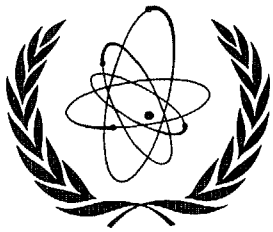
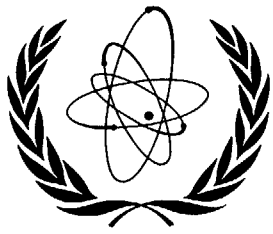


International Atomic Energy Agency

# ANNUAL REPORT TO THE ECONOMIC AND SOCIAL COUNCIL OF THE UNITED NATIONS FOR 1969-1970



International Atomic Energy Agency

# ANNUAL REPORT TO THE ECONOMIC AND SOCIAL COUNCIL OF THE UNITED NATIONS FOR 1969-1970

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# THE AGENCY'S ANNUAL REPORT TO THE ECONOMIC AND SOCIAL COUNCIL OF THE UNITED NATIONS FOR 1969-70

The text of the Agency's annual report to the Economic and Social Council of the United Nations for 1969-70 is reproduced in this document for the information of all Members.

# ANNUAL REPORT BY THE INTERNATIONAL ATOMIC ENERGY AGENCY TO THE ECONOMIC AND SOCIAL COUNCIL OF THE UNITED NATIONS FOR 1969-70

(1 April 1969-31 March 1970)

## CONTENTS

## List of abbreviations

| | |
|---|---|
| Agency | International Atomic Energy Agency |
| CNNWS | Conference of Non-Nuclear-Weapon States |
| ECE | Economic Commission for Europe |
| ECOSOC | Economic and Social Council of the United Nations |
| ENEA | European Nuclear Energy Agency of OECD |
| EURATOM | European Atomic Energy Community |
| FAO | Food and Agriculture Organization of the United Nations |
| IAEA | International Atomic Energy Agency |
| IHD | International Hydrological Decade |
| INIS | International Nuclear Information System |
| OAU | Organization of African Unity |
| OECD | Organisation for Economic Co-operation and Development |
| UNDP(SF) | United Nations Development Programme (Special Fund component) |
| UNDP(TA) | United Nations Development Programme (Technical Assistance component) |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNIDO | United Nations Industrial Development Organization |
| WHO | World Health Organization |
| WMO | World Meteorological Organization |

## INTRODUCTION

1. This report deals with aspects of the Agency's work that are of special interest to ECOSOC, further information about the Agency's programme being given in its annual reports to the General Assembly. The present report, which covers the period 1 April 1969 to 31 March 1970, is in the form of an analytical summary, as in previous years, and the structure is in accordance with requests made earlier by ECOSOC.

2. Environmental problems are of growing interest to the United Nations family as a whole and they are of particular interest for the future of the nuclear power industry. In the belief that ECOSOC will be interested to know of the care that is being taken to control the environmental effects of the application of nuclear technology, an addendum to the present report, entitled "Nuclear Energy and the Environment", is being submitted separately.

## CONSTITUTIONAL DEVELOPMENTS AND ACTIVITIES OF MAJOR ORGANS

3. At is thirteenth regular session in September 1969 the General Conference of the Agency approved Ireland for membership of the Agency, and reappointed Dr. Sigvard Eklund as Director General for another term of four years, from 1 December 1969.

4. During the past year the Board of Governors and the General Conference have given special attention to questions discussed at the Conference of Non-Nuclear-Weapon States (CNNWS) in August-September 1968, which subsequently became the subject of resolutions of the General Assembly later that year. The action taken by the Agency has been reported upon in detail to the General Assembly and was discussed again by the Assembly in November and December 1969 at its twenty-fourth session. As a consequence[1], the Agency will again be submitting reports to the General Assembly on the action it has taken in regard to the recommendations of CNNWS and to the establishment within its framework of an international service for nuclear explosions for peaceful purposes under appropriate international control.

5. The present status of some of the matters discussed by CNNWS is described in the following paragraphs.

### Composition of the Board of Governors

6. The Agency's General Conference, at its thirteenth regular session, in September 1969, requested the Board to make every effort to present a draft amendment of Article VI of the Statute, concerning the composition of the Board, to the Conference at its fourteenth regular session, in September 1970[2]. The Ad Hoc Committee of the Whole, open to all Member States of the Agency, which is dealing with this question, held its eighth meeting in December 1969 and its ninth and tenth meetings in February 1970. More than 50 of the Agency's 103 Member States attended these meetings. Several proposals have been submitted to the Committee and discussions are continuing.

