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MECHANISMS FOR THE TRANSFER AND DEVELOPMENT OF TECHNOLOGY
IN THE ECWA REGION

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INTRODUCTION

1. No region of the developing world has reached a state in which its economic structures and its intertwined social and political systems are independent and free from influences wielded by forces emanating from the developed industrialized countries. The Western Asia region bears all the characteristics of a region which is technologically very dependent. Some of these characteristics are briefly examined in chapter I of this report.

2. The countries of the region share with other developing countries a high degree of dependence on imported technology. This dependence is expected to accentuate in the coming years, with the over increasing disbursement of significant portions of the region's newly acquired financial resources, on imports with high technology content. Moreover, the foreign exchange costs involved in technology transfer constitute additional burdens on the limited resources of several countries in the region - notably the lesser developed ECWA Member States - and is often a serious strain on their balance of payments.

3. These developments together with the consolidation of national planning processes in the region - under which technological inputs are increasingly subjected to detailed considerations - have made the countries in the region growingly aware of their technological dependence. This realization has created a mounting consciousness that international technology transfer to Western Asia needs to be viewed both as an instrument for attaining the general objective of reducing technological dependence and as a catalyst for accelerated growth and indigenous technological development. Hence, widespread concern is being expressed that the transfer^{1/}, development and absorption of technology needs to

^{1/} Transfer of technology as employed in this report, connotes the movement of technology from its generation through effective communication and adaptation, to application in the context of political, economic and social conditions that - together with technology-can control the rate, direction and impact of that movement. Transfer can take place vertically (i.e. from basic research to applied research, development and diffusion) or horizontally (i.e. from one socio-economic sector - say, industry, to another sector); within countries or between nations.

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be programmed and regulated if indigenous technological development is the overall objective of a self-reliant strategy of accelerated development.

4. Hitherto, imported technology in the region seems to exist as an alien component without interacting with and enhancing the contribution of industry to development. This lack of integration can only be overcome through programming including the formulation of appropriate policies and establishment of institutional machinery ensuring the absorption and development of imported technology into national production sectors.

5. The external dependence of the countries of the ECWA region is, particularly, heavy when compared with that of other countries. Its burden, however, is easier to bear when account is taken of the high level of foreign exchange earnings of many countries of the region, particularly through exploitation of their oil resources. On the other hand, the non-renewable oil resources are temporal in character. It is important, therefore, to ensure such a utilization of these resources as to create necessary bases of self-reliant growth through the development of national production and technological capacity. If this were not to be achieved as part of a long-term development strategy, the countries of the region will be faced - once the oil resources are depleted - with impossible-to-sustain patterns of external dependence on imports of manufactured goods and technology. This report is, therefore, centrally concerned with initiating the process of reducing such dependence and achieving a measure of national economic and technological independence.

6. At the global level, these concerns have given way to various international efforts aimed at untying the one-sided technology channel between developed and developing countries. A series of international resolutions guide the world community in these efforts.

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At the regional level, few activities have been embarked upon in the ECWA region and only recently transfer of technology and related activities have become the focus of regional forums. Both the international and regional policy-making efforts are summarized in chapter II.

7. Recent initiatives in other developing regions, following UNCTAD resolutions 39 (III) and 87 (IV), have marked considerable progress towards the creation of appropriate national, subregional and regional institutional structures. For instance, the Inter-governmental Meeting on the Establishment of the Regional Centre for Technology Transfer for the region of the Economic and Social Commission for Asia and the Pacific (ESCAP), held in Bangkok from 21 to 23 February 1977, has already reached final agreement on the creation of such a centre. The Economic Commission for Africa (ECA) has sent a mission team, beginning 15 March 1977, to various African countries in order to review the current policy and institutional framework in Africa and to submit recommendations for the establishment of an African centre; these recommendations are to be considered at a plenipotentiary Conference scheduled for November this year. An expert-group, convened by SELA (Sistema Economico Latinoamericana) in Caracas, Venezuela, in March 1977, has initiated the preparatory work aimed at the progressive transformation of the existing technological information and data systems into centres for the development and transfer of technology. The countries of the ECWA region can benefit from the lessons of these experiences, and thereby shorten the period needed for the establishment of its regional centre, inter-linked with national centres and institutions dealing with the transfer and development of technology.

8. Within the context of both international and regional action programmes and policy guidelines, the Economic Commission for Western Asia proposes for consideration the progressive establishment of

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Western Asia Centre for the Transfer and Development of Technology. The principles, the needs for and the functions of such a centre are discussed in chapter III of this report, while the immediate steps to be taken to establish it are set out in chapter IV.

