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SCIENCE AND TECHNOLOGY TO DEVELOPMENT

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PRELIMINARY SUGGESTIONS FOR PREPARING CEPAL'S REGIONAL DOCUMENT FOR THE UNITED NATIONS CONFERENCE ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

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I. DESCRIPTION OF THE CURRENT SITUATION

The interest shown by the United Nations in the application of science and technology for economic and social development derives essentially from three significant and inter-related circumstances:

a) The first concerns both the paramount importance acquired by scientific and technological progress in determining income levels and living standards and the conviction that in the future such progress should be rechanneled in the direction of peace, well-being and development. This suggests the need to emphasize the technological aspects of international development (particularly in countries with low productivity and income) which has become a distinctive characteristic of the various programmes and projects sponsored by the United Nations. This interest was reinforced, inter alia, by the abundant supply of knowledge existing in the industrialized nations, which in turn has produced concern among the developing countries owing to the critical gaps presently existing with regard to the transfer of technology and the dissemination of available knowledge. Consequently, irregularities and disadvantages -which have tended to multiply- became manifest for the developing countries.

b) The second circumstance concerns awareness that scientific and technological progress is transmitted unequally through present international systems and social structures. This has brought about a shift of emphasis and even of perspective, inasmuch as mere demonstration of the potentialities of science and technology does not in itself constitute a sufficient objective. Rather, it is necessary to establish conditions favourable for the application of these potentialities among the developing countries. It should be pointed out, nevertheless, that the contributions of the United Nations organizations in this field have been significant. Certain studies and experiences in this respect have revealed that, first, the developing countries are obliged to face a number of problems presented by the industrialized nations in respect of the dissemination of scientific knowledge; second, that scientific and technological development and distribution of its benefits do not take place spontaneously in all circumstances; and third, that under the present-day organization of the

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international system and under certain national set-ups, factors exist that distort or impede the application of scientific and technological knowledge.

c) The third circumstance involves the negative long-term effects caused by irregular or disordered dissemination of technological innovations, which, combined with other circumstances that add instability to the development patterns of the developing countries, lead to the imbalances and global problems which have attracted the attention of the international community. If technical change lies at the source of a plan for interdependence and if this factor contravenes the international arrangements examined by the United Nations during the course of this decade, then there is ample justification for studying this factor specifically in the light of these studies within the framework of the New International Economic Order.

It should be noted that the institutional development produced within the United Nations system was largely a reflection of the requirements, the consequences and the tensions of scientific and technological progress. For example, the first cooperative actions carried out by UNESCO were followed by those of other organizations such as UNIDO, UNCTAD, UNDP and UNEP, which raised the diverse aspects of scientific and technical cooperation to a more sophisticated level. This process of specialization even affected institutions founded before the United Nations, such as ILO and WIPO.

In brief, in General Assembly resolution 31/184 of 21 December 1976, in which it was decided to hold a United Nations Conference on Science and Technology for Development (UNCSTD), converge three basic considerations: first, that science and technology represent significant accelerators of socioeconomic and cultural transformation activities; second, that such forces have contradictory results that are particularly marked in relatively less-developed countries; and third, that the United Nations system is in a position to formulate and implement a coherent strategy for scientific and technological development within the framework of the New International Economic Order.

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In a certain sense these premises constitute a doctrine for scientific and technological development and cooperation which is outlined in the preparatory material and agenda for the UNCSTD (see ECOSOC resolution 2028 /LXI/). This doctrine will take form as a result of two actions: first, a synthesizing of the principles suggested by the international community during the past decade; and second, the formulation of a coherent policy and plan of action for the development of science and technology within the United Nations system.

Comparative study of the process of accumulation and transfer of scientific and technological knowledge brings several problems to light:

a) The first concerns the historical nature of the scientific and industrial revolution and its universal implications. For example, scientific and technological development do not constitute a historically continuous process, since it is only since the industrial revolution that favourable conditions have been created for constant and inter-related growth of science and technology.

