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**ADVISORY COMMITTEE ON THE APPLICATION
OF SCIENCE AND TECHNOLOGY
TO DEVELOPMENT**

NINTH REPORT

May 1972

**ECONOMIC AND SOCIAL COUNCIL
OFFICIAL RECORDS: FIFTY-THIRD SESSION
SUPPLEMENT No. 8**

UNITED NATIONS

ADVISORY COMMITTEE ON THE APPLICATION OF
SCIENCE AND TECHNOLOGY TO DEVELOPMENT

NINTH REPORT

CorrigendumPages iii and 8:

The title of chapter III should read MAJOR ITEMS UNDER CONSIDERATION

Page 15, paragraph 50, line 2:

For Workers read Unions

Page 21, annex I:

The name of the member from the United Kingdom of Great Britain and Northern Ireland is Mr. A. H. Bunting

The name of the member from Japan is Mr. T. Mukaibo

Page 23, paragraph 8:

Insert the reference letter b/ at the end of the quoted passage

Page 25:

In the title of document E/AC.52/R.5, for UNICEF read UNESCO

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NOTE

Symbols of United Nations documents are composed of capital letters combined with figures. Mention of such a symbol indicates a reference to a United Nations document.

E/5131

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INTRODUCTION

1. The Advisory Committee on the Application of Science and Technology to Development has in the past submitted to the Economic and Social Council a brief annual report summarizing its activities over the preceding 12 months. The eighth report (E/4970) 1/ covered the period from 16 April 1970 to 15 April 1971 and dealt with the fourteenth session of the Committee. The present report covers the period from 16 April 1971 to 15 April 1972. During those 12 months, the Committee held two plenary sessions, its fifteenth and sixteenth, the latter with the new membership approved by the Council at the organizational meetings of its fifty-second session in January 1972. The present membership of the Committee is shown in annex I.

1/ Official Records of the Economic and Social Council, Fifty-first Session, Supplement No. 10.

I. GENERAL REVIEW

Past activities of the Committee

2. The original tasks of the Advisory Committee were set out in 1963 by the Economic and Social Council in resolution 980 A (XXXVI). As a result of the United Nations Conference on the Application of Science and Technology to Development it was decided to follow up and keep under constant review the progress made in that field and to propose new measures. That was to be done by the Advisory Committee in close co-operation with agencies and institutions in the United Nations system.

3. The Committee has reviewed its own progress periodically and reported on it to the Economic and Social Council. In addition to the various subjects it has been concerned with, either on its own initiative or by reference from the Council, the Secretary-General or agencies within the United Nations system, the Committee has, in the period under review, submitted the World Plan of Action for the Application of Science and Technology to Development ^{2/} to the Council at its fifty-first session. The World Plan of Action is the outcome of several years of concerted work on the part of the Committee and the members of the United Nations system, including the regional economic commissions. The Committee considers it the single most important set of proposals it has produced. It is also its specific contribution to the Second United Nations Development Decade, and has been formulated fully within the strategy and targets set for the Decade by the General Assembly.

4. During the period since 1963, considerable progress has been achieved in the application of science and technology in the less developed countries, through national efforts and with the aid of international co-operation. Special mention should be made of the programmes carried out by members of the United Nations system under the United Nations Development Programme (UNDP) and other arrangements. Nevertheless, such progress still falls far short of the needs. The World Plan of Action, together with other efforts under United Nations auspices, is therefore an essential element in making it possible for the less developed countries - particularly the least developed - to speed up the process of their over-all development in the coming decade.

The new arrangements for consideration of science and technology

5. The Economic and Social Council, in recognition of this situation and prospects, decided at its fifty-first session to enhance and give sharper focus to its own work on science and technology in relation to development. On the one hand, in paragraph 4 of resolution 1621 B (LI), it decided to maintain the Advisory Committee in accordance with its original terms of reference; on the other, in paragraph 1 of the same resolution, it decided to establish a standing committee of

^{2/} United Nations publication, Sales No.: E.71.II.A.18.

the Council "to provide policy guidance and make recommendations on matters relating to the application of science and technology to development". At the same time, it widened the terms of reference of the Advisory Committee so that it would "furnish expertise to the Standing Committee" and "receive such instructions from the Standing Committee as will be necessary to provide it with scientific, technological and innovative advice and ideas".

6. At its fifteenth session, the Advisory Committee held its final meeting under its then existing membership. The Economic and Social Council has subsequently appointed a new slate of 24 members, 15 of whom were members previously. Thus, although there has been some change in the membership, continuity, in order to follow through the work of several years, has been assured. At its sixteenth session, the Committee had the benefit of many useful ideas from its newly appointed members. It should be noted that in anticipation of that transition, the Committee at its fifteenth session prepared a statement on past accomplishments and suggestions on the responsibilities facing the Committee (E/AC.52/L.131, annex IV). In that statement, stress was laid, among other things, on the difficulties encountered over the years in securing implementation of the Committee's proposals and recommendations; on the need for closer contacts with the executive level of the specialized agencies, including the international and regional financial agencies; on the equally important need for stronger ties and effective associations with the world scientific community; and on the overriding importance to be attached to furthering international development through the Committee's own efforts and those of other bodies in the United Nations system, within the framework of the Second United Nations Development Decade.

7. Although the terms of reference of the Council's new standing Committee on Science and Technology have not at the time of writing been decided, the Advisory Committee welcomes the creation of the Standing Committee and expresses its readiness to co-operate very closely with it. The Advisory Committee believes that the intergovernmental body set up by the Council can play an important role in ensuring the implementation of its recommendations throughout the United Nations system as well as by Governments of Member States. The Advisory Committee conceives its principal role to be that of a body of independent advisers to the Council, the Secretary-General and the members of the United Nations system. It is therefore ready to co-ordinate its work with that of the Standing Committee and looks forward to a fruitful and continuing consultation in the common tasks of ensuring the better application of science and technology to development. It will seek to avoid any unnecessary and wasteful duplication of effort. The Committee adopted a brief statement (E/5122) for consideration by the Council at its fifty-second session at the same time as the Secretary-General's report on the proposed terms of reference of the Standing Committee. It expressed the hope that the Standing Committee would include in its own work programme a continuing review of some of the major needs and problems of application of science and technology to developing countries to which the Advisory Committee since its inception has repeatedly drawn attention. These include: expanding the capacity of the developing countries to apply science and technology; research on their specific problems, appropriate technologies and technological information; the World Plan of Action; protein malnutrition; implications of major developments in science and technology; and the scope of national and international action.

