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(vi) TECHNOLOGY

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The Lagos Plan of Action noted that : "Africa has the largest concentration of the Least Developed Countries, and is the most backward and disadvantaged in the field of Science and Technology for Development". It also expresses the desire that ".....Member States should join with other Third World countries in restructuring relevant existing international funding agencies, with a view to establishing a better balance and distribution of power within them. Within the Third World group Africa should therefore, be accorded serious and urgent attention in the negotiations of technology transfer, (including the 'reverse' transfer aspects), with the North. This idea should also be given due importance in the negotiations for disbursements of the United Nations' Fund for Science and Technology for Development and the various UN Systems relating to technology.

The search for a solution to these problems requires a comprehensive approach and efforts at the national, regional and international levels.

ANALYSIS OF PROGRESS SINCE UNCTAD V.

In the technology sector, various resolutions were taken at UNCTAD V. Attempts have been made towards the implementation of these resolutions in varying degree. However, this state of affairs has not been made any way easier because of the diverse nature of the groups involved in the implementation and also because of the unwarranted protectionism purposely practiced by the main owners

and exporters of technology. An analysis is given below of the progress made in the implementation process since UNCTAD V.

RESOLUTION 101 (v): UNCTAD CONTRIBUTION TO ECONOMIC, COMMERCIAL AND DEVELOPMENT ASPECTS OF THE INDUSTRIAL PROPERTY SYSTEM IN THE CONTEXT OF ITS ON-GOING REVISION

This resolution emphasises the need for the promotion of indigenous inventive and innovative capacity. The resolution also calls on the World Intellectual Property Organization to convene the Diplomatic Conference for the Revision of the Paris Convention for the Protection of Industrial Property. This Conference has held two sessions so far 4 February - 4 March, 1980 (Geneva) and 28 September - 24 October, 1981 (Nairobi). While some progress was reported to have been made towards the desired revision of the Paris Convention, there are a number of unresolved issues which would be subject to further negotiations at the Third Session envisaged in the near future. UNCTAD should therefore continue to intensify its work in this area in order to enable developing countries to benefit from trade in industrial property under better conditions. African countries should effectively participate in the African organizations on Industrial Property in order to strengthen their collective self reliance and safeguard their interests in the global organizations dealing with intellectual property.

RESOLUTION 102 (v): DEVELOPMENT ASPECTS OF THE "REVERSE" TRANSFER OF TECHNOLOGY

The resolution calls for collective efforts to arrest the brain drain problem of developing countries. In deed, the subject of brain drain has always been sensitive and its treatment thwarted with political and legal problems. While the problems involved are clear enough, they do not always lend themselves to a uniformly

acceptable solution. It is nevertheless an area that deserves further indepth analysis in order to minimise the impact of the brain drain in African countries, or to stop the brain drain completely.

Some progress has been made by UNCTAD's Committee on Transfer of Technology towards the implementation of some of the provisions of the resolution including recommendations for the conduct of commissioned studies on the imputation of skill values and flow. At the regional level, Member States have adopted the Lagos Plan of Action which incorporates a chapter on science and technology which takes due cognizance of this problem. It is noteworthy also that some Member States have already taken steps to mobilize efforts to arrest the brain drain.

RESOLUTION 122 (v): STRENGTHENING THE TECHNOLOGICAL CAPACITY OF DEVELOPING COUNTRIES, ACCELERATING THEIR TECHNOLOGICAL TRANSFORMATION

This resolution recognizes technology as the pillar-stone for the socio-economic development of a country. In particular, for the purpose of Africa, there is a need for the integration of technology in rural development programming, the enhancement of indigenous technology by giving it its true meaning and place in the national development programmes and plans, the integration of indigenous technology in the formal education sector and the production of technologists of various levels to meet the immediate needs of the country.

The dominant and leading role to be played by African governments is clearly recognized, especially through co-operative efforts at the regional, sub-regional and other levels.

The Lagos Plan of Action has recognized the importance of the subject of technological transformation and gives clear indications as to how this goal can be achieved. Various institutions have been created to accelerate technological transformation in Africa. Such institutions include the African Regional Centre for Technology (ARCT), based in Dakar, the ARCEDEM, based in Ibadan, Nigeria and AIHTR based in Nairobi, Kenya.

The problem in financing the technological transformation, is serious, since it is very much associated with the expanded programme of investment in all key sectors.

With respect to the financing of Science and Technology activities for development, the UN General Assembly Resolution 34/218, set up the initial multisectoral arrangements for international co-operation in the area of Science and Technology for Development. In response to the request for assistance from African countries, the Interim Fund was able to allocate approximately 34% of its available resources towards the financing of scientific and technological activities relating to the development of indigenous capabilities in Africa. Close vigilance and active participation of African countries in the activities of the UNIFSTD are very much required in order to ensure that allocations from the UNIFSTD not only match the disbursements of the interim fund but are also commensurate with the requirements of their technological transformation.