This phenomenon began to be accompanied by increasing inequality in the distribution of international income. The countries which were the leaders in industrialization based on technological innovation began to obtain considerably higher levels of income and productivity. At the same time, certain obstacles appeared in the developing countries which restricted their access to the economic benefits derived from technological change, inasmuch as no spontaneous transfer of technology had taken place between one country and another through the usual means of competition, specialization and economic policy. Nevertheless, the scientific method and science as an intellectual and economic undertaking became elements of worldwide importance with numerous impacts, especially in the area of consumer goods. These elements gradually homogenized and united, in varying degree and depth, a world previously segmented by accidents of history. In this manner the differences among countries that were brought about by the application of science and technology to industry, transportation, commerce and the organization of universities, inter alia, became increasingly marked, so that

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incorporation of the developing countries into the international system, far from being on an equal footing, was regulated by a cumulative system of advantages for the industrialized nations, on the one hand, and disadvantages for the primary economies on the other hand.

This problem concerning the historical nature of the scientific and industrial revolutions and their universal effects has brought about consequences that still require careful study. However, for the time being it is important to point out the tensions existing between the historical nature and the universality of scientific and technological accumulation, since such tensions have had ambivalent repercussions on development and underdevelopment.

b) The second problem concerns the imperious need for the developing countries to absorb and create productive knowledge in the absence of appropriate resources and infrastructures. This is particularly important for the countries of Latin America which are on the road to industrial maturity. In fact, observations made during the subregional seminars preparatory to the UNCSTD indicate that most of the knowledge required derives principally from the industrialized nations. This state of affairs produces a technological dependency that is characterized by only very meagre local research efforts on the part of the developing countries and by huge direct and indirect costs. Nevertheless, it should be noted that many Latin American countries are making great efforts in the promotion of local scientific and technological research with the objective of achieving innovations and adaptations more appropriate to technical change. This is made despite the formidable obstacles they have had to face because the links existing between these efforts and the existing infrastructure in the educational and productive systems of the developing countries are deficient, which, in turn, has given rise to the well-known problem of the disproportionate relationship between the demand for technology and its local supply.

It should be noted that in Latin America and in the developing world in general, there is an urgent need for the creation of endogenous technological capacities, supplemented with advantageous and appropriate transfer

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of imported technology and public dissemination of available technologies. Unfortunately, however, many factors indicate unfavourable tendencies in this respect, for example, the disproportion between public and private spending and research and technological development expenditures. National papers indicate that such expenditures (between 0.2% and 0.5% of the gross national product) continue to be below the percentages recorded in the industrialized economies. Moreover, the functional distribution of these expenditures reveals that in the developing countries, generally speaking, somewhat more than three quarters of such funds are allocated to wages for the personnel employed in this field. Consequently, the funds which they are able to allocate for the acquisition of equipment for logistic support of scientific and technological research are extremely limited.

In addition, the lack of appropriate planning usually creates a situation in which scientific and technological activities have no direct relationship with national needs, but respond rather to individual and sectoral initiatives dissociated from any coherent national or regional strategy. Consequently, it may be seen that important areas of development have been neglected - for example, subsistence agriculture, low-cost housing, employment, capital goods, and transportation - in favour of benefitting other sectors of scientific research which perhaps bring about short-term results, but at a high social cost.

To a certain degree the third problem is associated with the previous two. In recent decades a process of internationalization of the economy has assumed great importance, which, instead of diminishing the differences among countries, has accentuated them owing to the significant differences in the attitudes taken by the centres providing technology and those receiving it, thereby giving the international transfer of technology a superficial and contradictory aspect. This tension has given rise to the search for "appropriate technologies" compatible with the factor mix, the aspirations and the available infrastructures in the developing countries.

