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# Report on Treatment of Water Resources Development in the United Nations Family of Organizations

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by C. S. Jha Joint Inspection Unit

> Geneva June 1972

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#### FORLWORD

This report has been prepared after an examination and study of the activities of the members of the UN family of organizations concerned with water resources, namely UN, FAO, WHO, UNESCO, WMO and IAEA. The report has six appendices, one devoted to each of the above organizations, wherein an examination together with a brief appraisal and review of the activities has been made. with a view to reducing the volume of documentation, copies of these appendices have been forwarded to each of the organizations concerned and should be available for reference to Member States and others who may be interested.

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#### CHAPTER I

#### Introduction

The raison d'être of the present study is the prime importance 1. of water as a natural resource whose proper exploitation and utilization are directly or indirectly essential for every phase of economic activity and the wide and complex involvement of many members of the United Nations family in activities of various kinds based on water and aimed at assisting Member States. The purpose of this study is to determine firstly, the manner in which each of the organizations of the United Nations family interested in the subject of water is performing its allotted functions, secondly to what extent they coordinate their activities and thirdly, in what manner gaps, if any, can be filled in the future so as to ensure an integrated approach and a maximum contribution by the United Nations to the solution of the problems related to the use of water by Member States. In a broad sense all Member States, developed or developing, are underdeveloped in relation to the conservation and use of water.

2. Precise estimates of all expenditures, direct and indirect, on water resources are difficult to make, but it can safely be said that the United Nations family of organizations today spends some thirty million dollars every year on activities and operations connected with water.

3. In recent decades the demand for water as an essential component of economic activity has increased enormously. The growing world population, along with the fact that the under-developed and underprivileged countries of the world have embarked on rapid economic and social development, has resulted in further increase in demand for water for agriculture, forestry, industry, community water supply, fisheries, production of electric power, transport, sport, tourism, etc.

Although water is a renewable natural resource, the water cycle 4. is a fairly long one, liable to distrubance by human activities; and considering its ever increasing actual and potential use, water other than water in the seas, is becoming a natural resource in short supply, which makes it imperative to make the most prudent, economic and effective use of available resources. Both in developing and developed countries new sources of water must be found and all available water resources have to be brought under proper management. The pollution of surface and underground water supplies which is reaching dangerous proportions in many countries, and rendering water unfit for use for various purposes and, in fact, detrimental to human, animal and plant life and economic development, aggravates the shortage and underlines the great need for conservation and sound management of water resources. Indeed, the problem of water pollution is inseparable from that of the development of water resources for various purposes.

5. Unlike other natural resources, water cannot be transported from one country to another or over long distances within a country because of the quantities involved and the cost of transportation, though water flowing naturally can be diverted over relatively short distances. Each country and, indeed, each local area in a large country with variations of climate, has its own water resources to the increase of which there are limitations, and its own particular water problems. Therefore, in dealing with the problem of water and water resources development each country and sometimes each local area within a country has to be treated separately.

6. Since most geographical areas in the world are short of rainfall and/or rivers, rational utilization as opposed to wasteful management in which the resources capital of water is often sacrificed to medium and short-term benefits, is a matter of supreme national importance. Where water resources like large rivers traverse several countries the problem of the rational utilization of this water resource on a fair and equitable basis by all the riparian countries becomes an important question of international co-operation and often raises difficult political problems.

7. There is close inter-relationship between natural resources of various kinds. For example, water affects forests and deforestation, as is well known, leads to diminished rainfall. Again, prudent and skilful water management is conducive to the preservation of the soil and to enriching it, whereas wasteful and unscientific use of water can cause soil erosion and loss of fertility. Furthermore, careless utilization of water can often seriously affect the health of the population and frequently upsets the ecological balance.

Looking as a whole at the problem of development and rational 8. utilization of water resources in the service of the community, operations leading to the development and utilization of all water resources should logically speaking have the following sequence:

- (a) survey and inventory
- (b) classification(c) evaluation
- (d) utilization and management (including conservation and prevention of pollution).

In actual practice, and because of the compelling need for rapid 9. economic development in many countries, such a sequence is not and cannot always be observed; and the needs of the community are such that utilization assumes first priority, even in the absence of complete scientific information and of classification and evaluation of available water resources. Nevertheless, all these components have to be kept in view in their proper sequence if water resources are to be developed and utilized to the maximum benefit of the community and without jeopardizing future development.

10. Evidently, different scientific and technological methods are necessary for the various processes or phases referred to in the preceding paragraph. It is now accepted principle - though practice is still far from conforming to it - that all these processes must come under the umbrella of adequate administrative structure which should enable each country to make appropriate provision for water resources development in its national plans and to provide the machinery for implementation. The latter, of course, needs experts, engineers, research workers and other trained personnel. Thus, to the four essential components enumerated in the preceding paragraph must be added adequate administrative and technical infra-structure.

11. It has been emphasized by UN and other international organizations time and time again that each country should develop a unified, integrated and scientific approach to the development of water resources and build up suitable and adequate administrative and technical apparatus for water management. Many developed and several developing countries have recognized this and have already set up suitable machinery of varying patterns which provide the focus for co-ordination and help in taking a total view of the problems of development of water resources,

12. The United Nations family of organizations must be geared to provide the maximum technical assistance to developing countries (and indeed to many developed countries also) in the development and utilization of water resources. To be able to do so, the United Nations system must itself be organized in a manner that enables it to take a total and integrated view of the problems of water development, and to carry out its tasks in this field in a systematic way. It is among the main purposes of this study to examine the extent to which the United Nations is able to do so and what further steps are necessary to these ends.

The bodies in the United Nations family of organizations which 13. are mainly concerned are UNESCO, WMO, FAO, WHO, IAEA and the United Nations. UNESCO, WMO and to some extent the United Nations are concerned, directly or indirectly, with the survey, inventory, classification and evaluation of water resources. FAO, WHO and the United Nations are mainly 'user' organizations. The development of technical and administrative infra-structures in their respective fields of competence is the common concern of all the above mentioned organizations. In the special field of the development and rational utilization of water resources of international rivers by riparian countries, the United Nations and FAO have taken a keen interest. Two other organizations are also involved to some extent in water resources namely ILO and UNIDO, the former with regard to vocational training in water technology and the latter in regard to the industrial use of water. Their interests at present are rather peripheral, but could increase considerably in the future.

14. While broadly indicating the main concerns of the different UN bodies, it may be added that a water-tight classification of their activities does not exist and is perhaps not possible or desirable. As ancillary to their main purposes, those primarily interested in utilization have indeed extended their activities to matters bearing on survey and inventory, classification and evaluation, and <u>vice versa</u>. This has been the result partly of historical evolution, resulting in overlapping areas of activities between various organizations, and jurisdictional difficulties, and to a somewhat unhealthy competition between the organizations concerned, to the detriment of the interests of developing countries.

#### Methodology

15. A questionnaire was issued to the organizations concerned. Replies were received from all the organizations addressed which contained detailed information relevant to the subject. Where necessary, supplementary information was sought and was furnished by several organizations. Advantage was also taken of personal discussions with the responsible officials of the organizations and with some eminent experts outside the UN organizations. Owing to limitations of time and the need for economy, it was not possible to visit important country and regional projects of multidisciplinary character in the field, but in the course of the inspector's tours of inspection for other purposes he took the opportunity of acquainting himself with some such projects. He also took the opportunity of discussing the problems of co-ordination arising out of multidisciplinary projects in the water field with some Resident Representatives of UNDP. Relevant portions of the draft report were sent to the organizations concerned for comments.

16. The assistance received from the UN organizations concerned and from many others is gratefully acknowledged.

# CHAPTER II

#### OVERALL REVIEW OF ACTIVITIES AND CO-ORDINATION AMONG UN ORGANIZATIONS

#### Success of Activities in Water Resources Development

17. UNDP expenditure for projects specifically involved with water amounted during the years 1959-1970 to 91.6 million dollars, of which 77.8 million dollars were spent through the agency of FAO, 12.0 million through the agency of UN and 1.8 million through the agency of UNESCO. UNDP expenditures on projects involved with water amounted to 7.3% of total UNDP expenditure. 20% of total UNDP expenditure through FAO was on water resources.\* It is clear that quantitatively speaking the work done by the United Nations family of organizations in the water field adds up to an impressive total. It is, of course, difficult to be sure that each sector or item of activity, whether seminars or publications, surveys, studies and research, or individual technical assistance projects, has produced the desired impact in accelerating the development of Member States. In the final resort, it is the latter who are in the best position to make a judgement of this nature.

18. However, it can safely be said that the activities of the United Nations family in the water field have helped towards:

the creation of awareness among Member States of the importance of an integrated approach to water resources, stimulating in many cases the creation of a central water authority or other appropriate machinery entrusted with over-all co-ordination of action in the water field;

the building up of trained personnel with necessary expertise in various aspects of water problems;

the establishment of institutions for training of experts and specialists at various levels;

the dissemination of technical information on a regional or global basis on the subject of water resources and their development;

promotion of research on water problems by establishing new research institutions and reference centres in various regions and strengthening the capacity of already established institutions through technical assistance projects of various kinds;

#### Deficiencies

19. While the activities of each organization in the United Nations family concerned with water problems within its competence are, on the whole, impressive, one must not ignore certain deficiencies. Among these may be mentioned the fact that each organization acts more or less independently and in an inward-looking manner. Each has its own concept of its competence and responsibilities and of priorities based on the most extensive interpretation and application of its mandates. Efforts have no doubt been made by organizations to co-operate with one another on a bilateral basis and sometimes on a multilateral basis. These are

\* This is in addition to expenditure incurred from the regular budgets of the organizations concerned, which were comparatively small, except in the case of WHO, the major part of whose expenditure on water was met from its regular budget. however, yet tentative and not wholly effective. There is yet no total and integrated approach by the United Nations family as a whole to the problems of water resources development \*/

20. Each organization tends to act without always taking into account what other United Nations organizations are doing, or other aspects which concern other organizations. As a result there are areas in which more than one agency is operating often with avoidable over-lapping and duplication of effort. An example - a typical one and by no means unique - is the request by the Sudan Government in connection with ats "Freedom from Thirst" campaign, to the Secretary-General of the dalted Nations in February 1970, with a view to obtaining international assistance in planning, construction, operation and maintenance of rural water projects. Similar appeals were addressed to WHO, FAO and UNESCO. The WHO Regional Adviser on Environmental Health (Community Water Supply for the Eastern Mediterranean Area), visited Sudan from 4 to 12 March. The Ground Water Consultant, Land and Water Division of FAO, from 13 to 18 March; the Programme Specialist of UNESCO was in Nairobi for 5 days in May 1970, and a United Nations Adviser also visited Sudan for 11 days from 5 to 16 June 1970. These experts primarily looked at the problem of water in Sudan from the point of view of their respective organizations. There was no consultation with one another either before the visit or afterwards. Perhaps if the request had been addressed to the Resident Representative, this kind of un co-ordinated enquiry would have been avoided. Since the action was taken by each of the organizations concerned separately and without mutual consultation, though commendably promptly, the Resident Representative was unable to exercize a co-ordinating role.

21. The proper thing in a case like this where multi-disciplinary aspects of water resources development were involved, would have been for the organizations concerned to consult with one another and with UNDP, so that a multi-disciplinary team could be sent to assess the various possibilities and establish an order of priorities among the types of assistance that could be rendered by the organizations in furtherance of the "Freedom from Thirst" campaign, on the basis of an integrated approach and taking into account the bilateral sources of assistance in the development of water resources in Sudan.

22. Member States have frequently commented on unrelated development of programmes. United Nations General Assembly resolution 2188 (XX1) described the work of the United Nations family as having, in economic and social affairs, "evolved over a period of twenty years on the basis of unrelated proposals rather than in accordance with a co-ordinated plan" thus creating a situation which "had impaired not only the efforts of the Economic and Social Council to co-ordinate the work of the United Nations family of organizations in this field but also the ability of Member States to benefit from that work". The Enlarged Committee for Programme and Co-ordination in its report (E/4748) noted that individual programmes were prepared and approved as though they were completely unrelated.

<sup>\*</sup> A total and integrated approach means one which takes into account all aspects of Water Resources Development, including the balanced and most efficient utilization of water for various purposes on a rational and scientific basis and with due regard to priorities, economic and social aspects, and conservation and prevention of water pollution.

The Advisory Committee on the Application of Science and 23. Technology to Development in its report to ECOSOC on Future Institutional Arrangements for Science and Technology (E/4727 dated 26.5.70) has also drawn attention to the danger of duplication. It observed "science and technology are no longer viewed as a subject capable of being assigned to a specific agency; they have come to be considered as an instrument of action applying to practically all economic and social activities .... Indeed the need for scientific and technological advise is growing in all contingencies of the United Nations system with the emergence of new multidisciplinary types requiring integrated approach and action ...." On problems of co-ordination the Committee said "in contrast to this new development, discrepancy between machinery and requirements had increased and it was clear that science and technology were progressing more rapidly than procedures of programming, budgeting and co-ordination in the UN system. The danger of duplication was, however, growing often as a result of a sponteneous and uncontrolled development of programmes". Although general in nature these observations apply as much to UN activities in the field of water as to others.

# "Grey" areas

24. A perusal of the list of activities of UN bodies in the field suggest that there are many "grey" areas in of water would which there is apparent, though often perhaps inadvertent duplication. For example, "ground water" is a subject which attracts the serious and enthusiastic attention of many organizations. Since the location of underground aquifers very often goes hand in hand with the exploration of mineral deposits (which is within the purview of the United Nations), the United Nations has helped in a great deal of pioneering work in the location and exploration and, sometimes, in the exploitation of ground water resources. There are many ground water projects which the United Nations has undertaken, both as Technical Assistance and Special Fund projects; and in the Resources and Transport Division of the UN secretariat much expertise has been built up and there are several experts of high calibre on ground water exploration. FAO is keenly interested in the development of ground water resources for irrigation purposes, either by itself or combined with surface water resources. Successive FAO conferences have given the Secretariat a definite mandate in this regard, and FAO has been participating and executing agency for a large number of Technical Assistance and Special Fund projects bearing on the development of ground water resources. In the performance of its task of scientific assessment and of making an inventory of water resources and by reason of its interest in hydrology UNESCO is also interested in ground water and has several projects to its credit as part of its programme for the International Hydrological Decade. It is also a participating and executing agency for several ground water survey projects. WMO's definition of "operational hydrology" includes ground water and it has several hydrometerological projects including a Special Fund project dealing with ground water. WHO has an obvious interest in ground water in relation to community water supply. UNESCO, WMO, FAO and UN are all interested in an inventory of water resources and are working in that area. Surface water also attracts the attention of all organizations involved in Water Resources Development.

25. UNESCO, WMO, WHO and FAO are working in the field of "water quality" respectively from the scientific and hydrological, hydrometeorological, environmental health and fisheries point of view. Both the United Nations and FAO are operating in the field of water resources development for irrigation and hydroelectric power and have a large number of projects.

26. Again, both FAO and the United Nations are operating in the areas of river basin development, the regime of international rivers and other allied subjects. UNESCO, WMO, FAO and WHO all operate in the field of water pollution.

27. UNESCO is interested in the science of hydrology and the influence of human activities on the water cycle, and in the inventory of water resources. WMO is concerned with field observations of movements etc., of water in relation to the main function of forecasting weather and of maintaining a World Weather Watch. The scientific data collected under the auspices of WMO and UNESCO are mutually supporting and in most cases, the same data can be used for the purposes of both organizations. Hydrological information and data are essential in irrigation, hydroelectric and other projects and activities primarily concerned with the use and management of water, and therefore, concern FAO, WHO and the United Nations.

28. These instances are set out, not by way of criticism, but to show that they exist and have certain consequences. It is only fair to add that the interests, and hence the activities, of the UN organizations in the common areas referred to above are not identical. Lines of demarcation exist which, however, are not and sometimes cannot be sharply drawn.

#### Consequences of overlapping

29. As to the consequences:

- there is often a scramble for projects in the common areas indicated above, financed by UNDP and other extra budgetary funds;

- organizations working in the common areas are prone to consider each other's activities as some kind of 'interloping', creating a somewhat unfortunate psychological situation which affects co-operation between at least some of the organizations;

- each organization being naturally and commendably anxious to give the best account of itself is inclined to attempt too much on too broad a front;

- the various types of activities particularly those financed out of the regular budget of the organizations concerned are virtually planned in isolation. True, the organizations inform each other of their programmes through the ACC Committee on Water Resources and sometimes in informal consultations. <u>There is, however, no integrated</u> <u>approach and joint planning and programming of the activities by the</u> <u>organizations concerned;</u>

- each organization maintains its own staff of experts and consultants in various fields with the inevitable result that FAO, the United

Nations, WMO and UNESCO all maintain their own complement of hydrologists and ground water specialists  $\underline{*}$ / resulting in at least some proliferation and waste of resources.

## Co-ordination by ECOSOC and its subsidiary bodies

30. It would be appropriate at this stage to ask how the United Nations system has tried to meet this situation. Under the United Nations Charter the Economic and Social Council is entrusted with responsibility for co-ordination in international economic and social co-operation. Under articles 57 and 63 of the charter the specialized agencies have been brought in relationship with the United Nations. ECOSOC receives reports from the specialized agencies including reports on steps taken by the latter to give effect to the recommendations of ECOSOC and of the General Assembly.

31. From the very beginning ECOSOC has been conscious of the need for co-operation in the field of water resources development and since 1951 has adopted, almost every year, resolutions bearing on this subject. Resolution 417 (XIV) dated 2 June 1952 on 'International Co-operation on Water Control and Utilization and on the Development of Arid Land' was in many ways a landmark. It was a comprehensive resolution on the whole subject of water resources and its preamble\*\*/ set forth basic and fundamental considerations which are equally valid today.

\*/ FAO: 5 Hydrologists, 3 Hydrogeologists and 2 Ground Water specialists; UNESCO: 5 Hydrologists, 1 Hydrogeologists, 2 Ground Water Hydrologists (engineers) and 1 hydrometrist; WMO: 5 Hydrologists including a Division Chief, 3 Hydrometerologists including 1 Division Chief, 4 Hydraulic Engineers. Besides the staff in the professional category they maintain a large number of short and long term consultants at Headquarters.

\*\*/ "That effective use and control of water resources is important to economic development. That optimum use of water usually requires that irrigation be combined with power development, flo d control navigation, municipal industrial and other beneficial uses. Pollution control, development of fisheries, improved agricultural practices and industrial development all go hand in hand with the development of water resources. Activities of international organizations directed towards various aspects of water resources are closely interrelated and should be so planned that water resources development shall make its maximum contribution to the overall development of each country". 32. It requested the Secretary-General of the United Nations, <u>inter</u> <u>alia</u> to assume responsibility for the promotion of co-ordination in the field of water resources development, of co-operative action among national authorities and international organizations and of the development of basic water resources data and international exchange of information and experience. He was further asked to submit periodic reports of programmes and activities in relation to water resources carried out by international organizations with recommendations as appropriate for the better co-ordination and balanced development of their activities. The nouncil decided to keep the question of international co-operation with respect to water resources development under review and to continue to eive careful attention to the work of the specialized agencies in the acvelopment of arid land.

33. In subsequent resolutions (533 (XV11), 599 (XX1), 675 (XXV), 759 (XX1X), 876 (XX111), 1033 (XXXV11), the Council dealt more or less extensively with various aspects of the problem and of the co-ordination of activities related to water. Specifically, resolution 675 (XXV) resulted in the setting up at UN Headquarters of the Water R sources Development Centre to promote co-ordinated efforts for the development of water resources.

34. As a result of resolution 1033 the United Nations Water R<sub>e</sub>sources Development Centre ceased to be a co-ordinating body. Henceforth it was to service the Water Resources Sub-committee of ACC and submit triennial reports to ECOSOC on water resources.