9. Although, the proposed centre is planned to cover the ECWA region, the Commission may wish to give due consideration to extend its coverage to include all Arab countries. The Commission may recall, in this regard, its resolution 14(II) on Regional Co-operation, requesting the Executive Secretary in consultation with the Executive Secretary of the Economic Commission for Africa and any other interested party, to initiate studies on a selective basis to encompass the entire Arab world and to achieve this objective within the capacity of the financial resources available to the Commission.

10. For the preparation of this report, the ECWA secretariat consulted the UNCTAD secretariat.

I. TECHNOLOGICAL DEPENDENCE OF THE WESTERN ASIA REGION

11. The unequal relations between developing and developed countries as far as technology is concerned is characterized by a one-sided nature of technological dependence manifested in a range of asymmetrical economic features. The Western Asia countries carry all these features in different degrees but quite distinctly. These include the predominance of primary commodity production; minimal industrial outputs; trade structures largely based on import of equipment; weak technological infrastructure and shortage of skills.

A. Dependent Patterns of Commodity Production and Consumption

12. Commodity patterns of Western Asia countries compared to those of developed industrial nations reflect asymmetrical features in both the production and consumption of goods. With regard to consumption, patterns in Western Asia reflect the influence of tastes and consumption profiles of advanced industrialized nations implying a limitation and restriction of economic options in as far as consumption of imported goods and local production is concerned. Trade structures in the Western Asia region indicate that the region as a whole has still a long way to go and change from the traditional pattern of over-reliance on the export of a few primary commodities (oil, agricultural and mineral products) and the almost complete dependence on imports of plant, machinery and basic equipment. Table 1 is illustrative of this near total reliance on technology developed elsewhere. Particularly, in the oil economies, the total import of plant, machinery and other manufactures reaches in nearly all cases above 70 per cent of total imports. The region as a whole spends astronomical amounts on imported technology. For example in 1974, the ECWA region imported US\$10.1 billion on chemicals; machinery and transport equipment; and other manufactures.

Table 1. Percentage Share of Selected Trade Categories
of Total Imports in Western Asia countries

Country	Machinery and Transport Equipment		Other Manufactures	
	1970	1975	1970	1975
<u>Oil Economies</u>				
Bahrain	19.1	18.2	27.4	19.0
Iraq	30.6 ^{a)}	41.4	37.4 ^{a)}	33.5
Kuwait	36.0 ^{a)}	34.3 ^{b)}	37.7 ^{a)}	39.9 ^{b)}
Oman ^{c)}	16.9	41.5	29.8	28.7
Qatar	30.7	51.3	36.7	27.8
Saudi Arabia	33.0 ^{a)}	34.6 ^{d)}	26.9 ^{a)}	30.8 ^{d)}
United Arab Emirates	31.4	40.2	42.0	35.6
<u>Non-Oil Economies</u>				
Democratic Yemen	5.7 ^{a)}	17.4	29.1 ^{a)}	19.8
Jordan	18.2 ^{a)}	31.6	29.6 ^{a)}	26.3
Lebanon	20.1 ^{a)}	23.8 ^{d)}	31.7 ^{a)}	33.6 ^{d)}
Syrian Arab Republic	21.2 ^{a)}	28.8	31.6 ^{a)}	28.1
Yemen Arab Republic	19.9 ^{a)}	12.2	17.0 ^{a)}	27.2

Source: Based on data compiled by the ECWA secretariat.

a) average for years 1968-1970.

b) figure for 1974.

c) dutiable imports only.

d) average for years 1971-1973.

e) average for years 1969-1970.

13. Technological dependence is also reflected in the composition of GNP. Despite recent appreciable growth in industrial activities, the income derived from manufacturing remains proportionately low in all countries and does in nearly all of the most industrialized countries of the region - Syria and Iraq - not reach beyond 15 per cent. In the least developed countries of the region value added in industry does possibly not exceed 2 to 3 per cent of the GNP. High growth rates in manufacturing varying between 8 and 10 per cent reflect, however, future important disbursement on technology import as well as growing investment allocations to this sector.

14. Most of the region's technology is being acquired from abroad in the form of plant, machinery, equipment and other tangible assets and related know how, including management, patents, and licensing agreements. The total payments relating to external technological dependence in its broadest sense are estimated in Iraq to have reached in 1971, \$504,7 million representing around 11.2 per cent of the GNP for that year.

B. Trade and Technological Bondage

15. Western Asia countries depend all too a great extent from industrialized nations for their supplies of technical know how, patents, technical management and technical innovation. The current practices and systems for these types of supplies leave the industrialized world still in a powerful position to influence technology transfer, its pace, its local absorption and development. No accurate figures do yet exist on the total of foreign exchange costs of such items but it must be of magnitudinous proportions for the region as a whole. For example, most countries rely heavily or exclusively on foreign consulting firms for their feasibility studies. Yet no institutional mechanisms exist to associate, gradually, local firms /...

with this type of technology transfer.