The maladjustments mentioned above between the historical nature and the universality of scientific and technological knowledge, between growing demand and deficient supply, and among the ambiguities of the

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internationalization of the economy constitute the essence of the problem involved in applying science and technology to the development of the countries in the Latin American region. Finding appropriate solutions is not an easy task, since the deficit with regard to scientists and local research is being augmented qualitatively by a system of scientific recognition controlled by the leading research centres. Furthermore, the policies implanted in the economic sphere actually increase the demand for external knowledge, and the internationalization of national and regional economies does not bring about shared benefits; on the contrary, it intensifies intersectoral heterogeneity due to the unequal assimilation of the "best technological practices". It should be noted in this respect that some authors have suggested that such maladjustments will be spontaneously resolved as the economic modernization of the region continues. Others note that in the present stage of development emphasis should be placed on the adaptation and improvement of technologies. Both approaches appear to be inadequate, since it has already been noted that the forces which lead the developing countries to assymetrical and competitive interdependence - both within and among the countries - are very strong and that the historical trend has been the concentration of stimuli and benefits rather than their equitable distribution and balance.

It is important to observe that the one-sidedness existing in the adaptation and absorption of technologies produced abroad leads to economically and socially negative results which tend to perpetuate external dependence, inhibit the flexibility of national systems, weaken the aptitude for selecting products and processes appropriate to development strategies, alienate national culture and neglect innovative regional and world currents.

These considerations point to the need for seeking a framework of principles and actions which will lead to a sustained national and regional self reliance over the long term, both with regard to local efforts and to regional and international cooperation.

At this stage it appears to be imperative to increase efforts to formulate a sound scientific and technological policy and to integrate

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it into economic and social planning. Such efforts should revise the ground covered to date taking into account the important need for institutionalizing standards in this field. However, these efforts must not be limited to those sectors directly associated with the supply and demand of knowledge, since surveys and evaluations carried out in these countries indicate that a distinction should be made between the "transfer of technology", which involves these sectors and which has commercial connotations and the "dissemination of technologies", which represents a process of economic and social change. This means that scientific and technological policy in a developing region such as Latin America should seek objectives that might appear superfluous for industrialized countries. It is not a question here of merely creating or improving infrastructure, of increasing the budget for basic and applied research and technological development, or of promoting the ties existing within educational, cultural, political and economic systems. Rather, actions undertaken in this field should include the reorientation of the application of science and technology for development at national and regional levels by making a planned selection of programmes and projects to be established in a "regional development plan".

Specifically, it is expected that the United Nations Conference on Science and Technology for Development will take into account past experiences related with the following four domains:

i) Institutionalization of explicit scientific and technological development policies;

ii) Establishment of legislative and institutional arrangements to facilitate the control and selection of technologies;

iii) Statement of common regional positions in this field in conjunction with experiments in inter-regional cooperation;

iv) Formulation of specific positions with regard to international practices in the transfer and marketing of technology.

The subregional and national seminars preparatory to the Conference and certain studies carried out by CEPAL in which a review has been made of the institutional and legislative arrangements designed in the countries

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of the region to promote the progress of science and technology for development have indicated the influence of the technologically advanced countries on the Latin American region. As mentioned before, the Latin American economies have been subjected to a process of cumulative disadvantages brought about by the delayed and fragmentary nature of their processes of industrial technological innovation, which, combined with other factors, have produced instability in their patterns of development. On the other hand, the achievements made in recent decades by the principal research centres and by the productive organizations of the industrialized countries have been comparatively so great that they have considerably widened the gap in scientific and technological growth and productivity existing between the highly industrialized nations and those with low productivity leveles. This growth has not had the same effects in the developing countries, essentially due to a lack of appropriate planning of scientific and technological research. Instead of carrying out such planning following national or regional development priorities, it has been based on the selection of areas that are generally of greater interest to the industrialized countries, thereby increasing the relative disadvantages of the developing countries, which are in an unfavourable position due to the extremely small number of scientists and researchers available to them. Such a selection of areas of research, dissociated from national or regional realities, gives development a frame of reference alien to the interests of the countries in the region. This situation plus other factors, such as the centralization of research (which is generally carried out in the capital cities of the countries in the region and very rarely in provincial centres), the low levels of salaries and other benefits, and, in certain instances, tensions of various kinds, have resulted in an exodus of scientists and technologists who do not find satisfaction in working in their own countries, thus producing veritable "inverse transfer" of science and technology for the countries in the region.

