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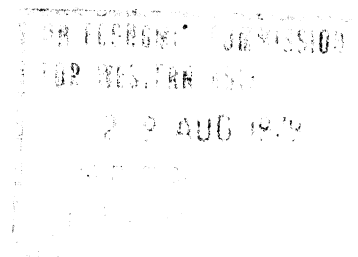
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1.0 INTRODUCTION

This document 1/ has been prepared in response to the request of the UNCSTD secretariat to present an overview of the experience of the economic commissions in the application of science and technology in developing countries; it has also been prepared to set out the position of the organization with regard to the specific items and subitems of the UNCSTD agenda.

Two United Nations activities recently addressed themselves to different aspects of the operations of the economic and social sectors of the United Nations system. The first of these was launched by the General Assembly with a view to the restructuring of the economic and social sectors of the United Nations system. In the words of the Secretary-General of the United Nations, the purpose of this effort was to enhance the ability of the United Nations system to work with "the necessary degree of speed, effectiveness and cohesion towards the establishment of a new international economic order". 2/ The second United Nations exercise concerned the Economic Commission for Western Asia and was the Administrative Management Service report entitled: "Review of the Organization of the Secretariat of the Economic Commission for Western Asia". This report addressed itself to some of the problems faced in planning a commission's research programme; the issues were those of quality, relevance, and selection of priorities.

The Group of 77 seems to have been the initiating and mobilizing force behind New International Economic Order (NIEO), UNCSTD, and the above-mentioned restructuring effort. The latter is apparently political: through it, the Group of 77

1/ In the preparation of this document, Professor A.B. Zahlan served as a consultant to the Economic Commission for Western Asia.

2/ A New United Nations Structure for Global Economic Co-operation. Report of the Group of Experts on the Structure of the United Nations System, p.1. E/AC.62/9, United Nations, New York (1975).

seeks to assert its objectives and to utilize the United Nations system as an instrument for achieving NIEO. Since all ECWA member States are also members of the Group of 77, it follows that the Commission is committed to assisting ECWA countries in establishing NIEO.

It is one of UNCSTD's goals to establish the international scientific and technological order that complements the New International Economic Order (NIEO). This report intends to complement the efforts in this direction noted above, together with the national and regional papers and other specialized documents prepared for UNCSTD. The emphasis in this report is on those aspects of ECWA's experience that are directly relevant to the purposive pursuit of the UNCSTD objectives. The economic commissions serving the developing countries exhibit a relevance in the objectives of their activities with the objectives of UNCSTD. For this reason an analysis of their experience should make a useful and relevant contribution to UNCSTD. The report dwells on ECWA's experience with programme planning and co-operation within the United Nations system; in its interaction with member States and field projects of United Nations agencies; and with the extent of co-operation between institutions in the same country. The process of linking science and technology to social and economic development in the context of international co-operation is shown to be a matter of extreme complexity. The experience of ECWA is seen to be directly relevant to any follow-up action that may result from UNCSTD.

1.1 Security environment

ECWA, established in 1974, is the youngest economic commission in the United Nations. Since 1975 the Lebanese civil war has had considerable impact on the productivity of the ECWA staff. This report is not concerned with productivity but rather with the structural features of ECWA's operations. Whenever relevant, the impact of the Lebanese civil war on the issues under discussion shall be indicated. On the other hand, the political tension in the region which seems to be a direct consequence of the Arab-Israeli conflict and notably of the Palestinian problem has led to a continuous military build-up of and confrontation between the

aforementioned two parties. This situation has apparently been reflected by an increasing resource allocation to defence in the Arab countries. It is within this security environment that ECWA had to operate since its establishment in 1974.

1.2 General remarks concerning ECWA

In ECWA the economic aspect of all activities is pre-eminent in both thought and in its work programme. The economic ~~commissions~~ are essentially research institutions undertaking policy level studies that are basically economic in nature. It is important to remember that science and technology are not the only functions to be linked to socio-economic development. In the past, attempts were made to ~~integrate~~ the social dimension into development planning. In the studies of the transport, agricultural and industrial sectors the economic dimension is always of major concern.

Economic ~~commissions~~ have been designed to serve as a nodal point at which the United Nations system and governments interact on a regional level. The United Nations agencies in the countries of the region (UNDP, FAO, ILO, WHO, UNIDO, UNESCO, and others) have roughly ten times as many professionals as ECWA does. 1/ The programmes of the specialized agencies are normally devoted to national projects. There is little interaction between ECWA and this United Nations activity in the region on the level of the professional staff or in the acquisition of data.

