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STATEMENT BY DR. ADEBAYO ADEDEJI, EXECUTIVE SECRETARY OF THE
ECONOMIC COMMISSION FOR AFRICA TO THE INTERGOVERNMENTAL MEETING
OF AFRICAN EXPERTS ON ASPECTS OF TECHNOLOGY DEVELOPMENT IN AFRICA,
ARUSHA, UNITED REPUBLIC OF TANZANIA (3-8 OCTOBER 1977)

Ladies and Gentlemen,

I am happy to welcome you to this meeting which represents an important step in our effort to grapple, on a regional level, with major practical issues as to how technology - modern and modernized - can optimally contribute to the development of the member States of this region. In particular I wish to thank Mr. Joao da Costa, Secretary-General of the UN Conference on Science and Technology for Development for making the effort to attend this meeting which will also examine the subject of preparations for the Conference and Mrs. Bineta Diallo of the Office of Science and Technology who is here to assist us in deliberating on the complex subject of how to organize technology information and deliver it to the potential user. I am also happy to see representatives of the United Nations specialized agencies especially of UNESCO with whom we have some practical business separate from but related to the subject of this meeting.

The meeting was originally intended to serve as part of the preparations for the establishment of an African Centre for the Transfer, Adaptation and Development of Technology. Its origin lies in resolution 87 taken at UNCTAD IV in May 1976, requesting ECA and the OAU, in collaboration with UNCTAD, UNIDO, UNESCO, FAO and WIPO and other interested agencies to call a meeting of African plenipotentiaries not later than 1977 to establish the Centre as part of the mechanism for strengthening technological capabilities of member States. The resolution expressly provided that adequate preparations should be made preceding the meeting of plenipotentiaries.

In consultation with the OAU and the agencies specified in the resolution the following programme of activities was carried out:

- (1) consultation and agreement on the terms of reference and modalities of a field mission to evaluate the existing situation in the region;
- (ii) the organization of an interagency field mission to 17 countries between April and June of this year under the over-all leadership of Dr. Emmanuel Lartey of Ghana. The mission was organized in two teams, one led by Dr. Lartey, the other by Prof. Ouahes of Algeria, and was composed of participants from FAO, ILO, UNIDO, UNCTAD, UNESCO, WIPO;
- (iii) the circulation of the mission's report to interested UN agencies for a meeting to consider the findings and recommendations of the mission. The report of that meeting is being circulated today; copies of the Lartey report were also circulated to member States;
- (iv) the organization of this meeting to enable experts from African States to make specific recommendations to their Governments on the nature, functions, broad programme, financing, etc., of the Centre.

The meeting of African plenipotentiaries to whom your recommendations will be addressed is scheduled to take place in Kaduna, Nigeria, from 10 to 15 November 1977.

Before going on to draw attention to particular aspects of technology, its transfer, adaptation and development which you may wish to take into account in the course of this meeting I should like to express our grateful thanks to the United Nations Development Programme for its firm and generous support to this project in particular and to programmes and projects in science and technology in general for the region which are now beginning to take shape. I therefore welcome the presence in this meeting of Mr. Otto Essien, the UNDP's Liaison Officer with ECA in Addis Ababa. I would also like to express my most sincere gratitude to all the specialized agencies which I have referred to. Without their support and co-operation we would not have made so much progress since UNCTAD IV took place.

Distinguished Delegates,

Our basic concern in this meeting is with technology: knowledge - whether in the heads of people, whether embodied in blueprints, equipment, operating and maintenance manuals - systemized in such a way as to be more or less immediately applicable in enhancing the natural capabilities of men individually or in groups to produce and distribute goods and services for the improvement of the conditions of living and of work of man and for the survival of society.

At first sight the key issues may be briefly stated as follows: firstly, that this body of knowledge has been most extensively developed in advanced countries and is not freely available to developing countries except on terms which are often extremely burdensome to them. There is a clear need for competencies and institutions for negotiating ownership or user rights on less burdensome terms within the broad framework of international agreements. Secondly, there is the problem of dependence in regard to transfer, i.e., we are confronted with the problem of competence in adequately identifying and defining the problem requiring a technological solution; in selecting the particular type and form of technology most suitable for the solution of the problem; in moving it to the location of optimum use; in setting its various parts up in working order; and, in operating and maintaining it. This range of capabilities - set out more concretely in document ACTT/INF/1 of 5 August 1977 measures the extent of our dependence in terms of the existing stock of technology. The significance of dependence would then be measured by the extent of dependence in areas which we consider of strategic importance for development, e.g., pharmaceuticals or transport equipment as compared with soft drinks.

A third issue concerns the range and quality of capabilities - entrepreneurial, technical, managerial, marketing, etc. - of potential recipients of technology (public utilities, other state enterprises, medium-scale and small-scale indigenous enterprises in both the urban and the rural sectors and farmers) for exploiting technologies fully.