16. With regard to patents, the participation of the developing world in operating and shaping the international patent system has remained marginal during the first half of the decade. For instance out of the 3.5 million patents currently in existence only about 6 per cent (200,000) were granted by developing countries. Of these, about five-sixths are held by foreigners. Thus, only one-sixth or one per cent of the world total (35,000) is held by nationals of developing countries. It is evident from these figures that the third world has been on the periphery of the patent system. No figures exist on the number of patents registered in ECWA countries, but considering the total held in the developing world, it can be only but very low. Information on patents and patents administration in the Western Asia region is very limited as in none of the ECWA countries the collection, classification and analyses of patent data required for assessing the operation of the international patent system as a whole, or national laws in particular, has been undertaken in a systematic manner or in depth. This is, further a reflection of the, hitherto, limited role of the ECWA region in this field, its previous scant attention to the current processes and practices in technology transfer and its poor relevant infrastructure (institutions, laws and trained manpower). In the Western Asian region, the Democratic Yemen, Oman, Saudi Arabia, United Arab Emirates and Yemen do not have as yet their own national patent laws though some of these countries grant protection through systems of registration of patents granted abroad (see table 2). Nor have the countries of the ECWA region, with the exception of Jordan, Lebanon and Syria signed the Paris Convention (the International Union for the Protection of Industrial Property, established in 1883), now undergoing a basic revision aimed at safe-guarding the interests of the developing countries.

Table 2. National Patent Laws and Accession to Paris Convention
Western Asia Region (1975 situation)

Country	Patent Law	Present Law	Year of Accession Paris Convention
Bahrain	-	1955	-
Democratic Yemen	1938	1945	-
Iraq	1935	1970	-
Jordan	-	1953	1972
Kuwait	1962	1962	-
Lebanon	1924	1924	1924
Oman	-	-	-
Qatar	-	-	-
Saudi Arabia	-	-	-
Syrian Arab Republic	1924	1946	1924
United Arab Emirates	-	-	-
Yemen Arab Republic	-	-	-

Source: UNCTAD, The Role of the Patent System in the Transfer
of Technology to Developing Countries, annex I. New York,
1975.

C. Inadequacy of Technical Skills

17. The seriousness of technological dependence is, particularly, reflected in the shortage of skills in most Arab countries in both the high level and medium-level manpower categories. Table 3 illustrates that the available stock of high-level manpower varies considerably from one country to another ranging from 22 per 100,000 population in Yemen Arab Republic to 432 in Iraq, to 1163 in Lebanon and 1572 in Qatar.

Table 3. Stock of Scientists, Engineers and Technicians in selected Western Asia Countries

Country	Year	Scientists/Engineers ¹⁾		Technicians ²⁾	
		Total	No per 100,000 population	Total	No per 100,000 population
Bahrain	1971	928	395	8,154	3,470
Iraq ³⁾	1973	43,465	432	24,689	244
Jordan	1972	4,288	170	1,089	43
Kuwait	1973	10,754	1,139	2,930	310
Lebanon	1973	37,000	1,163	8,000	250
Qatar	1974	1,352	1,572	577	671
Saudi Arabia	1974	33,376	395	-	-
Yemen Arab Republic	1975	1,394	22	680	11

Source: UNESCO, National Science and Technology Policies in the Arab States. Paris, 1976, page 18.

1) persons who have received complete third-level education in one of the following fields of science: natural sciences, engineering and technology, medical sciences, agriculture, social sciences and humanities (whether or not leading to an academic degree or diploma); or those who have gained training or professional experience nationally recognized as being equivalent to the formal third level of education.

2) those who have received specialized vocational or technical training in any branch of knowledge of either one or two years' duration beyond the complete second level of education or three or four years' duration beyond the first cycle of secondary education. Also included are those persons lacking such formal training who, through on-the-job training, have acquired the adequate skills to function as a technician.

3) Government employees only.

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18. The following comparison of the scientists/engineers ratio for Arab Countries (850) indicates that the ECWA region is occupying a middle position:

Table 4. Ratio of Scientists/Engineers and Technicians per 100,000 population in world regions (estimates)

	Scientists/Engineers	Technicians
Africa	100	100
Asia	150	135
Arab world	850	150
Latin America	1,000	1,450
Developed countries	2,800	5,000

Source: UNESCO, Statistics on Scientific and Technological Manpower and Expenditure for Research and Experimental Development in the Arab Countries, Paris, 1976, page 4.

