ii) science and technology policies as they relate to industrialization; and (iii) environmental effects of industrialization.27/

8. Some general observations

52. As may be seen from the description above of existing international machinery for technology assessment, there is no special mechanism or body at present for the assessment from the point of view of human rights of all aspects of the

25/ See UNEP/GC/Add.2, paras. 60-61.

26/ See Proposed Programme Budget for the biennium 1976-77, op.cit. Vol.IV, pp. 12/1 - 12/59.

27/ Information forwarded by UNIDO on 4 June 1976.

development of science and technology. Assessment functions on the international level are dispersed among various international bodies performing these functions in connexion with the purposes for which they were established. For instance, the United Nations Scientific Committee on the Effects of Atomic Radiation assesses radiation effects on man and his environment, the IAEA evaluates safety of atomic energy establishments and elaborates standards for nuclear safety and environmental protection and UNEP examines the impact of man-made changes in the environment on man's wellbeing as well as on ecosystems.

53. The absence of a single responsible organization and the division of assessment functions among many bodies in accordance with their specialization makes virtually inevitable the degree of overlapping in technology assessment work which may be seen to exist. On the other hand, since assessment functions are performed by various international bodies in connexion with their established purposes, and only so far as it is necessary for fulfilling tasks entrusted to them, it sometimes happens that certain fields where technology assessment from the human rights point of view should be carried out are neglected or are dealt with insufficiently.

54. The fact that assessment functions are carried out by various international bodies in relation to their specific purposes may also partly account for the facts that methods of assessment of scientific and technological developments by these bodies vary and that the scope and depth of their assessment differ. Some organizations, especially the IAEA, have at their disposal a well developed laboratory which is intensively used for assessment analysis. Others do not have such facilities. The specific character of the IAEA also calls for the sending of inspection teams to various countries. The United Nations Scientific Committee on the Effects of Atomic Radiation deals mainly with reports submitted by governments, international organizations and individual scientists. WHO and FAO use to a considerable degree special committees and expert groups. Other bodies in their technology assessment activities do not go beyond preparing studies; much attention is paid to studies by all international bodies concerned with assessments of scientific and technological developments.

55. It is therefore hoped that the present report will (i) contribute to the streamlining of assessment activities from the point of view of human rights; (ii) establish or strengthen such activities in areas where such action is called for; and (iii) promote the use of assessment methods, when appropriate from the point of view of human rights, in areas where such methods have not previously been used.

II. PROPOSALS WHICH HAVE BEEN MADE FOR THE ESTABLISHMENT OF INTERNATIONAL TECHNOLOGY ASSESSMENT MACHINERY

56. In view of the continuous acceleration of the rate of scientific and technological developments and the growing tasks of technology assessment functions performed by existing international bodies, a number of authorities propose the establishment of some kind of special international technology assessment machinery which would assess new technologies from the point of view of human rights, drawing attention to possible dangers to human rights which they may present and possibly even calling for controls upon new developments representing threats to human rights. It would also assess the potential benefits to mankind of new developments.

57. The Government of Iraq emphasized a need for an international ad hoc scientific committee to study the effects of scientific progress, and to safeguard, on a continuous and constructive basis, the human rights of all mankind. 1/

58. Speaking at the United Nations Seminar on human rights and scientific and technological developments, held in Vienna in 1972, Mr. A.A. Mohammed, the participant from Nigeria, proposed the establishment of a permanent interdisciplinary group of experts based on equitable, geographical distribution in the field to study, on a continuous basis, innovations in scientific and technological developments in order to recommend the establishment of a balance between scientific and technological progress and the protection of human rights. Another participant, Mr. K. Atsumi (Japan), advocated the establishment of an Advisory International Committee for Concentrated studies of a number of problems which included assessment of the main positive effects and negative side effects of any new technologies. Other participants, Mrs. Q. Ahmed and Mr. A.S. Mani (India), stressed the necessity of adoption by the United Nations system of an early-warning system so as to bring to the attention of the General Assembly and its principal organs all possible effects from the point of view of the implementation of the Universal Declaration of Human Rights and the international strategies for the Second Development Decade. 2/

59. At the consultation of the Group of eminent international experts, held in Geneva in September 1975 3/, a majority of the Group made a proposal for a technological assessment body on the international level to be set up through the United Nations to consider specifically human rights aspects of technological developments. According to this proposal, governments which had organized at the national level procedures for carrying out continuous technological assessment would arrange for the national organs concerned to report regularly to an international body composed of representatives of the United Nations and members of the Secretariat, including the Division of Human Rights, and of the interested specialized agencies, including ILO, UNESCO, WHO, FAO and the International Atomic Energy Agency. This international body would report to the United Nations General Assembly. A second body, consisting of perhaps ten to twelve high-level experts coming from all areas of the world, would informally and confidentially advise the inter-agency body, without necessarily adopting reports, and help it to

1/ See E/CN.4/1199/Add.1, para. 222.