It is also important to consider the ambivalent effects of the transnational corporations, which, owing to the advantages inherent in

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their mobility, flexibility and financial resources, have affected factors of great importance in the developing countries. For example, they employ production processes that require heavy investment in machinery, equipment and installations, but little manpower, a situation that does not correspond to the needs of the countries of the region. They also frequently produce consumer goods of greater demand in high-income societies and strata than in low-income groups, consequently reverting even more the social distribution of the benefits of development and frequently leading to displacement of traditional products that had at least provided sources of employment.

Other problems related to the application of science and technology to development should also be added to the considerations discussed above, such as:

a) The markedly low amount of resources available for achieving the scientific and technological progress required by the developing countries within a reasonable period of time.

b) The fact that in the international technological market there exist practices that work against the interests of the developing countries, such as:

i) The trend to minimize risk factors in the design of technologies and to increase profit margins derived from products, thereby creating a preference for technologies appropriate to the context and to the demand of the industrialized countries by means of considerations of market, scale and cost.

ii) The competitive position of the corporations which control available technology leads to their employment of restrictive measures aimed at preserving a system of incentives to carry out future research or to make new inventions. This has been the source of public debates.

iii) Productive knowledge is subjected to a system of patents and licences and to "industrial secret" practices which involve a certain resistance at the institucional level to provide information on products which incorporate a "closed system" thus preventing the "inductive" reconstruction of technology, which is of great interest for developing countries. This produces a definite imbalance in the negotiating

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capacities between buyers and sellers of technology and frequently leads to contradictory situations in which the buyer does not know precisely what he is buying, a factor which influences the direct and indirect cost of private technologies, the cost of the search for "appropriate technologies" and the cost of the product to the consumer.

It is also important to consider that only in the past 15 years, legislative and institutional instruments have appeared related to the development of science and technology, the supervision and regulation of foreign investment and industrial property systems (trademarks and patents), the training of human resources, and the promotion of the creation or strengthening of local engineering firms and of information and documentation services. Each country in the region has achieved varying levels with regard to these activities, as is revealed by the national papers to be submitted to the UNCSTD. These legislative instruments and the National Councils on Science, Research and Technology (CONACYT or CONICYT) have considered technological and scientific factors as a key element in long-term development and have, at times, clearly acted in a defensive manner in order to regulate the external flows of incorporated or non-incorporated technology so as to reduce direct and indirect costs and promote local technological innovation. At other times they have increased scientific and technological infrastructure both with regard to human and to material and financial resources for the development of scientific and technological activities with the purpose of achieving self-reliant progress. In order to achieve these goals, two actions have been carried out internationally: multilateral and bilateral scientific and technical cooperation planned in a manner more directly associated with national and regional priorities, and significant rectifications with regard to the conduct of private corporations and to public international cooperation. These efforts have been primarily directed at destroying the pattern of cumulative disadvantages previously mentioned in this document. It has been seen, however, that the increasing of human and material resources does not spontaneously produce scientific

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and technological progress. Such action must be accompanied by appropriate planning and coordination of actions which will make possible a gradual and sustained development of scientific and technological activities aimed at fulfilling specific goals within established periods of time and within a socioeconomic and ideological framework that will enable science and technology to provide concrete results.

With regard to the achievements obtained by the National Councils on Science and Technology, concerning the transfer and selection of technology, tangible results to date have been modest. However, the conceptual progress obtained in this area has been significant. This is largely due to the fact that the transnational corporations have, during their negotiations with Governments and national groups demonstrated a large amount of resources derived from their economic power and their organization, in addition to flexibility and a global understanding of cooperative action. On the other hand, however, public institutions have not always provided proper counterbalance in such negotiations, and on certain occasions governmental actions have followed courses sharply contrasting with their own official positions with regard to science and technology.