Future activities and work programmes of the Advisory Committee

8. Although the Advisory Committee will duly take account of the work programme of the Standing Committee, it believes it would be useful to outline at this stage, in the light of its past and current work, its own general lines of work for the next three years, which is the term of its present membership.
9. In the first place, the Committee has decided to assign a significant proportion of its time and effort to furthering the implementation of the World Plan of Action. It is gratified to note that many of the specialized agencies have already reported some progress in studying recommendations on the World Plan and in initiating various forms of action. It believes, however, that more intensive consideration will be necessary, and is willing to assist the Secretary-General in his contacts with the UNDP administration as well as with the International Bank for Reconstruction and Development (IBRD) group and the regional financial agencies. Having sponsored the preparation of regional plans of action for Africa, Asia and Latin America, with the active participation of the secretariats of the regional economic commissions, and the collaboration of United Nations and regional agencies, the Advisory Committee will also lend its encouragement to the careful consideration of such regional plans by the regional economic commissions and other bodies, with a view to effective implementation through regional, interregional and national programmes, under the established procedures. It has also supported the preparation of a regional plan for the Middle East with the assistance of the United Nations Economic and Social Office in Beirut (UNESOB). Similarly, it intends to pursue, in close association with the UNDP administration, the exploration of ways and means of carrying out global projects on World Plan of Action priority proposals. It places great importance on the concept of global projects, on which valuable experience has already been gathered.
10. Secondly, the Advisory Committee will review progress in the application of the World Plan of Action, and for that purpose intends to study the setting up of appropriate reporting machinery and to work out a suitable methodology for continuing review and evaluation. The Committee also expects to undertake further in-depth studies of any priority areas in the World Plan of Action that may require further attention on its part or on which international co-operative efforts are not adequate or sufficient. In addition, it intends to update the World Plan of Action from time to time as new information becomes available.
11. Thirdly, the Committee, which was instrumental in starting the work on the human environment on the part of the United Nations, especially from the point of view of the application of science and technology to development, will follow closely the results of the United Nations Conference on the Human Environment to be held at Stockholm in June 1972, and will review any matters on which it may be of assistance. Among them are the questions of a registry of toxic chemicals, and the cost of non-pollutive technologies. It will particularly be interested in the relationships between environmental management and development, due account being taken of what other bodies may be working on. The Committee will stand ready to co-operate with any institutional machinery arising from the Stockholm Conference.
12. Fourthly, the Committee will develop further and closer contacts with the world scientific community, in line with its belief that the goodwill and capacity of that community have hardly been sensitized to the specific problems of the less developed countries.

13. Fifthly, the Committee intends to devote increasing attention to the question of appropriate technology, including the transfer of technology, on which it has already issued a report to the Council (E/4967). Its consideration of that matter so far, with the co-operation of the International Labour Organisation (ILO), the United Nations Industrial Development Organization (UNIDO) and the United Nations Conference on Trade and Development (UNCTAD) and other bodies, leads it to believe that the development of appropriate technologies lies at the heart of the problem of development, given the scarcity of basic capital in the developing countries, and that the whole question of transfer of technology needs to be regarded in that light. Substantial efforts have been made in the past years in the agricultural field, but there does not yet seem to be, in the world at large, sufficient study and action on industrial and other technologies.

14. Sixthly, the Committee believes, in accordance with recent preoccupations in United Nations, governmental and professional circles, that there is not yet enough understanding of the conditions - social, economic and cultural - under which there can be an effective application of science and technology in the different types of developing countries. It therefore intends to study that problem as a whole and to consider, where appropriate, comparative case studies. It believes that that work will be useful for the guidance of agencies in the United Nations system as well as for the less developed countries themselves.

15. Seventhly, the Committee has taken due note of General Assembly resolution 2658 (XXV), on the role of modern science and technology in development, and has reviewed the tentative outline for the study to be undertaken by the Secretary-General on the subject, and made certain suggestions (see the record of the fifteenth session, E/AC.52/L.131, paragraph 56). The Committee is ready to assist actively in the preparation of the report, and to consider any matter relevant to it. There is an obvious interaction between social and economic change, on the one hand, and the development of science and technology and its application, on the other, which merits continuing interest on the part of the Advisory Committee and other United Nations bodies, including those in the development and planning field.

16. The Advisory Committee, while conscious of the need for economy, believes strongly that, in view of the speed of developments in the science and technology field and the important matters under consideration, it should hold two sessions annually of somewhat shorter duration than in the past. It intends, as before, to do much of its work through working groups, where the different questions can be dealt with in greater detail and depth. It also proposes to continue, for the time being, its regional working groups for Africa, Asia, Europe and Latin America.

17. Finally, the Committee wishes to reiterate its previously expressed view that adequate human and financial resources are essential for it to discharge its responsibilities more effectively. It believes that the Department of Economic and Social Affairs (Office for Science and Technology) should be given the necessary budget support, both to continue and consolidate its work for the Advisory Committee and to provide for the additional responsibility of the substantive servicing for the Council's Standing Committee on Science and Technology.

II. ACTIVITIES OF THE ADVISORY COMMITTEE

Meetings

18. During the year under review, the Advisory Committee held two sessions. The fifteenth session was held at Geneva from 15 to 25 November 1971 and the sixteenth session at Headquarters from 5 to 13 April 1972.

19. The Working Group on Population met at the headquarters of the International Atomic Energy Agency (IAEA) at Vienna from 13 to 17 September 1971. The regional groups of the Advisory Committee met as follows: The Regional Group for Europe at Geneva on 29 and 30 July 1971; the Regional Group for Africa at the headquarters of the Economic Commission for Africa (ECA) at Addis Ababa from 18 to 21 October 1971; the Regional Group for Asia at the headquarters of the Economic Commission for Asia and the Far East (ECAFE) at Bangkok from 25 to 27 October 1971; and the Regional Group for Latin America - at the invitation of the Government of Mexico - at the Colegio de Mexico in Mexico City on 10 and 11 June 1971. In addition, several working groups and regional groups of the Committee held meetings immediately prior to or during the fifteenth and sixteenth session.