1/ The documentation available at ECWA on the activities of various United Nations agencies is varied and may need in some cases to be supplemented by additional and up-to-date information. All in all, nineteen United Nations agencies had one or more professionals in the region. The number of authorized professional and technical staff posts appears to be approximately 1500 while the number of posts that have been filled is about 1000. This excludes UNRWA, UNTSO, UNHCR AND UNEF staff. Egypt had 197 filled posts in 1978: 42 (FAO), 41 (WHO), 25 (UNDP). The Arab Republic of Yemen had in 1978 the second highest number of United Nations personnel: 163 staff members. The two lowest recipients were the UAE and Oman with 238 and 24 respectively. The two agencies with the highest number of professionals in the region were FAO (first) and WHO (second); while the two lowest were UNCTAD and IAEA.

Approximately 10 to 15 per cent of ECWA's efforts are devoted to technical assistance to individual countries. Roughly 65 per cent of ECWA's professional manpower are committed to research and the preparation of studies, and the balance of ECWA activities is associated with regional and international seminars, meetings and conferences. During 1974-1978 ECWA organized 26 regional meetings, seminars and conferences. The preparation of the feasibility study of the Arab regional centre for the transfer and development of technology and the seminar on the integration of women in development are illustrations of the diversity of this activity. The preparatory work on the regional level that is usually required by United Nations conferences (e.g. the Population, Water, and Human Settlements conferences, as well as UNCSTD) calls for considerable participation by ECWA staff.

Each one of these 26 activities contributes to the creation of opportunities for the interaction of national and regional institutions with each other as well as with United Nations and international organizations. These events occurring at such a frequent rate generate a high density of transactions at the ECWA level and induce cross-linkages between institutions involved with different aspects of science and technology. Yet despite this rather high intensity of interaction we shall demonstrate in the specific example of the United Nations Water Conference how the opportunity was missed for establishing adequate linkage and communication between national science policy-making bodies and ministries responsible for water use in the region.

ECWA interacts with United Nations specialized agencies at headquarters level, and also with the governments of the region, and private and public institutions. These interactions are of varying type, duration and intensity. During the first two years of its establishment the meetings of the Commission were attended quite often by cabinet ministers and their senior staff. However, since then the insecurity in Lebanon has often led many member Governments to delegate more junior representatives.

Regional activity associated with a regional project or the preparation for an international conference gives rise to a short-term but extensive interaction. For example, the preparation of the study to establish an Arab regional centre for the transfer and development of technology resulted in three meetings (two interagency and one intergovernmental) which were attended by representatives of twenty Arab organizations, delegates from 13 Arab Governments, and representatives of 9 United Nations organizations including ECA. A total of 92 persons were involved in these three meetings. This was in addition to some 400 officials who had been visited in their home country by two field missions, and to close consultations with officers of ALECSO, UNCTAD, League of Arab States and the Council of Arab Economic Unity (CAEU). Once this project had been screened through a number of interagency and regional meetings and the fifth session of ECWA, it was referred to the League of Arab States for examining the feasibility of its implementation on the level of the Arab world.

In all the meetings and deliberations involving technological issues, ECWA has attempted to involve extensively concerned United Nations agencies, the member States and relevant national and regional institutions. To some extent the response has been encouraging although of a short term and imperfect nature. Here again the unsettled conditions in Lebanon have sometimes rendered communication between ECWA and concerned institutions in member States very difficult.

The execution of research studies calls for frequent trips by ECWA professional staff to the member countries to collect information not readily available in published reports and documents and discuss findings. These visits usually result in useful discussions and the exchange of information. There was a consensus among the ECWA staff that the travel funds authorized by United Nations Headquarters were insufficient to secure the necessary information and/or for creating effective contacts with counterparts in the region.

United Nations Headquarters also discourage the use of consultants and favour full-time staff. A considerable body of opinions at ECWA felt that the resources that were committed to consultancy services constituted a very small percentage of the total ECWA budget. This was considered to have a harmful effect on the programme implementation. Consultancies, properly utilized, could serve a number of useful purposes in the process of international co-operation and institution building. Consultancies may be used as a means to transfer know-how and expertise not necessarily or adequately available within the established staff of ECWA, execute ECWA's programme and stimulate the development of a specific type of research at national institutions. Naturally, linkages are thus generated and ECWA may be able to improve its anchorage in national institutions. Such policies have been successfully utilized by a number of national and international institutions.