The CONACYTs and CONICYTs have also been able to create a climate of opinion favourable to rectification of the current practices with regard to industrial property (patents and trademarks) and licences of the large transnational corporations. Nevertheless, the ground to be covered is still very extensive. The threat has not diminished that the transnationals are able to determine the course of scientific accumulation and technological innovations without taking into account national and regional policies in this field. Likewise, it appears that the "industrial secret" will continue to be the dominant practice as the response of the transnational corporations to the demands of the developing countries and to the growing competitive market for technology. There are no guarantees either that the restructuring of the systems for international scientific and technological cooperation will

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be carried out to the extent required or within the time-frame which circumstances demand.

Inasmuch as the subject of transnational corporations has been extensively dealt with in other studies and surveys, it is sufficient to add here only that, according to recent observations, the activities of transnational corporations are not restricted solely to the field of industry, but also cover agriculture, commerce and basic services, such as energy, transportation, insurance and finance, among others. This confirms the urgent need to adopt political resolutions in international fora as a means of formulating a code of conduct for the transfer of technology and effecting a detailed revision of the industrial property systems (patents and trademarks) of transnational corporations. Such revision will oblige them to programme true vertical and horizontal cooperation in conjunction with governments and higher education and research insitutions of the developing countries in which they carry out their activities as a means of achieving a dynamic balance between the interests of both and distributing the benefits derived in a more equitable manner.

In view of the above considerations we have arrived at the conclusion that the contradictory results of transnational activities, added to certain practices inherent in the technical and scientific cooperation offered to the countries of the region both multilaterally and bilaterally - which have been subjected to detailed analysis and strong criticism - have been quite unfavourable. Accordingly, the countries of the Latin American region have decided that there is an urgent need for explicit and concrete regional policies designed to regulate scientific and technological research; technical change; technological innovation; the transfer of technology; the patent, trademark and licence system; the access to scientific and technological information and documentation in all areas of socioeconomic and cultural development; and the training of human resources for scientific and technological development and appropriate for advantageous negotiation of the profit margins of the developing countries so as to enable the latter to create, select, invent, adapt and improve their own or the imported technologies which they require for their development processes.

/II. INPUTS

II. INPUTS FOR A PROGRAMME OF ACTION

Based on the considerations presented in Chapter I, the resolutions adopted in international fora, particularly those concerning the declaration on the establishment of a New International Economic Order, 3201 (S-VI) and the declarations that have been forthcoming from international meetings related to the preparatory phase of the Conference (UNCSTD), the following suggestions are submitted as a preliminary contribution to a Programme of Action:

1. At the National Level

a) Regarding the developing countries

1) Explicit medium and long-term national plans and policies for scientific and technological development should be drawn up which are compatible with the policies, priorities and plans for economic and social development as a primary function of the governments.

2) In the formulation of such policies and integrated approach should be adopted in order to inter-relate closely all aspects of scientific and technological development, such as the promotion of basic research applied to technological development; information and technical cooperation programmes; problems concerning the transfer and adaptation of foreign technology and foreign investment policies, taking care to avoid external dependency.

3) Access to integral economic, social and cultural development should be based on the inalienable rights of each nation under conditions of genuine independence.

4) The process of scientific and technological development should be self-determined, self-reliant and endogenous, and directed towards creating or strengthening the capacity for generating and adapting knowledge and technologies appropriate to the needs of each country and its resources.

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5) The application of science and technology should lead to ecologically sound development through the rational use of the natural resources of the biosphere in full knowledge of the potentialities of local ecosystems and of the limitations imposed on present and future generations of mankind.

6) Scientific and technological development should seek fulfillment of the material and cultural needs of people by providing social justice and placing special emphasis on the needs of marginated groups.

7) National and scientific and technological development plans should include specific scientific and technological development programmes corresponding to priority areas.