### Provision of services in connection with nuclear explosions for peaceful purposes

7. At the same session the General Conference endorsed a study that the Board had made of the Agency's responsibility to provide services in connection with nuclear explosions for peaceful purposes.[3] Similar conclusions had been reached by the Secretary-General in

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[1] See General Assembly Resolutions 2605 A (XXIV) and 2605 B (XXIV).

[2] General Conference Resolution GC(XIII)/RES/261.

[3] General Conference Resolution GC(XIII)/RES/258.

a report that he submitted to the General Assembly, analysing the results of a questionnaire sent to Member States of the United Nations. The matter is now under further study. After the preparatory work had been done in December 1969 by a small group of experts, a panel on the peaceful uses of nuclear explosions was held from 2-6 March 1970 as the first of a series of meetings during which different aspects of the technology, including health and safety, will be discussed. There were 57 participants or observers from 29 Member States, the United Nations and WHO. Among the matters discussed were the phenomenology of cratering and of contained explosions. Of particular interest were possible engineering applications.

Financing of nuclear projects

8. The General Conference also asked the Director General to make a comprehensive study of the likely capital and foreign exchange requirements for nuclear projects in developing countries during the next decade; of ways and means to secure financing for such projects from international and other sources on favourable terms; and to make suggestions concerning a constructive role which the Agency could play in this regard. [4] The Secretariat began the study in October 1969, seeking the collaboration of countries exporting capital for power development, the developing countries themselves, the International Bank for Reconstruction and Development (the President of which had offered his help in this connection) and other financing institutions. The study will be examined by the Board in June and a report thereon will be submitted to the General Conference in September 1970.

Fund of special fissionable materials for the benefit of non-nuclear-weapon States

9. Although some 70 requests have been met from the Agency's existing fund of some 5000 kg of special fissionable materials, the transactions have almost all involved small quantities (for research reactor or other research purposes), and the fund remains virtually intact. However, in response to enquiries made by the Director General to the Member States of the Agency that produce special fissionable materials, France, the United Kingdom of Great Britain and Northern Ireland, and the United States of America indicated that special fissionable materials will be available through the Agency on the same terms and conditions as they are available through bilateral channels. The Union of Soviet Socialist Republics, in addition to fulfilling its obligations under the agreement with the Agency of 11 May 1959, expressed its willingness to enrich raw materials belonging to non-nuclear-weapon States, parties to the Treaty on the Non-Proliferation of Nuclear Weapons, either on a bilateral basis or through the Agency. The General Assembly has since requested the Agency to continue its efforts to ensure the supply to Member States, when required and on a regular and long-term basis, of special fissionable materials including materials for power reactors. [5]

10. The Government of Mexico has indicated that it will seek nuclear fuel for its first power plant through the Agency's channels; this will be the first request that the Agency will have received for fuel for a power station.

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[4] General Conference Resolution GC(XIII)/RES/256.

[5] General Assembly Resolution 2605 A (XXIV).

## DEVELOPMENTS IN MAJOR PROGRAMMES

11. The amounts spent in 1969-70 on the main programmes of the Agency were[6]:

| | |
|---|---|
| Nuclear power | 930 000 |
| Nuclear science in food and agriculture | 1 330 000 |
| Nuclear science in medicine | 540 000 |
| Nuclear science in industry and hydrology | 600 000 |
| Nuclear science information | 1 650 000 |

### A. Nuclear power

12. In 1969 approximately 19 000 MW of nuclear electrical generating capacity was ordered throughout the world. Orders in the United States remained below the high 1966-67 levels, while a sharp increase was noticeable in Europe and the Far East. The forecast of 310 000-340 000 MW of installed capacity throughout the world by 1980, mentioned in last year's report, still seems to be a reasonable approximation; two developing countries, China and the Republic of Korea, ordered their first plants in 1969 and the share of nuclear capacity expected to be in operation in developing countries by 1980 is now estimated at about 7% of the world's total as compared to 5% a year ago.

13. The problems facing developing countries in introducing nuclear power and the prospects for future growth of their programmes were succinctly analysed by the group of experts that the Secretary-General called together last year to study the contributions that atomic energy can make to the economic and scientific advancement of developing countries.[7] Broadly speaking, the introduction of nuclear power in developing countries depends, on the one hand, upon the state of their scientific and technological infrastructure, and on the other hand upon the existence of sufficiently large interconnected power grids capable of accepting relatively big units. In this connection, it should be noted that nuclear plants are particularly competitive in large sizes because, with increasing capacity, their unit capital costs decrease more markedly than those of conventional plants. For plants of equal size initial financial requirements are, however, larger for nuclear than for conventional stations. It is for this reason that the problem of financing was singled out by the Agency's General Conference as it was by the Secretary-General's group of experts and by the General Assembly itself.