The table further reflects the difficulties Western Asia countries are experiencing at the middle-level (technician) manpower range. It is, generally accepted that the technician ratio should be at least two to three times bigger than the scientists/engineers ratio. This is, however, nowhere the case (exception Bahrain) in the region. In fact the contrary is the case: in countries like Iraq, Jordan, Kuwait and Lebanon with very low ratios for technicians, the situation is extremely difficult. The interregional comparison of technician ratios in table 4 is self-revealing in this regard.

19. The above figures should, however, be treated with caution since they include large numbers of non-nationals in the total stock of numbers of scientists, engineers and technicians. The relative position of the Arab region among the world's regions would be lower down the scale, if ratio figures for nationals only would be used.

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The percentage of non-nationals of total manpower stock of scientists and engineers reaches in the oil countries Qatar, Kuwait and Bahrain, respectively 90.3, 80.0 and 78 ; while for the technician category the percentage reaches for these countries, respectively 76.1, 80 and 35. In countries like Jordan, Syria and Lebanon (exporters of manpower) the percentage of non-national scientists and engineers is generally less than 5 per cent. The technological dependence of Western Asia countries in manpower terms will certainly tend to increase during the coming years with the implementation of large-scale development projects now being planned.

D. Weakness of Technological Infrastructure

20. Although certain technological dimensions of planning are taken care of by national R & D (Research and Development) institutions or technical ministries, none of the ECWA countries dispose as yet over institutionalized machinery responsible for identifying technological needs or drawing up technology policies. Selection of projects takes rather place in a non-institutionalized manner. Some countries have taken specific steps for dealing with selection and assessment of certain types of technology. The State Organization for Industrial Design in Iraq deals with the negotiation of contracts dealing with industrial property, while other State Organizations deal with technology in other sectors. However, Iraq and Kuwait envisage the setting up of a national centre, and committee for the transfer of technology, respectively. Also, in Saudi Arabia the establishment of a national science and technology authority with functions in national planning in transfer of technology is contemplated.

21. The limited capacity of Western Asia countries to engage in the development, adaptation and innovation of technology is above all manifested in the scant resources being devoted to R & D. For example the scientists, engineers and technicians engaged in R & D in the Arab countries constitute only a very small part of the total stock of

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scientific and technological manpower. Table 5 illustrates that for selected Arab countries the percentage of scientists/engineers engaged in R & D does not go beyond 3.6 per cent of the total, while for technicians it does not exceed 3.4 per cent.

Table 5. R & D Scientists, Engineers and Technicians as percentage of corresponding stock

	R & D Scientists/engineers	R & D Technicians
Iraq	3.6	1.5
Jordan	3.5	3.4
Kuwait	1.5	0.5
Lebanon	1.0	2.9

Source: UNESCO, Statistics on Scientific and Technological Manpower and Expenditure for Research and Experimental Development in Arab countries, Paris, 1976, page 6.

In developed countries the R & D scientists and engineers constitute 10-15 per cent of the total stock. Above table reflects also the increasing difficulties countries are experiencing in supporting scientific and technological activities and the rudimentary status of STS (Science and Technology Services) in the region.

22. Besides the above manpower figures, the expenditure on R & D expressed in percentage of GNP or per R & D worker are important indicators for the evaluation of a country's efforts to promote science and technology. The following table shows the very low level of R & D expenditures for selected countries in the region.

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Table 6. R & D expenditure in selected Western Asia countries

	1973		
	R & D as % of GNP	average yearly	per capita
		expenditure per R & D worker US\$	expenditure on R & D US\$
Iraq	0.25	16,840	2.3
Jordan	0.31	15,390	1.1
Kuwait	0.01	17,100	0.8
Lebanon	0.40	22,400	2.4
Yemen Arab Republic	0.25	35,270	0.3

Source: UNESCO, National Science and Technology Policies in the Arab States, Paris, 1976, page 21.

Most of the countries have not yet reached the target of 1 per cent of GNP to be allotted for R & D proper; implying that science and technology application and research needs considerably to be expanded over the coming years to come at par with developed countries. For international comparison, it is the R & D expenditure per capita which is most indicative of the long road the countries still have to go: while in developed countries per capita R & D expenditure ranges from US\$ 30 to 100, in the countries of Western Asia it does not exceed US\$ 2.5.

II. TECHNOLOGICAL DEPENDENCE AND RECENT DEVELOPMENTS

23. The crucial importance of technology in the improvement of the economic and social conditions of the developing countries has been recognized by the international community for a long time. Over the years, the question of technology transfer has been discussed in many forums both at the international and, more recently, at the regional level.