Two ECWA divisions, Agriculture and Industry, are joint programmes with FAO and UNIDO respectively. In general ECWA divisions interact preferentially with one other United Nations agency. As we shall see in greater detail later there is no evidence of a systematic integration between ECWA's programmes and programmes in science and technology in other agencies of the United Nations.

Unlike other United Nations economic commissions ECWA has not established any standing committees composed of representatives from relevant government institutions and ECWA to link on a permanent basis ECWA's programmes with the priorities and activities in the region. ECWA's professionals do not feel that the annual meeting of the Commission provides them with adequate guidelines and feedback. ECWA plans to seek the approval for such standing committees at the next session of the Commission.

The linking of science and technology to socio-economic development is institutionally and organizationally handicapped by a number of other factors that prevail in the region. The planning of and decision-making about projects and policies that either involve science and technology or bear on their exercise originate primarily in ministries of planning, finance, economy, petroleum, trade,

labour, and education. These decisions are generally taken independently by each specific authority and rarely reflect a coherent and co-ordinated approach. The science-policy-making bodies, where and when they exist, have little influence on the practice of planning.

Thus, for example, the recommendations adopted by the Arab ministers responsible for science and technology (CASTARAB, Rabat, 1976) and pertaining to some scientific and technological components of water resources development were not considered by those Arab ministers of irrigation and/or agriculture responsible for water use. Policies aimed at the development of the technological potential of a country involve considerable interaction, feed-back and co-ordination between national institutions. The weakness, if not absence, of such activities affects efforts intending to link science and technology to development planning.

A second practice that affects the linking of science and technology to socio-economic development is the wide use of turn-key contracts in project planning and execution. Contracts are executed in such a way that few, if any, local institutions and/or professional manpower are involved in projects. The isolation and weakness of institutions of science and technology in the region react negatively on ECWA.

In much of the United Nations literature on the subject, one also finds confusion between R & D on the one hand and science and technology on the other. Much science and technology is being directly implemented without R & D. R & D, S & T are not synonymous. Furthermore the word "development" in R & D has no relationship to the word development in "social and economic development". These international confusions have been introduced into the ECWA region and have resulted in the establishment of patterns of institutional behaviour and interactions that often make it difficult to link the relevant institutions to a specific ECWA activity.

2.0 SCIENCE, TECHNOLOGY AND INTERNATIONAL CO-OPERATION

UNCSTD is giving considerable attention to international co-operation as a vehicle for linking science and technology to development. ECWA has been involved in a number of international programmes and its experience may be a useful input to the improvement of the mechanics of co-operation. For this reason the ECWA paper gives special emphasis to ECWA's experience in achieving co-ordination and in disseminating information.

In describing ECWA's activities and programmes as well as in the analysis of the ECWA experience, a few illustrative examples are presented to exhibit the complexity of international co-operation with a view to attracting serious attention to the outstanding problems.

2.1 ECWA activities and programme

ECWA's professional staff totalled 73 in 1979.^{1/} Tables 1 and 2 show the actual and authorized distribution of this professional manpower amongst the different divisions for the 1974-1979 period. Some 50 per cent of the staff was committed to technological fields such as transport, housing, agricultural and strictly economic planning; finance and management consume 20 per cent of staff time; and 30 per cent of the activities are devoted to population and social studies. The divisions, and the activities engendered by them, are the product of historical development. The divisional structure of ECWA, the intellectual tradition of each field and United Nations customs and procedures have militated against inter and multi-disciplinary work. The programme in science and technology was staffed by one professional over the period 1974-1976, two in 1977, four in 1978, three in 1979. The small staff combined with high turnover made it difficult for the unit to play a major integrative role in the formulation and planning of ECWA's programme.

^{1/} Since 1974 ECWA has been unable to fill all the authorized posts. The shortfall varies from year to year depending on the state of security of Lebanon: it is between 33 and 22 per cent below the authorized level.

The ECWA work programme is prepared by the staff members of each division with some discussion within each division but virtually none between staff members of different divisions. Currently there are attempts to organize ECWA's work programme about focal points; however there are no reported inter-divisional formal or informal discussions.