#### ACC and its Sub-committee on Water Resources

35. Despite its concern with the need for an integrated and co-ordinated approach it remains, however, a fact that practical results have not matched the wishes of Member States as expressed in the various ECOSOC resolutions. The ECOSOC role has, indeed, largely boiled down to receiving triennial reports from the Water Resources Development Centre and an annual report on this subject from ACC. The latter's sub committee on Water Resources is performing a useful function but has serious limitations. It is a body composed of staff members of the various organizations who participate on a co-equal and competitive basis with no power of taking decisions. It is a forum for the exchange of information and discussions about each others activities and programmes, which is in itself very useful. Occasionally it tries to resolve jurisdictional differences. As an example of the latter may be cited its recommendation that when there is a choice between several agencies having an interest in UNDP projects, the one concerned with the end result should be selected as the executing agency. The sub committee does not, however, exercise the functions of real co-ordination. Its reports go to ACC to whom it is responsible. ACC in its far-ranging reports to ECOSOC is not able to devote more than a paragraph or two to water resources.

#### Committee for Programme and Co-ordination

36. Lately, CPC, has in the context of its growing concern with the question of co-ordination, shown interest in water resources development. It has commented on the brevity of the reference to water resources in ACC reports to ECOSOC, and generally on the state of co-operation among United Nations organizations in this field. The CPC's mandate, of course, -covers a wide range and co-ordination in the field of water resources is only a part of this broad mandate. Nevertheless, its increasing attention to water resources is a favourable development.

37. Other efforts for overall co-ordination of activities in the water resources field made by a number of different bodies have so far been rather fragmentary. These are, aside from CPC and the ACC through its sub-committee on Water Resources (reference to which is made above) the Advisory Committee on the Application of Science and Technology to Development (ACAST), and the recently formed Natural Resources Committee of ECOSOC.

#### Advisory Committee on the application of Science and Technology to Development

38. One of the terms of reference of the Advisory Committee on the application of science and technology to development embodied in resolution 980A (XXXVI) is "to review in close co-operation with ACC the scientific and technological programmes and activities of the United Nations and related agencies and propose to the Council measures for their improvement, including the establishment of priorities and the elimination of duplication".

39. ACAST has,<u>inter alia</u>,prepared a compendium on "Investigation, Development and Rational Utilization of Natural Resources of Developing Centres" which includes a summary of the activities of the Organizations of the UN family in the field of water resources, but this excellent general survey does not pretend to be a critical review of programmes nor has the Committee yet been able to make proposals to the ECOSOC for the establishment of priorities in the field of water, and for the elimination of duplication and for other improvements as contemplated by ECOSOC.

#### The Committee on Natural Resources.

40. The Committee on Natural Resources has just started work. Among the terms of reference as laid down in ECOSOC resolution 1535 (X11X) of 28 July 1970, is "assistance to ECOSOC and CPC to maintain the necessary liaison between the activities in the field of natural resources of the regional economic commissions, the specialized agencies, IAEA and other bodies doing relevant work with a view to ensuring the utmost efficiency and co-operation".

41. In the Committee's first session in 1971 there was a discussion on the functions and role of the Committee but there was no clear indication as to whether and to what extent the committee was to perform a coordinating role. At its second session held in January-February 1972, the committee laid down guide lines for action in the development of natural resources, and in this context set forth objectives and priorities in the field of water resources development. It also indicated measures to be taken by organizations of the UN system in assisting developing countries. In its review of the activities of the organization of the UN system which was part of an item on its agenda, the committee recommended that the Secretary-General should prepare concise reports covering the work programme and spheres of competence of the organizations and agencies of the UN system in the field of water and other natural resources, together with the views of these organizations and agencies on the most rational division of responsibility between them in these fields. The guidelines which are in the nature of broad policy guidance and the priorities laid down by the committee will no doubt be helpful to the UN organizations and Member States. Its initiative to have a clear cut definition of the competence and sphere of activities and a clear cut division of responsibilities between organizations and agencies of the UN system in the field of water and other natural resources, is a timely and useful one, even though it may not be possible to completely avoid overlapping areas of competence. However, considering the broad mandate of the committee which covers all aspects of natural resources development, one may respectfully doubt if the committee can perform detailed and effective programme co-ordination in the field of water resources for the entire UN system.

#### Past efforts at Co-ordination by UN organizations

42. As indicated in the appendices, co-ordination in matters of common interest has been attempted in various ways, such as: joint missions or advisory groups drawn from two or more organizations, particularly in the case of UNDP projects, by the formation of joint groups or administrative units between two or more organizations; by <u>ad hoc</u> arrangements; and by technical working groups under IHD programmes. In essence, however, co-ordination has been for the most part informal and by mutual consultations on particular matters or projects. Such coordination has sometimes been effective and sometimes not. Its effectiveness has depended a great deal on the personal factor. While the personal rapport between responsible officials in different organizations is important, it leaves too much to chance and cannot be a substitute for methodical and systematic co-ordination on the basis of integrated approach in such a vital field as water resources.

#### IHD Co-ordinating Council

43. An example of institutional approach to co-ordination between specialized agencies is the co-ordinating Council for the International Hydrological Decade. This Council was established in 1964 by a resolution of UNESCO intended to provide a single forum on matters relating to hydrology. The Council itself is a governmental body, meets once a year and is developing a long range programme with the participation of other UN bodies. UN, UNESCO, FAO, WHO, WMO and IAEA, as organizations operating in the water field, have the statutory right to attend and to participate in the meetings of the Council without the right to vote. However, there is no combined secretariat for the Co-ordinating Council as contemplated in the ECOSOC resolution. Although a reasonable measure of co-operation is developing under the IHD programme there has been some feeling among other agencies that UNESCO has tried to take over major responsibilities in hydrology which intimately concerns other organizations also.

#### Deficiencies in Co-ordination

44. From the above analysis we can diagnose the following deficiencies: 1. Limitations to effective co-ordination by ECOSOC and its subsidiary bodies (CPC, Committee on Natural Resources, ACC).

2. Absence of an overall unified and integrated approach to problems of water among members of the United Nations family of organizations: neither institutionally nor in practical terms are the horizontal links between the organizations concerned as adequate and strong as they should be. 3. Absence of comprehensive planning and programming of activities: each organization acts individually and independently and even in areas where two or more organizations have common interest, there is no joint planning and programming.

#### Towards integrated approach and better co-ordination

45. It remains to consider how these deficiencies can be removed, how an integrated approach to water resources problems can be brought about how present institutional arrangements can be reinforced and strengthened, and what further arrangements are necessary.

#### At the national level

46. At the national level organizations within the United Nations family have repeatedly emphasized the need for Governments to take an integrated view of the development of water resources. Many governments have set up departments, commissions or other bodies, which act as a centre for planning and co-ordination and a clearing house for development activities relating to water. The pattern varies from country to country according to the historical approach of governments to water resources development, climatic and geographical conditions, systems of administration etc. While some countries have a central water authority, others have located the machinery for co-ordination of water resources development or particular aspects of such development (e.g. groundwater) in ministries like those of agriculture, health etc.

47. While at the national level the primary responsibility lies with Governments, UN agencies could help and have indeed helped develop necessary expertise and infrastructures in integrated planning and programming in the water field within the framework of national development plans. Such assistance could best be given as is done now in many cases at Government's request, by agency representatives acting under the leadership of the UNDP Resident Representatives, and occasionally by development assistance advisory groups or missions sent under the auspices of UNDP. The latter practice should, where necessary, be more frequently resorted to; and where in any country programme there is a large component of water development such groups or missions should include experts especially competent in the water field. Not only is it necessary to ensure co-ordination of planning and programming of water resources projects but it is also desirable to ensure that there is co-ordination among international organizations in the course of the execution of programmes of a multidisciplinary character, which, observations in the field have shown, with but few exceptions, to be lacking. Both UNDP headquarters and Resident Representatives have to play a role in this regard. This point will be further elaborated when dealing with the role of UNDP.

#### At the International Level: Regional approach to Water Resources Development

48. It is not surprising that some of the most striking and successful projects for water development in which the United Nations system is involved are regional river basin projects covering a large number of countries in which several United Nations organizations are participating and co-operating. Regional Economic Commissions have become important foci of regional co-operation in the field of water resources, prevention of floods, pollution etc. 49. In practical terms, the subject of water resources development is often especially suitable for an integrated approach on a regional basis. The facts of geography and climate and the alignment of rivers, lakes and other water resources often compel a regional or sub-regional approach. Different regions or sub-regions have different water problems. Not only in the obvious case of river basins and lakes covering many countries but in other cases also, a regional or sub regional approach is necessary as against the individual country approach. (For example, the problem of floods in a country cannot be adequately tackled unless the problems of river management, deforestation and soil erosion are tackled in another country where the catchment area of the river lies).

#### Role of Regional Economic Commissions

56. Regional economic commissions have a great deal of work to their credit in regional or sub-regional development of water resources in their respective regions. They are in an uniquely favourable position to make co-ordinated studies in their respective regions of the economic factors governing the problems of water development; and in view of their close rapport with the Governments in their regions they can act and have already in fact acted, as catalysts for water resources development. Therefore, in any scheme designed to bring about a better integrated approach to water problems the role of regional economic commissions should be strengthened.

51. For this purpose the water resources divisions of the regional economic commissions should be strengthened as also the latter's lien with the technical including specialized agencies, UN HQ, UNDP and the important sources of investment such as the regional banks and World Bank. In recent years there has been collaboration between regional economic commissions and technical agencies (Examples ECAFE/WMO Joint Unit on Typhoons/Regional Commissions/ FAO joint division in the commissions secretariat; Joint ECLA/OTC/WMO/PASE/WHO group for water resources; FAO/UNESCO/WMO/ECA collaboration concerning the organization of conferences on hydrology and hydrometeorology for Africa 1971). These developments are in the right direction and should be further promoted. However, there are still instances of a Specialized Agency and a regional commission planning a seminar or a study parallelly and without consultation; and in one case it took prolonged correspondence between a regional commission and specialized agency, for an eventual agreement that the commission should undertake the particular project decided upon by the legislative body of the commission.

52. The regional economic commissions lien with the UN HQ in the field of water resources development apart from that arising from budgetary and financial control, and some collaboration in the holding and preparation of seminars etc., is not sufficiently strong. The UN HQ being itself a large executing agency in respect of water projects, its relationship with the regional economic commissions in this field has tended to resemble more and more that between the commissions and specialized agencies. Closer rapport should be established and HQ should treat the regional economic commissions more and more as its regional arm in the water field. Projects related to planning and studies of laws and institutions and economic factors governing water development, in their respective regions, particularly in relation to river basin projects, could be profitably entrusted to the commissions. Furthermore there should be close consultations between UN HQ and regional commissions in planning and programming of studies, seminars and conferences, which is at present lacking so that any duplication or repetition of effort is avoided. As a normal rule, unless

the seminar etc. relates to highly technical matters of global significance or involves too much expenditure (e.g. desalination), responsibility for these should be given to the regional commissions, with adequate backstopping from UN Headquarters.

53. So far as UNDP is concerned regional economic commissions should be fully utilized for the purpose of planning and programming of the development of water resources; and their experience and expertise in this area should be used for pre-project and in-project evaluations. Any multi-disciplinary teams formed for such purposes should include a representative of the water resources or natural resources division as the case may be, of the regional commission concerned. The Regional Commission not being an executing agency such a representative can bring an objective outlook to the task of evaluation. Now that strong Regional Bureaux have been created at UNDP HQ, these brueaux should establish close mutual rapport with regional economic commissions in the water field (as in others).

# Regional Centres for Water Resources

54. Considering the multi-disciplinary aspects of water resources development as indeed the increasing complexity of problems of conservation, flood prevention, water pollution, the development of international rivers etc., to all of which a regional or sub-regional approach is necessary, the time has come to create a suitable regional machinery for water resources development.

55. It is proposed that Regional Centres for Water R sources be created, one attached to each of the regional economic commissions. The purpose of the Centres would be to bring together on an expert forum all those interested and participating in one way or another in water development in a region so that together they could take a comprehensive and integrated view and give advice to UNDP and the various agencies concerned and the Governments of the region. Conservation of water resources and prevention of water pollution should receive the special attention of the Centre.

The Centre may be composed of:

- (a) experts from various United Nations agencies, involved in the field of water resources development, namely United Nations Headquarters, FAO, UNESCO, WMO, WHO, IAEA and from any new organization that may be decided upon after the Stockholm conference on environment.
- (b) an expert representing the Regional Commission;
- (c) a representative of UNDP;
- (d) representatives of the IBRD and the regional Development Bank;
- (e) a representative of the UN World Water Centre;
- (f) a number of eminent experts, not more than ten, drawn from countries nominated by the Commission on the basis of geographical distribution to serve for three years and in their individual capacity.
  On particular occasions representatives of international scientific associations concerned with water may be invited to participate.

56. The Regional Water Centre should be located at the Headquarters of the Regional Commission. The Centre should be an independent body and not part of the Commission. As a matter of convenience, however, the secretariat should be provided by the Natural Resources Division or Water Resources Division of the commission concerned. The Centre should be financed and supported by UNDP as a special fund project with voluntary assistance from Member Countries of ECAFE by way of funds or provisions of staff on a nonreimbursable basis, and in other ways. 57. The Centre should report to the UN World Water Centre and also to the UN specialized agencies and other bodies concerned. Its report should also be placed before the Governing Council of UNDP and the governing bodies of the agencies represented in the Centre. All agencies and their regional offices and UNDP should fully co-operate with the centre. Its reports should be available to Governments of the region.

# Function of Regional Water Resources Centre:

58. The Centres should evolve their own functions and methods of work within the framework of the general purposes referred to in the preceding paragraph. However, among the important functions of the Centres should be:

- (a) assembly and retrieval and dissemination of information about water needs and development in the region;
- (b) expertdadvisory services to governments and river basin commissions, including organization of specialized training sessions for government personnel;
- (c) sponsorship of projects and seminars to discuss technical problems of mutual concern;
- (d) recommendations for the adoption of priorities, and consideration of problems of water resources development affecting the region;
- (e) review of country and regional programmes of water resources in the region.

#### Co-ordination at Global Level

59. In addition to the integrated approach both on a national and regional basis as indicated in the preceding paragraphs, the subject of water resources development, considering its world wide importance, also needs to be viewed globally.

60. Ideally and logically one could argue in favour of the creation of a single water authority performing all the functions that are at present performed by several United Nations bodies. However, water enters into so many kinds of activities that it is simply not practicable or even desirable to have a single organization dealing with the totality of water problems. The many facets of the problems of water resources development need different technical treatment. The United Nations technical agencies have done good work so far; they have acquired a useful momentum, which it would be undesirable even if it were practicable to arrest.

61. This does not mean, however, that the present situation is satisfactory and should be left untouched. There are many deficiencies in organization and approach which have been pointed out earlier. These should, of course, be removed; and there is need for some institutional arrangement which could help in the development of a global approach.

62. Global co-ordination, in its broadest sense involves legislative, administrative and technical co-ordination.

#### Legislative Co-ordination

63. At the legislative level, it is for ECOSOC to exercise the function given to it under the UN Charter of broad policy co-ordination. It is necessary to strengthen, to the extent practicable, the co-ordinating role of ECOSOC and its subsidiary bodies, namely, CPC and the Committee on Natural Resources, and on the scientific side, that of the Advisory Committee on the Application of Science and Technology to Development.

# Global Co-ordination at administrative and technical level

64. Apart from policy guidance, co-ordination is most important on the administrative and technical level. At present the only machinery for such overall co-ordination is the ACC Sub-Committee on Water Resources, which as observed earlier, has done good work but cannot fill the bill adequately. Most of those with whom I have exchanged views on this subject whether officials of the organizations concerned with water resources development or outsiders experienced in the field of water, agree on the need for some new central steering machinery in the field of water resources. On the details of any new machinery, its nature and its functions, there is no uniformity of views. Some would like it to be a clearing house not only of information but for all programmes undertaken by any UN organization in the field of water resources. Others would give it a light advisory role only. All agree that there is too much of individual and unco-ordinated action, or to put it colloquially, "there are too many cooks" in the water field, and that something must be done to bring order into the multifaceted activities of members of the UN family which often add up to a chaotic situation.

# Nature of Machinery for Global Co-ordination

65. The time has come to consider the creation of a machinery for overall co-ordination and integrated approach on a global basis of water problems at the technical level. The answer to the question what exactly should be the nature of the machinery is not, however, very simple and one has to proceed cautiously. Full account must be taken of the historical development of UN activities in the water field and the facts of the present situation in which a number of UN agencies are operating autonomously and their activities have gathered considerable momentum.

66. To begin with it would be best to consider what any new machinery of this nature should <u>not</u> be:

It should <u>not</u> encroach on the functions and initiative of the various agencies operating in the field of water resources; and there should be <u>no</u> invasion of their autonomy;

It should not be an operational or executing agency;

It should <u>not</u> be another specialized agency or something else as elaborate as a specialized agency;

It should <u>not</u> be an integral part of particular agencies including UN which at present operates as an executing agency; detachment will invest it with the necessary objectivity and impartiality;

It should not be too expensive;

it should <u>not</u> be too large: at any rate to begin with, it should be small, compact, objective and without any operational responsibility;

# A New Global Machinery - Mandate and functions

67. In the light of the above considerations the functions of the new body, which could be called the World Water Centre for the United Nations and Specialized Agencies, would be, in general, to promote an integrated approach to the development of water resources among the organizations in the United Nations family, and be a watchdog in this regard on behalf of Member States. For this purpose, it would act as a clearing house for information, scientific, operational etc., of global significance in relation to water and undertake a critical review of programmes and assist ECOSOC and its subsidiary bodies on the one hand and the agencies on the other to discharge their responsibilities in the field of co-ordination.

68. The Centre would function as an independent body in equal relationship with the United Nations <u>qua</u> an operational and executing agency, and with other bodies in the United Nations system interested in water problems. Its members should function in complete independence. They should be a group of eminent men chosen from among scientists, administrators and water planners, selected for four years on the basis of their personal qualifications and experience having regard to thenneeds of fair geographical distribution and approved by ECOSOC. The experts should act in their individual capacity. Representatives of UN agencies the United Nations, UNDP and Governmental and non-governmental scientific organizations in the water field should be invited to assist the World Water Centre.

69. As the Centre cannot, organically speaking, be suspended, so as to say in mid-air, it should be created by a resolution of ECOSOC approved by the General Assembly. Functionally, it should be responsible to ECOSOC and to the legislative bodies of participating organizations to whom its periodic reports and any special reports would be submitted. Administratively it should be responsible to the Secretary-General of the United Nations. It should not be a part of the UN department of Economic and Social affairs. The Centre should be assisted by a small but strong Secretariat, the staff of which would be drawn from the UN organizations concerned with water, and headed by a high-powered Executive Secretary who should be a dynamic person with administrative experience and knowledge of water problems. The Centre should be located in Geneva which is a convenient point of contact with most United Nations organizations and other international bodies operating in the water field. The cost of the Centre should be shared by the United Nations, UNESCO, FAO, WHO, WMO and IAEA on an equitable basis.

70. The functions of such a body should evolve and develop with experience.

(a) The centre would not have any operational or executive function. It would, however, advise ECOSOC and participating organizations on questions of planning and co-ordination of programmes in the water field.

(b) It should be fed information by the various UN organizations on all their programmes and activities. This would include information on

hydrological and other scientific aspects of water resources development, prevention of water pollution, development of water resources, countrywide and reginnal, and problems of water management. It should be able to make a critical review of all this information on the basis of an integrated approach and the results of this review should be communicated to, and be seriously taken into account by the secretariats of the organizations and their policy making bodies. The review should, for obvious reasons, be impartial and objective.

(c) All United Nations agencies involved in water resources, including UNDP should be required by resolutions of their respective bodies to consult with the Centre and invite its comments on their proposed programmes and activities in the water field and to take these comments into account before finalizing their programmes.

(d) The Centre would have the authority to organize seminars, symposia, study groups, etc. on the broader aspects of water policy and in particular the multidisciplinary aspects. For these purposes it shall have the authority to call upon the assistance of all United Nations oeganizations with activities in the water field. However, the holding of seminars etc., without duplication by involved United Nations bodies on matters specifically relating to their respective fields of activity will not be excluded, provided they are part of their programmes approved by their Governing Bodies after a review by the UN World Water Centre.