20. In accordance with the detailed guidelines laid down at the second session of its European Regional Group, the Committee devoted two days (19 and 20 November 1971) of its fifteenth session to a joint meeting with a selected group of 19 European scientists and directors of research. The meeting reached conclusions regarding international links between research and development institutions and industries of developing and developed countries and agreed upon a list of priority areas for co-operative research. The summary report on that meeting and the major conclusions it reached are available in annex V of the record of the fifteenth session of the Committee (E/AC.52/L.131).

21. The seventeenth session of the Advisory Committee is due to be held at Geneva from 23 October to 1 November 1972.

22. Prior to the seventeenth session, the Working Group on Global Projects, the Working Group on Appropriate Technology and the newly proposed Working Group on Science Policy are to meet, respectively, in New York, Geneva and Paris on dates to be determined later. The regional groups for Africa, Asia and Europe are scheduled to meet as usual at the headquarters of the appropriate regional economic commission while the Regional Group for Latin America will meet in New York.

23. During the year under review, the report of the Advisory Committee entitled World Plan of Action for the Application of Science and Technology to Development, which was approved by the Committee at its fourteenth session, was published. ^{4/} A popular version of the Plan was also published by the United Nations Centre for Economic and Social Information as a pamphlet under the title The Great Experiment: Science and Technology in the Second United Nations Development Decade. ^{5/} Other reports of the Advisory Committee have been published; two relating to the industry sector under the title Appropriate Technology and Research for Industrial Development ^{6/} and one entitled The Role of Science and Technology in Reducing the Impact of Natural Disasters on Mankind. ^{7/} Also, as recommended by the Advisory Committee at its fifteenth session, the Strategy Statement on Action to Avert the Protein Crisis in the Developing Countries, ^{8/} prepared by a panel of experts convened by the Secretary-General, was published in 1971, and part I of the report entitled The Application of Space Technology to Development, prepared by a group of consultants, is due to be published in 1972.

^{3/} For a list of selected substantive reports and publications relating to the work of the Advisory Committee from its inception in 1964 to 1972, see annex III.

^{4/} United Nations publication, Sales No. E.71.II.A.18.

^{5/} United Nations publication, Sales No. E.71.I.19.

^{6/} United Nations publication, Sales No. E.72.II.A.3.

^{7/} United Nations publication, Sales No. E.72.II.A.8.

^{8/} United Nations publication, Sales No. E.71.II.A.17.

III. MAJOR ACTIVITIES OF THE ADVISORY COMMITTEE

World Plan of Action for the Application of Science and Technology to Development

24. The Advisory Committee was informed of the reception of the World Plan by the Economic and Social Council at its fifty-first session (resolution 1638 (LI)), and the Council's intention to discuss the World Plan in depth at its fifty-second and fifty-third sessions. The Committee also endorsed the Council's instructions for the widest possible distribution of the published version with a view to obtaining the reactions of the recipients and placing them before the Council. For exploring the additional avenues for financing the Plan, the Committee suggested that informal approaches should be made at the highest level to UNDP, IBRD and bilateral and multilateral agencies such as the Development Assistance Committee (DAC) of the Organization for Economic Co-operation and Development (OECD). The Committee emphasized that a large part of the implementation of the World Plan of Action rested with the developing countries themselves.

25. In a statement adopted at the fifteenth session, the Advisory Committee strongly urged all relevant bodies within the United Nations family, national Governments and the scientific community in general to give careful consideration to the targets and proposals contained in the World Plan. The priorities of world-wide significance were pointed out in part one of the Plan, but those could differ as between regions and as between countries and consequently the full process of analysis and implementation of the World Plan requires detailed study by all the agencies, regional commissions and Governments concerned in order to determine country policies and programmes which could be co-ordinated with their development plans. In its statement, the Committee also outlined the need for special consideration of financial aspects of implementation and urged that the Governing Council of UNDP should specifically allocate part of its expected increase in resources to a special fund or account for science and technology projects in accordance with regional and country programme requests. It also urged an increase in allocation to "global projects" above the present one per cent limit. The full statement is available as an annex to the note by the Secretary-General on the World Plan of Action (E/5101) submitted to the Council at its fifty-second session.

26. At its sixteenth session, the Advisory Committee reaffirmed the views it had set out in that statement and prepared additional comments (E/5101/Add.1, annex I). The Committee emphasized that the Plan needed to receive firm support from the Council and urged the implementation of the Plan at international, national and regional levels. The Committee also saw the need for further revisions and elaboration in several areas such as industrial technology based on raw materials produced by agriculture ("post-harvest" technology), education, global projects and appropriate technology. The Committee would like to ensure momentum for the World Plan by continuing to draw it to the attention of the United Nations system and its legislative bodies, of intergovernmental organizations such as OECD, the Organization of American States (OAS), the Organization of African Unity (OAU), the World Intellectual Property Organization (WIPO), etc., and also of individual

developed and developing countries. The preparation of global projects and their submission to UNDP was one way of implementing the Plan. Regarding financing for the Plan, the Committee was of the opinion that meetings should be arranged with institutions such as IBRD, UNDP and the regional development banks to discuss ways and means of financing the future projects which would emerge from country and regional proposals. Since many programmes mentioned in the World Plan were already in progress, an inventory should be made of what had already been done or what was being undertaken in consultation with the specialized agencies and other concerned bodies.

27. The World Plan is primarily a guideline for the less developed world as a whole. In addition, the Committee has made arrangements to prepare regional plans for Africa, Asia, Latin America and the countries covered by UNESOB, which would be more specific. The Council, in resolution 1638 (LI) also requested the regional economic commissions "to consider the proposals contained in the World Plan of Action in the light of the needs of the countries in each of the regions, with a view to preparing specific plans of action for each region". Considerable progress has been made in preparing those regional plans. The plans for Africa, Asia and Latin America will be finalized by the respective regional groups at their meetings in 1972. It is hoped that the full Committee will review those plans at its seventeenth session and that subsequently they will be submitted to the Economic and Social Council in 1973. At its sixteenth session, the Committee also decided that at its next session it would establish an ad hoc group to review the preparation of the plan for the countries covered by UNESOB.