A. At the International Level

24. Adopting in 1970 the International Development Strategy for the Second United Nations Development Decade, the General Assembly called, inter alia, upon developing countries to expand their capability to apply science and technology for development, so as to enable the technology gap to be significantly reduced. In specific terms, the strategy calls for the institution of a programme for the transfer of technology to developing countries to attain their trade and development objectives. Such a programme was to include:

a review of the international conventions on patents;
identification and reduction of obstacles;
facilitation of access to technology; and,
development of indigenous technology.

25. In May 1974, the sixth special session of the United Nations General Assembly dealt also with the area of transfer of technology and adopted resolution 3201 (S-VI) on the "Declaration on the Establishment of a New International Economic Order" which states that such an order should, inter alia, be based on: "giving to the developing countries access to the achievements of modern science and technology and promoting the transfer of technology and the creation of indigenous technology for the benefit of the developing countries in forms and in accordance with procedures which are suited to their economies".

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26. Also during the sixth session, the General Assembly adopted resolution 3202 (S-VI) on "Programme of Action on the Establishment of a New International Economic Order" which dealt extensively with issues on transfer of technology and stated, inter alia, " that all efforts should be made:

- (a) to formulate an international code of conduct for the transfer of technology corresponding to needs and conditions prevalent in developing countries;
- (b) to give access on improved terms to modern technology and to adapt that technology, as appropriate, to specific economic, social and ecological conditions and varying stages of development in developing countries;
- (c) to expand significantly the assistance from developed to developing countries in research and development programmes and in the creation of suitable indigenous technology;
- (d) to adapt commercial practices governing transfer of technology to the requirements of the developing countries and to prevent abuse of the rights of sellers; and,
- (e) to promote international co-operation in research and development in exploration and exploitation, conservation and the legitimate utilization of natural resources and all sources of energy".

27. It is against above background that the Secretary-General of UNCTAD convened an Intergovernmental Group of Experts on the Code of Conduct on Transfer of Technology in May 1975. Work on the code has been continuing since then within the United Nations Conference on Trade and Development (UNCTAD) and it is expected that such a code will be ready for adoption by a special United Nations Conference under UNCTAD auspices early 1978.

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28. UNCTAD (IV) adopted in June 1975 resolution 87(IV) on "Strengthening the Technological Capacity of Developing Countries", and recommended to improve the institutional infrastructure and capacity of developing countries for the development and transfer of technology.

29. Above resolution was subsequently welcomed by ECOSOC resolution 2034 (LXI) also entitled "Strengthening the Technological Capacity of Developing Countries", in which the Secretary-General and executive heads of UN bodies were requested:

- (a) "to proceed with the immediate implementation of UNCTAD resolution 87(IV) in the light of its consideration by the General Assembly at its thirty-first session; and,
- (b) "to render immediately, in a co-ordinated manner operational and technical assistance to developing countries towards the establishment or strengthening of national, subregional, regional and inter-regional centres for the development and transfer of technology".

B. At the Regional Level

30. In 1973, the Advisory Committee on the Application of Science and Technology to Development (ACAST) adopted the "Regional Plan of Action for the Application of Science and Technology to Development in the Middle East" which was subsequently endorsed by the Economic and Social Council. The Plan calls, among others, for the establishment of institutional arrangements in Western Asia for the analysis, selection, adaptation and transfer of foreign technology.

31. UNCTAD, in order to build up concrete programmes in the field of transfer of technology and in response to various resolutions, undertook an "Exploratory Mission on Transfer of Technology" in 1975, primarily to identify and evaluate the needs of developing countries in the field of transfer of technology. Iraq was among the countries visited.

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32. Attention has already been drawn in para. 7 above to recent initiatives in the ESCAP, ECA and ECLA regions aimed at establishing regional centres for the transfer and development of technology.

33. The Conference of Ministers of Arab States responsible for the Application of Science and Technology to Development (CASTARAB) held in Rabat, Morocco from 16-26 August 1976, expressed also the need for greater efforts by Arab countries in the various international activities as well as regional co-operative efforts in this field. The following priorities were established for action to be taken at the national level;

(a) The promulgation or updating of national legislation concerning the protection of industrial property, taking into account local and regional needs, relations with the industrialized countries and drawing on the model laws prepared by the Industrial Development Centre for the Arab States (IDCAS) and the World Intellectual Property Organization (WIPO);

(b) The establishment or reorganization of national bodies responsible for the protection of industrial property; and,

(c) The training of specialized personnel in the field of industrial property through the introduction of relevant disciplines in higher education.

To accelerate the implementation of above recommendations, it was decided by the CASTARAB Conference to take the following action at the regional level: To organize regular meetings, from 1977 onwards, of heads of national bodies responsible for the protection of industrial property for the purpose of co-ordinating national action; and, The setting up of a committee of Arab experts to study the possibility of establishing an Arab regional mechanism for the protection of industrial property.