Although there exist formal procedures for co-operation and co-ordination in the planning of work programmes within the United Nations system, these measures appear to be purely notional. ECWA receives very little feed-back in time to influence planning; ECWA's staff find little time to study the large volume of United Nations literature on programmes to be able to exert influence on other plans or learn from them relevant information. Some measure of co-operation and co-ordination with the activities of some United Nations agencies is achieved via the personal knowledge ECWA's professional staff has of ongoing activities of other United Nations agencies.

A large number of United Nations interagency and expert meetings exist. The ECWA staff, however, feel that the extent of intellectual communication at these meetings between professionals is insufficient and that the influence of these activities on programme planning and design is relatively marginal. A number of ECWA programme elements are dictated by world-wide activities of the United Nations system. We have already noted that the United Nations conferences constitute an important share of ECWA's activities.

The level of co-operation and co-ordination with specific United Nations agencies varies from division to division; it is appreciable and effective in the joint division of ECWA/FAO and ECWA/UNIDO. The Population Division indicated a high level of co-operation with several United Nations agencies involved with demographic problems. As a rule, activity is highly polarized towards one or two United Nations agencies whose functions overlap with that of a specific ECWA division.

Table 1

Actual
Professional manpower at ECWA (including Chiefs)
by programmes and divisions for the years 1974-1979

Divisions	Programme	1974	1975	1976	1977	1978	1979
Development planning	Development planning, projections and policies	8 ⁸	8 ⁸	8 ⁶	5 ³	6 ⁷	6 ⁷
	International trade and development	2	2	2	1	1	2
	Development finance and administration	-	-	-	1	1	1
	Transnational corporations	-	-	-	1	2	2
	Labour, employment and management	10	10	10	9	11	13
Natural resources, science and technology	Natural resources	6	6	6	7	7	8
	Science and technology	1	1	1	2	4	3 ¹
Social development and human settlements	Social development	7	7	7	9	11	11
	Human settlements	6 ⁶	6 ⁶	6 ⁶	7 ⁷	5 ⁴	7 ⁷
Joint ECWA/FAO Agriculture	Human settlements	4	3	4	5	5	5
		10	9	10	12	10	12
Joint ECWA/FAO Agriculture	Agriculture, forestry and fisheries	6 ¹¹	7 ¹²	6 ¹¹	8 ¹³	9 ¹⁴	10 ¹⁰
		5 ¹⁷	5 ¹⁷	5 ¹⁷	7 ¹⁶	7 ¹⁶	9 ¹⁵
Joint ECWA/UNIDO Industry	Industry	6 ³	6 ³	6 ³	9 ⁹	9 ⁹	9 ⁸
	Population	3 ¹⁸	3 ¹⁸	3 ¹⁸	5 ⁵	7 ²⁰	5 ¹⁹
Transport, communication and tourism	Transport, communication and tourism	*	*	2	6	5 ²	4
	Statistics (Unit)	47	47	49	63	69	73
TOTAL		47	47	49	63	69	73

* Statistics was
19. 1 from Population
20. 1 RA and 1 from Population part of DFD in
1974 and 1975

1. 1 XB 7. 2 XB + 1 RA 13. 4 FAO
2. 2 XB 8. 3 XB + 1 RA 14. 5 FAO
3. 3 XB 9. 5 XB + 1 RA 15. 1 UNIDO + 1 RA
4. 1 RA 10. 1 XB + 3 FAO 16. 1 UNIDO
5. 2 RA 11. 2 FAO 17. 2 UNIDO
6. 1 XB + 1 RA 12. 3 FAO 18. 1 RA and 1 borrowed from ECA

Table 2

Authorized
Professional manpower at ECWA (including Chiefs)
by programmes and divisions for the years 1974-1979