Appropriate technology and employment

28. The Advisory Committee's report entitled "Technologies appropriate for industrial development" (E/4967) ^{9/} presented to the Council at its fifty-first session had dealt primarily with the question of industrial development of the developing countries. At its fifteenth session, the Committee considered a paper entitled "Appropriate technologies, employment and income growth", prepared by the International Labour Organisation at the request of the Committee. The paper dealt with the general problem of the choice of technologies facing developing countries and outlined a proposed action programme covering all economic sectors, to assist the Governments of those countries in selecting and adopting appropriate technologies. The Committee welcomed the studies carried out by the ILO and hoped that these would be closely co-ordinated with the work in that area of UNIDO, FAO, OECD and other bodies. The Committee endorsed the ILO's programmes of country missions. Some members expressed reservations, however, on the emphasis being given to small-scale industry in the ILO work programme, noting that several of the small-scale industries succumbed to competition with larger industries. Attention was drawn to the Committee's previous observations in its own report that, in addition to the choice between technologies within an industry, there

^{9/} The report has since been published in conjunction with another report of the Advisory Committee on industrial research organizations in developing countries (E/4960) under the title, Appropriate Technology and Research for Industrial Development (United Nations publication, Sales No. E.72.II.A.3).

was also the choice between industries, and a sector-specific analysis might be more productive in that regard. The Committee felt that efforts should be concentrated on the identification of sectors with labour-intensive technologies and on areas where alternative technologies currently exist but need to be re-studied with regard to their effects on employment and economic efficiency under current conditions. Such research should continue in both the developing and the advanced countries.

29. The Committee was advised that intersecretariat consultations had been held between UNCTAD and UNIDO for implementing the Council's recommendation in resolution 1636 (LI) to study ways in which reliable information - which should include relevant data on the requirements for capital, labour, raw materials and other factors of production - on known alternative technologies for selected major industries of interest to developing countries could best be furnished in a systematic way to Governments, enterprises and industrial consultants. The Committee requested UNIDO, UNCTAD, the ILO and FAO to make a definitive attempt to implement the recommendation of the Council as soon as practicable.

30. The Advisory Committee, as mentioned in paragraph 13, intends to study in depth the question of appropriate technology and has placed the item on the agenda of its seventeenth session.

Transfer of technology

31. The Committee was informed by the representative of UNCTAD that a detailed questionnaire had been issued to the Governments of the developing and developed countries on the subject of the mechanisms and costs of transfer. The information so far received indicates that actual costs incurred, classified under several heads, are indeed very much higher than originally estimated.

32. The Committee's attention was drawn to the fact that the third session of the United Nations Conference on Trade and Development, to be convened at Santiago, from 13 April to 17 May 1972, would deal with the subject of transfer of technology, with specific reference to transfer of technology and economic development, foreign exchange cost of the transfer, and major policy issues and measures for immediate action. The action by UNCTAD would be principally concerned with four items: the establishment of institutional machinery in developing countries specifically dealing with the transfer of technology; training of specialized personnel needed for those offices; establishment of advisory services for the formulation of technology projects; and elimination of restrictive practices. The Committee welcomed the initiatives undertaken by UNCTAD and noted that those were in line with its own recommendations.

33. In response to the UNCTAD representative's invitation that the Advisory Committee be represented at the third session of the Conference, the Committee decided to ask one of its members, J. Valenzuela, to express at the Conference the Committee's interest in the work programme in transfer of technology and report back to the Committee at its seventeenth session the decisions taken by the Conference.

34. Further, the Committee agreed that the subject, being of continuing and high interest to it, should be kept on its agenda and that the Ad Hoc Working Group on Appropriate Technology should take up the question, bearing in mind the activities of other organs, such as the Division of Public Finance and Financial Institutions of the United Nations Secretariat, UNESCO, UNIDO, the ILO and other appropriate organizations.

Research for developing countries

Global research projects

35. Consultations have been held since the fourteenth session of the Advisory Committee between the Department of Economic and Social Affairs (Office for Science and Technology) and the UNDP on the possibility of increasing UNDP allocations to global research projects of importance to the developing countries. At the Committee's sixteenth session, a joint meeting was held between the members of its ad hoc Working Group on Research for Developing Countries and the representatives of UNDP (a) to consider the ways and means by which the Advisory Committee could most effectively assist in the definition and development of global projects and (b) to select broad areas considered suitable for the development of global projects. The UNDP had identified three broad areas of specific interest to it, namely, the building and construction industry, in particular housing; urban water supply and sewage treatment; and adaptation of appropriate production and management techniques with a view to more intensive utilization of manpower resources.

36. The Advisory Committee reiterated its special interest in global research projects because of their important scientific and technological research components. A consensus was reached at the joint meeting with UNDP that the Advisory Committee should in the first instance direct its efforts to assisting UNDP in reviewing proposals for their globality, priority, validity and applicability and in identifying the catalytic elements needed to develop financial participation in the implementation of the project. That should not preclude the Committee from suggesting subjects deemed especially pertinent to its work such as those from the World Plan of Action. Even if UNDP could not finance a global project, the joint Advisory Committee/specialized agencies/UNDP stamp of approval would greatly assist in stimulating the interest of other bodies with financial resources. The Committee decided to set up a small ad hoc working group on global research projects to meet with UNDP. It was decided that the first joint meeting should be held in New York prior to the seventeenth session in October 1972. It was also agreed that a representative of IBRD should be invited to participate in the consultations. The first meeting should concern itself with establishing the specific thrust, direction and administration of the joint effort, the methodology of the review function, the inputs from other bodies of the United Nations family, and the financial implications, particularly those relating to the resource requirements for meetings, project analysis and advice on providing scientific personnel for such field missions as are required for the most efficacious conduct of the reviews.