RESOLUTION 113 (v) : INTERNATIONAL CODE OF CONDUCT ON THE TRANSFER OF TECHNOLOGY

The objectives of the Code include the regulation of the technology transfer transactions, and of the conduct of the parties to the said transactions. Other objectives relate to steps to be taken by governments to meet their commitments to the Code.

One of the concerns of the Group of 77 regarding the provisions of this Code is to use it to eliminate restrictive practices in technological transactions. An analysis of progress made since UNCTAD V is given below :

> By General Assembly resolution 36/140, an interim committee was established with a mandate to formulate proposals on issues outstanding in the proposed Code. The issue of technology transfer and the fair trade called for, as far as Africa is concerned, has met with global failure. It turns out that technology, globally speaking, is sellers market. In view of the nature of this subject, the Interim committee met four times in 1982 and the report is to be submitted to the United Nations Conference at its Fifth Session in 1983.

In spite of the above mentioned difficulties experienced in achieving consensus on all the provisions of the Code of Conduct for the transfer of technology, the UNCTAD Secretariat should intensify its efforts to arrive at a final agreement on the provisions.

Meanwhile, at the national level, efforts should be made to make adequate use of certain provisions of the Code especially with respect to the importation of technology and the 'non-contestation' clauses to ensure that the technologies are transferred under fair terms.

ANALYSIS AND EVALUATION OF PROBLEMS OF MAJOR CONCERN FROM THE AFRICAN STANDPOINT, STILL TO BE DEALT WITH

It is generally recognized that technology is the pillar-stone for the socio-economic development of a country. In the case of Africa, for development to be realized when technology is utilized for the production of goods and services, there is need

for the existence of a body of competent institutions, individuals with relevant know-how and skills and with capabilities in defining development and production needs in technological terms; identifying alternative forms of technology to satisfy those needs; identifying competitive sources of procurement; negotiating ownership or user rights; or organizing importation; setting up management operations and maintenance; undertaking lateral transfer by adaptation within existing uses or to new uses; and developing new forms of technology.

The extent to which a society is technologically dependent is demonstrated by the extent to which it fails to develop the above-mentioned capabilities, and is thus a reflection on its level of development.

Most of the technological problems of the African continent stem from the fact that it lacks the necessary capabilities in the above mentioned areas, which in turn accounts for the technological dependence on Industrialized countries. There is therefore, a need for the countries of the continent to take concrete actions in at least some of the areas outlined below, in order to ensure that technological solutions will emerge in a number of significant sectors of their society.

The African continent through participation in the Group of 77 negotiations and through adoption of the Lagos Plan of Action, expressed disatisfaction at the fact that very little progress has been made since UNCTAD V towards achieving the minimum requirements laid down by the African delegations in particular for technology transactions to be fair and meaningful.

In so far as the transactions for the transfer of technology are concerned, the elimination of the restrictive practices which have adverse effect on technological transactions, and are a hinderance to the enhancement of the national technological capacities, is a most urgent task.

Another problem area which needs to be addressed is the seeming inability of African negotiators to project the urgent needs of Africa in negotiations within the Group of 77. This inability has compelled the African Group to accept various compromises within the Group of 77 in the attempt to define the needs of developing countries particularly those of the least developed among the developing countries. It is essential therefore, for the continent to give due consideration to the development of a body of skilled and competent negotiators who can present the African view point more vigorously.

In terms of manpower requirements and availability, African countries in their drive to control their destinies and exercise mastery over their natural resources should take urgent steps to review the orientation of education and training programmes, so as to make it more applicable to the immediate needs of the respective countries.

Only a few features can be referred to here, namely : (a) The difference between routinized know-how i.e. established formulae, procedures, practices, etc.., and know-how, i.e. the engineering science behind know-how which is the basic knowledge required for adaptations and breakthroughs. (b) The domination of curriculae for science and technology by textbook problems and textbook solutions mainly derived from developed countries. There are two separate issues here.

A thorn in the flesh of Africa at this crucial moment of its development is the effect of the "reverse" transfer of technology. This arises in the main, from the education system and the conditions of employment, professional environment and the attractiveness of facilities existing in the developed economy countries. Attempts have been made to alleviate the situation in some African countries by establishing mechanisms to reverse the flow of brain drain. At the international level, efforts have been initiated to arrive at agreed procedures and conventions on a

standardized basis for imputing value figures to skill flow. Efforts should therefore be intensified at all levels to redress this situation particularly in Africa, if the potentially available skilled manpower should be effectively utilized in solving pressing African development problems.