(e) The Centre might seek scientific advice on any problems related to water from the Advisory Committee for the Application of Science and Technology to Development, or itself convene a meeting of scientific experts for the purpose. In any review of programmes of activities of the United Nations family on scientific and technological projects having a bearing on water, the Centre would participate.

(f) The Centre would submit annual or biennial reports to ECOSOC and the legislative bodies of the organizations concerned.

#### Co-operative arrangements between United Nations Organizations

71. There are as already indicated, areas of activity in various aspects of water resources development in which two or more United Nations organizations are interested and are in fact operating, with some inevitable overlapping and duplication.

72. The ideal arrangement might appear to be that a single organization should be in charge of a particular aspect of water resources development; and that this particular organization should be called upon for advice, planning and execution when any programmes have a component relating to that aspect of water resources development. For example, logically it might be argued that the actual work of groundwater exploration, whether a project itself or part of a project, should be entrusted to the United Nations, which over the years has acquired a great deal of expertise in this field and has competent staff at Headquarters. However, the ramifications and interlocking aspects of water resources development are so great and varied that one would hesitate to over-simplify and to suggest a clear-cut division on these lines. All that could be said is that to the maximum extent possible, the special expertise acquired by different United Nations organizations over the years in different aspects of water resources development should be utilized. Also any

advice or recruitment of experts or consultants should be entrusted to, or be on the advice of, the most competent organization in that particular aspect. This could also minimize duplication of expert staff in various headquarters.

#### Strengthening of horizontal links between organizations

73. In the water field there are some matters which fall exclusively within the competence of particular organizations. Most, however, have multi-disciplinary aspects. Hence, perhaps, more than in any other field the horizontal links between the organizations need to be strengthened. Beginnings have already been made and there have been considerable efforts in recent years in mutual co-operation but as pointed out there are still deficiencies. In the final resort, it is the actual extent of co-operation and co-ordination between agencies that will determine how effectively the UN system is dealing with water problems.

74. The direction in which the existing links can be reinforced has been pointed out by WMO. The annex to Resolution 12 of the WMO Sixth Congress lays down "the activities of WMO in operational hydrology with regard to soil moisture, water quality and groundwater should be pursued in <u>consultation and agreement</u> with other organizations of the United Nations family and taking into full account the on-going programme of the IHD". The key-word is <u>agreement</u>. Mere <u>consultation</u> is not enough and will not succeed in avoiding friction and heartburnings, and in harmonising the activities of the various organizations. There must be agreement. The answer is joint planning and programming.

#### Joint Planning and Programming - Bilateral

75. Except to a marginal extent in the field of hydrology under the auspices of the International Hydrological Decade, joint planning and programming has been virtually absent.

76. In the first instance joint planning and programming should be undertaken at the bilateral level where two organizations are specially and intimately concerned with particular subject. For example, UNESCO and WMO are both intimately and often competitively involved in hydrology and in the scientific aspects of water resources. They should undertake joint planning and programming for two or four year periods, the programmes, both under the auspices of the IHD and outside, being designed to avoid duplication, to be mutually supporting, and to ensure that they have common purposes and make the best use of the expertise and competence available to both organizations. As ancillary to joint planning and programming there should be an agreement to keep each other fully informed of the progress of the programmes and their results and to make periodic joint reviews.

77. Such joint planning and programming should be undertaken by a joint working group of competent officials drawn from both organizations whose task will be to formulate a detailed programme on the subject of hydrology

and submit  $\underline{1}/$  the programme to their respective government bodies to IHD co-ordinating council by UNESCO and to the Commission on Hydrology by WMO - for approval respectively of UNESCO and WMO programmes, and of any joint programmes. In the case of irreconcilable disagreements in the joint group the executive heads of the organizations should confer and settle the differences before the programme is submitted to the IHD co-ordinating council and the commission in Hydrology.

### Joint Planning and Programming - Multilateral

78. In the field of hydrology, organizations other than UNESCO and WMO are also concerned and it is necessary to have a secondary stage of consultation 2/ between all agencies concerned with hydrology that is, UNESCO, WMO, UN, FAO and WHO, with the objective of harmonization of each others programmes. The joint group of officials of concerned organizations should meet and work out a two or four year programme of activities. The Regional Water Centre and the World Water Centre and the appropriate governmental bodies should be apprised of these programmes - in the case of UN, the Committee for Programme and co-ordination and the Committee on Natural Resources and in the case of other agencies, their appropriate body or bodies.

79. A similar procedure could be followed in the case of ground water and surface water resources. A joint group of officials from UN, FAO, WHO, UNESCO and WMO should meet, review the programmes and hammer out an agreed future two or four year programme.

80. In the first instance it is suggested that joint planning and programming should be introduced in three areas, namely, hydrology, ground water and surface water resources and conservation and prevention of water pollution. For hydrology, UNESCO and WMO should be alternately the convening agency. For ground and surface water FAO and UN alternately and for conservation and pollution problems WHO may be responsible for convening the joint groups. Later, joint programming may be extended to other areas.

81. The above suggestions are without prejudice to and will fit into the broad framework of "Long Term programmes in International Hydrology" decided upon by resolution V1 II of the IHD co-ordinating Council at its sixth session in July 1970 for which a working group of experts from eight countries has been created.

- 1/ The submission of the programmes will be preceded by reference to the proposed UN World Water Centre for comments.
- 2/ To minimise expenditure the already existing occasions when officials meet e.g. meetings of ACC Sub Committee on Water resources IHD co-ordinating council meetings, etc., should be utilized for joint consultations and planning and programming.

82. There is nothing novel in the suggestion of joint groups for planning and programming of activities in the water field. The agreements between UN and specialized agencies have a clause to the effect -"The United Nations and organizations recognize the desirability in the interest of the most effective use of personnel and resources of avoiding wherever possible the establishment of competing or overlapping of facilities among UN and specialized agencies" and in the agreement between some of the specialized agencies (article  $\underline{IV}$  of the agreement between FAO and WHO and article  $\underline{IV}$  of the agreement between UNESCO and WHO, both concluded in 1948) there is provision respectively for joint missions and joint committees. The above suggestions fit into the framework of these agreements.

#### Role of UNDP

83. As indicated in paragraph 17 UNDP has provided considerable funds and has thus made a remarkable contribution to the UN family's assistance for the development of water resources by Member States. According to a statement submitted to the Committee on Natural Resources Document (E/C/7/22) of 2nd December 1971, during the period 1959 to 1970 UNDP projects in the field of water resources have resulted in direct investment of nearly \$393.6 million and indirect investment of \$309.6 million.

84. Programmes financed by UNDP which form the major part of the activities of the agencies in the water field (except in the case of WHO), are formulated on the basis of country requests. Hitherto, country requests have been made on the basis of each requesting country's estimate of its own needs and according to its own concepts of development. Very often project requests have not been based on an over-all and integrated approach to water resources, taking into account the available resources and the principles of water management; this has been particularly so when there has been absence of a planning machinery within the government charged with over-all perspective planning. As a result, the system of project by project approach based on a country request has worked against a total and integrated view of water resources problems, nationally, regionally, and globally. UNDP's decision to change over to fairly long-term country programming integrated with a country's national development plans is likely to go a long way to rectify the position; and the replacement of country requests by 'Project Reports' will further help promote such an approach.

85. Nevertheless, there is some danger that the country programming method adopted by UNDP might militate against broader regional or subregional considerations. UNDP is, of course, alive to the importance of regional programmes in the water field and has many multi-purpose river basin projects. It seems, however, that to apply the necessary corrective much closer links between regional economic commissions and UNDP are necessary; and the machinery and expertise and experience of the commissions should be effectively integrated with the processes of country, subregional and regional programming. The suggestion made in a preceding paragraph to have Regional Water Resources Centres in which UNDP should fully participate and to associate regional economic commissions with pre-project evaluations or advisory groups for water projects of a multidisciplinary character will help in this direction. Now that UNDP headquarters have been re-organized on the basis of regions and have strong Regional Bureaux a more effective liaison between UNDP and regional commissions is both logical and desirable. I would repeat the suggestion made in JIU's report on ECAFE (JIU/REP/69/6) that UNDP appoint whole-time liaison officers at a senior level with economic commissions.

86. Since UNDP has the power of the purse, it can ensure that water resources development projects financed by it and based on sound principles of water management and on an integrated approach to water resources development. It can and should insist on joint planning and programming in areas of common interest before deciding on a project or who is the executing agency.

87. The present practice is that UNDP, after such pre-project evaluation and consultations with governments as are deemed necessary, approves the projects and entrusts the execution to a Specialized Agency or IAEA or the World Bank, as the case may be, on the principle that the agency concerned with the end result should be appointed as executing agency. This principle is a convenient one in practice but it suffers from some disadvantages. In the first place, in a multidisciplinary water project it is often not very easy to decide which agency is interested in the end result, the claims of more than one agency being more or less balanced. Secondly, it inhibits any further initiative or interest by any other agencies with the result that cooperation between agencies during the execution of projects, particularly when the latter is of a multi-disciplinary character, is reduced to a minimum. Thirdly, UNDP has, normally, not been very receptive to other agencies participation, once an executing agency has been appointed.

88. Sometimes UNDP has adopted the practice of designating in the plan of operations an executing agency in "association" with another agency. This is, however, not enough and enquiries in the field into two such projects showed that the "association" has in practice, remained a dead letter. The concept of associated agency is a good one but should be given precision and made to work in practice. The UNDP Resident Representative should have the responsibility of co-ordination and of ensuring that the association is effective in respect of approved UNDP projects in the field. The plan of operation should set forth in as much detail as possible the functions and responsibilities of the associated agency and the role of the Resident Representative, in coordinating the functions of the executing agency and the associated organizations.  $\underline{*}/$ 

<sup>\*/</sup> In the terminal assessment report by the Resident Representative on a Special Fund Groundwater Investigation Project in a country in an advanced stage of development of which the United Nations was the executing agency in association with FAO, it was observed "there was practically no support provided by the FAO which was supposed to be associated with the UN in the execution of the project. Perhaps a clearer understanding of the respective responsibilities of the United Nations and FAO in executing the project would have minimised these support problems. In this particular project, the plan of operation, aside from designating the "United Nations in association with FAO" as participating and executing agency contained nothing to show how, when and at what stages such association was in practice to be effective. Actually, this particular project which was aimed to assess the "groundwater development potential" of a particular area had as one of its components, agricultural soils and irrigational studies with a view to determine the methods by which the expended use of groundwater could increase agricultural production. Active participation and contribution by FAO would have been very helpful to such studies."

89. It is necessary to review the older concepts and move forward to new ones. The new directions may be, in large and complex multidisciplinary water projects; (a) breaking up of projects into different identifiable components and disciplines and entrusting these to different agencies according to their competence as executing agencies or sub executing agencies or sub contractors, \*/ the agency considered most interested in the end result being designated as executing agencies (b) the appointment of two or more agencies as joint executing agencies with one of them as co-ordinator; (c) greater precision to the role of the organization associated with an executing agency (vide preceding paragraph).

90. The nature of water resources projects is such that experiments in these directions are called for and would be justified. I do not anticipate a great deal of difficulty in translating into practice the concept of joint executing agencies. The psychological advantage of associating two or more agencies on a co-equal basis would be considerable. Once agencies and UNDP get away from the old grooves of thinking the further extension of existing practices in this and other directions indicated above should be practicable.

91. UNDP is in a position to exercise its influence towards promoting an integrated approach to the rational utilization of water resources in many other ways. Reference has been made earlier to the importance of having a solid scientific basis for field projects and of scientific studies and research in that connection. Some field projects in the development of water resources have been failures or not met with the expected measure of success because they were approved and put into execution in the absence of scientific data and without adequate prior studies. Reference may be made in this connection to\_the sequence of activities in the water field referred to in chapter 1, paragraph 8. While the sequence cannot always be meticulously observed UNDP can do a great deal to ensure its observance by promoting scientific studies and research, collection of data relating to inventories of water research and studies and research in many other fields, in preparation for field projects for water utilization. Indeed much can be done to fill this gap which exists in most developing countries. UNDP is already helping in the establishment of hydrological and other institutions for the training of technicians in water resources development. It might consider earmarking funds within UNDP for scientific studies and research in water resources.

#### Possible criticizms answered

92. In considering the proposals for better co-ordination and integrated approach some questions remain to be answered. (a) What will happen to the ACC Committee on Water Resources and the United Nations Water Resources Centre ? (b) Whether the proposals do not amount to a proliferation of institutions ? (c) Question of expenditure.

<sup>\*/</sup> It is understood that occasionally though rarely, UNDP has adopted the practice of sub contracting the execution of projects to agencies other than the executing agencies.

93. Administrative co-ordination falls legitimately within the purview of ACC. Given the situation that a large number of United Nations bodies are operating in the field of Water Resources and there are a number of common areas and aspects, there will be need for administrative co-ordination; and it is for ACC to ensure that the programmes are implemented and co-ordinated without over-lapping and in the most effective and economical way. For this purpose ACC is competent to set up appropriate inter-agency machinery. However, with the creation of a global centre for Water resources it should not be necessary to have an ACC Sub-Committee on Water Resources, on the present institutionized basis, and meeting once a year. It will perhaps suffice to convene a subcommittee on Water Resources every two or three years.

94. As regards the United Nations Water R<sub>e</sub>sources Centre it should be detached from the United Nations Resources and Transport Division and merged with the secretariat of the proposed UN World Water Centre. The triennial report which the United Nations Water Resources Development Centre has to submit to ECOSOC at present and which is mainly a catalogue of the activities in the water field of the various organizations, should be submitted by the UN World Water Centre to ECOSOC.

95. At first sight the proposals might appear to amount to proliferation of United Nations bodies. This Inspector is himself against proliferation and has taken the opportunity of suggesting the creation of a World Water Centre and Regional Water Centres after carefully weighing the pros and cons. Proliferation is no doubt to be avoided but even more to be avoided is the somewhat chaotic condition that exists at present. The field of water resources is so complex and vital that there is justification for new bodies if these are considered essential to eliminate present inadequacies to prevent overlapping and duplication and to bring about a more efficient and co-ordinated and integrated approach to the problems of water resources development. The proposals seek to strike a balance between the considerations referred to above.

96. As to the extra expenditure involved in the proposals made in this report, it is difficult to make a precise estimation. The only proposals that are new are the Regional Water Resources Centres and the UN World Water Centre. As regards the first, the extra expenditure on the Secretariat should be small; the Water Resources or Natural Resources Divisions of the four commissions would service the centres. Governments should be persuaded to pay the cost of experts to the meetings. The appropriate division of the Regional Economic Commissions may need the addition of one professional of the rank of a P4 and one general services officer. The Director of the Division should act as Secretary of the Regional Water Resources Centre. As to other expenditure such as travel, representatives of specialized agencies and other UN bodies as also international organizations, both governmental and non governmental, would meet the travel costs of their own representatives at the meeting.

97. The United Nations World Water Centre would require a secretariat of sufficient strength headed by an executive secretary of high grade and status. All travel expenses for representatives of the United Nations and the agencies and other international organizations attending meetings would have to be paid by their own organizations, who should, with some rationalization of expenditure on travel, be able to meet these without additional expenditure. Governments should be persuaded to pay for travel and subsistence allowances for experts drawn from their countries, except that the UN should pay for experts, if any, drawn from the least developed of the developing countries. There would, of course, be some extra expenditure on preparation and publication of reports, seminars, etc.

98. The extra cost could be reduced by the savings effected through the elimination by the UN bodies concerned of some existing joint groups or units and of seminars, conferences and working parties and publications, since the proposed Regional Water Centre and the World Water Centre would undertake some of the tasks. This would save a lot of expenditure and avoid a good deal of duplication and overlapping which at present occurs. The periodic conferences on Water Resources convened by ECAFE should, with the development of a Water Resources Centre, not be necessary. Likewise, it should not be possible to dissolve the Joint Water Resources Group of ECLA. With the establishment of a global centre it should be unnecessary to hold expensive seminars or panel of experts' meetings on global water policies, two of which have already been held (at Buenos Aires and Delft, Netherlands), without appreciable results.

99. To sum up, the following diagram illustrates the means for bringing about better co-ordination and integrated approach and harmonization of the plans and programmes of United Nations bodies.



# CHAPTER III

#### CONCLUSIONS

100. While the activities of the various organizations in the United Nations family concerned with water problems are on the whole impressive, each organization acts more or less independently and in an inward-looking manner on the basis of the most extensive interpretation of its mandate and without always fully taking into account the aspects of water resources development other than those of its immediate preoccupation.

Consequently:

- there is often a scramble for projects financed by UNDP and other budgetary funds, particularly in the common or 'grey' areas;
- organizations working in the common areas are prone to consider each other's activities as some kind of 'inter loping' thus often creating an unfortunate psychological situation which affects mutual co-operation;
- each organization tends to attempt too much on too broad a front with an inevitable rarification of results;
- there is no integrated approach and joint planning and programming of the activities by the organizations concerned;
- research studies, surveys, seminars, conferences and publications by each organization are planned virtually in isolation;
- each organization maintains its own staff of experts and consultants in various fields, including the common areas, resulting to some extent in a waste of scarce resources, both human and material.

101. Though attempted since 1951 co-ordination by ECOSOC has not been very effective and has largely boiled down to receiving triennial reports from the UN Water Resources Development Centre and an annual report from ACC, without much action taken on them. The various subsidiary bodies of ECOSOC because of the limitations of time and the wide range of subjects they must deal with, have not been able to do much by way of detailed co-ordination.

102. The ACC Sub-Committee on Water Resources, though acting as a forum for the exchange of information and discussions about each other's activities and programmes, does not perform functions of real co-ordination either.

103. As regards co-ordination and co-operation among UN organizations <u>inter se</u> at the executive level, devices such as joint missions or advisory groups (in connection with UNDP projects) and joint groups or administrative units between two or more organizations have sometimes been tried. In essence, however, co-ordination has been attempted for the most part informally and through personal consultations. Such coordination has sometimes been effective and sometimes not, its effectiveness

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depending a great deal on the personal factor. While the personal equation is important, the field of water resources development is so vast and vital that it leaves too much to chance and cannot be a substitute for methodical and systematic co-ordination on the basis of a common integrated approach.

104. Better co-ordination and a more integrated approach to the problems of water resources development are necessary both at the national and international level. While at the national level the primary responsibility lies with Governments, the UN agencies could do more to help countries develop expertise and infrastructures in integrated planning and programming in the water field within the framework of their national development plans. It is also necessary and desirable to ensure coordination and co-operation among international organizations in countries where there is a large number of water development projects or such projects are of a multi-disciplinary character. UNDP headquarters and the Resident Representative can do much in this regard.

105. The subject of water resources development, due to the very facts of geography and climate, is particularly suitable for an integrated approach on a regional or subregional level. The regional economic commissions already have a great deal of work to their credit in this respect at the regional or subregional level. Their role and their lien with specialized agencies, UN Headquarters and UNDP, however, needs to be strengthened. The regional economic commissions should also be fully utilized for the purpose of regional planning and progamming of the development of water resources and their experience and expertise in this area should be used for pre-project and in-project evaluations.

106. Four Regional Centres for Water Resources, should be created, one attached to each regional commission. While ideally and logically there may be a case for a single organization dealing with water resources development, water enters into so many kinds of activities and has so many facets needing differing technical treatment that it is not practial or even desirable to entrust all these activities to a single organization. This does not mean that the existing situation is satisfactory; there is need for some institutional arrangements and demarcation of functions and responsibilities, while maintaining the momentum acquired by the various UN organizations over the years, could help develop a global approach on a co-ordinated basis and reduce over-lapping and duplication to a minimum.

107. Global co-ordination involves legislative, administrative and technical co-ordination. At the legislative level, ECOSOC should, with assistance from its subsidiary bodies, exercise its functions under the UN charter for broad policy co-ordination.