37. As regards subjects for global projects, a number of additional suggestions could be offered including such areas as education, international scientific and

technical information systems, strong ground motions due to earthquakes, and expanded production of protein for human consumption. The representatives of UNDP indicated that it would be inadvisable to diffuse efforts by undertaking too many projects, that it had already considerable activity in areas such as agriculture and education and that the interest of the members of its Governing Council seemed to indicate the need for labour-intensive projects in the industrial area. It was understood that the Administrator of UNDP was of the opinion that if well-prepared projects could be submitted to the Governing Council for approval more resources might become available. Finally, in view of the high cost of research involved in most fields, it would be useful to consider seriously a consortium-type of approach towards the funding and implementation of global projects with the participation of development banks, bilateral donors and others pooling their resources with those of UNDP in order to obtain the most effective outcome.

Case studies

38. The Advisory Committee at its fourteenth session had requested the Department of Economic and Social Affairs (Office for Science and Technology) with the assistance of consultants as needed, to carry out several studies on specific problems of importance to developing countries on which research could be carried out in the laboratories of the developed countries. The major objective was to establish guidelines which would assist the institutions in developing countries to prepare research projects in a manner which would stimulate the interest and participation of the institutions in developed countries. The Advisory Committee expects to consider the general report on that subject at its seventeenth session.

39. The Advisory Committee at its sixteenth session considered the abstracts of 14 research proposals (E/AC.52/L.136, annex) which were prepared as case studies with the assistance of consultants and research institutes in both developed and developing countries. The Committee emphasized that it was not its responsibility actively to promote research proposals from developing countries, but that it should limit its role to suggesting means whereby the United Nations system could most effectively assist in encouraging research co-operation between the developing and developed countries on problems of the developing countries. The Committee appointed a small group to study the relevant material and select two or more from the 14 case studies for a more complete formulation. The Committee also requested the Department of Economic and Social Affairs (Office for Science and Technology) to place before it at its seventeenth session a brief note containing the suggestions for a mechanism to perform a clearing-house type of function for research proposals on problems of importance to developing countries and their implementation by institutions in developed countries.

Survey of research institutions and laboratories in developed countries

40. The Advisory Committee at its fifteenth session considered two papers prepared by UNESCO on the above subject, "Survey of research institutions and laboratories in developed countries conducting research on problems specific to developing countries" (UNESCO/NS/ROU/241) and "Statistical survey of the research and experimental development effort of developed countries devoted to specific problems of developing countries" (UNESCO/NS/ROU/240). With regard to the

statistical survey, it suggested that (a) the OECD Development Aid Committee method of identification of developing countries required amending, and (b) the survey should include consideration of expenditures for research and development activities in its broadest context. It encouraged UNESCO to proceed with those two surveys and requested it to inform the Committee of further progress.

UNDP and interinstitutional links

41. The Advisory Committee welcomed UNESCO's efforts to stimulate UNDP participation in a scheme of interinstitutional links in science and technology.

The population problem in developing countries

42. The Advisory Committee, at its tenth session had decided (E/AC.52/L.54) to take up an intensive study of the problems of human fertility and related policies in relation to economic and social development. At its twelfth session, the Committee received a report, which was later published under the title Human Fertility and National Development: A Challenge to Science and Technology. 10/ That report had been prepared jointly by the United Nations, UNICEF, the ILO, FAO, UNESCO and WHO. The Advisory Committee noted that the report provided for the first time a general review of the subject areas comprising the multidisciplinary effort of the United Nations system and agreed upon a comprehensive five-year programme of work (1970-1974) in the field of population.

43. The Advisory Committee, at its thirteenth session, decided to prepare its own report which would contain an indication of priority areas of needed research as well as judgements about future work that might be stimulated within the United Nations family. 11/ The report entitled "Science and technology and problems of population growth in developing countries" (E/5107) was submitted to the fifty-second session of the Council.

Protein malnutrition confronting the developing countries

44. The Advisory Committee at its fifteenth session endorsed the Strategy Statement on Action to Avert the Protein Crisis in the Developing Countries 12/ prepared by the panel of experts convened by the Secretary-General in May 1971. The Committee recommended its widest distribution. The Committee expressed its disappointment at the reaction of the Council as expressed in resolution 1640 (LI), particularly at its omission of support for the establishment of an appropriate policy body and for the provision of a protein fund. The Committee reiterated its own recommendations to the Council in its seventh report that both those

10/ United Nations publication, Sales No. E.71.II.A.12.

11/ See Official Records of the Economic and Social Council, Fifty-first Session, Supplement No. 10, para. 30.

12/ United Nations publication, Sales No. E.71.II.A.17.

steps were urgently needed to ensure further progress in dealing with the problem, which it was convinced was of the highest priority in relation to development.

45. The Advisory Committee at its sixteenth session reviewed further developments, particularly the response of the General Assembly to the Strategy Statement. The Committee was encouraged by the interest and support for the substantive elements of the Strategy Statement in General Assembly resolution 2848 (XXVI). However, the Committee emphasized its disappointment with regard to the insufficient response to its recommendations about appropriate machinery and financial provision for United Nations activity in the protein field.

46. The Advisory Committee was informed of the decision of the Secretary-General to recommend United Nations sponsorship of the Protein Advisory Group. The Committee welcomed that step, particularly as a means of indicating the concern and broad involvement of the United Nations and the Advisory Committee in the protein problem. In the light of the Secretary-General's recommendation, that might provide a timely opportunity for a review of the modus operandi of the Protein Advisory Group, and, if called upon, the Committee would be willing to assist in such a review.

47. The Advisory Committee took note of the efforts being undertaken by the specialized agencies, including IBRD, and by UNDP and UNICEF. The Committee was informed of the activities of the Consultative Group on International Agricultural Research and of its interest in supporting certain major international institutions that are contributing or will contribute to the alleviation of the protein problem. In particular, its support for research on the genetics and breeding of legumes and on improving the technology of providing them was regarded as most welcome.