Division	Programme	1974	1975	1976	1977	1978	1979
Development planning	Development planning, projections and policies	9 ⁸	9 ⁸	9 ⁸	9 ⁹	8 ⁷	8 ⁷
	International trade and development	2	2	2	2	2	2
	Development finance and administration	-	-	-	2	2	2
	Transnational corporations	-	-	-	1	2	2
	Labour, employment and management	-	-	-	1	2	2
		11	11	11	13	16	16
Natural resources, science and technology	National resources	10	10	11	11 ¹	11 ¹	11 ³
	Science and technology	1	1	2	3	4 ¹	4 ¹
		11	11	13	14	15	15
Social development and human settlements	Social development	6 ⁵	6 ⁵	6 ⁵	7 ⁶	6 ⁵	7 ⁶
	Human settlements	4	4	5	5	6 ¹	5
		10	10	11	12	12	12
Joint ECWA/FAO Agriculture	Agriculture, forestry and fisheries	9	9	10	10	11	12
Joint ECWA/UNIDO Industry	Industry	8	8	10	10	10	12
Population	Population	9	9	10	10	11	12
Transport, communication and tourism	Transport, communication and tourism	6 ¹⁹	6 ¹⁹	6 ¹⁹	7 ⁴	8 ¹³	8 ¹³
Statistics (Unit)	Statistics	*	*	3 ¹	4 ⁵	5 ²	4 ³
T O T A L		64	64	73	80	89	95

* Statistics was part of DPD
in 1974 and 1975

1. 1 XB
2. 2 XB
3. 3 XB
4. 2 XB
5. 1 XB + 1 RA
6. 2 XB + 1 RA
7. 2 XB + 2 RA
8. 3 XB + 1 RA
9. 3 XB + 2 RA
10. 5 XB + 1 RA
11. 5 XB + 2 RA
12. 8 XB + 2 RA
13. 4 FAO
14. 5 FAO
15. 4 FAO + 1 XB
16. 3 UNIDO
17. 3 UNIDO + 1 RA
18. 2 RA + 1 from Population
19. 1, 2, 4, 1 borrowed from ECA

In the preparatory work for the 1980/81 draft programme, the Natural Resources, Science and Technology (NRSTD) attempted to present its programme in energy to O.A.P.E.C., in mineral resources to the Arab Mining Company, and in water to the Water Regional Meetings. The feed-back from these consultations has not been fully satisfactory. In addition, NRSTD is soliciting the advice of a number of consultants and experts in developing its draft programme.

There is no doubt that the mechanics of preparing the work programme require systematic study and development in order to mobilize effectively relevant expert opinion in the region both in the design of the programme and in a heightened concern for the findings.

There are no joint or complementary programmes between industry and energy, industry and housing, water and agriculture, transport and industry, technology and transport, to name but a few possibilities. Thus although all kinds of activity of the ECWA professional staff are directly or indirectly related to technology, yet because of the above organizational and programme planning modes, limited explicit attention has so far been paid to the linking of science and technology to the work programme.

Science and technology are embedded in the knowledge and skills of scientists, engineers, technicians and labour. They have to be organized within a variety of appropriate institutions equipped with suitable facilities to be able to render useful services. Their services are called for in the planning, execution and management of projects. Civil works, industries and food production come directly and indirectly under the influence or control of several ministries and policies.

The acquisition of science and technology for the purpose of improving agricultural production, acquiring control over natural resources and improving water utilization calls for a capacity to develop coherently institutions, education and policies. In order to be fruitful such actions must be sustained over fairly long periods of time. Thus the linking of science and technology to social and economic development is not a uni-dimensional process. This character of the topic under discussion per force imposes multi-disciplinary consideration on programmes as well as the co-operative behaviour of a number of public institutions.

2.2 United Nations conferences and ECWA

The participation of economic commissions on the regional level in the preparatory work leading to a United Nations conference and in the follow-up activity provides very useful insights into the linking of science and technology to development and to international co-operation. We will thus present here some aspects of ECWA's experience to illustrate the practical problems that should be attended to.

Very briefly, prolonged discussions and deliberations take place within and ~~outside the General Assembly and the~~ Economic and Social Council for several years prior to the adoption of a United Nations resolution to hold a conference. During this period the economic commissions have direct or indirect opportunities to express their opinions, to influence discussions and to alert member States to the key issues. Once a resolution is adopted by the General Assembly, a conference secretariat is created and a preparatory committee is installed. The commission becomes involved in the day-to-day implementation of the directives of the preparatory committee and conference secretariat. Here the commission is generally involved in calling for the preparation of national papers along the lines indicated by conference secretariat, in preparing a regional paper, in organizing a regional meeting to co-ordinate attitudes and positions and, after the conference takes place, to hold a regional meeting to "follow up" on the resolutions taken at the United Nations conference.