14. The Agency's programmes have continued to concentrate on the problems of the developing countries. Thus, for instance, the Agency held a large symposium in Istanbul in October 1969 on nuclear power costs and economic development. This provided participants, a number of whom came from developing countries, with a valuable opportunity to exchange experience about the problems encountered in planning a first nuclear power station. Participants in the symposium stressed the importance of close collaboration from the very start, between the nuclear energy authorities responsible for the technical aspects of the plant and the public utility companies that will be responsible for running it. The matters discussed will be taken further at a symposium on the economic integration of nuclear power stations in electric power systems, that the Agency is convening jointly with ECE in September 1970.

15. The Agency also held an international survey course on technical and economic aspects of nuclear power for two weeks in September 1969. This was attended by 64 senior engineers and scientists, chiefly from the developing countries, many of whom were already planning or carrying out nuclear projects. The course paid special attention to the problems of introducing nuclear power to the developing countries.

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[6] This list does not include all of the Agency's activities, in particular its safeguards programme and its regulatory and standard-setting functions which are reported upon to the General Assembly.

[7] United Nations document A/7568.

16. The use of nuclear power in developing countries could also be promoted if smaller economically competitive power reactors could be developed. The Agency has made an internal study of this matter and is carrying out a co-ordinated research programme on the desirable technical characteristics and the costs of intermediate-sized power reactors.

17. In November 1969 a symposium, held in Prague, reviewed the performance of the components that have been used in the first generation of nuclear power reactors. The symposium noted that the troubles encountered in earlier years (chiefly with non-nuclear components) now seem to be over, and that utilities and manufacturers foresee an improved performance with the components in new plants. In this connection the Agency has issued the first of a series of annual reviews on operating experience of nuclear power stations in its Member States.

18. In 1966-67 the sudden spurt of orders for new nuclear plants raised expectations of a revival in demand for nuclear raw materials, particularly uranium. These expectations are reflected in some of the recommendations in the report of the Secretary-General's group of experts referred to above[7]. Although the most recent trends suggest that there will be a temporary slow-down in uranium exploration in the next few years, the long-term requirement is such that much of the uranium ore required to satisfy the projected demands up to the mid-1980s will have to come from deposits not yet found or delineated. The Agency is following developments by maintaining contact with Member States on the subject, and is carrying out periodic reviews jointly with ENEA. The next joint report on uranium resources and production estimates will be published later in the year. In the meantime, important new deposits are being brought into production in Niger and the Central African Republic as well as in certain other countries which are major producers of uranium.

19. In expectation of the long-term demand, exploration and prospecting is continuing with the Agency providing technical assistance to a number of countries. The Agency is also helping Greece and Pakistan to prepare requests for assistance from UNDP(SF) for this purpose. Training is also being provided as, for example, by the course on this subject held in Argentina in September-October 1969.

### B. Nuclear science in food and agriculture

20. The joint IAEA/FAO programme continues to give particular attention to co-ordinating research using nuclear techniques to increase and improve the production of rice and wheat. The co-ordinated programmes cover subjects such as radiation breeding, studies of the best use of fertilizers and use of nuclear techniques in measuring water content of soils. Radiation-induced mutant varieties of plants are now being grown on millions of acres throughout the world. At a joint IAEA/FAO symposium held in the United States in July 1969, it was reported that 80 radiation-induced mutant crop varieties had already been released to farmers.

21. In 1969 a joint WHO/FAO/IAEA group of experts recommended that provisional wholesomeness clearance for five years be given to potatoes, wheat and wheat products that had been irradiated for purposes of disinfestation or to prevent sprouting. The clearance will be reviewed in 1974. The Agency is planning to establish jointly with ENEA an international research and wholesomeness project that will provide, amongst other things, some of the data needed to confirm the provisional clearance of the foodstuffs in question. The Agency is also promoting the use of irradiation for fish preservation and has completed a research and demonstration project in Iceland which included test shipments by sea from Iceland to the United States of fish preserved by radiation.

22. The UNDP(SF) project in Central America has successfully demonstrated the effectiveness of the sterile male technique for control of the Mediterranean fruit fly. The project has been extended to 30 June 1970. New co-ordinated programmes have been started for

controlling other insects; for instance, the Agency's Laboratory at Seibersdorf has made a decisive improvement in methods of artificial rearing of the tsetse fly, which makes it possible to breed the insect by feeding it on blood through an artificial membrane instead of on a living animal as heretofore.

23. The Agency is also supporting co-ordinated research on using nuclear techniques to study the effects of pesticides such as DDT and pesticide residues which are causing increasing concern to public health authorities.