48. As to its own activities with regard to the protein problem, the Committee, over the next three years, wishes to review programmes, activities and machinery related to that area in the United Nations family of organizations, in bilateral and regional organizations and in the developing countries. The Advisory Committee expressed the hope that the Department of Economic and Social Affairs (Office for Science and Technology) would obtain, with the assistance of the organizations of the United Nations system as appropriate, all relevant information to assist it in undertaking that review on an annual basis, if necessary with the use of consultants, experts or members of the Committee to gather additional information not otherwise available on the ongoing activities in that field. The Committee also invited its regional groups and the regional economic commissions to give particular attention to the protein problem. It also recommended that the new Committee on Science and Technology should make the protein problem one of its major concerns and arrange for joint meetings between it and the Advisory Committee on that topic. A number of relevant and high-priority global projects could also be formulated by the Advisory Committee with the assistance of the newly established Advisory Committee-UNDP Working Group and the Department of Economic and Social Affairs (Office for Science and Technology). These should be submitted for consideration by UNDP, the Consultative Group of International Agricultural Research and other appropriate bodies, including FAO. Finally, the Advisory Committee urged FAO, WHO, UNESCO and other appropriate organizations to continue and intensify their efforts to help developing countries to formulate national food and nutrition policies and to

collect and analyse, by age and socio-economic group, data related to food availability, habits and consumption, and magnitude, effects and distribution of protein-calorie malnutrition. The Committee believes that data which are aggregated or expressed in broad percentage ranges limit the insight to formulate effective programmes at the national, regional and international levels. It would also be useful to provide special data covering the vulnerable groups, as described in the Strategy Statement.

Problems of human environment

49. At its fifteenth session, the Advisory Committee was informed of the progress of the preparations for the United Nations Conference on the Human Environment by the Secretary-General of the Conference. The very important interrelationship between environment and development had been examined by a group of international economists convened for two weeks at Founex and subsequently by a group of scientists (including two members of the Advisory Committee at a meeting of the Special Committee on the Problems of the Environment (SCOPE) at Canberra, organized in co-operation with the International Council of Scientific Unions (ICSU) and the Office for Science and Technology. In addition, the subject had received priority attention at four regional seminars held at Addis Ababa, Bangkok, Beirut and Mexico City. Developed countries had given consideration to the problem at a seminar held at Prague which had been convened by the Economic Commission for Europe. The Committee discussed the importance of environment to the development process and development priorities, and the distinction to be made between environment problems stemming from poverty and those resulting from economic growth. Several members of the Committee expressed concern that the direct and indirect costs involved in the protection of the environment might be a heavy burden, particularly in the developing countries, and might put them at a disadvantage in international markets. The Committee also decided to look into the cost problem of non-pollutive technologies. The Committee, at its sixteenth session, agreed upon a statement to be presented by its Chairman on its behalf to the United Nations Conference on the Human Environment to be held at Stockholm in June 1972.

50. After reviewing a proposal by the Special Committee on Problems of the Environment of the International Council of Scientific Workers, the Advisory Committee endorsed the advisability of establishing an "International registry of potentially toxic chemicals". The Advisory Committee believed that such a registry would have particular importance for developing countries, in addition to its significance to the problem of the human environment as a whole. The Advisory Committee decided to place the matter on the agenda of its seventeenth session and requested the Department of Economic and Social Affairs (Office for Science and Technology) to arrange for the preparation of a paper that would consider the action needed to set up such an international registry, and contain suggestions for obtaining political, financial, scientific and industrial support. In addition, the Advisory Committee invited SCOPE and its Registry Commission to present an additional paper to the seventeenth session, outlining the next steps for stimulating the types of study, testing and information dissemination.

The application of space technology to development

51. The Advisory Committee, at its fifteenth session, commended a draft report prepared by a group of consultants in close co-operation with the secretariat of the Committee on the Peaceful Uses of Outer Space. It recommended that the report, with some revisions, be published early in 1972 by the United Nations under the names of the authors and with a preface by the Advisory Committee. Among the earth-oriented applications of space technology, the following areas are selected in the report as most relevant for the benefit of developing countries: satellite communication, particularly for education, culture and information; meteorology; and remote sensing for natural resources and other development purposes. The report includes several proposals for action. The Committee agreed upon a statement, which is reproduced in annex II.

The role of science and technology in reducing
the impact of natural disasters

52. The Advisory Committee adopted a report entitled "The role of science and technology in reducing the impact of natural disasters on mankind" and requested that it be submitted to the Secretary-General in connexion with the consideration of the subject of natural disasters by the General Assembly at its twenty-sixth session in December 1971. The Committee further recommended that the report be brought to the attention of Governments through the regional economic commissions and that their attention be drawn to the priority areas for research and the need for the application of existing knowledge and technical assistance.

/...

IV. OTHER ITEMS

The role of modern science and technology in the development of nations and the need to strengthen economic and technico-scientific co-operation among States (General Assembly resolution 2658 (XXV))

53. The Committee re-emphasized its earlier advice, endorsed by the Council, that the Secretary-General's report should not be encyclopaedic and should omit or reduce historical or descriptive parts. Greater emphasis should be placed on part II of the study dealing with international action to strengthen international scientific and technical co-operation. The Committee also suggested that specific case studies on some major topics such as the "green revolution" or the malaria eradication programme should be used rather than an exhaustive account of all the activities of the organs of the United Nations system. As regards the Council's recommendation to explore the possibility and implications of combining the study with the UNESCO study entitled "Current trends in scientific research" in a single publication, the Advisory Committee did not think that that was feasible as the two studies had different purposes and if combined they could serve only one purpose or the other. Only one chapter of the UNESCO study touched on one section of part I of the draft outline. Co-ordination should be sought only on that one common point in the two studies.

Scientific meetings in developing countries

54. The Advisory Committee reviewed a report prepared by ICSU on its current and anticipated programmes of international scientific meetings in developing countries. The report emphasized a number of obstacles to such meetings, including the financial one. The Committee stressed the importance of personal contacts not only between scientists of developed and developing countries but also between scientists within the developing regions, particularly for subjects of regional importance.

The nature of the scientific community

55. The Committee took note of a paper on the subject prepared by an international panel convened by UNESCO. It also considered an ILO study on the employment and working conditions of highly qualified scientific and technical personnel. It recommended that the latter study be published and distributed widely.