The pattern of ECWA's involvement in the preparatory work for the United Nations Water Conference held at Mar del Plata in Argentina, March 1977 was normal, and followed United Nations practices. In ECWA, an arid zone region, water is a precious resource. Concern with all aspects of water resources has been at a high level in numerous national, regional and international agencies. Within the United Nations family, FAO, UNEP, WHO, UNESCO, WMO to name a few agencies, have been active in a variety of scientific and technological fields connected with water. Furthermore, UNESCO sponsored the Conference of Ministers of Arab States Responsible for the Application of Science and Technology to Development (CASTARAB) in Rabat, August 1976; at this meeting the Arab ministers adopted recommendations 7 to 28 (inclusive) all of which were intimately connected to water science and

technology. 1/ ECWA, ALECSO, ACSAD, FAO, IBERD and numerous other United Nations agencies attended the CASTARAB meeting in Rabat.

The First Preparatory Regional Meeting for the Water Conference was held in Baghdad in December 1976. Although UNESCO, ALECSO and ACSAD attended this meeting which was organized by ECWA, no mention was made there of any of the recommendations or working papers presented at CASTARAB only four months earlier. This lack of interaction between the community of professionals and institutions dedicated to water science and the ministries dedicated to water use continued at the Second Regional Water Meeting held in Riyadh from 30 December 1978 to 3 January 1979.

This absence of a linkage between the CASTARAB deliberations on water science with those of the regional activity surrounding the water conference is interesting for a number of reasons: both activities took place within the United Nations system; furthermore, CASTARAB involved Arab science policy-making bodies (SPMBs) that are generally linked to the highest authority in their respective countries and thus one would have expected some collaboration in one or more Arab country between an SPMB and the ministries concerned with natural resources and with economic development. It is also important here to note the cleavage plane between science and technology on the one hand and socio-economic development on the other. Science and technology falls under specific agencies and units of the United Nations: UNESCO's Science Policy Division, the United Nations Office of Science and Technology. Thus United Nations activities in science and technology interact with SPMBs, i.e. national research councils, ministries of science, academies of science and technology and supreme councils of science and technology. Yet socio-economic issues and projects are under the authority of ministries of irrigation, agriculture, water resources, industry, planning. Within the United Nations system the uses of technology are the concern of FAO, ILO, UNIDO, WHO, etc. There is no operational overlap between those responsible for science

1/ 55 per cent of the recommendations adopted by CASTARAB dealt directly or indirectly with water science and technology.

policy and those responsible for the projects that involve science and technology. Generally there is no overlap or functional cross linkages between these two sets of institutions within the United Nations system, and within each government. Thus despite the commonality of the problems associated with water one notes no intercourse between those involved in water science and those involved with its socio-economic aspects.

ECWA's experience with the Water Conference thus raises interesting and important questions with respect to linking science and technology and international co-operation. First, ECWA's manpower resources committed to the topic of water (two to three professionals) was too limiting. Preparatory work to orient discussions on crucial issues should have been initiated, in collaboration with other interested parties even prior to the United Nations decision to hold the Conference. In this fashion the first regional meeting would have been placed in a more commanding position of the subject. This impetus would then be maintained through assistance in integrating within each country the scientific community to the national effort as well as in generating policy level analysis and relevant technological studies. Such an intervention does not imply that the findings and recommendations will be adopted or implemented: it merely means that science and technology have been effectively brought to the attention of the decision-makers in the region and that the existing know-how in the international system has been adequately mobilized to achieve such a limited objective.

2.3 Institutional behaviour

ECWA's activities and mode of operation are to a certain extent influenced by external factors such as various United Nations resolutions. Internally, ECWA has still to exhibit a higher degree of coupling between professionals and divisions in order to effect the accumulation and dissemination of institutional experience to ECWA staff. This type of institutional behaviour is unsatisfactory when it comes to linking science and technology to the programmes of the Commission.

Meetings of division chiefs are held but substantive discussions of specific issues, programmes, policies and experiences do not appear to receive exhaustive discussion. The professional staff have limited opportunities for formal or informal communication with each other. The majority of the staff felt strongly about the need for a more active intellectual life within ECWA as a precondition for effective co-operation in programme planning and design. Because of the weakness of lateral transactions within ECWA the vertical pull on each division exerted by other United Nations agencies, and sometimes by member States, exacerbates institutional incoherence.