8) Scientific and technological development policies of Member States should incorporate social development concepts and criteria, such as social evaluation of technologies, and should assign maximum priority to programmes aimed at solving problems of education, training, nutrition, health, low-cost housing and employment, particularly with regard to marginated groups in pursuance of the principles established in the New International Economic Order.

9) Scientific and technological infrastructures of the developing countries should be developed by allocating the necessary resources for ensuring endogenous, self-determined and self-reliant scientific and technological development including the following elements:

i) Institutions for policy making and planning;

ii) Research and development institutions;

iii) Scientific and technological information services;

iv) Specialized higher-education institutions;

v) Institutions for the regulation and control of foreign investment, industrial property and licences;

vi) Governmental and private mechanisms for coordinating the scientific and technological sector with the productive sector;

vii) Consulting and engineering services; and

viii) Services for technological management and for the strengthening of technological negotiating capacity.

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10) Sufficient resources should be allocated to enable universities, research centres and other higher-education centres to carry out basic and applied research and technological development in accordance with the requirements of the developing countries, and also to establish or strengthen institutes for research and technical services at the sectoral level as a means of promoting the development of science and technology in accordance with the potentials of each country with the aim of achieving the greatest possible degree of inter-relation between industry and the other sectors of the economy, particularly agriculture, through the establishment of agro-industrial research centres, the development of new agricultural zones, the introduction of new and improved crops for consumption and industry, and, of course, equitable distribution of the benefits obtained from the development of science and technology among all sectors of the population.

11) Priority support should be provided to training the human resources required to carry out the programmes and projects to be established for scientific and technological development, including genuine incorporation of women as a means of achieving maximum use of available human resources.

12) National scientific and technological information systems should be strengthened, emphasizing their role to provide information on advances which may have impact on the economies of the developing countries.

13) Strong support should be given to the productive sector to enhance its capacity to generate its own technology, as well as to negotiate and adopt foreign technologies to its needs.

14) Legal provisions in force related to the transfer of technology should be revised with the objective of obtaining freer and less burdensome access to modern technology and adopting an international code of conduct for the transfer of technology.

15) Taking into consideration that the basic criterium for the revision of national patent systems in developing countries must be the need for the systematic use of the principle of differentiation in the

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grant and management of patents in line with other economic policies with a view to aligning patent legislation more closely with the requirements of development. The principal measures to be incorporated in national legislation include the following:

i) The examination of the social and economic value of the products or processes for which patents are applied for, and of the possible effects of their protection by means of patents;

ii) The definition of certain categories of non-patentable inventions on a permanent or temporary basis, applicable to all or to only some categories of inventors or applicants;

iii) The adoption of higher standards with regard to patent description, legal definition of working of patents, legal provisions for proof of use and sanctions in case of non-use or unsatisfactory working of patents;

iv) The establishment of discrete rights and obligations in respect of patentable inventions in accordance with technological, sectoral or nationality considerations. Such differential rights and obligations may relate to the duration of patent rights, the working of patents and patentability requirements. One of the factors that may justify the application of differential treatment is the nationality of the inventors or applicants (more favourable legal treatment to local inventors, e.g. special guarantees for the protection of minor technological improvements, adaptations and developments, promotion of utility models, exemption from legal provision for an inventive step as condition for patentability, State patenting of inventions developed with government funds, etc.).

v) The establishment of preferential treatment for Latin American inventions developed within the context of economic integration processes (the patents of the region would be considered as national patents of each member country, definition of Latin American origin on the basis of nationality of the inventor and the place where research and development took place).

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vi) The detailed specification of methods of exercising control over patented inventions, especially by stipulating the various obligations of the patentees (information on working, registration of license agreements, description of inventions, information on examinations conducted in other countries, etc.). Domestic legislation should provide the national authorities with various alternative methods of checking on the fulfillment of obligations by patentees and of imposing penalties for failure to do so (further to compulsory licensing, the applicable legislation should include, inter alia, the use of licenses of right or licenses d'office, automatic lapse in the event of failure to work or abuse of patents, the use of inventions by the governments, etc.);

vii) The provision for positive measures ensuing that patents assume the character of genuine industrial incentives;

viii) The promotion of the export of local patentable inventions by protective and promotional measures.