108. Global co-ordination at the administrative and technical level, which is at present attempted solely by the ACC Sub-committee on Water Resources has proved to be inadequate.

109. It is necessary, therefore, to establish a United Nations world Water Centre with a constitutional structure and functions as detailed in Chapter II. In addition, since in the final resort it is the actual practical co-operation and co-ordination between UN agencies in this field that will be the determining factor, the horizontal links between these organizations need to be strengthened.

110. The solution lies in joint and integrated planning and programming. Mere consultation between organizations or individual officials is not enough; there should be agreed programmes, particularly in the common areas. With this should be combined effective communication between the official UN organizations of what each is doing and each office's experiences, which at present is lacking.

111. To begin with, such joint planning and programming should be introduced in three areas, namely hydrology, ground-water and surface water resources, and prevention of water pollution. Later other common areas may also be brought within the orbit of joint planning and programming.

112. To-date the investment resulting from UNDP and agency projects in the field of water resources has been, with the exception of WHO projects, by and large disappointing. The marriage of several elements sound national planning, soundly conceived preinvestment and preproject surveys, and internal and external investment are essential for sound and successful development.

113. Where such machinery does not yet exist, national planning on an integrated basis, and the creation of a ministry or department or authority or commission entrusted with and capable of taking an integrated view of water resources development as a whole or of such aspects of it as may be regarded of primary importance is necessary. The United Nations system should, at the request of governments, provide advisory services to help in the creation of such national machinery.

114. Having the power of the purse and being the prime source of financing for the large majority of water resources development projects undertaken by the various UN organizations, UNDP has an important role and responsibility for ensuring that projects take into account sound principles of water management and promote an integrated approach. This can be done by (a) sending out carefully selected multi-disciplinary teams to assess the various possibilities and establish an order of priorities among the types of assistance to be extended on the basis of an integrated approach and taking into account also the possibilities of bilateral aid; (b) insisting on joint planning and programming by organizations in common areas before they seek UNDP assistance; (c) breaking up projects into different identifiable components and disciplines and entrusting these to different agencies according to their competence as sub-executing agencies or sub-contractors, the agency considered most interested in the end result being designated as Executing Agency; (d) appointing two or more agencies as joint executing agencies with one of them acting as co-ordinator; and (e) having one or more agencies associated with the Executing Agency, the manner, terms and stages of the association being carefully spelt out in the plan of operations.

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115. The possibility of attracting capital should be considered in the earliest stages of consideration of a project. It is wrong, as if often

the case at present, to initiate a pre-investment project or a feasibility survey on its technical merits along, leaving the question of investment for development entirely to the future. A much stronger and more effective liaison between UNDP and external financing agencies than exists at present is required already in the pre-project formulation stage.

116. To ensure the success and maximum usefulness of the project it finances, UNDP should encourage and promote scientific studies and research and collection of data.

117. Greater emphasis should be placed on the scientific side of water resources development. A more intensified programme of research and collection of scientific data than at present should be undertaken. UNDP should set apart and earmark funds for scientific research and for the development of the scientific and technical capability of Member States for undertaking a rational utilization of their water resources.
# CHAPTER IV

## RECOMMENDATIONS

- 118. <u>Recommendations for consideration by ECOSOC and the legislative</u> bodies of organizations concerned.
- 1. The co-ordinating role of ECOSOC and of its subsidiary bodies (such as CPC, the Committee on Natural Resources and others) as regards activities in the development of water resources should to the extent possible be strengthened (paragraphs 36, 41, 63).
- 2. Four Regional Centres for water research should be created, one attached to each Regional Economic Commission, with structure and functions as detailed in paragraphs 55-58.
- 3. A United Nations World Water Centre should be created with structure and functions as detailed in paragraphs, 66-70
- 119. <u>Recommendations requiring executive/legislative action by a number</u> of organizations concerned:
- 1. To bring about a better integrated approach to water problems than exists at present, the role of the regional economic commissions should be strengthened (paragraphs 40-53).

For this purpose:

- (a) The water resources divisions or units in the regional commissions secretariats should, where necessary, be strengthened.
- (b) United Nations Headquarters should treat the regional economic commissions as their regional arm in the water field. Normally projects designed to promote planning and studies of laws, institutions and economic factors related to water resources development, particularly those related to multi-national river basin projects, should be entrusted to the commissions; also seminars etc., unless they relate to highly technical matters of global significance and are too costly.
- (c) There should be systematic planning and programming, in mutual consultation, between UN Headquarters and the commissions in respect of studies and research, seminars, conferences, symposia, working groups, and other activities in the water field undertaken by the United Nations. Such joint programming should cover two-year periods.
- (d) The experience and expertise of the commissions should be used likewise for pre-project, in-project and post-project evaluations. Any multidisciplinary teams formed for such purposes should include a water resources expert from the division or unit of the regional secretariat concerned.
- (e) There should be more effective communications between the specialized agencies concerned and the commissions. Each should inform the other of their plans and programmes of activities in the water field, and should consult with one another to ensure that there is no over-lapping and duplication of effort.

- (f) The existing trend towards closer collaboration between technical agencies concerned with water and the commissions should be further developed through the creation of joint groups or joint units, both <u>ad hoc</u> and permanent.
- 2 Joint and integrated planning and programming should be undertaken in the areas of the common interest by all organizations interested in water, both bilateral and multilateral (paragraphs 75-82).
- (a) Too much should not be attempted on too broad a front. Planning and programming should be geared to meet the urgent needs of Member Countries and aimed towards rational utilization of water resources for development. Such joint planning and programming should cover two-year periods (or longer if desirable in any given area of activities). It should be carried out by joint working groups of officials of the organizations concerned. The agreed programmes should be forwarded to the World Water Centre and along with the latter's comments, to the technical and governing bodies of the organizations concerned.
- (b)Such joint planning and programming by two or more bodies will be without prejudice to joint consultations between all agencies concerned with a particular subject in the water field.
- (c)Initially joint programming may be extended to the following areas hydrology, ground water and surface water and the prevention of water pollution. Subsequently it may be extended to other common areas.
- (d)Specifically, in the area of hydrology, joint planning and programming should be undertaken by UNESCO and WMO; in the case of ground water and surface water - by the UN, UNESCO, WHO and WMO and in the case of prevention of pollution by FAO, WMO, WHO and IAEA.
- (e)For meetings of the joint programming groups e.g. in the case of hydrology, UNESCO and WMO, and for ground and surface water FAO and UN should alternately be convening agency, and for prevention 'of water pollution WHO should act as the convening agency.
- 120. <u>decommendations requiring executive/legislative action by</u> <u>individual bodies</u>

United Nations

- 1. The present Water Resources Development Centre should be merged with the proposed World Water Centre. (paragraph 94).
- 2. There should be close and regular consultation between UN and regional commissions in preparing headquarters and commissions' programmes respectively (paragraph 52).

# UNDP

3. UNDP should, on request by governments help provide advisory services for strengthening of the national machinery for co-ordination in water resources at the national level, be it a ministry, a department an authority or a commission (Paragraph 47).

- 4. Regional Bureaux of UNDP should establish close links with the regional economic commissions in the water field by accrediting a senior liaison officer to each commission; and the machinery and experience of the commissions should be integrated with the processes of country, subregional and regional programming.
- 5. Multidisciplinary teams (which should include experts from the regional economic commissions) should be sent to assess the various possibilities and priorities and the types of assistance that could be rendered on the basis of an integrated approach and in harmony with existing national development plans (Paragraph 53).
- 6. Projects of a multidisciplinary nature should be broken down into identifiable components, each of which would be entrusted to the most competent agency in a discipline, acting as sub-contractor, the agency considered most interested in the end-result being designated as executing agency (Paragraph 89).
- 7. In multidisciplinary projects in which two or more agencies have a more or less equal contribution to make, their appointment as joint executing agencies, with one of them acting as co-ordinator, may be considered in suitable cases (Paragraph 90).
- 8. Prior to considering a technical assistance water project and who should be executing agency, UNDP should insist on joint planning and programming in areas of common interest (Paragraph 86).
- 9. The practice of having one or more agency associated with the executing agency in projects of joint concern should be resorted to more extensively, with the manner and various stages of association spelt out clearly and incorporated in the plan of operations (Paragraph 88).
- 10. Where in any particular project there is need for advisory services other than those of the executing agency or associated agency (e.g. health aspects of an irrigation project) such participation should be negotiated beforehand and incorporated in the plan of operations. (Paragraphs 88-89).
- 11. Co-ordination during the execution of a project between both the executing and associated agencies and all others interested in it should be ensured at the headquarters level by UNDP, and in the field under the leadership of the UNDP Resident Representative (Paragraph 68).
- 12. UNDP should place greater emphasis on the promotion of scientific studies and research in the water field in developing countries. Specifically the creation of a fund within UNDP for this pourpose may be considered (Paragraph 91).
- 13. An intensified programme of assistance in the establishment of hydrological and other institutions for the training of scientists and engineers in water resources should be undertaken (Paragraph 91)

14. In order that FAO projects related to the use of land and water which are so germane to the speedy development of agriculture, fisheries,forestry etc., should result in maximum investment, there should be adequate examination on an integrated basis both of the technical and of the socio-economic aspects of any development that might result from such projects, the investment potential being investigated through the joint FAO/IBRD programme or otherwise.

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15. Much greater emphasis than hitherto should be given in FAO projects to problems of conservation and prevention of water pollution.

# <u>WHO</u>

- 16. As with ECA and ECAFE, WHO should appoint liaison officers with ECA and ECE. The rapport between WHO and the regional economic commissions in the water field should be further strengthened.
- 17. WHO may consider constituting with IBRD, a joint WHO/IBRD technical unit, either at headquarters or in some of the regions, or both
- 18. The organizational set-up on water pollution in WHO should be .strengthened so as to enable it to play its role in the framework of any future institutional arrangements in this field that might follow from the decisions of the International Conference on Environment.

# UNESCO

- 19. UNESCO's studies and research in the water field should be more closely related to the practical and urgent needs of Member States; priority should be given to the needs of developing countries.
- 20. Technical and Scientific Training Institutes for water resources should be set up or training courses organized on a regular basis in some of the developing countries. Increased assistance should be given to universities and other national institutes for hydrology.
- 21. An institute for higher training in hydrology should be set up in each of the regions covered by the regional economic commissions, with perhaps two in Africa.
- 22. Preparation of regional/sub-regional hydrographic maps for Africa, Asia and Latin America should be undertaken or expedited in cooperation with the regional economic commissions concerned.
- 23. The Office of Hydrology should increasingly function as the focus for UNESCO activities in the water field.
- 24. In order to ensure joint planning and programming particularly in the context of the International Hydrological Decade, UNESCO and WMO should demarcate as precisely as possible their respective perimeters of activities. The programmes elaborated by the proposed joint UNESCO/WMO groups should, after reference to the proposed regional and World Water Centres, be submitted with the latter's comments by UNESCO

FAO

<sup>\*</sup> Vide paragraph 119 (d) and (e).

to the co-ordinating council of the IHD and by WMO to its Commission on Hydrology.

# WMO

25. The concept of joint partnerships with UNESCO in the field of hydrology should be developed in a much more positive way than hitherto, joint planning and programming being undertaken along the pattern described in paragraphs and recommendation above. ۳.

26. Joint partnership programmes and execution of projects in other areas of common interest should also be developed with other bodies concerned with hydrology.

# IAEA

27. In order that IAEA's special expertise and capacity to contribute to the scientific side of water resources, e.g. survey, classification, inventory, etc., be fully utilized, there should be a more intensified programme of IAEA's activities in the field of water resources undertaken by arrangement with developing countries and the other organizations concerned, and with the help of sufficient funds made available to IAEA.

# APPENDIX I

# UNITED NATIONS

# MANDATE AND COMPETENCE

1. The United Nations' role and activities in fields related to water resources cover a wide spectrum. The preamble to the Charter gives the United Nations the responsibility "to employ international machinery for the promotion of economic and social advancement of all peoples", which, as elaborated in Chapter IX, "International Economic and Social co-operation", gives legislative mandate for United Nations activities.

2. United Nations activities in the field of water resources come in the following categories:

- (a) General promotion of international co-operation aimed at fulfilling the wide responsibility under Article 55 of the Charter.
- (b) Co-ordination: (Article 57 "the Organization shall make recommendations for the co-ordination of the policies of activities with the specialized agencies", and Article 63 "it (ECOSOC) may co-ordinate the activities of the specialized agencies through consultation with and recommendations to such agencies and through recommendations to the General Assembly and to the members of the United Nations").
- (c) Acting as instrument for providing technical assistance and as executing agency in respect of UNDP Special Fund projects.
- (d) Froviding funds through UNDP for assistance to Governments.
- (e) Giving help through UNICEF.

3. United Nations activities have evolved in the last two decades. The attention of the United Nations was first drawn in 1951 to the imperative needs of the arid zones of the world for water. Later, it turned its attention to river basin development which attracted a good deal of attention from developing countries after the success attained by the Tennessee River Valley Development. Still later, ECOSOC adopted resolutions on desalination and on the need for co-ordination in the field of water resources activities of the United Nations family of organizations, and decided on creating a Water Resources Development Centre in the United Nations Secretariat. Since 1960 the United Nations has actively participated in UNDP Technical Assistance and in Special Fund programmes.

4. Over the years the following have become, by and large, the special spheres of activities of the United Nations in the water field.

- (a) integrated river basin development;
- (b) water desalination in developing countries;
- (c) the design of water supply systems based on desalination;

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- (d) comparative survey of national water administrations;
- (e) legal and institutional implications of international water resources development;
- (f) flood damage prevention measures and management.

5. Aside from these, seminars, symposia and conferences are held under its auspices in fields of special interest to the United Nations, and studies are undertaken by the staff of the Resources and Transport Division as well as by putside consultants.

# THREE LEVELS OF UNITED NATIONS ACTIVITIES

6. United Nations activities in the field of water resources are, broadly speaking, undertaken at three levels, namely at the Headquarters of the United Nations, by the four regional economic commissions and by UNDP and UNICEF, which are aid-giving bodies attached to the United Nations.

# UNITED NATIONS HEADQUARTERS

7. United Nations Headquarters undertakes specialized studies and is the participating and executing agency for UNDP technical assistance and Special Fund projects in the development of hydroelectric power, water transport, tourism in relation to water resources, ground water exploration, etc. It provides technical assistance through experts, fellowships and programmes of technical assistance financed by UNDP in some 50 countries; and it is executing agency of some 40 UNDP Special Fund Projects.

8. In the sphere of co-ordination, ECOSOC, by a series of resolutions, notably 417 (XIV) assumed responsibility, to be discharged by the Secretary-General, for the promotion of co-ordination of international activities concerning water resources development.

9. A centre was established within the secretariat to promote coordinated efforts for the development of water resources. This - the Water Resources Development Centre - submitted biennial reports until 1968. In its resolution 1033 (XXVII) dated 14 August 1964, the terms of reference of the Water Resources Development Centre were revised and whittled down; the functions of the focal point of co-ordination were transferred to an inter-agency committee - a special sub-committee of ACC on water resources functioning under the auspices of ACC. Since then the Water Resources Development Centre, aside from submitting a triennial report to ECOSOC is mainly used for servicing the ACC subcommittee on Water Resources, while continuing to be an integral part of the resources and Transport Division of the United Nations.

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10. The United Nations has also entered into bilateral and multilateral arrangements with other members of the United Nations family of organizations, in those aspects of water resources development in which it has common interest with them. For example, it has endeavoured to develop co-ordination with FAO on river basin development and regime of international rivers, with UNESCO on projects relating to hydrology of ground water and surface water resources, etc. Much of such coordination, however, is tentative, <u>ad hoc</u>, and non-institutionalized and does not go far enough. The degree of co-ordination and co-operation also varies from organization to organization and often boils down to no more than occasional personal consultations between officials and exchange of information.

# THE REGIONAL ECONOMIC COMMISSIONS

11. A great deal of work in the water resources field has been done by the four regional economic commissions. The nature of the work has varied from one regional commission to another, according to the different needs and environmental circumstances of the countries covered by the regions.

12. For example, ECE has been particularly concerned with the problems of environmental pollution, of water management and inter-state cooperation with regard to the use of international rivers and lakes. ECAFE has been concerned with the prevention of damage by typhoons and floods which are of frequent occurrence and cause a great deal of devastation in many countries of the Asian region, and the survey and development of the potentialities of the great rivers of Asia such as the Mekong, the Salween, etc. ECA, has, in reference to the needs of the vast continent of Africa, mainly concerned itself with the assessment and inventory of water resources and the hydrological survey of the various sub-regions and in this connection with the development of institutions for training in hydrology, water management, etc. ECLA had been engaged in a close study of the water resources of various areas in Latin America on the basis of a river basin approach, and has helped governments to prepare requests for programmes of water development, for assistance by the financing agencies like UNDP and the World Bank.

# THE COMMISSIONS' ACTIVITIES

13. ECAFE has constituted a seven nation intergovernmental Typhoon Committee with the object of promoting and co-ordinating the planning and implementation of measures required for minimizing typhoon damage in the western Pacific. The Typhoon Committee Secretariat consists of three experts : a meteorologist provided by WMC, an expert in hydrology and flood forecasting provided by the United Nations (OTC/ECAFE), and an expert on telecommunications provided by WMO. A joint WMO/ECAFE panel for tropical cyclones is about to be set up with similar responsibilities in regard to the Bay of Bengal.

14. The Mekong River Basin Development Project provides a note-worthy example of successful inter-agency and intergovernmental co-operation for which ECAFE has been the prime mover. Besides the four riparian countries represented on the Mekong Committee, there are twenty-six countries and thirty-nine national and international agencies and organizations co-operating with the project. 15. Starting from 1951 nine sessions of the Regional Conference on Water Resources Development, at which substantive matters of policy and administration are discussed, have been organized by ECAFE.

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16. ECAFE renders advisory services to governments of the regions through Regional Advisers on Water Resources. During the period 1968-1969 it undertook preliminary investigations to determine the feasibility of the development of regional power stations for the supply of electricity to West Malaysia, Singapore and South Thailand and for the supply of desalinated sea water to Singapore. Early in 1962 ECAFE initiated a comprehensive survey of the land and water resources of the Mu river basin in Burma, with the object of developing irrigation and hydroelectric power. This became a Special Fund project in 1966.

17. <u>ECE</u> has an active Committee on Water problems which sets the programme of work and priorities. The committee seeks to adopt an integrated approach to water problems, bringing together both the scientific and management aspects with a view to assisting governments to deal comprehensively with urgent problems of water policy and administration.

18. Under the auspices of the ECE Committee on Water Problems, meetings and conferences have been held of groups of experts on the survey of water resources and needs, and many seminars have been held on the protection of ground and surface waters against pollution by oil and oil products and on river basin management. Surface water research and studies relating to water pollution are undertaken on a fairly extensive scale by ECE.

19. The second session of the ECE Committee on Water Problems was held in February 1970 and has laid down a programme of work and priorities for 1970-1971 as well as for 1971-1975.

20. <u>ECLA</u> activities in the field of water resources derive from resolution 99 (VI) and subsequent resolutions of the Commission. Resolution 131 (VII) refers specifically to the study and use of international lakes and rivers.

21. Under ECLA's Natural Resources and Energy Programme a Joint Water Resources Group was formed in 1957 comprising experts provided by the UN (OTC), WMO and, since 1965, WHO/PASB.

22. ECLA's main fields of action have been a general study of countries or large regions and have included :

- (a) an analysis of the role of water in economic and social affairs;
- (b) technical assistance to governments upon request;
- (c) co-operation with advisory groups on economic and social planning;

- (d) participation in symposia, conferences, seminars, etc., and
- (e) research and survey work on matters of concern to all Latin American countries or large groups of countries in the region.