The manner in which the organizational structure is reflected in the Commission's activity is seen in the boundaries that have to be imposed on ECWA studies by ECWA as well as other United Nations agencies. Since each report must necessarily have a beginning and an end, the writer in the absence of multi-disciplinary co-operation is forced to place the content within the boundaries of a sub-discipline. Thus although the labour, management and employment programme's objective is "to combat mass property, unemployment..." no attention is paid to the technological dimension of such an endeavour. This despite the fact that the labour-technology aspect is today universally recognized. Nor does the science and technology programme deal explicitly with problems of labour productivity, the upgrading of labour skills, management of programmes for labour training and so on.

Country reports on the chemical industry were prepared by the Joint ECWA/UNIDO Industry Division. These reports provided information on the chemicals imported and produced; the supply and demand for each chemical and the manpower skill composition per category of chemical manufacture. There is little information in these reports on the science and technology of the chemical industry. ^{1/} Thus upon reading the reports we are enlightened as far as tonnage of sulfuric acid consumed or produced but we are left in the dark as to the capacity of the countries

^{1/} A type of study that comes to mind and that reflects science in industry would be along the lines of Chemistry in the Economy, An American Chemical Society Study, American Chemical Society, Washington D.C. (1973); and Cecil Rajana, The Chemical and Petrochemical Industries of Russia and Eastern Europe, 1960-1980, Sussex University Press, London (1975).

themselves in the science and technology of designing, constructing, operating, maintaining and developing chemical plants. The absence of programme integration results in a limited view of industry. The education of engineers, the existence or non-existence of consulting firms for the design of chemical plants and/or process development, all constituting the sinews of science and technology, are left out of consideration. Serious technological difficulties being met are sometimes glimpsed in the reports but cannot be treated outside the prescribed framework.

The arrangement between ECWA/FAO and FAO's regional office in Cairo resulted in a division of labour between the two institutions: ECWA/FAO is to be concerned with economic studies while the regional office is to deal with technological problems. On the basis of this arrangement ECWA/FAO was able to contribute a number of important papers on food security, Arab trade in agricultural commodities, and related topics. ^{1/} These and numerous other studies are important starting points for linking science and technology to social and economic development.

The subject that appeared to worry almost all levels of staff members was how to improve the dissemination of findings and studies as well as to adapt programmes to fit demand.

Follow-up and standing committees from counterparts in the member States appear to receive much favour among the staff. Several of the divisions indicated an increasing concern for the technological aspect of the problems under discussion.

^{1/} Food Security Aspects of Arab Trade in Agricultural Commodities (November 1977). A Study of National and Subregional Food Security Planning. (The case of wheat in the Syrian Arab Republic), April 1978. A Study of Subregional Agricultural Plan: Harmonization and Integration. (The Syrian Arab Republic and the Hashemite Kingdom of Jordan), March 1978. Alternative Strategies for Long-Term Development of Agriculture in East Jordan, Improvement of Agricultural Planning, March 1977.

Current planning for the following biennium emphasizes science and technology in the 1980/81 work programme. For example, in the Industry Division a shift is planned towards the study of engineering firms, R & D and technology blockage. In the Agriculture Division studies of farm mechanization will be undertaken. Thus the trend is for greater linkage of programmes with science and technology.

2.4 Overview

ECWA is at a nodal point in a hierarchy of relationships. ECWA's overall effectiveness and the degree to which science and technology can be linked to its programmes depend on three major considerations:

1. ECWA's institutional capabilities;
2. The operational conduct of ECWA's staff and programmes; and
3. The interactions between ECWA and the United Nations agencies and member countries.

We have noted that many of the programmes of ECWA are integrated with those of other United Nations agencies. At the present level of manning at ECWA it is difficult to avoid the type of situation that led to an unsatisfactory interaction between the resolutions of CASTARAB and the preparatory work for the Water Conference. There is a need to attempt this integration at an early phase of the formulation of the overall United Nations programme.

The integration of science and technology with development planning calls for professionals specialized in areas that are not commonly available. Science policy analysts and science policy researchers are needed in all fields of activities of interest to ECWA and UNCSTD. Yet there are very limited facilities to train such specialists. It is our view that UNITAR, as well as a number of other United Nations agencies, should concern themselves with this problem.

Formal and informal professional interactions within ECWA, and between ECWA and professionals in the region as well as outside the region, are inadequate. The volume of activity at ECWA, by United Nations missions in the region, at

national universities and regional institutions could justify a fairly intensive (one hour) seminar programme. Such a programme should be designed to bring interesting and important research findings to the attention of the staff. Furthermore activity within the United Nations system, inclusive of ECWA, is too restrictive: there is a need to open up the system to the considerable and highly qualified professional manpower working in private and public institutions. These observations bear on item 2 of the UNCSTD agenda.