16) Necessary structural transformations should be promoted at the governmental level for the implementation of policies designed to:

i) Make possible full social participation in scientific and technological development and in the benefits deriving therefrom;

ii) Reorient the educational systems of the developing countries;

iii) Stimulate national technological innovation;

iv) Stimulate industrial standardization and quality control, and

v) Include ecological criteria in the use of technologies.

17) Appropriate working conditions should be established for national scientists and technologists so as to counteract the exodus of technicians, engineers and scientific and research personnel and the consequent "inverse transfer" of technology in the developing countries.

18) Necessary institutional machinery should be established to facilitate consultation and coordination with regard to scientific and technological activities with the objective of obtaining improved conditions for the acquisition of technology, experts, licences, equipment and installations.

/b) Regarding

b) Regarding the developed countries

1) Genuine technical and scientific cooperation should be promoted both bilaterally and multilaterally with the developing countries through collaboration in research programmes and projects and their practical application in accordance with national development plans and the priorities established by the developing countries.

2) Commercial measures should be adopted to benefit the developing countries by increasing their exports of manufactured and semi-manufactured goods, including processed agricultural products.

3) Developed countries should:

i) Refrain from taking discriminatory measures against developing countries determined to exercise sovereignty over their natural resources exploitation, transformation and marketing;

ii) Refrain from encouraging the exodus of technical and scientific personnel from developing countries towards the developed countries;

iii) Provide access under more favourable conditions to modern technology and adapt it, as required, to the specific economic, social and ecological conditions of the developing countries;

iv) Cooperate with the developing countries in establishing, strengthening and developing their scientific and technological infrastructures, and their research programmes;

v) Endeavour to ensure a just and equitable balance of the developing countries' export and import prices;

vi) Adopt policies to encourage the suppliers of technology to transfer relevant technologies to the developing countries and to observe the provisions established in international agreements;

vii) Formulate research projects taking into consideration the fundamental social and economic needs of the developing countries;

viii) Establish, whenever possible, a fund for the scientific and technological development of the developing countries.

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2. At the Regional Level

1) In formulating scientific and technological policies full account should be taken of the need to establish subregional and regional systems for scientific and technological cooperation that will carry out activities with regard to problems, inter alia:

i) Formulation of common policies to resolve the most outstanding problems of scientific and technological development;

ii) Implementation of cooperative programmes for research and for scientific and technological development;

iii) Adoption of agreements to improve conditions for the transfer of technology among the countries of the region and with regard to third-party countries, and

iv) Exchange of information and documentation.

2) Scientific and technological cooperation on the subregional and regional levels should be based on the establishment of priority areas of common interest to all the countries of the region for which purpose multilateral mechanisms should be created to identify such areas.

3) Scientific and technological development of the region requires, inter alia, cooperation that will make it possible to increase capacities on the basis of clearly defined projects, such as:

i) Selection, adaptation, creation and negotiation of technologies;

ii) Training, specialization and repatriation of qualified human resources;

iii) Establishment or strengthening of national research institutions and scientific and technological support services;

iv) Development of technological information and documentation systems and services, and

v) Creation of services for national and regional technological development in the various productive sectors.

4) The developing countries should promote their economic cooperation and expand their trade with one another in order to accelerate their economic and social development.

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5) An international code of conduct for the transfer of technology in accordance with the needs and conditions of the developing countries should be supported and adopted.

6) Cooperation among the developing countries should be promoted with regard to technical and scientific research and their practical applications to the exploration, exploitation, preservation and marketing of their natural resources and all sources of energy.

7) The scientific and technological education system of the region should be modified so as to be geared to solving the economic and social problems of the countries.