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34. CASTARAB particularly, in adopting its resolution No. 4 "Technology Transfer and Assessment", invited the Governments of the Arab States, inter alia,

- to draw up national policies for the transfer of technology;
- to strengthen or create the national bodies capable of giving effect to technology transfer; and,
- to set up a monitoring system for technology transfer.

35. Within the context of, particularly, the regional efforts, the Economic Commission for Western Asia consulted with UNCTAD late 1976 for the purpose of initiating a concrete regional programme contributing to and arriving at a gradual reduction of technological dependence of Western Asia countries by establishing the appropriate mechanisms such as a Western Asia Centre for the Transfer and Development of Technology. The following chapter sets out in a preliminary fashion the principles underlying the proposed co-operative programme and the mechanisms envisaged for facilitating the transfer of technology to and within the region.

III. MECHANISMS FOR THE TRANSFER AND DEVELOPMENT OF TECHNOLOGY:
A WESTERN ASIA CENTRE

36. Possible actions by the Governments in the field of technology transfer aiming at moving the region along the path towards greater technological independence could be envisaged in a variety of fields such as training, information, technical assistance, R & D and others. Action in all these fields could be programmed on an ad hoc basis. It is, however, advisable that the various types of possible co-operative actions are grouped together into a comprehensive medium-term programme (5 years), while short-term and immediate measures would function as time-bridging and supporting the development of the medium-term programme.

Hence, the proposed action centres around the establishment of a medium-term programme which may be called: A Western Asia Centre for the Transfer and Development of Technology. Proposed short-term measures are to be discussed within the context of the establishment of the Centre.

A. Objectives of the Centre

37. The main thrust of the proposed Centre which emerges from a period of international and regional policy-making is the need to strengthen the technical competence of the developing countries and achieving their greater technological independence. These goals can be achieved through both changes in the infrastructure for research, development and engineering in the Member States of ECWA and the building up of a workable network system by interlinking the infrastructure at the regional level, as well as linking the region with other systems and regions.

38. Long-term objectives

(i) to assist the Governments in the region in strengthening their technological capability so that the countries concerned are increasingly able to promote indigenous technology development by interlinking

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research, development, design and engineering institutions and access then to other regions and systems. In addition, the Centre would assist the countries in the region to absorb, adapt, improve and innovate on imported technologies on their own;

- (ii) to improve the terms of transfer of technologies both within the region and from outside the region to Member States;
- (iii) to promote the transfer of technologies developed in countries with the region;
- (iv) to speed up the industrialization of the countries in the region in line with the LIMA Declaration on Industrial Development and Co-operation of 1974; and,
- (v) to promote regional integration and harmonization in the technology field.

39. Immediate objectives

- (vi) to set up a regional Centre which will function as the central node in a network system linking national centres or focal points within the region;
- (vii) to promote the establishment of national centres, institutions or programmes concerned with technology transfer, adaptation and development;
- (viii) to facilitate the access to technological information and services located outside the region;
- (ix) to provide technical assistance from within the region in areas of transfer of technology;
- (x) to promote R & D related to technology;
- (xi) to assist in the training of personnel in different aspects of technology development; and,
- (xii) to promote regional and interregional co-operation in activities relating to technology development.

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B. Centre Concept

40. The mechanism proposed for the transfer and development of technology may be built around the modern principles of the network. Such a network could constitute a system for:

dynamic interlinking of national centres or focal points in Western Asia dealing with technology transfer (certain ministry, national Science and Technology institute, industrial property institute, planning authority, etc.),
through a regional co-ordinating, information, advisory and supporting mechanism (programme, institute, centre or any other feasible institution),
with other Member States in the region (national centres, etc.) other regions, networks and information systems and,
providing a two-way channel for information exchange, advise, support, feedback, and technical assistance.

41. The networking idea would stand central in the operations of the Centre: on the one hand allowing for access to any available information or service in the region by any focal point or affiliated centre, while, on the other, information, services, systems located outside the Centre's geographical area would be able to be accessed to the same focal points through the Centre.

42. At this stage the proposed Centre can only be described in approximative terms and its eventual shape and feasibility would need to be determined by preproject activities including feasibility studies. At this time the concern is the principle of such a mechanism, its need and the way to proceed towards its establishment.

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C. Justification for a Western Asia Centre

43. The need for the above described Centre stems primarily from the needs in the field of technology transfer at national levels. These, as reflected in chapter I of this report, can be summarized as pertaining to policies, institutions, manpower and information. The proposed Centre has to be designed in such a way as to meet the different needs of the countries in the region, including:

44. Needs for national policies in the field of technology transfer and requisite institutional machinery (national centres for transfer of technology, industrial property offices, patent administrations) requiring identification procedures of technological needs and analyses of existing institutional infrastructures.

