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FURTHER REFLECTIONS ON THE QUESTION OF THE SUBJECT AREAS

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1. Origin of the problem

The document prepared by the General Secretariat of the United Nations Conference on Science and Technology for Development[1/] contains some background and criteria which have served as guidelines for the "subject areas". It explains that, when the foundations were laid for an international forum which would comprise the very outstanding dimensions of the creation, transfer and use of scientific and technical knowledge, various questions arose with regard to the purpose of such forum.

One of these questions refers to the significant extent of the subjects which would have to be dealt with considering the transverse and comprehensive nature of science and technology. Indeed, many are the activities related to these forces; from a certain point of view, the development process is tantamount to the absorption of productivity factors which have their roots in technical advances. But the extent of the subjects involves dilemmas in the preparations of the Conference. Obviously, the Conference cannot embrace all the aspects of international and internal transmission of scientific and technical knowledge. In other words, it is up to the Conference to determine the group of areas which entails the most important problems and its consequences.

This need for selection also arose in other inter-governmental meetings sponsored by the United Nations for the purpose of discussing subjects of international significance. Each of the subjects examined - environment, population, employment, women's participation, water, industrialization, among others - presented ample dimensions apart from reflecting global unbalances which have had an unfavorable impact on human welfare. However, they were circumscribed through discussion and wide consultations to analitically limited areas. As a result a relevant and meaningful exchange of ideas which conveniently led to a harmonized plan of specific actions became possible.

With regard to science and technology, however, the selection is much tougher, and not less urgent. These factors have a considerable influence

1/ The Question of Subject Areas (CEPAL/MEX/ELCT/3, september 1977).

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on the present international disparities on the perspectives and limitations of industrial growth, on the marked interdependencies of the economic system, on the possibility of satisfying the basic needs of a wide strata of humanity, on the overcoming of structural constraints stemming in the internal and external circumstances and on the strengthening of heterogeneous factors which accentuate the concentration of income, and jeopardize the viability of the poor nations. It is sufficient to raise these questions --and the list is by no means exhaustive- in order to understand one of the dilemmas which implies the selection of the subject areas.

During the preparatory activities of the Conference a second question closely related to the considerations made up at this point was posed. It refers to the ways and means for making compatible the national priorities with the subject matters which are to constitute the basis for a new type of international cooperation. It is obvious that the priorities reflect specific problems of the countries and are subject to the preferences and sovereignty of the member States. It is necessary, however, to identify joint problems, which solution should set free appropriate and selective technical innovation flows which are now generally blocked due to circumstances of a national or global nature. To obtain a clear correspondence between the priorities of the countries in the field of science and technology and the topics contemplated by the Conference is also a task that cannot be postponed.

As a result, two considerations have raised the question of the subject areas. One of them is the abundant variety of aspects and irradiations which determine the scientific and technical progress as well as the technological lag in contemporary society, a feature that has to be reconciled to the restrictions of a practical order which the preparatory process and the execution of the Conference on Science and Technology for Development, itself, have to face. The other consideration refers to the coincidences and contrasts which can emerge between the particular priorities chosen by the member States and the subjects on which it is advisable and feasible to set up a regional and international programme of concerted actions. It seems absolutely necessary to achieve

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an optimal correspondence between the two. On the understanding that the orderly and equitable transfer of technical progress, within and among the countries, is a lengthy, dynamic and contradictory process.

In this order of ideas, the following reflections on the criteria, the requirements and the context which the identification of subject areas could involve, are set forth.

2. The insufficiency of the sectoral approach

If one accepts that science and technology have a substantial influence on the economic and social life, the selection of subject areas cannot be strictly sectoral. For instance, the choice of a production branch as a topic of international concern presents a threefold disadvantage: it undermines, in an unjustified manner, the real and virtual impacts of scientific and technical knowledge on the socio-economic fabric; it stresses possible discrepancies between the national priorities and the global interests; and it duplicates the contents and the preoccupations of other international meetings which have dealt with specific subjects. A non discriminatory attention given to a sector or branch (e.g. "agriculture", "industry", "capital goods", "fertilizers") may lead to excessively vague statements which would weaken both the substance and the guidance which the Conference seeks to give to science and technology matters.