The strengthening and development of institutional capabilities depend to a considerable extent on a public assessment of performance. The absence of open technical evaluation of United Nations reports, studies, conferences on a regular and timely basis, has negative consequences. The inherent difficulties of such analyses is no excuse for not undertaking it. Panels of experts, from outside the United Nations system but familiar with the problems of a region, may be appointed by the Secretary-General of the United Nations to review in-depth the output of each commission and assess it in terms of its resources, programme and United Nations policies.

The operational conduct of the commission's affairs on the regional and international levels calls for interactions of different staff members and consultants of the commission with staff members and representatives of United Nations agencies and member States. It is ECWA's experience that these interactions require serious study and review. As already noted, the complexity of all issues involving science and technology calls for precise, sustained, elaborate and systematic interactions. The limited strength of science policy-making bodies in LDCs makes it imperative that the regional commissions and United Nations agencies assume considerable responsibility in making up for the shortcomings of national institutions. This responsibility also calls for imaginative research work on the current styles of operation.

All stages of the preparation of a research study depend on the participation of the member States: to provide statistical data, to discuss findings and to receive the final document. Government officials are often reluctant to provide

ECWA staff with the necessary data to execute the work programmes. Technical reports are not adequately presented to concerned parties. In most of the interactions between ECWA staff and government officials personal relations play too important a role.

3.0 POSITION OF ECWA ON THE ITEMS OF THE CONFERENCE AGENDA

In two extensive exercises undertaken by ECWA with respect to this item ^{1/} the complexity of the problems associated with all the subitems were clearly exhibited. The internal obstacles to the utilization of science and technology in development are enormous and it is felt that there is a need for extensive research on these internal problems. There is also a considerable need for training science policy analysts and for the development of effective and operational methods for integrating science and technology in economic and social development.

Some of the countries of the region already possess considerable technical manpower resources. However, difficulties are still faced in deploying these resources in an effective fashion.

Although it is always beneficial to search for better technologies, the bulk of the pressing developmental problems in the region can be solved adequately with the existing knowledge.

Item 2: Institutional arrangements

In the ECWA region the building-up and expansion of institutional systems are of the highest priority. Furthermore, there are no basic obstacles preventing the countries of the region from successfully and rapidly achieving such goals. Here, a number of countries may depend on expatriate professional manpower to staff such institutions for a number of years. However, Egypt, Iraq, Syria,

^{1/} These were the preparatory work for UNCSTD and the extensive field work and discussions in conjunction with the Arab Regional Centre for the Transfer and Development of Technology.

Lebanon and Jordan have adequate professional manpower resources at home and abroad; the Arab Republic of Yemen and the People's Democratic Republic of Yemen both will continue to require financial assistance and expatriate manpower.

At the moment much of the R & D required for the execution of developmental projects in the region is undertaken in foreign institutions. It is our impression that progressively more of this R & D work could and should be performed in national institutions.

Regarding the exchange of information, ECWA's experience has been that simple and standard information is not published routinely by national institutions of the region. This has resulted in planning difficulties. Much of the time of the ECWA professional staff has been utilized to collect such information. Access to foreign information is also difficult because of the generally unsatisfactory condition of libraries in the region. Some efforts are being exerted in this direction. However, it is only when R & D institutions are fully developed that the effective demand for information will lead to satisfactory informational flow.

ECWA feels that international co-operation can only be achieved through the improvement of the mechanics of the existing machinery. In other words, the thrust should be towards the elimination of the obstacles discussed at length in relation to ECWA's programmes. It is our experience that the existing forms of co-operation are adequate if sufficient attention is paid to the mechanics of the process of co-operation. There is no doubt that the shortage of specialized manpower is also an important obstacle to co-operation. The development of technical co-operation among developing countries will also require careful design of both the institutional framework and the processes through which the participants are to exchange services.

Item 3: Utilization of the existing United Nations system

ECWA's programmes and experience, with respect to the linking of science and technology to social and economic development, exhibit the type difficult and detailed measures that must be taken to improve the utilization of the United Nations system. The United Nations system cannot be harmonized prior to the introduction of major reforms that would lead to the reduction of bureaucratic red tape and the increase in the level and intensity of professional activity.