23. ECA has in recent years been quite active in the field of water resources. To examine aspects of water resources planning and implementation, a Working Group of Water Resources Experts of the African Region was held in June 1970. ECA, UN Resources and Transport Division, FAO, WMO, UNESCO, and IBRD and some national experts participated in the Working Group. The preparation and publication of an inventory of international rivers and international river basins in the region and their potential for development is also being considered, as also a comprehensive study on water resources administration in Africa.

24. ECA is giving priority to collection of data relating to water. In co-operation with WMO a study of deficiencies in data collection networks in the countries of the regions was carried out. Subsequently a seminar on network design was held. A joint ECA/WMO programme for advise on network design assisted three countries in 1970.

25. A preparatory meeting with representatives from UNESCO, FAO and WMO was held in Addis Ababa in June 1970 to prepare the ground for a conference on hydrology and hydrometeorology in the economic development of Africa. The conference was held in 1971. ECA also undertook a survey of Eastern Africa in collaboration with UNESCO and in West Africa with the collaboration of several agencies, on the problems of manpower training and research.

26. ECA assisted the Member States of the Niger and Chad basins in the preparation of the treaties establishing the River Basin Commission or authority (There are 54 international river basins in Africa with immense potentialities for development). It also participated in the preparations for the study of the Lake Victoria Basin which is now a UNDP Special Fund project with WMO as the executing agency and with five Nile basin countries.

## UNDP

27. Notwithstanding the fact that it has become more and more autonomous under a Governing Council of its own, UNDP is an integral part of UN; and its contributions to the efforts of the UN family of organizations goes to the very heart of United Nations activities in relation to the development of water resources.

28. UNDP has from its very inception given prime importance to the development of water resources. Continuing the assistance provided by the erstwhile EPTA, it increased assistance for the programme of arid zone research undertaken by UNESCO. It has provided technical assistance to countries through the various UN organizations in the field of research, holding of seminars, training of hydrologists and engineers in the water field, etc.

29. Precise estimates of the actual amount spent on water resources development is not however available. A large proportion of UNDP's activities (the monetary value of which increased from \$66.6 million in 1959 to \$534.9 million in 1971) is devoted to financing projects related to the utilization of water for irrigation, the production of electricity, community water supply and other purposes essential to economic development.

30. Apart from financing UNDP projects and providing technical assistance in a variety of fields relating to water resources, UNDP is in a position to perform, and has actually performed, some co-ordinating functions, first in project evaluation and in identifying projects, then in the selection of the executing agency and in the formulation of the plan of operations, and finally during the field operations. It is increasingly resorting to the practice of appointing pre-project consultative and advisory groups, to advise governments both in regard to the general planning of development (including that of water resources) and specific multilateral projects relating to water. Although the accepted principle is that the organization which is interested in the end result should be entrusted with its execution, very often UNDP has been obliged by force of circumstances and the demands of competing agencies to name an executing agency on the basis of distributive justice. In my talks with the officials of the specialized agencies, I have often heard that such and such a project was given to such and such an organization which had the best competence for it. While there may be an element of chagrin in such complaints, UNDP procedures in the past have sometimes lent themselves to the creation of such a feeling among agencies. The project-by-project approach which UNDP had hitherto been adopting has somewhat militated against an overall or integrated approach whether at a national or regional level - more so as most governments had not evolved the necessary infrastructures, administrative and institutional, to enable them to take a total and integrated view of their water resources development. The new country programming approach in which UN development plans are to be closely linked with the national plans wherein, hopefully, one can expect a total approach - is likely to help in the evolution of an integrated approach at the level of the international organizations, provided the necessary minimum machinery is created and a modicum of understanding on the basis of give and take is reached between the various organizations concerned.

31. Some senior officials of UNDP with whom I have discussed the matter are aware of the urgency and importance of the problem. The expanded role of the UN Resident Representatives as a focus of co-ordination in the field will also help in co-ordinating planning at the country level, so far as UN assistance is concerned. The problem, however, is vast and complicated and will require action on a much wider basis if the experience and expertise of the various UN organizations operating in the water field are to be pooled and integrated and there is proper distribution of functions and operations among them.

## UNICEF

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UNICEF is endeavouring to help in making clean water supplies 32. available to rural communities rather than urban communities since, in the later case, the volume of assistance required is much too large for UNICEF's resources, and other sources of aid have not been much interested in water supplies to small rural communities. (Urban community water supply is dealt with by WHO). Because the supply of clean water is necessarily linked with environmental sanitation, ideally, schemes should not be confined to water supply but should include other environmental sanitation measures such as excreta disposal. In practice this has not always proved possible, so that the emphasis tends to be on water supply. UNICEF's assistance has taken the form of provision of pumps, piping, transport and training. On the technical side, UNICEF collaborates in its rural water supply schemes with WHO and the latter provides whatever technical expertise may be required. Health education is also encouraged in conjunction with these schemes.

33. In June 1970 the number of countries aided in water and environmental sanitation (which usually go hand in hand) was 72. The number of countries assisted prior to 1970 was 19, thus making a total of 91. The distribution of countries assisted, by regions, was as follows :

	Currently	Previously		
Region	assisted	assisted	<u>Total</u>	
AFRICA	28	-	28	
ASIA	22	l	23	
EASTERN MED.	5	1	6	
EUROPE	1	1	2	
THE AMERICAS	<u>16</u>	<u>16</u>	<u>32</u>	
	72	19	91	

34. In actual terms there has been a spectacular increase in expenditure on water supply and environmental sanitation as illustrated by the following figures:

Annual	average	for	:	1954	- 1958	\$328 <b>,</b> 951
				1959	- 1963	<b>\$1,551,54</b> 0
				1964	- 1968	\$1,791,028
				1969		\$1,924,645
				<b>197</b> 0		\$3,279,760

35. Over 70% of the expenditure has been incurred in countries of Asia which have the largest rural populations.

36. The largest UNICEF projects for rural water supply approved by the UNICEF Executive Board in April 1970 is in India. This is a fouryear project with an estimated cost of \$18,575,000 (excluding cost of assistance from other UN agencies and bilateral sources) of which UNICEF's commitment is \$5,893,000. UNICEF's expenditure is meant to cover the purchase of about 85 drilling rigs to be placed by UNICEF at the disposal of governments of several states through the government of India. The project intends to provide children and families of 12,000 villages in India with a supply of clean water for drinking, washing and, in a few areas, small scale food production. These villages are located in hard-rock, water scarcity areas requiring the use of very recently developed methods of drilling in order to sink wells of sufficient depth and in adequate numbers.

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37. UNICEF has acted in close collaboration with WHO and with other agencies where necessary, and during visits to the field one usually hears complimentary remarks about the value of UNICEF's assistance to developing countries. UNICEF has set up a field organization of regional representatives who keep in touch with the assistance requirements of the countries of these regions in the water and other fields.

## ORGANIZATION IN UN SECRETARIAT

38. Responsibilities for water resources development fall within the purview of the Resources and Transport Division of the Department of Economic and Social Affairs in the UN Secretariat. Within this Division the responsibilities concerning water resources are shouldered by the Water Resources Section. Until the beginning of 1970 ground water projects were carried out by the Geology and Mining Section. These have been made the responsibility of the Water Resources Section, thus emphasizing the shift of emphasis from surveying, which is closely connected with geology and geological explorations, to water management.

39. However, since most water resources projects are multi-purpose, many other organizational units in the Resources and Transport Division participate in the formulation and evaluation of water resources projects such as the Geology and Mining section, and the Cartographic Section. A special Inter Sectional Project Co-ordination Unit has been constituted with the responsibility for pooling of technical know-how, in regard to inter-disciplinary projects.

40. Additionally, some other divisions and departments at UN Headquarters such as the Office of Legal Affairs in the preparation of the UN Panel of Experts on the legal and constitutional implications of international water resources development, and the Public Administration Division in the design of the comparative study of national water administration, have co-operated with the Resources and Transport Division. 41. The UN Resources and Transport Division is responsible for all the technical, economic and other substantive problems of UNDP projects in the field of water resources development entrusted to UN for execution, from initial formulation of projects to final reports. The Division has sometimes also provided technical advice and assistance to governments in the formulation of project proposals at their request. It also participates in UNDP sponsored survey and evaluation missions.

# REVIEW AND APPRAISAL

42. The foregoing description of the activities of the United Nations in the water field shows that at headquarters these relate to seminars, studies and operational projects. At the regional level much work is done, primarily of regional importance in co-operation with the specialized agencies and governments concerned. Appropriately, the economic aspects of water resources development in their respective regions receive attention from the regional commissions.

43. There are subjects which do not strictly come within the purview of other organizations, e.g. water desalination, comparative study of national water administrations with a view to helping governments to set up appropriate integrated national administrations, legal and institutional implications of international water resources, hydroelectric development, etc. There are other fields in which other organizations and UN bodies are also marginally or substantially involved such as ground water exploration and assessment (UNESCO, FAO, WHO, WMO), hydrological resources survey (UNESCO, FAO, WMO), international river basin development (FAO, UNESCO, WMO), flood control (UNESCO, FAO, WMO), etc. It is true that the interest of each organization is not exactly the same but in these particular fields there are often large grey or overlapping areas where better co-ordination and distribution of functions are called for than is at present the case.

The work done by the UN in the field of water resources is 44. impressive. It is clear that over the years a great deal of special experience and expertise have been acquired. Much of the UNRTD's activities are operational. In UNDP projects relating to water resources UN has a large share \*as participating or executing agency and virtually acts as another specialized agency. Specialized agencies operating in the water field are not quite happy about this and often regard the UN as intruders. This feeling is no doubt somewhat exaggerated and for some aspects of water resources development for which UN has unique qualifications, unjustified, as these do not legitimately fall within the purview of any other UN organization. The fact that the UN is in competition with many of the specialized agencies psychologically affects its acceptability as focus of co-ordination for the activities of specialized agencies and other UN organizations in the water field.

<sup>\*</sup> UN's share 12.1 comes next after FAO's of 77.8, out of UNDP expenditure of \$91.6 millions on water during the period 1959-1970.

Despite efforts made in recent years the UN headquarters lien with 45. the specialized agencies having a common interest, on the one hand, and with regional commissions on the other are still weak. Even though there is assistance of UN representatives at meetings convened by specialized agencies and vice versa when matters of common interest in the water field are considered, one misses the close liaison necessary for co-ordinated planning and programming of activities of a multi-disciplinary and multi-purpose character. Likewise, although both UN Headquarters and regional commissions are part of the UN, they often seem to be taking independent initiative and proceeding on their own lines. There is nothing basically wrong in taking independent initiative but these should spring from common and co-ordinated thinking, Headquarters profiting from the work of the regional commissions, using the latter as their regional arm, and providing guidance derived from their global view and experience; and, on their part, the regional commissions planning their activities in the water field in full consultation with UN Headquarters. There is no common planning and programming and distribution of functions between Headquarters and the regional commissions of activities - neither in relation to studies and seminars nor with regard to technical assistance projects.

46. ECOSOC's role of co-ordination has not been sufficiently exercised. This includes the water field where ECOSOC's functions of co-ordination have hitherto been minimal.

47. It is through the UN water centre that some co-ordination has been attempted, but the functions of this centre have been severely limited.

# APPENDIX II

# FAC

# MANDATE AND COMPETENCE

1. The Food and Agriculture Organization of the United Nations is deeply involved in many aspects of water resources including their development for the promotion of agriculture, fisheries and forestry.

2. Water, together with soil, is the natural resource on which agriculture and fishery are based. Certain of man's actions in agriculture, forestry and fisheries can lead to over-exploitation and destruction of water as a renewable natural resource, while other activities can lead to improvement of natural conditions.

3. FAO's interest and competence in the water field derive from the responsibilities placed on it by its constitution and by a series of directives of FAO conferences.

4. FAO's mandate, which is in general terms under its constitution, has been elaborated and given precision by various directives concerning water resources, given to the Secretariat by FAO Conferences. These directives concern integration of the two basic natural resources of agriculture, soil and water, and their management in a technically and economically efficient system of production and include :

- Appraisal of water resources.
- Co-ordination of work for development of land and water resources and for the management of large water-sheds, river basins, flood control and water conservation.
- Increased efficiency of water utilization, use of brackish water and sewage water and prevention of salinity.
- Investigation and use of surface and ground water resources.
- Control of marine and inland water pollution for fisheries.
- International water legislation and administration.
- Prevention of over-exploitation, erosion and pollution of natural resources and the rational use of such resources.
- Conservation of natural resources of water along with those of forests, fisheries and soil and preparation of an inventory of water resources.

5. Apart from indicating the field of priorities from time to time the FAO Conference has emphasized an integrated approach to the problems of water resources.

6. The need for co-operation with other international agencies with regard to water problems was emphasized. It was observed "with clear differentiation of functions greater understanding and, therefore, closer co-operation, are facilitated and concrete results become available to member countries through <u>joint endeavour</u>".

7. The basic importance of FAC's work in the investigation and development of water resources for increasing agricultural production, mainly through irrigation and drainage of croplands, and developing fish production, was re-emphasized in the new concept of the "Five Areas of concentration" evolved by FAO in 1968 are all directly or indirectly related to the development of water resources. Introduction of the new high-yielding varieties and the green revolution, in particular, are dependent on good water management and a timely and sure supply of water in quantity and quality.

#### NATURE OF FAO'S ACTIVITIES

 $\beta_*$  - FAO's activities in the water resources field have been directed to :

- (a) the development of new water resources for agriculture, including surveys, planning for integrated development and use both on national and international rivers;
- (b) planning and most effective and economic use of all sources of water presentation, surface and underground, including supplementary irrigation with special reference to high-yielding varieties;
- (c) identification of land and water and of inland fisheries development projects;
- (d) use of water resources for fish production;
- (e) planning and design of efficient water control structures including drainage and land reclaimation works;
- (f) operation and maintenance of water development schemes emphasizing economic, institutional, administrative and legal aspects of such water use;
- (g) transformation of traditionally irrigated areas into modern water managed schemes; and
- (h) conservation and improvement of the productivity of land under irrigation.

DESCRIPTION OF ACTIVITIES

- 9. FAO's activities to this end have included:
- (a) General surveys and programmes of systematic collection and processing of information; (b) Research and studies; (c) Publications;
- (d) conferences, working parties, seminars and training courses; and
- (e) technical and financial assistance.

# General surveys and programmes of systematic collection and processing of information

10. The most important and massive programme under this heading is the preparation of the Indicative World Plan (IWP) for agricultural development. This plan is an exercise in perspective agricultural planning intended to provide an international frame of reference to help governments to formulate and implement their agricultural policies and provide a basis for the activities of FAO. The water development potential is estimated and the proposals for development and improvement of irrigation are made in this connection. Account is taken in these projects of the stringent water needs of the new highyielding varieties. Various regions were selected for study such as the Near East, South America, Africa South of Sahara, Asia and the Far East, Central America and North West Africa. By August 1969, two volumes had been published, covering 85 per cent of the developing countries.

11. Based on projections of increasing population and food needs, an estimation is made in every region of the extra food requirements in 1975 and 1987 and of the increase in arable area and the extra demand for water for irrigation necessary to reach the target of food requirements in those years.

12. FAO participates also in the International Hydrological Decade and has collaborated in the collection and analysis of hydrological data. It provides the technical secretariat for two of the working groups established by the Co-ordinating Council of the International Hydrological Decade, namely "The influence of man on the hydrological cycle" and the "Hydrology of the Carbonate Rocks of the Mediterranean basin". It also participates in the working group on floods and their computation.

13. FAO, in co-operation with ECA and UNESCO, has participated in the man-power survey in the field of water resources development in Africa.

# Research and Studies

14. FAO is primarily concerned with water management for increased agricultural production, fisheries and forestry which by producing quick results and accelerating development have direct social and economic impact. Pure research on hydrology, water resources, and water use is not normally undertaken by FAO, which concentrates on the application of proven techniques and results to the task of increasing and improving the production of food and fisheries. FAO's research activities are, therefore, mainly in the nature of applied research having relation to specific projects in its field programmes. Furthermore, the description of the projects under the title "research and studies" shows that the studies aspect pre-dominates over the research aspect. 15. Research work, carried out primarily through the European Inland fisheries Advisory Commission, has been undertaken on the establishment of water criteria for fresh-water fish. FAO co-operated with and is involved in the work of the International Rice Commission, and the European Commission of Fisheries and the Commission on Land and Water Use in the Near East. Work has also been undertaken in the problems of phenols, ammonia and some heavy metals concentration and on desirable oxygen requirements for fish.

16. Other examples of research studies are the detailed water resources survey in Northern Iraq and South West Ethiopia, survey of the Altiplano of North West Latin America and of the highlands of Eastern Africa and a study of the monthly mean occurrence of days of 10 mm or more of rain over the desert locust area from Senegal to East Pakistan.

# Publications

17. The output under this item of activity is considerable. Publications comprise the result of studies as well as treatises on important subjects such as rice irrigation, sprinkler irrigation, surface irrigation, the use of sewage water for irrigation, etc. These included during the period 1 September 1970 to 1 September 1971, 23 papers and 5 reports.

## Conferences, seminary, Working Parties

18. FAO organizes seminars, conferences and working parties on the use of water for agriculture and fisheries. It also participates in others organized under the auspices of sister United Nations organizations. 25 of these were held during the period 1 September 1970 to 1 September 1971.

# Technical Assistance

19. The utilization of water resources claims a large proportion of FAO's activities. Under UNDP and other technical assistance programmes (FFHC and Funds in Trust Programmes) FAO has carried out more than 200 land and water projects, including fisheries projects, in 89 countries with more than 650 specialists in the field. At the end of 1968, water projects constituted 44% of the Special Fund Projects entrusted to FAO. Out of a total UNDP expenditure of \$91.6 millions on water during the period 1959-70,\$77.8 millions were spent through FAO.

20. FAO gives technical advice to WFP regarding the feasibility of its projects relating to utilization of water resources.

21. FAO is involved as participating and executing agency in both country and regional SF and TA projects. Some of these are very large projects; in Africa, for instance the Senegal river basin project costs a total of \$4,633,600, including government counterpart contributions

equivalent to \$611,000. The Chad basin project costs \$3,540,000, including government counterpart contribution equivalent to \$600,000. In Latin America the Marim Laggon Basin project costs \$1,460,000, including Government counterpart contribution equivalent to \$531,800. Lastly, FAO is executing Agency for numerous multi-disciplinary country projects.

# CO-ORDINATION AND CO-OPERATION WITH OTHER UN AGENCIES

22. Co-operation and agreements have been entered into by FAO and many organizations of the UN system : United Nations in 1964; ILO in 1947 and 1955; UNESCO in 1948 and in 1961; WHO in 1948, as well as IBRD (and IFC and IDA), WMO and IAEA. These are all general agreements with no specific reference to water.

23. In actual practice these agreements are translated in terms of FAO's participation in technical meetings and seminars organized by other specialized agencies and vice versa. FAO also sometimes uses the services of experts from other specialized agencies, especially from WHO, on projects for which FAO is the executing agency.

24. With UNESCO, apart from mutual participation in seminars, conferences, etc., the collaboration has taken the form of participation in the UNESCO arid zone programme and in the international hydrological decade programme. As already stated, FAO is providing the technical secretariat for two of the IHD working groups. The collaboration with WHO is mainly concerned with the supply by the latter of experts on water borne diseases and sanitary engineers to field projects executed by FAO where water resources development and use might create health hazards.

25. Collaboration with IBRD takes the form of an FAO/IBRD co-operation programme, established in 1964, which seeks the orientation of field studies and investigations in such a way as to conform to the Bank's requirements for financing such development projects as may be identified. A large part of these programmes concerns the utilization of water resources.

26. FAO participates in the "inter-agency co-ordination group on an agro-meteorological programme in aid of world food production" which was set up as the result of the fifth congress of WMO in 1967. FAO participates in the work of WMO's Commission for hydrology on the basis of invitations to attend the sessions of the Commission and likewise in many other WMO meetings, seminars and reviews on draft publications in which FAO has an interest, from the point of view of hydrology and water resources.