Consequently, it is advisable to link the technological contents of the productive sectors - including genuine, international trade - to the factors which determine the technological market. In other words, the problem is to examine questions which affect the supply of scientific and technical knowledge (training, information networks, adequate financing, institutional incentives) as well as the demand (composition of the social product, engineering and consulting services, control and selection of techniques, guidelines on foreign investment and industrial property) within a national frame which would have clearly defined its style of development.

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This is implicit in Resolution 2028 (LXI) which establishes the programme of the Conference.[2/] It seems wise to place emphasis on the importance of this principle, since it throws some light on the criteria which should be adopted in the selection of subject areas. It would be advisable to go two steps further. One would refer to the requirements which would preside over the identification of areas, according to the philosophy and purposes of the Conference, and the other to the context - external and internal - within which these areas should be placed.

3. Some requirements

The selection should reflect, in the first place, the needs and interests of developing countries. It has repeatedly been pointed out that the scientific and technical advance and its projections are concentrated, on an excessive scale, in the industrialized countries; that the transfer of knowledge involves significant social and financial costs; and that these facts - among others - originate and emphasize the economic distance among the countries. Therefore, the Conference would have to promote actions to either repair or relieve the unbalance stated above.

On the other hand, in the choice of subject areas it should be kept in mind that historically speaking, scientific and technical progress is not always constant, that it shows discontinuity and even setbacks, though during the last two hundred years there has been, on the whole, a technological acceleration without precedent, and that, it demands conditions and specific frameworks which do not appear spontaneously.

In third place, the selection has to be pragmatic. Not all subjects are equally important nor are they capable of transforming themselves into pivots of regional and international cooperation. In part, because the resources are perforce limited, in part, because

2/ See Annex 1 to document United Nations Conference on Science and Technology for Development (CEPAL/MEX/ELCT/2, September 1977).

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the resources are perforce limited, in part, because discrepancies of interest can be unsurmountable on the short run, the selected subject areas should arise from a realistic judgement of the well-defined actions which can be promoted immediately.

The approach has to be critical, any way. Forces and repercussions of science and technology are contradictory, ambiguous, and multiple. A blind resistance to the scientific spirit is as unfortunate as the unreflected acceptance of its products. The greater the influence of scientific and technical knowledge on the socioeconomic structure, the more indispensable it is to distinguish motivations and results.

This observation entails a fifth requirement: sensibility to long term. Science and technology deeply influence the factors which affect the strategy, the viability and the comparative advantages of national and regional systems; they have, in addition, mediate or indirect consequences which escape a superficial and a two-narrow analysis; and they are capable of determining either the acceleration or the breakdown of structural transformations. The identified areas would posit landmarks for the future.

Finally, the subjects have to justify and sustain an international cooperation at different levels with the active participation of the international scientific community. The Conference, indeed, cannot be an exclusive meeting of diplomats nor an inducement to the isolation of scientific tasks. The universal nature has to be preserved.

In summary, it is desirable that the selection of subject areas satisfy these requirements which still have to be elaborated and thoroughly discussed. The preferential attention to the problems of the developing world is one of them; another is the unique nature of the historical conditions which support the scientific and technical progress; the pragmatism in the evaluation of the possibilities for action is a component which is not at odds with the critical spirit regarding the forthrightly destructive or ambiguous applications of

science; finally, the channeling of international cooperation towards a fluid transfer of technical knowledge and the implementation of projects which respond to shared problems is as well called for.

The selected areas would thus be the result of the attention given on the one hand, to these requirements and, on the other, to the interlinkage of factors which influence the innovation and exchange of technologies. It is anticipated that this approach would first be undertaken at national level with a view to creating links with the priorities assigned by the country; then it would lead the regional discussion toward the discovery and consolidation of affinities in the previously selected areas; the regional consensus obtained in each case would finally serve as inputs to the worldwide Conference which is to open channels for action programmes.

From the foregoing arises the expectation that each country and region will set up a frame of reference which would reasonably satisfy the designs of the Conference as well as its own historical experience as far as technical change is concerned. This is one of the basic objectives of the national report which was requested by the Preparatory Committee of the Conference,[3/] and which will also shape the document which the CEPAL Secretariat was asked to present at the forthcoming Regional Conference.[4/]

4. The international and internal scene

As a preliminary exploration required by the nature of the questions examined in this document, the following are some general statements based on the experiences collected in Latin America. Apart from being limited, the only pretension of this analysis, is for illustrative purposes.[5/]

From the international angle, the Latin American experience regarding technical change shows four outstanding features. In the first place, it was introduced through commerce and, particularly, by way of imports.