Feasibility study of a World Science Information System (UNISIST)

56. The Committee was advised that the proposed UNESCO/ICSU information system was to cover primarily science and technology and would be based on a voluntary co-operation of individual documentation services and information centres in a universal network. The Committee decided that it should continue to keep the UNISIST programme under review and extend its support to it. Particular

attention should be given to its orientation towards meeting the practical needs of the developing countries and to the building up of the locally required skill through the provision of training opportunities.

The application of computer technology to development

57. The Advisory Committee expressed the hope that it would be possible in the new report to be prepared by the Secretary-General in response to General Assembly resolution 2804 (XXVI) to elaborate on certain aspects of the application of computer technology in developing countries which relate in particular to employment, privacy, curriculum development, management and trade barriers, including customs regulations, which impede the international movement of hardware and software. The report might also review the strategies proposed for the sound use of computer technologies in developing countries, particularly regional activities and bilateral links, to ensure the necessary flexibility of the plans. For that purpose, it would be useful to gather up-to-date data and information concerning the current situation in the developing countries in the field. Attention was drawn to the necessity for computer software to be freely accessible to developing countries without any proprietary restrictions.

Systems approach to development

58. At its fifteenth session, the Committee considered the contributions received from UNCTAD, UNESCO, WHO, IBRD, the International Telecommunication Union (ITU) and UNIDO on the use of systems analysis with regard to items in their work programmes and suggested that instances of useful application of systems analysis be transmitted to Governments of developing countries. As to its own work in the area, the Committee was doubtful if it could make any specific contribution at the present time.

Creation of basic technology and research facilities for natural resources development

59. The Committee decided that its previous report entitled Natural Resources of Developing Countries: Investigation, Development and Rational Utilization, ^{13/} chapter VIII on natural resources of the World Plan of Action and the report on the application of space technology prepared by consultants ^{14/} would help in estimating the requirements for the creation of basic technology and research facilities for development in the fields of water, energy and mineral resources. It wished to draw these reports to the attention of the Committee on Natural Resources.

^{13/} United Nations publication, Sales No. E.70.II.B.2.

^{14/} To be issued as a United Nations publication.

Science policy for developing countries

60. In the discussion of several items on the agenda, the importance of science policy for developing countries was underlined. The Committee suggested that a review should be undertaken of the important work programme of UNESCO in that field. It was pointed out that the work had considerable significance for most of the matters with which the Advisory Committee was dealing, particularly the World Plan of Action. It was agreed that the Director-General of UNESCO should be asked if he would be agreeable to the establishment of a small working group of five Advisory Committee members to study the work being undertaken in a short meeting which could be held at UNESCO headquarters later in the year.

Annex I

MEMBERS OF THE ADVISORY COMMITTEE

P. V. Auger (France)
A. H. Buntung (United Kingdom of Great Britain and Northern Ireland)
M. Castel (Algeria)
C. Chagas (Brazil)
W. K. Chagula (United Republic of Tanzania)
R. Diez-Hochleitner (Spain)
J. M. Gvishiani (Union of Soviet Socialist Republics)
J. G. Harrar (United States of America)
A. Keynan (Israel)
T. Kristensen (Denmark)
Sir Arthur Lewis (St. Lucia)
M. G. K. Menon (India)
T. Nukaibo (Japan)
L. Mukendi (Zaire)
J. Novák (Czechoslovakia)
L. Rousseau (Canada)
F. T. Sai (Ghana)
A. Salam (Pakistan)
I. Staicu (Romania)
V. L. Urquidi (Mexico)
J. Valenzuela (Chile)
N. B. Videnov (Bulgaria)
Sir Ronald Walker (Australia)
M. Yeganeh (Iran)

Annex II

THE APPLICATION OF SPACE TECHNOLOGY TO DEVELOPMENT: STATEMENT ADOPTED BY THE ADVISORY COMMITTEE AT ITS FIFTEENTH SESSION

1. The Advisory Committee on the Application of Science and Technology to Development has reviewed the present status of scientific and technological knowledge which has been acquired from the recent space activities, and is of the opinion that the potential value of earth-oriented practical space applications to the development of countries is considerable.

2. It suggests that developing countries should pay increased attention to the space technology applications, and consider carefully which of these applications could help solve their own priority problems and enable them to obtain a quantum jump in their process of development. The areas selected by the Committee as offering particular opportunities to developing countries are the following:

(a) The use of satellites for point-to-point communications, with a view to providing more extensive data communications, telephone and radio coverage;

(b) The use of direct broadcast satellites to obtain a wide distribution of education by television programmes;

(c) The use of meteorological satellites for weather information, particularly for agricultural purposes, water management etc.;

(d) The use of remote sensing systems, from aero or space-platforms when this technology has passed the experimental stage may provide more comprehensive and accurate surveys of earth, hydrologic and oceanographic resources, a better control of environmental and ecological conditions, particularly pollution, and the monitoring of agricultural resources, management and productivity;

(e) At a later stage, the use of navigation satellites for aircraft guidance and communications.

3. The Advisory Committee recommends that developing countries seek the assistance of the Outer Space Affairs Division of the United Nations Secretariat and of the specialized agencies in elaborating their own programmes in the field, which should include, inter alia:

(a) An information phase raising the general awareness on the subject;

(b) A definition of the priority needs of the country which can be fulfilled by space technology applications;

(c) The training of selected nationals of the country; and their participation in demonstrations;

(d) The assessment by the nationals of selected space applications by considering cost-benefits and other aspects of their usefulness;

(e) Planning and implementation of operational systems, as will be required by the national planning.

4. To implement their plans, Member States could already take advantage of the programme of practical applications set up by the United Nations and the specialized agencies and send competent participants to the technical panels currently being organized by the Outer Space Affairs Division; countries should also send their qualified nationals to take part in the training programmes and fellowships offered by Member States through the United Nations and the specialized agencies and get acquainted with the publications issued in these fields by the United Nations system and Member States.

5. Considering that the report by the consultants can contribute to raising the awareness of countries as regards space technology by "demystifying" the subject, the Advisory Committee recommends that part I of it be given a wide distribution with the preface approved by the Committee. The Committee recommends that part I be published in printed form early in 1972.