27. With IAEA a joint FAO/IAEA division on atomic energy in food and agriculture has been established. This division covers work relating to the use of water for agricultural purposes including, for example, the application of radiation techniques for water use, efficient studies and the work of the IAEA radioactive waste disposal panel of experts. In FAO field projects IAEA assistance is sought in field projects on the use of isotopes in hydrology. 28. In addition to the five areas of concentration, FAO has lately been charged by the FAO Conference to give particular attention to problems of conservation and those related to environment. An interdepartmental working group of FAO has been established to work on the conservation of natural resources in the human environment in so far as it relates to agriculture. FAO, mainly through its Department of fisheries, has participated in scientific, technical, administrative and legal aspects of water pollution control with ECE and with many of the specialized agencies. It collaborates with the WHO expert committee on water pollution and with ECE on legislation and administration of water pollution control.

# ORGANIZATION

29. FAO's activities relating to water are centred mainly in the Land and Water Development Division of the Agriculture Department, though several other divisions, branches and units such as the investment Centre, and the 77 HC are involved in water resources development. Thus the Department of Fisheries promotes research and measures to provide water of good quality and ample quantity for aquatic life, the reclamation of waste land into fish farms, etc. In the field of inland water pollution research and control it participates in inter-agency activities. Within the Land and Water Development Division all operational activities have been consolidated into one service, i.e. the Operations Service and its Administrative Unit, consisting of 15 offices.

30. The regular programme provides technical assistance through four additional regional land and water development officers, one for each region - Asia and the Far East, Near East, Africa and Latin America.

#### REVIEW AND APPRAISAL

31. From the point of view of utilization, of all members of the United Nations family of organizations, the Food and Agriculture organization has, perhaps, the largest interest in water resources. Its operations relating to water cover a wide range, from assessment and inventory of surface and ground water resources for irrigation and of surface water resources both inland and coastal, for fisheries, to their actual utilization and from conservation of water resources to the prevention of pollution. The element of pure research included in its activities is small, while that of applied research, namely the most efficient and economical utilization of water resources in given geophysical and climatic conditions, forms an integral part of its wide ranging activities.

32. FAO field projects are of direct and immediate benefit to Member States. The extent of the benefit can best be judged by Member States themselves. It can be safely said, however, that success as in most endeavours in the field of international co-operation has not for various reasons initially come up to expectations. So far investment resulting from UNDP SF/FAO projects amounts to \$80,000,000 in three water resources development projects, with loans approved in six other projects, and four others under consideration by financing agencies such as IBRD and others. Compared to the magnitude of FAO preinvestment projects, the results in terms of investment are disappointing. The joint FAO/IBRD programme is a step in the right direction and will no doubt help to ensure that the preinvestment projects are so selected and executed as to stand the best chance of attracting capital for investment in the follow up stage.

33. While the major part of FAO's programme relates to agriculture and fisheries, it is not certain if full account is taken of the other needs of water. My observations in the field have shown that several of the earlier projects related to water use were generally based on short term benefits and sufficient awareness was not always shown of the need for a total and integrated approach to the use of this precious natural resource. In later projects the multidisciplinary elements have been emphasized and efforts have been made to take a more integrated view.

34. While at the headquarters level there appears to be consultation (usually brought about by UNDP), even if only a token one, prior to the formulation of a project, during its execution in the field this is usually not the case. There is little evidence that except to a limited extent e.g. use of WHO experts in regard to health problems arising in connection with irrigation and drainage problems, systematic use is made in multidisciplinary projects of the experience and expertise of other organizations dealing with various aspects of water and water resources development.

35. The Indicative World Plan is a good example of perspective planning, taking into account various factors e.g. water, soil, fertilizer, capital, man power, etc. It will be necessary to keep it up to date.

36. Within the existing framework of co-ordination and co-operation between agencies, FAO has on the whole co-operated satisfactorily with sister UN organizations operating in the water field. The framework is, however, itself limited largely to a mutual exchange of views and informal communications between members, mutual participations in seminars, etc., organized and conducted by UN bodies and an annual meeting of the three organizations that associate with one another on water resources. There is no doubt that a much broader framework has to be devised with institutionalization to the maximum extent compatible with economy of time and effort and with apportionment of tasks and responsibilities among members of the UN family on an appropriate basis.

37. Recent FAO conferences have rightly stressed the importance of conservation and prevention of fresh water pollution. FAO activities in this direction have not, however, yet gathered momentum though in pollution control it is co-operating with the WHO working groups.

Better progress seems to have been made in marine pollution. In GESAMF (Group of Scientific Experts for the Prevention of Marine Pollution), FAO participates by providing a Technical Secretary. There is no corresponding body yet in regard to fresh water pollution.

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# APPENDIX III

#### WORLD HEALTH ORGANIZATION

#### MANDATE AND COMPETENCE

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1. WHO is deeply involved in all problems of water in so far as these are related to environmental health, in the fields of community water supply, both in urban and rural areas; in all aspects of water pollution e.g. rivers, lakes, the sea, etc.; in liquid waste collection, treatment and disposal and in health aspects of water supply to dwellings, places of work, swimming pools, etc.

#### NATURE OF ACTIVITIES

#### Community Water Supply

2. WHO has a large programme for community water supply. In 1964 the 17th World Health Assembly proposed goals for water supply to urban communities realistically capable of achievement within a 15 year period which would provide adequate supplies of safe water to all members of each community within a reasonable distance of their homes and to at least half of them, piped to their homes.

3. Although considerable progress has been made and indeed accelerated with this programme since 1964, there is a backlog which has been aggravated by population growth and rapid urbanization in many developing countries, and the target of water supply for 20 millions a year for the first development decade has not been realized.

4. The World Health Assembly at its 18th session in April 1970 adopted new targets, namely the provision of piped water supply in their houses or court yards in 40 per cent of urban dwellings, and access to piped water from public fountains within reasonable distance from their houses for the remaining 60 per cent by 1980. The target for rural communities is to double by 1980 from 10 per cent of rural dwellers who have at present adequate amounts of safe water to 20 per cent. A ten-year programme 1971-1980 has been adopted which requires pre-investment planning, training, and research fellowships and the establishment of the necessary institutions.

5. In fulfilment of this large programme in the field of community water supply WHO has already undertaken a large number of projects both from its regular programme and on behalf of UNDP. In order to achieve this target for the Second Development Decade a considerable expansion of WHO activities in the field of community water supply may be expected.

# Water pollution

6. The health aspects of water pollution are of prime importance in water quality management. The World Health Assembly has directed that immediate attention be given by the Organization to the development and operation of water pollution control programmes, including estuary and coastal waters. 7. WHO's programme in water pollution includes the promotion, coordination and support of research into new methods of pollution prevention and their efficacy, the effects of new pollutants - physical, chemical and biological - on stream conditions, the criteria for classification of streams according to use or quality, standards for water quality for various purposes, etc. The activities extend to coastal as well as to ground water which, because of the possibility of contamination with sewage organizms, and, increasingly in recent years, with chemical compounds, presents a special problem.

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8. Systematic collection and evaluation of data on water pollution began in 1954. In earlier years, such data and their evaluation and information on water pollution problems were mainly confined to Europe. Later water pollution has been studied on a global basis. An interregional seminar on water pollution control was held in New Delhi, India in 1967.

9. Water quality data has been studied by a number of WHO consultants in a dozen or more countries viz. Argentina, Brazil, Costa Rica, India, Iraq, Pakistan, Peru, Syria, Arab Republic of Egypt, Uraguay, Venezuela. In 1966 a comparative study of water pollution in sixteen selected countries was carried out by WHO.

10. Two WHO expert committees on water pollution control were convened in 1965 and 1967 to appraise the situation on a world-wide basis. The second expert committee was devoted particularly to pollution in developing countries.

11. WHO provides the technical secretariat for the Working Group on hydrological aspects of natural and artificial changes in water quality established by the Co-ordinating Council of IHD.

12. Training of personnel in water pollution control principles and techniques has been promoted both by individual fellowships and by courses in institutions created or supported by WHO.

## Sanitation Services and Housing

13. In this area WHO's activities consist essentially in the provision of technical advice and in the recruitment and training of sanitary engineers for responsible positions in public health, public works, municipal and other universities, with specific regard to such fields as waste disposal. A major part of WHO's work in this field consists of advisory services to national, regional and local authorities on such aspects of water waste management as the storage, collection and transport, treatment, re-use and ultimate disposal including advice on aspects of adequate organization in the final administration and management of appropriate aspects of systems. The treatment and disposal of communal waste covers waste water, sewage, institutional waste, industrial effluents and storm drainage apart from solid - as produced within a community, rural or urban. Much of this assistance takes the form of advice on requests to the UN for finance, pre-investment and engineering studies. WHO also advises governments on planning and implementation of programmes for control of all industrial effluents and in the matter of treatment and disposal of waste. In 1969 a WHO International Reference Centre on waste disposal was established at the Federal Institute for water supply, sewage purification and water pollution control in Zurich, Switzerland. Among the functions of the centre would be the training of research workers especially in developing countries. It is proposed at a later stage to set up regional reference centres.

## Types and details of activities

14. WHO activities are undertaken by Headquarters and at the six regional offices in Africa, Asia, Europe and Latin-America to whom many functions have been delegated and decentralized. While the executive responsibility for projects of direct assistance to governments is the concern of the six regional offices of the organization, Headquarters in Geneva provide them with technical assistance as necessary. Technical staff also contribute to the medical research programmes, to the work of the expert panels and expert committees and advise Regional Offices on planning and methods.

:	: : :	Total No. of Projects	WHO Regular Budget	: WHO/PAHO : Joint : Project	: :
: Overall surve : programmes of : tic collectio : processing of	ys and : systema- : n and : information :	3	2		
Research and	studies :	25	4	: 21	· WHO/PAHO · UNDP 1
: Publications	:	12	: 5	: : 6	:
: : Conferences, : parties, semi : training cour	working : nars and : ses :	34	: : 5 :	: : 29 :	: : :
Technical and financial ass	istance	1	:	: WHO/UNDP : I :	: : :

15. A tabular statement of the activities of WHO is given below.

\* These figures relate to the year 1969.

:	Africa	Asia	Europe	Latin America
Financed by WHO :	13	15	: 6	: 11
who/рано	- 3	. –	: -	49
WHO/UNDP (TA)	6	11	· : -	: 2
WHO/UNDP (SF)	10	9	5	2
WHO/UNICEF	8	10	: -	: –
who/ft	3	1	: -	-
WHO/UNDP/UNICEF	7	3	: -	: –
UNDP (SF)/FAO/WHO	1	-	: -	: -
UNDP/PAHO/WHO	-	: –	· • -	. 6
WHO/PAHO/UNICEF	_	. –	: -	: 1
WHO/UNDP/PAHO/UNICEF	-	•		: 3
Total No Projects	48	: 49 :	: 11	: : 74 :

Field Projects by Continents (1 Sept. 1970 - 1 Sept. 1971)

16. WHO projects are undertaken under the regular budget as well as with the financial support of PAHO (Pan American Health Organization) UNDP/TA, UNDP/SF/UNICEF, WFP and funds in trusts and other voluntary funds for health promotion.

# ORGANIZATION

17. Water problems are dealt with at the Headquarters in the Division of Environmental Health under an Assistant Director-General who is responsible to the Director-General. Other units of the Organization are also involved either directly or in collaboration with the above named units, their co-ordination being done through the Division of Co-ordination and Evaluation. In November 1971, Pre-Investment Planning (PIP) Unit was created within the Division of Environmental Health. This Unit is responsible at Headquarters for all pre-investment projects in the field of water supply and waste disposal, financed by international and bilateral agencies e.g. UNDP (SF) and IBRD.

18. In regional offices there are minor variations in organizational patterns, but all water-related projects come under the sections dealing with environmental health.

# Field Staff

19. All field staff are assigned to field projects and hence their posting changes as projects start up or close down.

: : : : 1968 1969 1970 : 1 1 1 : : : Sanitary Engineers 118 : : : 132 132 : : Scientists 4 4 4 : 1 : Technical Officers 4 4 4 • : : : 12 : 11 : 11 : Sanitarians : : : Others • 7 9 9 : 2 : : : : : :

Total Staff HQ, ROs and Field in Environmental Health

\* well drillers, sanitary chemists, laboratory technicians.

20. Field staff report back directly to regional offices and Regional Advisers (Environmental Health) exercise supervision on behalf of the Regional Director.

21. Besides being an executing agency for UNDP/SF projects and a participating agency in UNDP/TA projects in its own right, WHO participates actively in UNDP/SF projects in other fields of which other organizations of the UN system are executing agencies in such fields as irrigation, fisheries and water for recreation projects, through the provision of WHO experts. Such provision is made sometimes in the plan of operations but more often by negotiation with the executing agency after the plan of operations is adopted and the project has become operational. In the latter case prolonged negotiations between WHO, the executing agency and UNDP becomes sometimes necessary.

#### CO-OPERATION WITH OTHER ORGANIZATIONS

22. WHO has co-operated in the preparations for the 1972 UN Conference on Human Environment. WHO also assisted ECE in preparing the Prague Conference on Problems Related to Environmental Health in 1971.

23. WHO participates in the Joint Group of Experts on the Scientific Aspects of Marine Pollution with IMCO, UNESCO, FAO, WMO, IAEA.

24. WHO organizes or participates in a number of UNDP preparatory and assistance missions, often in collaboration with other agencies. Among the most important of such projects in 1970 in relation to water was the assistance in the formation of special fund requests for waste disposal projects in Damascus. 25. Close liaison and collaboration have been built up between UNICEF and WHO. In particular UNICEF has actively collaborated with WHO in programmes for rural water supply.

26. Every World Food Programme project is submitted to WHO for scrutiny of its possible health implications and suggested ways of dealing with them. Co-operation has been developed with regional economic commissions. WHO has assigned a full time liaison officer with ECA. It has also assigned sanitary engineers to ECA and ECLA headquarters.

27. Collaboration has been established in the field of housing and urban planning with the UN. WHO participated in the public health aspects of the Lower Mekong Basin Development Programme.

28. A liaison officer with UNIDO has been designated for co-operation in the public health aspects of the industrial waste problems in development projects.

29. With FAO, WHO has developed co-operation in such fields as marine pollution and its effects on living resources and fishing, etc. In many instances joint FAO/WHO technical and expert groups have been created in the field of water resources development. As already stated, WHO advises FAO on health aspects of irrigation and ground water development projects.

30. WHO collaborates with UNESCO in the International Hydrological Decade Programme. Recently this collaboration has been strengthened by WHO's acting as technical secretariat for the Working Group on Hydrological Aspects of Natural and Artificial Changes in Water Quality.

31. For the supply of adequate quantities of safe drinking water to urban communities and for waste disposal, high investment is necessary in engineering and construction works. For this reason one of the directives of the WHO Assembly to the Director General was to help Member States to secure capital for investment in water projects from international financial sources. WHO has endeavoured to maintain, particularly in recent years, close liaison with IBRD. The recent practice of joint commissions of specialized agencies and the World Bank to study prospective projects from a technical and investment point of view has resulted in a realistic approach. In collaboration with IBRD, WHO participated in 1970 in a preparatory mission to study water supplies in Mali, and in sector studies and pre-investment missions to Kenya, Uganda and the United Republic of Tanzania. In 1971 further intensification of co-operation arrangements with IBRD was attempted.

# REVIEW AND APPRAISAL

32. WHO activities in the field of water present a picture of systematic pursuit of definite and clear objectives in the fields of community water supply, waste disposal, environmental pollution and sanitary services and housing. Important research has been promoted in health problems relating to water and water quality. Advisory J

services to Governments are rendered in the field of sanitation and environmental health where water is concerned. These have proved useful. Investment resulting from WHO assistance is to the tune of at least \$210 million, \*/ including funds provisionally committed by governments.

33. The lien of WHO with organizations operating in the field of water, is on the whole, satisfactory, though, as might be expected, with some organizations, like FAO, collaboration is much closer than with others. Joint participation with other organizations and bodies in activities in which WHO has common interest with them, has been frequently resorted to, but is usually on an <u>ad hoc</u> and non-institutional basis.

34. An examination of the list of Technical Assistance projects shows that in most projects consultation with WHO was held and expert advice on the health aspects of water projects was extended by WHO <u>subsequent</u> to the designation of the executing agency and finalization of the plan of operations and often following prolonged and sometimes fruitless negotiations between WHO, the executing agencies and UNDP. <u>Jamaica - Assistance in physical development planning</u>, UNDP/SF (JAM 88) WHO recommended addition of sanitation engineers for 6-8 man-months to the team of physical planners. This was reviewed by the executing agency in 1967 who saw difficulty in sparing the man-months.

# <u>Kuwait - Water resources in central Kuwait</u> (KUW 2)

WHO proposed a public health engineer (16 man-months) plus a superintendant experienced in plumbing and water for 60 man-months. UNDP on 13 June 1963 agreed to the inclusion of sanitary engineers but on 18 October 1968 queried the relation of WHO proposals to the project. No funds available. WHO were encouraged to seek funds in trust.

# Lebanon - Ground water survey (LEB 37)

WHO requested to be consulted before finalization of the plan of operations and asked for copies of the UN experts' report. They also proposed a sanitary engineer for three man-months to carry out the Beirut water supply part of the project. UNDP acknowledged WHO's comments on 16 September 1972. The sub-contract proposal was not accepted by the executing agency (16 October 1968) which instead submitted for comments a list of sanitary engineers from which it could recruit for the project.

<u>Bolivia - Ground water development in the Altiplano</u> (BOL 14) Preliminary assistance from local WHO staff within Bolivia, WHO suggested 18 man-months for sanitation engineer. UNDP on 6 February 1968 expressed reluctance to envisage such changes.

35. The above few instances have been cited - there are many others not for the purpose of fault finding (there may have been valid reasons for non acceptance of WHO's proposals for participation by executing agencies of UNDP) but merely to illustrate the rather unsatisfactory <u>post facto</u> provision for sanitation and health consultancy for projects.

<sup>\*/</sup> This is not a complete figure. The exact figure will be known when replies to a questionnaire, issued by WHO, are received from all governments.

36 One would have thought that the health aspect of a water project should be taken into account right from the beginning and be reflected in the plan of operations. The practice now increasingly adopted of sending preparatory missions or advisory groups prior to the formulation of projects should go a long way to ensure that this is done.

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37. Regional economic commissions are playing a significant role in the field of water resources development. In the future this role will be no doubt of increasing importance, particularly on the economic side and for the creation of infra-structures and of a legal framework for regional co-operation in this field. WHO liaison with regional commissions has increased in recent years. At present WHO has liaison officers with ECA and ECAFE. ECLA and ECE should be brought in line with this practice and generally further concrete steps should be taken for establishing closer rapport between WHO and the regional commissions.

38. Thanks to the initiative of UNDP, better co-operation has developed between WHO and IBRD in the areas of community water supply, waste disposal and prevention of pollution. The economic and financial aspects of water resources development are so important that it is necessary to bring in the World Bank actively. It may be useful for WHO to consider a joint WHO/IBRD technical unit either at Headquarters or in some of the regions or both.

39. Co-operation also exists between WHO and non-UN organizations such as the International Water Supply Association (IWSA). WHO work in the field of pollution control has not yet gathered momentum but it is clear that in any institutional set-up or arrangements that may come as a result of the UN Conference on the Human Environment in Stockholm in 1972, WHO will have to gear itself more than now to play its role in the broader framework of international activity in this field in the future. Specifically, to meet the increasingly dangerous pollution menace, more thorough and elaborate international arrangements may have to be made, the precise nature of which cannot yet be envisaged.

# APPENDIX IV

#### **UNESCO**

#### MANDATE AND FRAMEWORK OF ACTIVITIES

1. UNESCO's involvement in problems relating to water and the development of water resources arises from its broad mandate under article I of its Constitution, for the promotion of "collaboration among nations through education, <u>science</u> and culture" and the "encouragement of co-operation among the nations in all branches of activity including the exchange of persons active in the field of <u>science</u>".

2. In pursuance of this broad mandate UNESCO's main activities in the field of water since 1949 have been embodied in two programmes, the Arid Zone Research Programme 1951 - 1964, and the International Hydro-logical Decade, 1964 - 1973.