3/ Please see United Nations Conference on Science and Technology for Development, Annex 5, op. cit.
4/ Ibid, Resolution 374 (XVII) of Annex 4.
5/ For additional background information on these questions, see CEPAL Considerations on some recent experiences in the promotion of scientific and technical development in Latin America (ST/CEPAL/Conf.53/L.4) November 1974.

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It represents thus, more a cultural transplantation than a process caused by internal forces. The industrialization based on import substitution was not able to introduce the mechanisms of technological innovation; in addition, the efforts made to create a local climate favorable to the establishment and adaptation of techniques have been poor and fragmentary.

The penetration of technical change by way of imports[6/] had several effects. One of them - which represents the second contextual feature - is the stressing of the internal heterogenities, in particular at the levels of productivity and with regard to the standards of consumption. The intensive external purchase of technology led to a concentration of innovations in some of the social sectors, directly or indirectly linked to international trade; the effect was accentuated by the absence or weakness of the internal mechanisms which, under different circumstances, could have disseminated within the countries, the rhythm and the contents of technical progress. Thus, a structural heterogenity is formed which, far from strengthening the social and economic integration, as in the case of the industrialized countries, creates and aggravates internal dissent.

In the third place, the technical change had paradoxical consequences with regard to geographical and functional income distribution. Instead of amplifying and homogenizing the standards of consumption, reducing costs and shortening social distances between regions and strata - such were the repercussions in the advanced societies - this change caused an income concentration completely out of proportion. Certainly, this phenomenon appears parallel to the pyramidal structure of those who can benefit directly from the fruits of development, thanks to the direct power mechanisms under their control as well as to the advantages which education and family links bring about.

6/ As far as scientific accumulation is concerned, this explanatory scheme is also applicable. Science - and the universities as to institutional seat - has imported ideas, equipment and professional paradigms on which only recently have critical appreciations appeared.

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Finally, by promoting a pattern of development, supported essentially by imports - which by its very nature and by reason of a substitution process, free of technical innovation - and which entails a high productive potential, the dependency on the part of the suppliers has been accentuated with the passing of time. Certainly, this was not due only to these circumstances, the process of internationalization inherent to the capitalistic system also had its influence and the massive investments which basic and applied research require as well as the conversion of patents and, in recent times, of industrial secrets into sources of monopolistic profits.

These features make technical change in Latin America a conflictive and ambivalent process. The special configuration of this phenomenon must not be attributed to external factors only. The experience of other countries, where imports equally served as the main vehicle of technical change, shows that certain measures could have counterbalanced its negative impact. This leads us to the internal circumstances.

Reference to one of them was already made: the poor promotion of the local supply of researchers and research parallel to the outside acquisition of knowledge and techniques. There was little progress in this direction and only with hesitation, as shown by the indicators of expenditure for research and development, the reduced supply of scientists and the erratic and contradictory characters of the prevalent policies in this field.

The passive and reactive attitudes - of the State as well as the private sector - with regard to the long-term determinants (education, health, basic and applied research) of productivity made its contribution too. And as far as measures of immediate effect are concerned (reorientation of public spending, changing of a new institutional and legal scheme for the regulation of scientific and technical transformations) action generally was excessively cautious and frequently moving backwards.

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It seems pertinent to take into consideration, as far as the selection of subject areas is concerned, the features of the external and internal context in which technical change in Latin America is inserted. So it will not be sufficient, for example, to recommend the promotion at regional levels, of programmes in the fields of energy (conventional or not), capital goods, building of tractors or training of technicians in different fields. Neither will suffice the coordination of institutions with similar interests or the creation of new bureaucratic entities.

All this will be unsatisfactory, if the mechanisms of transfer, accumulation and selective creation of scientific and technical knowledge are not discovered and used; if the idea is not maintained that public recognition of the scientific task is indispensable, that an overbureaucratization of research institutions is suffocating, and that, finally, the key to continuous technical progress lies in a transforming impulse which necessarily goes beyond this progress while supporting it at the same time.