These issues in technology are not only of great importance today but appear ominous in terms of the vast expansion in the region's economy implied by, for example, the industrial target set at the second General Conference of UNIDO at Lima in March 1975. It is clear that if such targets are to be even partially achieved there would need to be an expansion in transport; telecommunications; mining; the production and distribution of power and of technical inputs into agriculture; food production; processing and packaging; chemicals and petro-chemicals; textiles; pulp and paper; building and construction; the production of hospital equipment and pharmaceuticals; to name only a few, which is little visualized at present by member States. If this expansion were to be conducted under the present terms and conditions of access to existing technology the region would be beggared long before the targets were reached. The cost effect would obviously be exacerbated by competition among the large number of third world countries for imports of technology as such strives to reach its targets in these sectors.

But is this all? The term 'access' which I used earlier suggests a stock of knowledge in different forms and sectors which is universally applicable and which meets every variety of present as well as foreseen and unforeseen needs. If therefore the owners of this stock were inexplicably to undertake to make the whole of it available to Africa without restriction and if we were in a position to choose, impart, install and operate - would that be the end of Africa's problems in technology?

The answer is, of course, certainly not because this would mean that we would rapidly produce in Africa all the ills that technology is inflicting and is likely to inflict on advanced countries: the cumulative destruction of the environment; the massive waste of natural resources; the steady increase of hazards to health and life of man and animal; the increasingly unmanageable volume of urban debris; the rapid rate of obsolescence of human skills and experience with its associated human and social ills; and, not least, the emergence of factor disproportions which economists are so fond of telling us is one of the most paralyzing characteristics of developing countries.

These two assumptions: that the stock of technology to be transferred is likely to meet all our needs and that every bit and piece of it can without adaptation and without risk be seized upon and used is clearly contrary to common sense, observation, or experience. We must therefore consider the extent to which we need to choose with care and the extent to which we need to adapt what we choose to our own needs and conditions.

Distinguished Delegates,

It has been pointed out that discussions on science and technology tend to confuse the universality of scientific knowledge with the specificity of technological knowledge. A piece of technological invention, for a process or product, is the result of a specific organization (usually a business enterprise) seeking, within the resources at its disposal, at a particular time and place, to solve a technological problem. Technology is therefore time-bound, resource-constrained, location specific and directed and managed within a business production matrix. This is even truer of the process by which a technological innovation is taken up by competing business enterprises, disassembled and subjected to intense trial-and-error research with the object of finding substitutes for materials, improving design of parts, components and accessories, power engineering and ~~over-all~~ performance. We therefore have no alternative but to consider such questions as: where are the business production matrices where such a process of adaptation can be carried out in African countries? What is the range - in terms of sectors and subsectors and in relation to planned development - of such matrices and what is their quality and orientation? How are they organized and what kinds of personnel and equipment do they make use of? How are they financed and by whom? How are the results of this activity transformed from laboratory prototypes into technologies for sale or diffusion?

These questions, it will be seen, lead us back to the point I raised earlier, about the number, pattern, quality and orientation of the potential recipients of transferred technology and especially about the role of public enterprises. We need to learn a great deal more not only about who are the recipients of technology and where the main burden of adaptation and development will depend but about the factors which affect their willingness to undertake adaptation and development even merely to adopt technologies adapted or new: the persuasiveness of machine sellers; risk aversion; the adjustability of new equipment and processes; the cost in resources and time of retraining; the burden of reorganization; plant layout or management; the maintenance factor; the availability of finance for investment in replacing equipment and processes, etc.

They go further and oblige us to ask what we mean by transfer and, indeed, what it is that is to be transferred. There is a tendency to rely on what I would consider a geographical concept of transfer. If we reject the assumption that the stock of technology available in advanced countries is in every respect suitable to all our present and future needs, both foreseen and unforeseen, and if we accept as reasonable the characteristics of technology as time and location specific, resource-constrained, etc., we immediately come face to face with a concept of dependence, the economic, social and political consequences of which would be fantastic and need hardly be spelt out. What I wish to stress here is that we in ECA are less concerned with transfer in the geographical sense. As we all know, a machine or technique only expresses and partially embodies a corpus of knowledge. It is the mastery of that corpus knowledge in such a way that we are not only able to use it with the minimum of help, and to redesign and adapt it but to conceive, design and produce new technology that has, in a sense, to be not so much transferred as obtained, improved and expanded.*

* Mira Wilkins: The Role of Private Business in the International Diffusion of Technology, Journal of Economic History, March 1974, pages 169-170.

Chandler Morse: Making Science and Technology for LDCs, The Columbia Journal of World Business, Vol.10, No.1, Spring 1975.

From this point of view, a large volume and variety of technologies transferred in the geographical sense may easily become a major obstacle to domestic adaptation and development of new technologies.

There are several implications of this interpretation of transfer. Firstly, it is clear that a much wider range of capabilities from science at one end to production and marketing at the other is involved, i.e., we need to think in terms of systems. Secondly, thinking in terms of systems requires that the locus of initiative activation and manipulation of the transfer process must be firmly in the hands of the recipient country, subject to accommodation with the producers of technology elsewhere. Thirdly, a major policy decision is implied: each country has to make the choice between autonomous promotion of development (technological and other) and perpetual and increasing dependence. Once this decision is taken, it becomes relatively easy to work out the programmes, projects and instruments for initiating of process by which technology gradually becomes a domestic product. The experiences of the USSR, Japan and China make clear the importance of this policy decision. No matter what the Centre does, the principal object of strengthening national technological capabilities will not be achieved without such policy decisions by member States.