# Arid Zone Programme

3. The involvement of UNESCO in the programme for arid zone took four years to materialize since it was first mooted. This was symptomatic of the leisurely way in which this subject was dealt with and the slowness of the evolution of UNESCO's (and United Nations) thinking or this subject, which at best constituted only one facet of the larger question of water resources development. There were two phases of UNESCO's Arid Zone Programme, (i) from 1951 - 1956 and (ii) from 1957 to 1964.

4. In 1951 there was hardly a programme to advise upon, the funds set apart in the UNESCO budget that year being \$14,000 only. In 1952 for the first time, there was a regular programme with the necessary funds, the total value of the programme amounting to some \$40,000. From these modest beginnings, the programme developed gradually both as regards scope and intensity. The Advisory Committee was increased to nine members in 1952 and a tenth member was added in 1955. Funds for a special service of research were first allocated in 1953, which was also the beginning of the fellowships programme in arid zone research. By 1956 UNESCO's programme had increased to \$152,250 and the technical assistance programme to \$125,000.

5. In 1956 the UNESCO General Conference at its minth session established a six year Major Project  $\underline{1}/$  on Scientific Research on Arid Lands in the region stretching from North Africa through the Middle East to South East Asia.

6. Since then much larger funds were available under the regular programme of technical assistance, and after 1959 the funds under the regular programme exceeded \$300,000. In particular, funds were substantially increased for assistance to institutions in the form of experts, scientific personnel, books, etc.

<sup>1/</sup> A Major Project is defined as "a special UNESCO activity selected from a priority area". It must be of sufficient magnitude to ensure within a given time practical results in the solution of important problems and generally involves the co-operation of different disciplines.

7. The objectives were sought to be achieved by taking the initiative in promoting essential services and surveys and research on specific problems, the development of research institutes 1/ in the area from Morocco to India, and by helping countries to draw up their own research programmes, to train their staff and obtain the necessary equipment. Other means adopted were the grant of a substantial number of fellowships for training and organizing training and refresher courses and promoting the establishment of national co-operating committees to work with UNESCO in arid zone problems.

8. Side by side with UNESCO's regular programme, technical assistance programmes were developed under the Expanded Programme of Technical Assistance (EPTA) which, though administratively independent of the arid zone programme, were closely associated with arid zone research.

#### International Hydrological Decade

9. During the last few years, UNESCO's activities in the field of hydrological and related sciences are mainly centred around IHD (1965-1974) and consist of efforts to evaluate the world's water resources and to intensify research in all branches of hydrology with a view to a more rational management of water.

10. The International Hydrological Decade was established by a resolution of the thirteenth session of the General Conference of UNESCO in 1964. A Co-ordinating Council of IHD was set up with a detailed statute. The Council was to consist of 21 Member States (later increased to 30) selected by the General Conferences at each of its ordinary sessions, taking due account of equitable geographical distribution and the need to ensure appropriate rotation. The secretariat of the Council was to assemble all proposals sent in by the members of the Council by Member States of UNESCO and by the various international organizations and prepare programmes for examination by the Council.

11. These purposes were further elaborated by the fifteenth session of the General Conference to include the development of national institutions and programmes for research and training in hydrology, and the planning, development and operation of basic observation networks and hydrological basin studies.

12. Under the auspices of the International Hydrological Decade programmes approved by its Co-ordinating Council, UNESCO has a regular programme under which secretariat services are provided to the Coordinating Council and assistance is given for the scientific projects included in the international programme of the decade, and for promotion of regional co-operation programmes.

<sup>1/</sup> The Negev Desert Institute, Beersheba, Israel; Egyptian Desert Institute, Cairo; Geophysical Research Institute at Quetta, Pakistan; Pakistan Forest Research Institute at Abbottabad; Desert Research Institute, Jodhpur, India; Institute of Botany, Ankara University, Turkey; Botany Department of Cairo University, Egypt.

13. After the end of the International Hydrological Decade, UNESCO intends to continue its efforts in hydrology by launching in 1975 a long term intergovernmental programme to be known as the "International Hydrological Programme".

#### UNESCO'S PROGRAMME AND ACTIVITIES

14. The programmes fall into two categories:

- (1) The regular programmes financed by the regular budget of UNESCO;
- (2) Technical Assistance and Special Fund programmes financed by UNDP.

15. The regular programmes are for the promotion of the general advancement of hydrology and those that relate specifically to the International Hydrological Decade.

16. For 1971-72 the total regular programme was for \$419,000. Although for budget purposes a distinction is maintained, for all practical purposes the two regular programmes often merge with one another.

17. Programmes for the general advancement of hydrology consist of training of hydrologists and technicians, promotion of hydrological research and diffusion of information, and assistance to Member States.

- 18. The hydrology programme of UNESCO has five main components:
  - (a) Collection and studies of basic data; inventories and water balances.
  - (b) Research;
  - (c) Exchange of information, symposia and publications; and
  - (d) Education and training of hydrologists.

# Basic data

19. These studies concern the design of Decade stations, network planning and design of water resources projects with inadequate data, as well as inventories and water balance, representative and experimental basins, snow and ice investigations and gross sedimentation and transportation into oceans.

#### <u>Research</u>

20. The research programme consists of thirty-eight projects, two thirds of which deal with "processes (precipitation, evaporation, transpiration, soil moisture processes, surface and ground water flow, channel flow, sedimentation, chemical quality)" and "environmental research" and one third with "methodological" research (methods, models, techniques).

# Environmental

21. Study of various geographical and climatological environments, such as limestone terrains, lakes, reservoirs, coasts, glaciers, etc., man's influence on hydrological cycle, hydrological aspects of pollution, etc.

## Methodolcgical

22. Mathematic methods and models, use of nuclear techniques, physio-chemical methods, automatic pursuing of data and use of computers, instrument development, water information systems, etc.

#### Exchange of information, symposia and publications

23. Information is undertaken through symposia, of which twentyseven have been held until 1971, in addition to a large number of meetings of Working Groups and Experts held each year. A long and impressive list of technical publications by UNESCO include reports, some of which are published by UNESCO and others are joint publications with WMO, IASH and others. Guide books, manuals and results of research, etc., some published by UNESCO and others jointly with WMO, IASH and others.

#### Education and Training

24. The training of hydrologists, technicians and observers, a high priority activity in the Decade programme, has been one of the main contributions of UNESCO to the development of hydrology. This type of activity has been conducted through seminars, training courses, summer schools for hydrology teachers, granting of fellowships and special assistance for particular purposes, including assistance to universities, the provision of equipment for demonstration purposes and monographs of curricular syllabi, synoptic tables and hydrological text books, hydrological films, correspondence courses, etc.

#### Seminars

25. Since 1966, ten seminars have been organized on subjects related to hydrology, hydro-geology, etc., in collaboration, where necessary, with other organizations concerned such as WMO and with international scientific associations such as the International Association for Hydrology and the International Association for Geo-Chemistry and Cosmo-Chemistry.

## Training courses for technicians

26. Regional training courses for technicians have been held in Bamako (Mali) in 1965 with twenty-four participants from six African countries, in Tunis in 1976 with thirty-one participants from Algeria, Morocco and Tunisia and in Kenya in 1967 with twenty-four participants from seven African countries. A training course was organized in 1971 in Asia for the use of computers in hydrology.

#### Post-graduate training courses

27. UNESCO sponsors four post-graduate courses of six months each in Budapest, Madrid, Padua (Italy) and Prague, and an approximately eleven months course in Delft (Netherlands). The diploma of Delft Course has received wide recognition and is regarded as being equivalent to a Master's Degree. In addition UNESCO has organized or supported training courses varying from one month to six months in Madrid, Haifa, Graz, Barcelona and Tokyo on various subjects of applied hydrology and ground water exploitation and management, ground water tracing techniques, ground water hydrology, hydrological engineering and ground water resources and development. UNESCO also has provided part-time lectures for courses organized by the UN agencies, particularly WMO and regional economic commissions.

#### Assistance to governments

28. UNESCO is helping in securing assistance in hydrology from the technically advanced countries to less-advanced countries to enable the latter to develop the most efficient and most economical systems for hydrological observations and for the collection and processing of the resulting data.

29. UNESCO has also provided assistance to governments in the development of research, teaching and planning activities for national institutions; in setting up, planning and equipping hydrological networks and the use of modern technology for hydrological studies; and in the use and supply of hydrological equipment, standard instruments and teaching aids.

30. The assistance has been given from UNESCO's regular budget, UNDP Technical Assistance (regional and country) and the UNDP Special Fund.

31. Under the UNDP "Technical Assistance Country Programme" technical assistance has been provided to Member States for the development and implementation of programmes in hydrology. Experts have been made available to Brazil (a hydrologist in the north eastern region to carry out hydrological research with a view to knowledge about the hydrological cycle); Cuba (an expert in surface water hydrology); Syria (hydrology teacher for the Aleppo University); Mali (two experts on surface and one on ground water hydrology for assisting the government to establish a hydrological service for implementing a national hydrological network and training counterparts in hydrology); Arab Republic of Egypt (an expert on applied hydrology in the University of Alexandria); Guinea (hydrologist for lectures on water resources in Technical College in Conakry); etc., etc.

32. Under its Technical Assistance Regional Programme, UNESCO, through regional advisers in South and South East Asia, in Africa and in Latin America, assists Member States at their request, in their participation in the Decade and in the development of regional activities.
33. Under the <u>Special Fund Component of UNDP</u>, UNESCO has provided assistance to Member States for the creation and strengthening of research and training in hydrological institutes and laboratories, and for hydrological research studies and hydrological investigations on a national and international basis. Among UNDP Special Fund projects are :

# Hydrological research and training institutes:

<u>Argentina</u>	: National Centre for Hydrological and Applied Hydrological Research.
<u>Brazil</u>	: Centre for Applied Hydrology; Porto Alegre.
Iran	: Institute for Hydrosciences and Water Resources Technology.
Cambodia	: National Hydraulic Laboratory; Phnom Penh.

# Hydrological basin studies:

 Brazil
 : Hydrological studies of the Upper Paraguay River Basin.

 Regional (Algeria, Tunisia): Study of ground water resources in Northern Sahara.

 Chad
 : Study of water resources in the Lake Chad Basin.

 Cambodia
 : Flood warning

 Cambodia
 : Flood warning system in Mekong river.

<u>Spain</u> : Scientific studies on water resources in Canary Islands.

34. In the budget period 1971-72 the Special Fund projects in <u>Argentina</u> and <u>Iran</u> and the regional (Algeria and Tunisia) project referred to above were current projects; the rest had been completed.

# REVIEW AND APPRAISAL

35. UNESCO's activities in the field of water are in the main centred round hydrology of the terrestrial waters, the latter's occurrence, circulation and distribution on our planet, their physical and chemical properties, etc.

36. UNESCO is not directly concerned with water management which is the concern of other organizations like FAO, WHO and UN. However, UNESCO can and does help to provide to some extent a scientific basis for the rational and most effective utilization of water resources.\*/

<sup>\*/</sup> A typical example is the hydrological survey of the Chad Basin the results of which have formed the basis of and stimulated projects in the area.

37. IHD which is UNESCO's major water programme has succeeded in its main objectives, although as with most other international undertakings requiring a large measure of international co-operation, success has been neither uniform nor entirely up to expectations.

38. As a pioneering effort towards bringing a greater awareness among Member States of the basic importance of hydrology and hydrological investigations and data for the development and utilization of water resources, and assisting Member States to set up infrastructures for scientific studies in hydrology, UNESCO has done a commendable job. Especially noteworthy has been UNESCO's contribution, with the help of many developed countries, towards the education and training of hydrologists, hundreds of whom have been trained and are now available for service in their respective countries.

39. 107 National Committees, most of which are active bodies, are helping to bring about a better appreciation and integrated approach to the problems of water resources.

40. Over 70 projects, including a few relating to the arid zone, have been established, and 1,000 hydrological stations in various countries have been designated (these consist of pre-existing stations in the main, with, in a few cases, strengthening of already existing ones, and establishment of new stations).

41. For a balanced and objective appraisal of UNESCO's activities, however, it is necessary not to ignore what might be regarded as certain weaknesses. According to senior officials of UNESCO, "UNESCO's task is the scientific study of water resources without regard to the needs of water management which must be considered by governments and by other international bodies"; and "study of the movement and circulation of water must be done without relation to immediate needs". A rigid adherence to such a principle, however, may result in studies and research becoming too academic and divorced from the practical and urgent needs of Member States, particularly those of developing countries.

42. UNESCO's projects are a mixture of those with main or total emphasis on scientific studies and research with somewhat remote interest or benefit to Member States, and others of more practical and proximate benefit to both developed and developing countries. For example, projects for the training of hydrologists for establishing hydrological research stations in developing countries, a study of the hydrology of river basins etc, in developing countries are of immediate and visible benefit to Member States. However, such other projects as research on precipitation and evaporation processes, on the global and regional water balances, etc., have no similar immediate benefit even though for the scientific understanding of hydrological processes and of the water cycle and for determining the extent to which these are being disturbed, as indeed for hydrological forecasting, they are undoubtedly important. The UNESCO sponsored Mid-Decade Conference on Hydrology in December 1969 reviewed the programmes of the International Hydrological Decade, a great majority of delegates urged that future efforts be concentrated on practical topics.

43. The IHD originally included 10 technical working groups and 21 panels of experts, UNESCO being responsible for all but a few of them. The servicing of these is an awesome task, costly both in money and manpower Following the recommendations of the Mid-Decade Conference, IHD reviewed this meeting programme; the 10 working groups were maintained but the panels were abolished. Provision, however, remains for the creation of "sub-groups" and "commissions" of experts for special tasks - one which, it is hoped, will be moderately used. With the limited. funds available there is an inevitable impression of dispersal of effort and rarification of activities, particularly in programmes other than Technical Assistance and Special Fund projects financed by UNDP. It should be seriously considered whether concentrated attention on a few problems at a time selected according to a sound determination of priorities would not produce better results. Conscious of this, the Mid-Decade Conference recommended to the Co-ordinating Council that during the second half of the Decade, priority be given to activities benefiting developing countries.

44. While UNESCO's programme of studies and research is impressive one cannot help feeling that funds provided for research are not commensurate with the importance and complexity of the topics selected. For example, under 1971-72 budget out of a total of \$1,673,000, earmarked for activities in the field of water, the funds provided under the heading "Stimulation of Hydrological Research and Diffusion of Information" amounted to only \$68,000 or little over 4%. In UNESCO's regular programme, in addition to the research being undertaken on a global or regional basis, a concentraled and urgent drive to increase the capability of developing countries for studies and research in the field of water resources is necessary. However, since the possibility of obtaining funds for such purposes from the regular budget is limited, UNDP should take a greater hand in this matter than it has done hitherto, all the more so since the success of UNDP field projects relating to water development depends much on prior surveys, inventories, evaluation, classification, etc., of water resources and on studies and research in that connection. The creation of a fund within UNDP for scientific research on water seems overdue and should be considered.

45. UNESCO has an excellent record in the field of training of hydrologists. However, most training courses, summer schools, etc. are held in developed countries. There are, obviously, certain advantages in holding such courses in collaboration with the developed countries, because of their advanced knowledge and of their willingness to meet a substantial part of the expenses, including those of expert lecturers. Nevertheless, it would be of advantage to developing countries if, with the assistance of UNDP, national training institutes were set up and training courses organized on a regular basis in some of those countries where practical problems of water resources development exist and have been or are being tackled. Besides, one such institute for higher training in each of the regions covered by the regional economic commissions, with perhaps two for Africa, will be very useful. In organizing and running such institutes the experience and assistance of the regional economic commissions, which have already helped set up a number of regional institutes in other fields, should be fully utilized.

46. A hydrological map of Europe on the scale of 1:1,500,000 is being prepared with the co-operation of European countries and the International Association of Hydrology. This map, will no doubt be of great value. Such maps may be more difficult to prepare for other continents or sub-continents or regions. The latter's need for such a map, however, is obvious. UNESCO is planning a programme in this direction and has a hydrological map of Africa in mino. There seems no reason why, despite difficulties, preparation of continental or regional and sub-regional maps for Asia and Latin America should not be attempted, in co-operation with the regional economic commissions some of which, for instance ECAFE, have prepared maps in respect of other natural resources and are planning hydrological maps for their regions.

47. From the description of the organization of the secretariat in respect of water resources it will be seen that while the main responsibility lies with the office of Hydrology, under the Department of Environmental Sciences and Natural Resources Research, research comes under the Department of Science Teaching and Technological Research. The Division of Educational Science is also concerned with soil water relationship and the inter-relationship between water and agriculture. While no serious difficulties appear to arise from such dispersal of responsibilities in the water field, it is obviously desirable that overall responsibility be concentrated in one office and the most appropriate would seem to be the Office of Hydrology which should be the initiating Office of all regular programmes, including those for education and training and those related to soil water relationship. This Office should also be responsible for Technical Assistance and Special Fund projects. I understand that this principle has been accepted and the Office of Hydrology is functioning more and more as a focus of UNESCO activities in the field of water resources.

48. UNESCO has good co-operative relations with the regional commissions. It has participated in the organization of the Conference on Hydrology and Hydrometrology in the Economic Development of Africa (Addis Ababa, September 1971) along with ECA and WMO. It has also co-operated with ECAFE for its meeting of Asian national committees for IHD, held in Bangkok in October 1970. However, in order that the experience and expertise of the regional commissions should be fully utilized steps should be taken to strengthen the links between the regional offices of UNESCO and the regional commissions 'headquarters and also between the latter and UNESCO headquarters.

49. The IHD programme raises complex problems of co-ordination with other UN organizations working in the water resources field. With WMO, in particular, there are large areas of apparent overlapping and competition in hydrology, hydrological data collection and hydrological forecasting. The problem is somewhat aggravated since the Co-ordinating Council of IHD, although composed of government representatives, is a subsidiary body of UNESCO. It thus does not fit into the concepts of autonomy prevalent among organizations in the UN family. A certain measure of co-ordination has been achieved through the Technical Working Groups but this is of a limited nature and has varied from one organization to another. In particular, it is necessary to reinforce co-ordination and co-operation between WMO and UNESCO on a sound and systematic basis. Much of the existing misunderstanding between the two organizations in connection with hydrological activities will be removed if joint planning and programming are undertaken by the two organizations in the whole field of hydrology. It is understood that some initiatives have been taken by UNESCO to brink about a closer partnership with WMO in the field of hydrology.

### APPENDIX V

#### WORLD METEOROLOGICAL ORGANIZATION

### COMPETENCE AND MANDATE

1. Water resources along with agriculture, health, transportation and many other basic factors of human activities are influenced, if not controlled, by the weather. For example, water resources depend on rainfall. Likewise weather and climate are influenced by the presence of moisture in the soil, in the surface and in the air.

2. The World Meteorological Organization's interest in hydrology and water resources arises as a by-product of its main task of studying weather conditions and assisting weather forecasting; and studies and measurements undertaken for meteorological purposes are also the basic data of hydrological investigations for establishing the water balance, for determining the water cycle and for the survey and assessment of water resources. Several other activities of WMO in different fields of meteorology (such as climatology and agricultural meteorology) are also helpful to the Member States in the solution of their water resources problems. Finally, WMO assists in the consolidation and development of national hydrometeorological services, particularly in developing countries.

The Convention of WMO includes among the main purposes of the 3. Organization "to further application of meteorology to ..... water problems". The Convention also states that one of the purposes of the Organization is to facilitate worldwide co-operation in the establishment of networks of stations for the making of meteorological observations or other geophysical observations related to meteorology, which covers the collection of most of the atmospheric and water data relevant to and necessary for water resources development. In recent years certain additional tasks have been entrusted to WMO. The Fifth Congress in 1967 specified in further detail the Organization's responsibilities in the field of water resources. Thus Resolution 27 entitled "Hydrometeorological Water Resources Development and the International Hydrological Decade (IHD) "authorized the Secretary-General to participate actively in and support the International Hydrological Decade activities, and in particular to provide the secretariat for IHD activities in projects for which WMO had already assumed responsibility, and to participate in or assume responsibility for additional projects on the invitation of the Co-ordinating Council of IHD. The Organization also decided to assist in the training of hydrometeorologists, hydrologists and relevant technical staff and in developing meteorological and hydrological services as an essential pre-requisite for the development and economical use of water resources.