24. Four training courses were held by members of the Agency's staff in 1969 on nuclear applications in food and agriculture. Progress in the use of nuclear techniques in animal husbandry includes wider use of radiation for the preparation of certain vaccines and nuclear research on the prospects of using non-protein nitrogen (e. g. urea) for food for cattle and other ruminants.

### C. Nuclear science in medicine

25. The addendum to last year's report[8] described in broad terms the division of labour that has been agreed to between the Agency and WHO. This was further elaborated in detailed arrangements agreed to by the two Secretariats in May 1969. To a growing extent, programmes are designed to fit into various related activities of WHO. The Agency's programme is very varied and is best illustrated by the following examples of some of the activities undertaken or planned in 1969-70:

(a) Training courses held in Bombay on radiation microbiology, and in Khartoum on medical applications of isotopes, for scientists from developing countries;

(b) The launching of a joint IAEA/WHO co-ordinated research programme on the use of nuclear techniques in the studies of iron nutrition; and

(c) International symposia held in co-operation with WHO in Athens on radiation-induced cancer, and in Vienna on in vitro procedures with radioisotopes in clinical medicine and research.

26. The Agency has also developed further a postal dose intercomparison service whereby radiation centres throughout the world can check the accuracy of the radiation doses given by the equipment that they use.

### D. Nuclear science in industry and hydrology

27. Ionizing radiation is steadily becoming more important as a tool in chemical and plastic industries, for instance in the manufacture of "non-iron" textiles, the curing of paint, the making of wood plastic composites for furniture and buildings and the cross-linking of polyethylene for cable and wire insulation. The progress made in the use of large radiation sources was reviewed at an international symposium in Munich in August 1969, which was attended by technicians and scientists from 30 countries and endorsed the plans of some developing countries to establish large industrial projects involving radiation processing.

28. Other industrial projects include:

(a) The completion of a research programme on neutron moisture gauges, which will give users of these devices (in civil engineering, agriculture and hydrology) a clear picture of their advantages and limitations;

(b) A panel, held in Cracow, on nuclear techniques and mineral resources, which reviewed techniques of special interest to developing countries; and

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[8] "Atomic Energy in the Developing Countries. The 1968-69 Programme." Addendum to document INFCIRC/126. (United Nations document E/4650/Add.1.).

(c) A co-ordinated research programme to develop nuclear techniques (geochemical and geobotanical) for prospecting non-nuclear minerals such as iron and other ferrous metals.

29. The Agency and UNIDO are consulting with a view to co-operating in certain industrial projects.

30. In hydrology the Agency has continued to work with FAO, UNESCO, WMO and the United Nations to introduce isotope techniques in several major water resource studies in Central, West and North Africa, as well as in smaller studies in Afghanistan, India and Nicaragua. Expert advice was given to Argentina, Brazil, Chile, Iran, Kenya, Niger, Venezuela and Yugoslavia. An IHD Working Group meeting on nuclear techniques in logging boreholes was held in June 1969 in Vienna. A seven-week training course on nuclear techniques in hydrology was held in São Paulo in November 1969. It was attended by 23 hydrologists from nine Latin American countries. In March 1970 the Agency held a symposium on the use of nuclear techniques in hydrology, which was followed by a panel meeting on carbon isotopes in subsurface hydrology.

### E. Nuclear science information

31. The International Nuclear Information System (INIS) described to the Council in earlier reports, will begin operation in May 1970. Work will start on a limited scope of subjects of maximum interest to Member States. Many Members have undertaken to provide input into INIS, and it is clear that most of the world's new information on the topics selected will be reported. International and regional organizations concerned with atomic energy are also co-operating. The services that will be available from May 1970 include magnetic tape records of bibliographic descriptions and keywords, a monthly announcement bulletin, abstracts on "microfiche" of all items reported to the system and the provision to Member States of full texts on "microfiche".

32. The scientific information programme for 1969-70 has also included 14 major symposia and seminars attended by a total of 2568 participants from 70 countries and international organizations. In 1968 the Agency began to give financial help to selected scientists from developing countries who wished to attend its symposia. This project has been widely welcomed and has been continued.

## CO-ORDINATION WITH OTHER INTERNATIONAL ORGANIZATIONS

33. The Agency has collaborated closely with the United Nations in various tasks arising out of resolutions adopted by the General Assembly in 1968 on the matters discussed by CNNWS. Besides preparing several reports requested by the General Assembly, the Agency extended its help to the United Nations Secretariat and to the group of experts convened by the Secretary-General to prepare the report referred to in paragraph 13 above. The two Secretariats have also arranged that as a matter of routine, consideration will be given to the use of nuclear techniques in water resource projects carried out by the United Nations on behalf of UNDP, as well as to co-operation in the development of nuclear raw materials.