Lack of information is one of the most serious obstacles to the selection acquisition and use of appropriate technology options. The local environment plays a very important role here. An understanding of the character and orientation of the transfers is as important as the information to be supplied. Care should be exercised to ensure that the supply matches demand. Machinery should be established to assess and promote the acquisition, dissemination of information on the range of alternative technologies, processes and products available for particular application.

The approach is essential for the promotion of Research and Development and the enhancement of innovation, the issuance of patents for such work, for up-grading skills, techniques for easing drudgery, for having consultation and exchange of information with other African and Third World countries in areas such as the dynamics of technology policy and planning, for building of Technology infrastructure etc..

The development of Research and Development is another problem area which should be given due attention by African countries. Governments should in this exercise, strive to establish a competitive environment in which research undertaken at universities and other institutions is geared towards development needs. In terms of appropriations, Governments should increase the Research and Development budget and make a greater per cent of that budget available for this kind of research. If the above is done, when relevant inventions or results are produced, (local) entrepreneurs can transform these into concrete elements of production thus providing the much needed linkage between the innovative system and the productive system. This will be one way of handling problems arising out of the much discussed difficulty of commercializing Research and Development.

It is essential for African countries to develop technological capabilities in specific sectors of their economy such as, energy, food and agriculture processing, etc. along the lines outlined in the preceding paragraphs. This should entail the definition of set objectives to be realized through the use of technology, the instruments required for achieving these objectives including modalities for generating finance for technology activities and mechanisms for the promotion of technology markets (domestic and external) within the framework of a technology policy and plan which is integrated with the national development plan.

AT THE NATIONAL LEVEL

1. African countries should set up technology information networks linked with other information systems at the national level to promote the dissemination and use of technology within the society. Such networks should be linked to relevant regional and international networks (see paragraph 154 of the Lagos Plan of Action).

2. Each African country should establish a national machinery for the development of technology along the lines outlined in paragraph 126 - 128 of the Lagos Plan of Action.

3. In order to ensure that the development, the regulation of its transfer of adaptation is adequately provided for at the national and sectoral levels, African countries should create an adequate range and number of institutions and strengthen existing ones to enable them provide effective solutions to the problems of development.

4. African countries should give due attention to the development and utilization of human resources required for the establishment of a science and technology infrastructure of competent manpower, skills innovation and productive capacities to absorb and adapt imported technologies and develop technology locally for the identification, exploration and exploitation of natural resources and their

conversion into finished and semifinished goods and products. Other aspects of this recommendation are contained in paragraphs 130 - 134 of the Lagos Plan of Action.

5. The 'brain drain' in Africa has its economic implications both in terms of the cost of training and the cost in expected services to be rendered by the skilled manpower. African governments should therefore review the local working environment with a view to developing incentive schemes for the appropriate utilization and retention of indigenous skilled manpower.

6. African governments should increase their Research and Development budgets and ensure that a large share of this budget will be spent on financing the conduct of development needs oriented Research and Development.

7. African governments should ensure that the transnational corporations operating within their national boundaries train and utilize local manpower in the conduct of locally relevant Research and Development within such boundaries.

8. African governments should establish legal instruments and institutional infrastructure to strengthen their capacity to negotiate and regulate the importation of technology so as to acquire technology under the most favourable terms. In drawing up the legal instruments, reference could be made to the acceptable and relevant provisions of the draft international Code of Conduct for the Transfer of Technology.

9. African countries should make special efforts to ensure the provision of adequate resources for the funding of science and technology activities for development. Some measures designed to bring this about are spelt out in paragraphs 179 - 183 of the Lagos Plan of Action.

AT THE REGIONAL AND INTERNATIONAL LEVELS

1. The African countries should urge international organizations to assist in the strengthening of existing regional information networks, such as the Pan-African Documentation and Information System (PADIS)

2. The African countries should make use of the services of the relevant regional technological institutions and in particular the African Regional Centre for Technology in the development of national machineries for technology. They should also ensure that adequate support is provided to these institutions to enable them to perform the functions that the governments have assigned to them in furthering the progress and development of Africa.

3. African countries should co-operate in the implementation of practical measures designed to arrest the problem of brain drain. International organizations such as UNCTAD, IMF, ILO etc. should assist with the implementation of not only the above mentioned but also of UN General Assembly resolution 32/192; the compensatory financing facility proposed by the IMF and the studies on the feasibility of measuring human resources flow.

4. International organizations should increase their technical and operational assistance to African countries in the implementation of measures for strengthening their technological capacities and enhancing progress of their technological transformation. (See paragraphs 199 - 204 of the Lagos Plan of Action).