4. In 1969 the Executive Committee decided at its twenty-first session that WMO's responsibility in hydrology should be strengthened by a long-term plan of action concerning the operational aspects of the collection, transmission, processing and publication of hydrological data related to the land phase of the hydrological cycle.

# NATURE OF WMO'S ACTIVITIES

5. WMO's activities related to water come under the purview of its Commission on Hydrometeorology (now renamed Hydrology) which is one of the Organization's ten technical commissions and was established in 1957. This Commission provides guidance on technical questions in the field of hydrology and hydrometeorology and oversees the implementation of WMO projects in these fields.

6. Other technical commissions of WMO include in their terms of reference some basic activities required for water resources development. For example, the Commission for Agricultural Meteorology provides advice on "the most practical utilization of knowledge concerning weather, climate (natural and artificial)... for purposes such as conservation of natural resources, land utilization, etc."

7. A technical conference of hydrological meteorological services, held in Geneva in October 1970 under the auspices of WMO further defined and elaborated WMO's responsibilities in the field of hydrology in relation to water resources development. One important result of this conference was to re-emphasize WMO's interest and competence in operational hydrology and in some aspects of ground water and quality of water.

8. The role of WMO in promoting international co-operation in "operational hydrology", was laid down pertaining to the following elements (with particular reference to surface water):

- (a) Precipitation
- (b) Snow cover
- (c) Evaporation from lakes, river basins and reservoirs
- (d) Temperature and ice regime of rivers, lakes and reservoirs
- (e) Water level of rivers, lakes and reservoirs
- (f) Water discharge of rivers
- (g) Sediment discharge of rivers
- (h) Soil moisture and depth of soil frost
- (i) Quality of water
- (j) Groundwater

9. The current activities of WMO in the fields related to water resources consist of the following:

(a) <u>World Weather Watch</u>. This is a very important part of WMO's activities. Apart from a global observation system, global data processing system and a global telecommunication system, it includes

a research programme, education and training, forecasts of stream flow and water levels for efficient management of water resources, forecasts of flood flows and levels for protection of life and property, forecast and observation of the extent of snow and ice cover and rate of melting, etc., all of which are important in the context of assessment and evaluation of water resources for the purpose of "most economical and productive development".

(b) <u>The International Hydrological Decade</u> (see later)

(c) <u>Studies and research</u>, e.g. network planning and design, hydrological bench marks, water balance studies, research on hydrological forecasting, hydrological design, data for water resources projects.

(d) <u>Conferences, working groups and seminars</u>. During the period l September 1970 to 31 August 1971 eighteen conferences, working groups, seminars and symposia were held, most of them in collaboration with other United Nations organizations and/or international scientific associations.

(e) <u>Publications</u>, e.g. guide books, manuals and hand-books, and research papers on the scientific problems connected with hydrology and hydrometeorology.

(f) <u>Participation in Technical Assistance and UNDP Special Fund</u> <u>projects</u>. The proportion of expenditure on technical co-operation projects in the water field during the years 1967, 1968, 1969 to the total expenditure on T.A. projects in all fields (all under UNDP), was respectively 21%, 44% and 46%. Major hydrometeorological projects (15) are at present being executed by WMO in Africa, Asia and Latin America, besides an extensive programme of expert missions, seminars, conferences and fellowships. Expert missions have been sent to Ethiopia and fellowships have been provided for Chad, Ghana, and Sierra Leone in Africa. In Asia fellowships have been given to Indonesia, Korea and expert missions sent to Jordan, Laos, Syria, Thailand and Turkey. In Europe fellowships have been given to Albania and to Yugoslavia. In Latin America an expert mission has been sent to Ecuador and fellowships have been provided for Uruguay and Ecuador.

### Country Projects

10. WMO is executing agency for important country projects. Among these may be listed the following:

Algeria	a Special Fund project (Hydrometeorology Training a	and
	Research Institute), (4 1/3 years from 1970).	

<u>Tunisia</u> a Special Fund Project for strengthening of the national meteorological service (4 years from November 1971).

- Arab Republic<br/>of Egypta Special Fund Project (Meteorological Institute for<br/>Research and Training), (two phases; phase I March<br/>1965 to December 1970; phase 2 January 1971 to<br/>December 1973).Afghanistan<br/>Mongoliaa Special Fund Project development of meteorological<br/>services (5 years from 1969).Mongoliaa Special Fund Project-expansion of meteorological<br/>and hydrology services (5 years from June 1969).
- <u>Philippines</u> a Special Fund Project meteorological training and research (5 years from May 1968).
- <u>Cuba</u> a Special Fund Project expansion and improvement of the meteorological and hydrology services (3 years from January 1972).

## Regional Projects

WMO is likewise executing agency for a large number of important regional projects in Africa.

A Special Fund Project - hydrometeorological survey of the catchments of Lakes Victoria, Kioga and Albert (5 years from August 1967). Countries involved are: Kenya, Sudan, Uganda, Arab Republic of Ferret and the United Republic of Tanzania. Mali - Guinea: a Special Fund Project flood forecasting and warning system on the Niger River Basin (2 years 2 months from October 1969). Asia - typhoon programme in the ECAFE region. A joint ECAFE/WMO unit financed by UNDP Technical Assistance is operating this project. Improvement of Caribbean meteorological services (5 years from August 1967) in the Caribbean countries. The Caribbean countries include: Barbados, Guyana, Jamaica, Trinidad and Tobago and the British Caribbean territories.

Expansion and improvement of hydrometeorological and hydrological services in the Central American Isthmus (5 years from August 1967) embracing: Costa Rica, El Salvador, Honduras, Guatemala, Nicaragua and Panama, the object being to establish an adequate network of hydrometeorological and hydrological stations to collect the basic data necessary for the planning of hydro-electric power generators and longterm development in water resources. ECLA - Water Resources Study Group in which a WMO expert in hydrometeorology is a member of the ECLA Water Resources Study Group, and has participated in meteorological and hydrological services in various Latin American countries.

### International Hydrological Decade

11. An important aspect of WMO's activities in the field of water resources is its participation in and co-operation with the International Hydrological Decade. WMO representatives participate in all meetings of IHD, though WHO itself does not participate in the IHD secretariat.

12. WMO has provided the technical services for nine IHD projects including hydrological forecasting.

# ORGANIZATION

13. As already stated, WMO's activities in the field of hydrology and in others related to water resources development are carried out by its technical Commission on Hydrology. The revised terms of reference adopted for it by the 1971 Congress aimed at strengthening the Commission's and WMO's role in hydrology and in related fields bearing on water resources development.

14. The Commission is an active body. It meets once in four years and during the current intersessional period (1968-1972) eight working groups and nine rapporteurs are engaged in finding answers to major problems and in providing advice on a wide range of hydrological and hydrometeorological questions. These are guide-book and technical regulations in hydrometeorology and hydrology, instruments and methods of observation, water levels and discharges, hydrological aspects of the World Weather Watch, machine processing of hydrological data, hydrological forecasting, representative and experimental basins, hydrological design data for water resources projects, lake evaporation, continental drought, network design, training of hydrologists, maximum flood terminology, universal decimal classification, instruments, maps and mapping techniques in hydrology. The Commission on Hydrology and its various working groups are serviced by the WMO secretariat.

15. In accordance with the decision of the 1970 Technical Conference, the sixth WMO-Congress approved the creation of an Advisory Committee for Operational Hydrology composed of twelve directors or representatives of national agencies responsible for hydrological services, two from each region, reporting to Congress and to the WMO Executive Committee.

16. The <u>Secretariat</u> has several departments dealing with matters having a bearing on water resources. The Technical Co-operation Department (whose structure is to be re-considered by the Executive Committee) deals with all aspects of WMO technical assistance activities under the UNDP. All matters relating to hydrology and water resources, including co-operation with the International Hydrological Decade, are dealt with by the Department of Hydrology and Water Resources. The important World Weather Watch project, which as indicated earlier, has a bearing on water resources, is a separate Department. The Education, Training and Research Department deals with education, training and research in hydrology. Thus, the various activities of WMO in the field of water is spread out mainly between four departments, the focal point of co-ordination being the Secretary-General, his Deputy and his Assistant for Programme Planning. 17. Asidé from the ACC Sub-committee on Water Resources, WMO co-ordinates its activities in the field of water via such channels as :

(a) joint Technical Working Groups with one or more UN organizations,
 (e.g. Joint WMO/UNESCO working groups on hydrology, Joint WMO/ECAFE and WMO/ECLA groups, respectively, on typhoon warning and a study of the water resources of the Latin American countries);

(b) attendance by WMO experts and officials at seminars, conferences and meetings related especially to those of hydrology and water resources problems in which WMO is interested; and

(c) informal meetings and discussions between WMO officials with those of organizations having a common interest in any studies or projects bearing on hydrology and water resources.

# REVIEW AND APPRAISAL

18. Beginning from a federation of meteorological services of different countries nearly a hundred years ago WMO is now a fully fledged UN specialized agency. In its special field of meteorology and meteorological forecasting and the various studies, measurements and research connected therewith, it stands uniquely competent. Its increasing interest and involvement in problems of hydrology of surface water during recent years, and its decision to undertake increased and more intensified responsibilities in operational hydrology including ground water and the quality of water, have, however, brought its activities into areas in which other organizations of the UN family, such as the United Nations, UNESCO and WHO, have concurrent and often competing responsibilities.

19. With the establishment of the International Hydrological Decade under the auspices of UNESCO in 1965, and of a strong Co-ordinating Council of representatives of Member States, UNESCO is now actively involved in hydrology, many aspects of which also concern WMO.

20. A mere perusal of the list of activities of UNESCO and WMO, makes it clear that both are operating in certain fields such as hydrological forecasting, establishment of hydrological stations, instrumentation and network designs, assistance to Governments in strengthening hydrological services, training of hydrologists, ground water, water quality, etc., etc. This development has had two notable effects. First, it has tended to cause some inevitable, though often inadvertent, overlapping and crossing of wires between WMO and UNESCO, giving rise, on the one hand, to a feeling in WMO that UNESCO was trying to arrogate to itself functions which belonged to WMO, and, through the establishment of the IHD Co-ordinating Council, to exercise authority in the field of hydrology over WMO, and, on the other hand, to a feeling in UNESCO, that WMO was extending its domain in hydrology and was either not fully cooperating or doing so with arrière-pensée. 21. Since 1968 there have been several internal arguments between UNESCO and WMO over the question of which body has competence and capacity to deal with certain matters relating to hydrology. During the last two years efforts seem to have been made to draw the necessary lines of demarcation of functions between WMO and UNESCO. The sixth Congress held in 1971, has tried to lay down the perimeter of WMO's activity in the field of hydrology and has approved the definition of operational hydrology for WMO's guidance.

22. This is a move in the right direction and will doubtless help to streamline WMO's activities, as also the co-ordination with UNESCO in the International Hydrological Decade and with other UN agencies concerned with water resources. However, it seems desirable that UNESCO should also, through the Co-ordinating Council, attempt to set forth the precise areas of its activities, taking into account the position of WMO.

23. Both organizations have, in the resolutions of their legislative bodies, repeatedly emphasized the imperative need for co-ordination with one another and with other international organizations involved in problems of hydrology, and have enjoyed full mutual co-operation for the success of the International Hydrological Decade. The line is, therefore, clear for translating these intentions into practical measures which will enable each to act separately in their special fields and jointly in the fields of common interest to them.

24. In the Annex to resolution 12 of the Sixth Congress, while defining "operational hydrology", it has been laid down : "The activities of WMO in operational hydrology with regard to soil moisture, water quality and ground water should be pursued <u>in</u> <u>consultation and agreement</u> with other organizations of the UN family and taking into full account the ongoing programme of the IHD". What is intended is not merely consultation, but <u>agreement</u>; and it is obvious that agreement can best be reached on the basis of the principle of joint partnership involving joint planning and programming. Any practical means of giving effect to these principles on the lines suggested above would, therefore, be completely in conformity with the desire of Member States.

25. So far as WMO and UNESCO are concerned, the mutual dissatisfaction of these two organizations principally concerned with hydrology, on the role of each organization in this field, sometimes vocal but largely muted, needs to be removed on the basis of mutual co-operation and joint partnership.

26. Similarly, co-operative methods need to be introduced in the field of programming and, in suitable cases, in the execution of projects where WMO and other organizations are concerned, though, perhaps there need be no institutionalization to the same extent as in the case of WMO and UNESCO in the field of hydrology. Suggestions in this regard will be made in considering the larger question of co-ordination.

27. The points made above are elaborated in the chapter on "Overall Review of Activities and Co-ordination among UN Organizations" in the course of the main report.

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# APPENDIX VI

# INTERNATIONAL ATOMIC ENERGY AGENCY

## MANDATE AND COMPETENCE

1. The Agency's interest in water resources development derives from the statute under which "the Agency shall seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world" and the agency is authorised "to encourage and assist research on development and practical application of atomic energy for peaceful uses throughout the world".

2. Apart from this general mandate which applies to all fields of development including water resources, there is a specific resolution of the General Conference of the Agency which calls upon the Director-General "in concert with the United Nations and specialized agencies concerned, to initiate a study as to how the Agency might intensify its efforts and play an increasingly useful role in the development of water desalination".

# ACTIVITIES

- 3. The Agency has programmes covering:
- (a) the use of nuclear techniques in hydrology;
- (b) the use of nuclear techniques in the efficient utilization of water by crops;
- (c) the use of nuclear energy for desalination of water; and
- (d) protection of water resources from pollution by radioactive materials, particularly wastes.

4. The basic aims of the programmes are to promote with particular regard to developing countries, the application of nuclear technology in the investigation of ground water resources within the framework of Technical Assistance projects and UNDP Special Fund projects and in co-operation with other agencies concerned such as FAO, UNESCO, WHO and UN; to assist developing countries in the establishment of their isotope laboratories related to hydrology and in preparing their programmes in the use of nuclear technology in hydrology; promoting research in the field of nuclear technology in hydrology; to co-operate in research with national institutes on problems related to nuclear technology and hydrology; to organize seminars and courses, working groups, meetings and symposia; to give advisory services and information on the use of nuclear techniques and hydrology. The programmes are devoted to training and research and to technical assistance to Member States.

## Training

5. Training in the use of nuclear techniques in hydrology is mainly undertaken by :

 (a) award of fellowships for training in national institutes and Agency's Fellowship Programme;

- (b) organization of international training courses on the use of nuclear techniques in hydrology under the auspices of UNDP and under the Agency's regular programme;
- (c) provision of staff from the IAEA secretariat to lecture on isotope hydrology in international hydrology courses in Delft, Padua and Prague.

6. The Agency's fellowship programme is financed from its operational budget and sometimes the cost of the fellowships is met by the host country. The study courses are convened in various regions from time to time for participants from developing countries to discuss the recent developments in nuclear power. They discuss the latest developments in nuclear power and nuclear desalination with international experts. For example, an International Survey Course on Technical and Economic Aspects of Nuclear Power was held in Vienna in September 1969 which was attended oy 65 participants from 33 countries including 39 from 22 developing countries. The subjects discussed included nuclear desalination.

# Research

7. Research is undertaken in nuclear techniques in hydrology by way of research contracts and agreements with institutes and universities, to investigate specific nuclear desalination topics such as the feasibility of nuclear reactors for sea-water distillation, cost of nuclear desalination, cost of water from single purpose Multi-Stage Flush Plant with Vapour Recompression, and dual purpose desalination land designs.

The cost of such research contracts is generally shared with the contracting institution.

### Panels and Symposia

8. The Agency has organized a number of panels and symposia on nuclear desalination. These were held on desalination of water using conventional and nuclear energy, nuclear energy for water desalination, costing methods for nuclear desalination, value to agriculture of high quality water from nuclear desalination, nuclear desalination and so on. The Agency has also convened panels and symposia on isotope techniques in hydrology.

#### Operational Projects

9. Operational projects are of two types. The first concerns technical assistance projects executed both under the Agency's regular programme and UNDP. The second type consists of sub-contractual work in isotope hydrology for UNDP Special Fund projects. The Agency itself has no UNDP Special Fund project as executing agency. Technical Assistance projects have been undertaken, <u>inter alia</u>, in Brazil, Iran, India, Greece, Thailand.

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10. In over fourteen projects sub-contractual work has been undertaken by arrangements between the executing agency and IAEA. These include projects in Algeria, Chad, Morocco, Nicaragua, Northern Sahara and Senegal. 11. During the three years 1969-1971, out of a total expenditure under the regular programme of technical as istance of \$7,692,300, the expenditure on projects in hydrology was \$272,500 or 3.5%. For the same period, out of a total UNDP technical assistance expenditure of \$3,509,000 projects in hydrology accounted for \$79,100 or 2.2\%. Out of a total expenditure both under the regular and UNDP programmes of technical assistance amounting to \$11,201,300 projects in hydrology totalled \$350,600 or 3.1%. The sub-contractual work for isotope hydrology during these three years amounted to \$52,110.

### ORGANIZATION

12. The work relating to water resources falls into three departments at Headquarters, namely, the Department of Technical Operations, the Department of Research and Isotopes, and the Department of Technical Assistance and Publications.

13. The Division of Nuclear Safety and Environmental Protection of the Department of Technical Operations deals with the subject of prevention and control of water pollution. The Division of Muclear Power and Reactors of the same Department is responsible, <u>inter alia</u>, for work on the scientific, technical and economic aspects of nuclear desalination.

14. The Division of research and Laboratories of the Department of Research and Isotopes has a special section dealing with isotope hydrology studies and services.

15. The Joint FAO/IAEA Division of Atomic Energy in Food and Agriculture, which is located in Vienna, operates a joint programme on behalf of both organizations which includes the use of nuclear techniques for better utilization of water resources.

16. Fellowships and training requests are handled by the Division of Technical Assistance of the Department of Technical Assistance and Publications. -

# CO-ORDINATION AND CO-OPERATION WITH OTHER ORGANIZATIONS

17. The Agency, through its Joint FAO/IAEA Division, through its regular liaison channels with WHO and the UN and through informal communications with the other specialized agencies exchanges information on its current and impending projects. The specialized agencies are consulted with regard to data for water resources, hydrology and hydrological services.

18. The Agency also collaborates with UNESCO in the programme of the International Hydrological Decade. This co-operation takes the form of provision of the technical secretariat of the working group on nuclear techniques and isotope studies in the experimental basins. On nuclear desalination, co-operative arrangements exist with the United Nations through informal consultations.

# REVILW AND APPRAISAL

19. The International Atomic Energy Agency operates in a highly specialized field. Its activities, whether independently undertaken by it or in aid of projects undertaken by other organizations have, therefore, precise objectives and are effectively carried out. A large proportion of its activities is by way of sub-contractual work for UNDP SF projects executed by other agencies like FAO, UN, UNESCO and wHO. This represents a practical and fruitful division of functions and mutual co-operation between United Nations organizations. One cannot but feel, however, that since the use of isotopes in detecting water flows, water pollution, soil and water relationships, etc. has enormous prospects, IAFA's apacity in the field of water resources has not yet been wholly utilize... In particular in the field of prevention and control of environmental pollution there is need for a particularly close liaison between IAEA and the other interested organizations such as WHO, FAO and UNISCO and any new body that might be created as a result of the UN Conference on the Human Environment.

20. The question really boils down to the availability of resources to enable IAEA to undertake much increased activities in the water field. A much more intensified programme of such activities undertaken with the consent of the other organizations concerned and of developing countries would greatly benefit the latter.

21. I'. A has to some extent already entered into co-operative arrangements with regional commissions. The liaison and communication with regional commissions should be further strengthened.

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