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ECONOMIC COMMISSION FOR AFRICA
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Utilization of Science and Technology for
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WORKING GROUP II

DRAFT REPORT

INFRASTRUCTURE FOR SCIENCE AND TECHNOLOGY

RAPPORTEUR: Mr. C. Gahamanyi

M70-2273

1. Working Group II, responsible for studying this item under the chairmanship of Mr. L.E. Ngugi (Kenya), Mr. C. Gahamanyi (Rwanda), being Rapporteur, considered this question in the morning and afternoon of 12 October 1970.

Educational Aspects

2. The first of the aspects examined was the educational aspect.
3. Several participants considered that the working documents on this item did not pay sufficient attention to pre-university education, on the one hand, and to adult education, on the other, although they formed fundamental parts of the infrastructure of scientific and technological activities. In the view of those participants, scientific preparation should begin in very early childhood; similarly, it was necessary, so as to facilitate the role of science in the life of the developing countries, to influence the mentality of adults through education and the information media. Many participants supported these points of view; others advocated that a larger role should be given to science and technology in the study plans at all levels; one participant referred to the need to increase the publishing of scientific books in Africa and for Africa. Similarly, the participants stressed the need for the education of scientists and technicians to go hand in hand with: (a) moral training, which aroused among those who had the privilege to receive middle- and higher-level education, a true awareness of what constituted disinterested service, the main aim of which was the national good; (b) thorough training in the national socio-economic realities; (c) a larger role for practical work and courses in agriculture and industry. On the latter subject, it was said that although the situation appeared satisfactory with regard to medical studies (and it could not be otherwise), that was not the case with regard to the training of engineers. Someone referred to the example of Nigerian legislation which obliged enterprises to give employment to students. Another participant favoured courses which included alternating periods of study and in-plant training (sandwich courses).
4. One participant said that in his opinion practical education should be increased considerably even in faculties of arts and sciences.
5. A lively debate to place on the balance which should be sought between agricultural education and industrial training. At the end of the debate the participants declared themselves in favour of the view expressed by the observer from UNCTAD, who had said that it was

a matter of agriculture versus industry, but of timing. The aim should be balanced growth. Depending on their individual cases, some countries were said to have given at a given time particular priorities which were likely to evolve. What was important was to satisfy the priorities of the moment.

Turning to the matter of whether increased attention should be paid to middle-level education compared to higher education, the participants were unanimous that although efforts to develop university education should be continued, the most pressing need in most African countries at the present time concerned the middle level, to which priority in such cases should be given. In that connexion it was recalled that if the activity of each engineer was to be effective, he should be supported by several technicians (and sometimes even by a whole group).

With regard to the universities, it was considered useless to base any criterion at all on considerations of tradition. The African universities, with few exceptions, were in the process of post-colonial adjustment to meet new requirements. They were still suffering from excessive dependence on abroad either for lack of local teachers or because their national teachers had to be trained abroad.

Many participants referred to the problem of giving training to technicians and scientists in administration (management gap).

The specific fields to which greater attention should be paid included:

- natural resources, the lack of geologists and hydrologists being particularly acute;
- nutrition and food technology, nutritional deficiencies in Africa being disastrous.

Lastly, general information was given by the observer from UNACAST on World Plan of Action of the United Nations bodies in the field of science and technology. The secretariat (UNESCO) explained what would be UNESCO's contribution to the World Plan with regard to training, on the one hand, and strengthening the public services in respect of science, on the other.

Recommendation 1: The African countries should, within the context of their scientific policies, strengthen their efforts to spread ideas and knowledge among the entire population starting from earliest childhood.

Recommendation 2: Particular attention should be paid, within the context of these efforts, at all levels: (a) to the moral aspects of the application of science; (b) to the need to promote thorough knowledge of the socio-economic realities and needs of the countries; (c) to activities of practical value including courses for students in agriculture or industry. Governments should study the possibilities of encouraging the training personnel even within enterprises through legislation.

Recommendation 3: Middle-level technical training should be given priority. In order to attract worthwhile pupils to the technological institutes, their prestige should be increased by linking them with universities. The diplomas awarded should, moreover, be recognized through appropriate legislation in order to encourage careers in the technical services of the administration.

Recommendation 4: Higher-level technical courses could be organized at regional and sub-regional level. Assistance for that purpose could be requested of the international organizations concerned (e.g. UNESCO, the ILO, the International Telecommunication Union, the International Civil Aviation Organization, etc.)

Recommendation 5: The international organizations and the bilateral aid programmes should co-ordinate their activities in the training of technicians so as to avoid dispersion of efforts and wasting of counterpart resources by the African countries.

Recommendation 6: Development of the infrastructure of technical education should form an integral part, at all levels, of national scientific policies. In particular, education should be very closely co-ordinated with job forecasting and with the main aims of the economic development plan by seeking a desirable balance between agriculture and industry.

Recommendation 7: The higher education institutions, despite their many obligations, should not neglect their efforts to train locally their own teachers in order (a) increasingly to have a staff fully informed of local realities and (b) to help counteract the "brain drain".

Recommendation 8: Particular attention should be paid to the training of scientists and technologists for identifying or making possible the exploitation of natural resources in Africa, particularly geological (mineral) resources and improved nutrition (food technology).

Public and Private Services

The observer from UNACAST stressed the fundamental importance, for the development of scientific activities, of the necessary public and private services.

Recommendation 9: The African States, with the necessary outside help, should endeavour to set up, as speedily as possible, the services essential to scientific development, particularly R & D activities such as instrumentation centres, meteorological and standardization institutes, information and documentation centres, etc.