45. Needs for technological information which contributes to the transfer and development of technology and assists in decision-making processes, research projects, practical applications and dissemination. It is, further, necessary for the design, selection, installation and improvement and development of processes, materials, equipments, services and methods.

Exchange of technological information can assist in bridging the technological gap that exists among countries. Without exception all countries in the region and, particularly, the users of technological information in the region have expressed the need for a type of "listening post" - open towards the outside world - for the collection, processing, storing and dissemination of technological information. At present, this type of information infrastructure does not exist and present situation limits seriously the options open to the countries and users.

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46. Training needs: staff of national centres will need more training in the capability to negotiate for technologies, to understand the contractual and legal implications of technologies offered and to develop the appropriate framework for technology transfer.

47. Needs for interregional linkage: present linkage of countries with the existing international information systems is unsatisfactory or non-existent. At the international level, various organizations of the United Nations system and other organizations with substantive responsibility in the field of technological information, have not been able to access the country level in the Western Asia region. Great benefit and advantages have been lost consequently.

48. Several of the existing information systems and services do permit ready identification of the world's scientific and technological literature, data and sources of technological assistance. These include systems and/or services offered by the various United Nations organizations such as the Clearing-House for Industrial Information of the United Nations Industrial Development Organization (UNIDO), the International Nuclear Information System (INIS) of the International Atomic Energy Agency (IAEA), the International Information System for Agricultural Sciences and Technology (AGRIS) of the Food and Agriculture Organization (FAO) and the International Referral Service (IRS) of the United Nations Environment Programme (UNEP).

49. National institutions and services such as the National Technical Information Service (NTIS) in the USA, the Scientific and Technological Information Institute (VINITI) in the USSR, PASCAL (FRANCE) and private organizations, like the Chemical Abstract Service of the American Chemical Society, the service of the Institute of Electrical Engineers in the United Kingdom, the Technotec - Technology Exchange Service of Control Data Corporation in the United States

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of America (USA) - to mention only a few - are offering valuable services. Assessment of their usage in Western Asia countries indicates their limited spread in the region, and often a total unawareness of existing possibilities. The present volume of information is such that no country, whatever its infrastructure, will be able to absorb and process all technological information. Hence, selection, will be essential. A regional facility could more appropriately take this specialized task in hand.

50. Needs for regional integration: national policies in the region may need to be harmonized through interlinking of national centres, institutions and exchange of information as to eliminate harmful competition within the region. Only through regional integration, the region will be enabled to take a common stand and stronger position in the revision of present transfer conducts as embodied in conventions and the current world economic order:

D. Functions of a Western Asia Centre

51. The functions of the proposed Centre can be grouped under five broad categories involving: technological information; technological advice; technological evaluation, adaptation and development; technological R & D; and, technological training.

52. Obviously, the precise and final functions of the Centre and its operational character can only be determined after assessment and analysis in depth of the needs at country level. However, taking into account similar projects in other developing regions and the above Centre's dimensions, its functions may, inter alia, include:

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53. Technological Information: the Centre assists in the promotion and exchange of information through:

collecting information on selective technologies which are of common regional interest by

linking national focal points together and access them to each other and to international technological information systems and services as well as national systems in other regions by

diffusing and disseminating the accumulated knowledge by modern methods. The technological information function should primarily be concerned with know how on supply sources, alternative technologies, patents, etc. The data or information base should thus be a base on where to go for information?

54. Technological advice: the Centre is to assist in the establishment, strengthening and upgrading of national technology transfer centres by:

formulating models of national policies on transfer of technology;

designing flexible and effective institutions including national transfer of technology centres and other relevant institutions;

strengthening existing transfer of technology nuclei through restructuring and formulation of programme development plans; and, providing advisory services at request on various aspects of technology.

55. Technological evaluation, adaptation and development: the Centre is to assist in the assessment of imported technologies and the search for alternative technologies and to promote the development of indigenous technologies through:

studies on evaluation of competing technologies, on request, of national centres; and,

studies on adaptation of technologies developed in industrial countries as to take account of the different production and

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application factors prevailing in the region (finance, labour, raw materials, market, maintenance, etc.).

56. Technology Training: the Centre will assist countries in training personnel in different aspects of transfer activities by:
organizing training courses; and,
developing training material

57. Technology R & D: the Centre will assist to develop R & D related to technology and by functioning as a "think tank" and institute for R & D technology by:
establishing innovative projects;
sponsoring and guiding R & D projects in the region; and,
developing co-operative R & D projects in the region.