2/ For details of these and other suggestions made at the seminar see E/CN.4/1199/Add.1, paras. 223-224.

3/ See also para. 5 above.

develop a global strategy which would substitute the separate policies followed at present by the various international organs. It was felt in the Group that pending the establishment of inter-agency machinery, the United Nations Secretariat, particularly the Division of Human Rights, should initiate this monitoring function. It was suggested that a function of international machinery would be to call the attention of governments which had no national machinery to the need for it, to assist governments in establishing appropriate machinery, and to provide the international structure to support it. The international body would co-ordinate developments in the field of science and technology and call to the attention of governments those areas which are of most concern. It was pointed out by certain members that, in an area in which new problems develop with great rapidity, it is imperative that action be taken before a situation becomes critical. In addition to predicting future dangers, it was necessary to draw attention to situations which were becoming irreversible. The suggestion was made by some members of the Group that the international body could establish minimum guidelines to be followed by all countries, as well as higher, "desirable" levels which all nations should aspire to attain. Attention was drawn in the discussion to the fact that national sovereignty should be respected in the operation of international machinery. Persuasion was important in the absence of powers of compulsion. 4/

60. The Statement adopted by the Group recommends in its paragraph 4 that international machinery should be entrusted with technological assessment for mankind as a whole; this assessment would include the assessment of possible side effects and long-range effects of particular innovations and would aim at determining whether the time is right for such innovations and whether their advantages outweigh the discernible disadvantage. In relation to both the national and the international machinery for technological assessment which were recommended, the Statement added that it was a basic human right to have a voice in such decisions and that these decisions must be made on the basis of the considered opinion of bodies of experts and laymen who represent the interests of all the people as well as of future generations. 5/

61. In its contribution to the present report, FAO suggested that the Division of Human Rights should serve as the secretariat for the two bodies described in para. 59 above if they were established. However, in the view of FAO, the possibility of entrusting the assessment and monitoring functions to special sub-committees of CSTD and ACAST should be explored. These sub-committees could concern themselves in particular with human rights aspects of the development and application of science and technology, and the establishment of the new United Nations inter-agency machinery could thus be avoided. "It is difficult", FAO went on, "to isolate the human rights aspects of what CSTD is trying to achieve, as practically all matters discussed and resolutions proposed by CSTD implicitly include the fundamental right of people, human groups, societies and nations to benefit from science and technology. The first task to be carried out by such sub-committees on human rights and science and technology development might be the

4/ See E/CN.4/1199/Add.1, paras. 216-218.

5/ See E/CN.4/1199, para. 4.

establishment of ... [an] 'International Code of Conduct on the Humanization of Science and Technology'. A first draft of such a 'code' should be prepared during 1977 and 1978 and discussed at the United Nations Conference on Science and Technology in 1979." 6/

62. The Recommendations of the Final Report on the Meeting of Experts on the Ethical Problems Posed by Recent Progress in Biology, Varna, Bulgaria, 24-27 June 1975, included the suggestion that the Director-General of UNESCO: "(c) establish in close collaboration with WHO and the CIOMS a standing committee of scientists and philosophers to monitor the applications of biological discoveries". 7/

63. The Congress of the International Union of Lawyers, Vienna, 1967, stressed the necessity to set up standing interdisciplinary committees, at both the local and the international levels, which are not answerable to governments, and which could provide a constructive and practical means of securing preventive vigilance and subsequent supervision of scientific research and the exploitation of new technical methods in order to bring about a more positive observance of the relevant articles of the Universal Declaration of Human Rights. 8/

64. At a CIOMS Round Table Conference held in 1972, Professor Amitai Etzioni suggested that countries and the international community should set up a permanent commission comprised of people who know the field, of representatives of science and the practising professions as well as humanists and theologians to ponder the social and moral consequences of new break-throughs in biological and medical research. The Conference adopted a resolution in which it recommended that:

1. CIOMS and its parent organizations, UNESCO and WHO, in conjunction with other national and international bodies concerned about the subject, should explore the possibilities of establishing an international non-governmental body to explore and study the moral and social issues raised by new and forthcoming developments in biology and medicine.
2. Such an organism would include, as a minimum, biological, medical and social scientists, humanists, religious leaders, science policy makers.
3. This body should be backed by the possibility of initiating and promoting research in the applications of biological and medical discoveries and their impact on society. 9/

65. The Report of an inter-disciplinary panel convened by the World Council of Churches in Zurich in 1973 contained the following recommendation:

"We urge the WHO (if useful, in collaboration with UNESCO) to set up a committee of the kind advocated at the 1972 Paris meeting of CIOMS. This

6/ Information forwarded by FAO on 30 November 1976.