8) With a view to adapting the international patent system to development purposes, action by Latin American countries in the regional context should be concentrated in the following three basic areas:

i) The elimination of trade barriers created by patent import monopolies, on the basis of general measures such as Decision 85 of the Andean Pact, specific measures such as those envisaged by the Caribbean Community, or resolutions adopted by economic integration bodies.

ii) The establishment of preferencial treatment for inventions and patents originating in other countries of the region, and

iii) The gradual unification of the administrative procedures and aspects of national systems, on the basis of a sectoral approach and on a subregional basis (e.g. subregional and/or regional procedures regarding search, examination, information, documentation, control of license agreements, etc.).

3. On the International Level

1) The international organizations should intensify their cooperation in the form of programmes and projects for research and development and for support services in the most pragmatic manner possible in accordance with national and regional scientific and technological development policies and plans.

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2) International scientific and technological cooperation, whether multilateral, bilateral or non-governmental, should contribute to strengthening the internal capacities of countries as a supplementary effort and not as a replacement for national efforts. It should also be coordinated with national policies and priorities, thereby ensuring a true multiplying effect in national and regional scientific and technological systems.

3) The international organizations should adopt appropriate measures, including consideration of the establishment of a technological data bank to provide a greater quantity of information and documentation to the developing countries, that will enable them to select advanced technologies in a suitable manner.

4) A growing proportion of world research expenditures should be allocated towards the development of appropriate technologies for the developing countries, in accordance with their needs and developing plans.

5) The appropriate United Nations organizations should provide assistance for the solution of specific problems such as:

i) Strengthening of national and regional capacities for obtaining more appropriate use of the various forms of cooperation available regionally and internationally;

ii) Inclusion of scientific and technological factors in development planning;

iii) Implementation and administration of research and development activities;

iv) Strengthening of the capacity for negotiation and evaluation of technologies;

v) Study of the inter-action between economic policies and scientific and technological development, and

vi) Strengthening of national and regional capacities to train high-level human resources to carry out scientific and technological development programmes and projects.

6. International organizations should consider the possibility of expanding, improving and supplementing the various forms and means of international cooperation, whether financial, technical, multilateral, bilateral or non-governmental.

7. International cooperation should acquire flexibility in order to correspond to varying national development realities and policies.

8. International organizations should bring about inter-action between vertical international technical cooperation and that existing among the developing countries.

9. The revision of the Paris Convention for the Protection of Industrial Property should take into consideration the following aspects:

i) Abolition of the overall neutrality of the patent system with regard to development policies in order to allow national legislations to introduce social and economic criteria and the corresponding legal instruments, and provision for maximum flexibility at this respect;

ii) Exemptions from the principle of national treatment with a view to allowing national legislation the introduction of preferential treatment of nationals, members of integration areas, etc. (e.g. certain types of patents for which only their nationals would be eligible, different patent fees, etc.), and express acceptance of the principle of non-reciprocal preferential treatment for developing countries;

iii) Modification of the territoriality principle thus avoiding restrictions on national legislation with regard to the effect of importations of a patented product and obligations in relation to the rights concerning importation deriving from a process patent;

iv) Exemptions from the principle of independence of patents with a view to avoiding "parallel patents" in integration areas;

v) Recognition of the right of a member state to adopt any legislative measures deemed necessary to prevent abuses emerging from the patentee's exclusive rights (especially the non-working of patents);

/vi) Reduction

vi) Reduction of the priority period with the possibility of granting insofar preferential treatment for inventions originating in developing countries. The duration of patents claiming priority could be measured from the date of the first filing;

vii) Obligation on the applicant for a patent who claims priority rights to indicate the results of the applications in other countries to the competent authorities and provision for the compulsory exchange of information among patent offices of all orders passed by administrative and judicial authorities with regard to the granting and validity of a patent;

viii) Promotion of bilateral or multilateral arrangements between developing countries which they might find consistent with their national development policies and cooperation programmes (e.g. cooperation regarding search, examination, information, documentation, control of license agreements, etc.);

ix) Abolition of the unanimity voting rule governing the revision of the Convention, and

x) Elimination of time restrictions on withdrawal by a member from the Convention.