IV. PREPARATORY ACTIVITIES TO BE UNDERTAKEN LEADING TO THE ESTABLISHMENT
OF A WESTERN ASIA CENTRE

58. Once an intergovernmental decision has been reached on the need for establishing a centre, it is recommended that ECWA's activities in the field of transfer of technology be intensified and extended in scope. ECWA's Science and Technology Programme Budget for 1978/1979 was, therefore, increased with additional resources as to include a project dealing with activities related to the establishment of a Western Asia Centre for the Transfer and Development of Technology. The activities leading to the establishment and functioning of the Centre can be grouped as:

1. Preproject activities from 1 May 1977 - 30 April 1978.
2. Project activities from 1 May 1978 onwards
3. Supporting activities

A. Preproject activities

(1 May 1977 - 30 April 1978) may consist of:

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1. The preparation of a substantive study by UNCTAD in co-operation with ECWA during the period May - September 1977. The subsequent consideration of the study by ECWA's Seminar on "Technology Transfer and Change in the Arab Middle East" (October 9-14, 1977) enabling the Commission to avail itself of external expertise and opinion.
 2. The preparation of a document during the period May - August 1977 outlining the nature and timing of preproject activities to be undertaken jointly by ECWA, UNCTAD and UNIDO.
 3. The undertaking of preproject activities during the period November 1977 - February 1978 including country missions, surveys, and consultations; required for the preparation of a project document setting out all steps to be taken for the establishment of the Western Asia Centre.
 4. Consideration of the project document on the Western Asia Centre by an ECWA Intergovernmental Meeting on the subject scheduled for February 1978.

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5. Consideration of the project document, inclusive the observations and findings of the February 1978, ECWA Intergovernmental Meeting, by the fifth session of the Commission, for final decision.

B. Project Activities (30 April 1978 onwards)

60. Proposed activities described above will set the scope and the concrete directions to be followed for implementing the project.

C. Supporting Activities

61. Orientation and Training : The role of transfer of technology is increasingly emphasized in regional forums in which the limited access to such transfer as well as high cost to the countries are respectively emphasized and the present practices, and the monopolistic character of present channels are quoted as handicapping technology transfer. In addition, available knowledge and expertise for negotiating technology transfer on appreciable terms and costs is very limited in the region.

62. Aware of the difficult position in which developing countries find themselves, UNCTAD has been organizing training courses for government officials to improve the access and increase the knowledge in the third world on the various dimensions of technology transfer. Financial support for such courses was received from the Swedish International Development Authority (SIDA). The first course was held in Nairobi, Kenya from 2 to 25 April 1975 and was attended by government officials from english speaking African countries. The second course was held in Colombo, Sri Lanka from 20 September - 2 October 1976 and attended by government officials from developing countries in the ESCAP region.

63. The immediate aim of the training courses was to assist the countries in the respective regions in the improvement of their governmental machinery for dealing with transfer of technology. The course-lectures,

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given in non-technical terms, provide a theoretical/diagnostic exposition of the major dimensions of technology transfer including such aspects as (1) markets for technology; (2) channels and mechanisms for transfer (foreign investment, direct import, consulting firms, licenses); (3) current restrictive practices and clauses in contractual agreements; (4) costs of transfer; (5) transfer pricing; (6) unpackaging of technology/local design. The topics were amply illustrated with case studies and underlined by empirical support.

64. An intensive training course for the Arab countries could be organized possibly in co-operation with the Arab Planning Institute in Kuwait. Financing of such a course may be considered by the regional financing organizations such as the various Arab Funds while expertise be made available by the UNCTAD and ECWA. An intensive training course in the immediate future might be, particularly, timely in view of the needed substantive as well as political support for the gradual establishment of the proposed Western Asia Centre for Transfer and Development of Technology as proposed and set out in chapter III of this report. The training course would further enable government officials to identify areas at national levels where strengthening is required. It should be recalled in this regard that a centre as proposed demands the existence and active participation of national nuclei.

65. It is considered that ECWA need to carry out the above programme elements in close co-operation with the concerned UN agencies as well as the regional organizations involved in the transfer of technology. It is to this end that ECWA initiated consultations in November 1976 with UNCTAD aiming at the formulation of a joint ECWA/UNCTAD programme in the field of transfer of technology covering in particular the activities under the proposed Western Asia Centre. It has been agreed between the secretariats of the two organizations in consultations in March 1977, that following the April session of the Commission, a comprehensive programme of co-operation to facilitate the movement towards the rapid establishment of the Western Asia Centre for Transfer and Development of Technology will be decided upon. In addition, consultations with UNIDO have already started regarding a similar co-operative programme.

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