34. In paragraph 25 above, reference is made to the working arrangements agreed to with WHO in May 1969 as well as to a number of joint projects that the two organizations have carried out. Besides these, WHO is now co-sponsoring certain codes of practice of the Agency dealing with nuclear safety, and the Agency's laboratories are co-operating with WHO in some of its activities.

35. Co-operation with UNIDO continued to develop satisfactorily in such administrative matters as the complete pooling of computer services, using the Agency's new IBM 360/30 computer, and certain language services. The two Secretariats have started consultations to ensure co-operation in technical programmes, both at Headquarters and in the field; preliminary outlines of arrangements for co-operation have been drawn up.

36. In July 1969 the Agency and UNESCO concluded the agreement for the joint operation, from 1 January 1970, of the International Centre for Theoretical Physics in Trieste.

37. The Agency provided advice and assistance to OAU, with which it concluded a co-operation agreement in September 1968, in holding a symposium on the peaceful uses of atomic energy in Africa, from 28 July to 1 August 1969. This was convened in the Democratic Republic of the Congo, and was the first major international meeting on nuclear energy held in Africa south of the Sahara.

38. With regard to the preparations being made for the coming into operation of INIS[9] EURATOM has in principle accepted a contract under which it will make much of its experience, and in particular, its thesaurus of keywords available for use.

## TECHNICAL CO-OPERATION ACTIVITIES

39. It was pointed out in last year's report that the developing countries are becoming increasingly aware of the benefits they can derive from the applications of atomic energy for peaceful purposes, especially in agriculture and industry. Moreover, many developing countries have by now completed the first phase of introducing nuclear techniques in that they have set up atomic energy centres or laboratories and have trained the nucleus of personnel required to operate them. They are therefore seeking practical outlets for this newly acquired scientific capacity, particularly in the application of nuclear techniques in local industry, agriculture and medicine. The research reactors now functioning in many developing countries are also providing local supplies of radioisotopes, thus reducing requirements for foreign exchange and enabling radiation processes to be applied more widely on a national scale, particularly in industry.

40. Technical co-operation projects resulted in more assistance being provided by the Agency to the developing countries in 1969 than in any preceding year, as the total value of the assistance amounted to $3 673 300. Shown by source of assistance, this total is made up as follows:

| | |
|---|---|
| The Agency's Regular Programme of Technical Assistance | $1 577 700 |
| Assistance provided in kind | 593 900 |
| UNDP(TA) | 1 237 900 |
| UNDP(SF) | 263 800 |
| | $3 673 300 |

41. Assistance provided to individual countries in 1969 included: 148 experts and 16 visiting professors; equipment and supplies valued at $831 500; and 294 country programme fellowship awards. In addition, 13 awards were made to cover the cost of visits of senior scientists from developing countries to institutes abroad.

42. Important supplements to country programme assistance are the short-term training projects conducted at the regional and interregional level. In 1969, these projects included: a study tour of nuclear centres in three countries, a survey course, a regional training and demonstration programme (involving visits of scientists to 24 countries in the region), nine training courses (two of which were financed from FAO resources) and a visiting seminar held in nine countries. A total of 916 persons representing 59 countries took part in these activities; 724 participated either at the expense of their Government or of another United Nations organization. In addition, 66 experts and lecturers as well as equipment and supplies valued at $51 300 were provided for these projects.

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[9] See para. 31 above.

## ADMINISTRATIVE AND BUDGETARY QUESTIONS

43. In 1969 the Agency's total Regular Budget amounted to $11 251 000 of which $10 887 500 represented assessed contributions from Member States. The Regular Budget for 1970 has been set at $12 250 000 including a contingency appropriation of $100 000 which may be utilized only after special authorization by the Board of Governors. Of the total Regular Budget an amount of $11 853 000 represents assessed contributions.

44. The Agency's Operational Budget amounted to $2 512 000 in 1969 and has been set at $2 587 000 for 1970. Of these amounts, $2 000 000 represents the target set for voluntary contributions from Member States each year since 1962; the balance in each case is to be obtained from special contributions for specific purposes (such as the International Laboratory of Marine Radioactivity in Monaco and the International Centre for Theoretical Physics in Trieste) and from minor miscellaneous income. By 31 March 1970 pledges of voluntary contributions for 1969 amounted to 74.79% and for 1970 to 80.48% of the target.

45. During the past year several reports have been received from the Joint Inspection Unit of the United Nations and have been brought to the attention of the Board of Governors.