Thinking in terms of "systems" also makes clear that where the socio-economic system is characterized by dysfunctional relations and enclaves, the technological multiplier can hardly be expected to work. It is not yet fully appreciated by our planners how extensive are these dysfunctional relations in many of our economies. There are enclave characteristics in education and training, in the pattern of production (for subsistence, for export), in sectors, in markets, technology, natural resource exploration and exploitation, transport and communications, industry, mining, urbanization, planning and plan implementation and even in government. It is possible to overcome the inhibiting effects of these structural deficiencies either by increasing the degree of socio-economic integration including gaps in production patterns and in communications or by engineering the kind of widely dispersed system of resource use, initiative and production favoured by China, or by some other patterning. But we should be fairly clear which pattern we are basing decisions on.

Distinguished Delegates,

I have spent this much time on some of the kinds of things which are pertinent to the dynamics of adaptation and development rather than to the statics of transfer for three reasons. Firstly, because I believe that purposes, objectives and targets determine instrumentation. If the former are poorly thought out it is likely that the latter will be inefficient. Secondly, because I want to stress that the Centre will be concerned essentially with helping member States face the challenge of continuous invention, innovation and diffusion of both material and social technology. These are, in basic terms, the capabilities that have to be built into individuals and institutions. Thirdly, because I want to draw attention to the vast area of work in technological development to which we have so far, in Africa, paid little attention. An example is the lateral transfer of a given technology from purposes for which it was designed to purposes unforeseen by its inventor. A good illustration is the computer but I do not wish to convey the idea that these possibilities are only characteristic of advanced technologies.

A second example is the upgrading of traditional technologies particularly for accelerating development in agriculture, industry and services in the rural sector. Here lies major challenges to our universities, polytechnics and research institutions because the process of adaptation and development in these areas can be as complex, difficult as anything to be found in advanced technology. They need command of sophisticated knowledge and experience in, for example, design and materials as may be found in electronics or marine technology. For example, the idea that simplifying or scaling down technologies or of up-grading traditional technologies is simple, second-hand activity cannot stand serious examination. As Paul Streeten remarks in discussing this subject "Understanding the atom is child's play compared with understanding child's play".^{1/}

^{1/} Scottish Journal of Political Economy, November 1972, . 214.

An even more important reason for stressing work in this area is not only its relevance to our needs for technology but the fact that a few successes in such areas create the sense of individual, institutional and national confidence on which further advances in technology can be built.

We can thus have a Regional Centre which justifies itself merely by promoting efficient regulation, encouraging successfully the buildup of national competences for negotiation and placing governments in a position to make the considerable and almost immediate savings in foreign exchange that the practical experience of a number of developing countries have shown could be made. In countries with large capital investments or in respect of large multinational projects such savings could well exceed the \$US 1 million mark annually. Direct financial benefits would accrue directly to governments out of public utility programmes and state enterprise projects. In effect, therefore, investment in the Centre should yield direct and indirect benefits to member States for exceeding investment in the Centre and the temptation would be very strong to stop there. In my judgement this would be an error of the first magnitude. I do not envisage the Centre as omnicompetent. I see it as carrying out a major synergistic function in collaboration and co-operation with institutions and agencies within and without Africa, within and without the United Nations.

Distinguished Delegates,

If I have not spoken directly on the other items on your agenda, it is because I am aware that my distinguished colleague, the Secretary-General of the United Nations Conference on Science and Technology for Development, who is also a co-sponsor of this meeting, will soon be addressing you at some length on this. We at the ECA Secretariat, have prepared three background papers which we hope will assist you in your deliberations. In document E/CN.14/ACTT/4 of 16 September 1977, we have put forward a wide range of proposals and have provided guidelines as to what subject areas African Governments should select. In suggesting these, we have ensured that they are critical problem areas with vital economic and social implications which may be solved by utilizing science and

technology. Accordingly, the critical problem areas suggested have clear relevance to problems of development in many, if not most developing countries.

We have also submitted for your consideration our proposed schedule of preparatory activities for the Conference during the last quarter of 1977 and for the whole of 1978 (E/CN.14/ACTT/4.Add.1). Finally, we have put forward suggestions for the Africa Regional Meeting in 1978 (E/CN.14/ACTT/4.Add.2).

Distinguished Delegates,

Before concluding this statement, I should like to take this opportunity to offer our heartfelt thanks to the Government and people of the United Republic of Tanzania for the readiness with which they came to our rescue when unexpected difficulties of finding a host country suddenly confronted us, for the facilities placed at our disposal, and for warm sympathy with which they have accepted the inconveniences of accommodating not one but three meetings at the same time.

I thank you for your attention and wish you a very fruitful meeting.