6. As regards part II of the consultants' report, which describes the state of affairs in 1970, the Advisory Committee is of the opinion that it might usefully be brought up to date in close co-operation with the Committee on the Peaceful Uses of Outer Space, to serve as a progress report of the World Plan of Action at the biennial review of the Second United Nations Development Decade, and also as a milestone of the progress achieved since the Conference held at Vienna in 1968 on Space Exploration and Applications.

7. The Advisory Committee calls the attention of Governments to its previous reports on these subjects, particularly the World Plan of Action on the Application of Science and Technology to Development, a/ chapter XV, section 6 on Space technology, and also to the reports prepared by the Committee on the Peaceful Uses of Outer Space, its Scientific and Technical Sub-Committee, and particularly the recent reports of its Working Group in Direct Broadcast Satellites and of the United Nations Panel on Remote Sensing Systems for Earth Resource Surveys.

8. The Advisory Committee calls also the attention of Governments to the establishment by the Committee on the Peaceful Uses of Outer Space of a Working Group on Remote Sensing of the Earth by Satellites with the main objective of promoting

"the optimum utilization of this space application including the monitoring of the total earth environment for the benefit of individual States and of the international community, taking into account, as may be relevant, the sovereign rights of States and the provisions of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies".

a/ United Nations publication, Sales No. E.71.II.A.18.

b/ A/AC.105/95, para. 16.

Annex III

A LIST OF SELECTED SUBSTANTIVE REPORTS AND PUBLICATIONS RELATING
TO THE WORK OF THE ADVISORY COMMITTEE ON THE APPLICATION OF
SCIENCE AND TECHNOLOGY TO DEVELOPMENT, 1964-1972

<u>Subject and title</u>	<u>Symbol</u>
<u>Annual reports to the Council</u>	<u>Official Reports of the Economic and Social Council</u>
First	<u>Thirty-seventh Session, Supplement No. 14</u>
Second)	<u>Thirty-ninth Session, Supplement No. 14</u>
Third) (of substantive importance)	<u>Forty-first Session, Supplement No. 12</u>
Fourth	<u>Forty-second Session, Supplement No. 8</u>
Fifth	<u>Forty-fourth Session, Supplement No. 8</u>
Sixth	<u>Forty-sixth Session, Supplement (E/4611)</u>
Seventh	<u>Forty-ninth Session, Supplement No. 9</u>
Eighth	<u>Fifty-first Session, Supplement No. 10</u>
Ninth	<u>Fifty-third Session, Supplement No. 8</u>
 <u>World Plan of Action for the Application of Science and Technology to Development</u>	
 <u>Science and Technology for Development: Proposal for the Second United Nations Development Decade</u>	United Nations publication, Sales No. E.70.I.23
 <u>World Plan of Action for the Application of Science and Technology to Development</u>	United Nations publication, Sales No. E.71.II.A.18
 <u>Machinery for science and technology in the United Nations system/Future institutional arrangements for science and technology</u>	
Paper prepared by the Secretariat	E/AC.52/L.67
Report of the Secretary-General	E/4845
Report of the Advisory Committee	E/4827

<u>Subject and title</u>	<u>Symbol</u>
<u>Science education</u>	
Some considerations in regard to public education	STD/9/11
The learning process and the teaching of science and mathematics in developing countries	E/AC.52/3
First report of the Advisory Committee to the Council	E/4448
Report of the United Nations/UNICEF Working Party on the Improvement of Science Education with Special Reference to Developing Countries	E/AC.52/R.5
Second report of the Advisory Committee to the Council	E/4814
<u>Science and technology in relation to industrial development</u>	
Technologies appropriate for industry in the developing countries	STD/5/RPCA/IND/1
<u>Appropriate Technology and Research for Industrial Development</u>	United Nations publications, Sales No. E.72.II.A.3
<u>The outflow of trained personnel from developing countries</u>	
The problem of emigration of scientists and technologists ("brain drain" or " <u>exode des compétences</u> ")	SC/WS/57
<u>Links with developing countries</u>	
Seminar with North American scientists on links with developing countries	STD/9/6
<u>The systems approach to development</u>	
Cost-benefit analysis as an aid to decision-making in the application of science and technology to development	SC/WS/203
Systems analysis and cost-benefits	E/AC.52/L.92

<u>Subject of title</u>	<u>Symbol</u>
<u>Transfer of technology</u>	
The channels and mechanisms for the transfer of technology from developed to developing countries	TD/B/AC.11/5
<u>The population problem</u>	
Approaches to the human fertility problem	STD/10/3
<u>Human Fertility and National Development: A Challenge to Science and Technology</u>	United Nations publication, Sales No. E.71.II.A.12
Science and technology and problems of population growth in developing countries	E/5107
<u>The problem of protein malnutrition</u>	
Report of the Secretary-General	E/4592 and Add.1-4
<u>Feeding the Expanding World Population: International Action to Avert the Impending Protein Crisis</u>	United Nations publication, Sales No. E.68.XIII.2
<u>Strategy Statement on Action to Avert the Protein Crisis in the Developing Countries</u>	United Nations publication, Sales No. E.71.II.A.17
<u>Natural resources</u>	
<u>Natural Resources of Developing Countries: Investigation, Development and Rational Utilization</u>	United Nations publication, Sales No. E.70.II.B.2
<u>Natural Disasters</u>	
<u>The Role of Science and Technology in Reducing the Impact of Natural Disasters on Mankind</u>	United Nations publication, Sales No. E.72.II.A.8
<u>Computer technology</u>	
<u>The Application of Computer Technology for Development</u>	United Nations publication, Sales No. E.71.II.A.1
<u>Space technology</u>	
<u>The Application of Space Technology to Development</u>	To be issued as a United Nations publication

Subject if title

Symbol

General exposition on science and technology
for development

Pierre Rondière, Rendez-vous 1980: La science
et la technique au secours du tiers-monde

Paris, Petite Bibliothèque
Payot, 1968

The Great Experiment: Science and Technology
in the Second United Nations Development
Decade

United Nations publication,
Sales No. E.71.I.19

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