7/ UNESCO document SHC.75/Conf. 605/21, Annex I.

8/ For details see E/CN.4/1199/Add.1, para. 181.

9/ Recent Progress in Biology and Medicine - Its Social and Ethical Implications, 7th CIOMS Round Table Conference, CIOMS, 1972, p. 29, 263.

would put the experts on genetics all over the world in a position to explain to all nations what measures they think should be taken, globally, regionally or nationally, in order to channel the results of modern genetic insight into programmes acceptable to governments and peoples." 10/

66. The ad hoc Committee of the International Council of Scientific Unions (ICSU) on Recombinant DNA Molecules 11/, which met in July 1976, in Heidelberg, unanimously recommended to the General Committee and General Assembly of ICSU that a Scientific Committee on Recombinant DNA Research (SCORD) should be established for the following purposes:

(a) to serve as a non-governmental, interdisciplinary and international council of scientists and as a non-governmental source of advice for the benefit of governments, governmental agencies, scientific groups and individuals, in respect of research on recombinant DNA, the practical benefits that may be derived therefrom and the need for such research to proceed under appropriate and generally agreed safeguards.

(b) to assemble, review and generally make available information on safeguards, containment facilities and other technical matters.

(c) to foster opportunities for the training of and international scientific exchange between workers in the field.

(d) to make itself available as a medium through which the many national, regional and other international bodies with interests in recombinant DNA molecules may communicate.

(e) to take note of the widespread concern over the possible deliberate or inadvertent dispersal of agents constructed by recombinant DNA techniques, to be vigilant regarding such possibilities and to attempt to foster public discussion of these situations should they arise.

SCORD would collect and distribute, as far as it is practical and useful, information about research on recombinant DNA molecules concerning beneficial applications, evaluation of hazards, ethical and legal issues, physical, chemical and biological containment for safe conduct of experiments, sources of technical advice, equipment and materials, laboratories engaged in research on recombinant DNA molecules and publication of research. The ad hoc Committee drafted a proposed constitution for SCORD together with a statement of membership, aims and purposes, and a suggested budget. The ad hoc Committee stressed that the hazards connected with recombinant DNA techniques are at present conjectural and more information is needed to evaluate them. It was therefore important to stimulate investigation of the possible existence and extent of such hazards and to distribute information relevant to the revision of guidelines for the safe performance of this research. 12/

10/ World Council of Churches, Genetics and the Quality of Life, Geneva, 1973, p. 22.

11/ On guidelines and controls concerning research involving recombinant molecules, see also E/CN.4/1236, paras. 27-58.

12/ See International Council of Scientific Unions, Report of the ad hoc Committee on Recombinant DNA Molecules, August 1976.

67. The Consultations on Facilitation and Safety in the International Transfer of Research Materials organized by WHO and National Institutes of Health (USA) in September 1976 proposed that WHO should initiate the establishment of an Advisory Group for Safety Measures in Microbiology. It was hoped that this Group would ensure, in an appropriate form, the participation of other organizations and institutes such as the United Nations Division of Human Rights, the International Labour Organisation, the United Nations Environment Programme, industrial organizations, research organizations, the International Council of Scientific Unions, the International Committee for Laboratory Animals and universities. It was stressed that full support should be given to a new, comprehensive assessment of the potential benefits and the conjectural risks of recombinant nucleic acid research. 13/

68. Professor Charles Malik proposed the establishment of standing commissions to study the possible beneficial or harmful consequences of new scientific developments before they are incorporated into technology. 14/

69. Professor Dennis Livingston proposed the establishment of an International Technology Assessment Board which would act as the major international clearing house for monitoring developments in technological progress and their consequences. The activities of the Board would include contracting out specific technology assessment studies. 15/

70. Professor Eugene B. Skolnikoff of the Massachusetts Institute of Technology, USA, developed arguments for establishing an international science foundation which would facilitate adequate research and development on subjects set by international needs. 16/

71. Academician Peter Kapitza of the Academy of Sciences of the USSR stressed that as soon as possible an international organization will have to be set up to control global problems on an international scale. 17/

13/ See WHO, Facilitation and Safety in the International Transfer of Research Materials, Report of WHO/NIH (USA) Consultations, Geneva, 14-17 September 1976, CDS/SMM/76.1, p.10.

14/ See E/CN.4/1199/Add.1, para. 182, for further details.

15/ See Ibid., para. 228, for further details.

16/ See Ibid., para. 227, for further details.

17/ See Ibid., para. 225, for further details.