

Science and Technology: the situation in Africa

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In spite of the numerous global and regional mobilization efforts, science and technology has not obtained the high priority it deserves in many African countries: UNDP has reported, for example, that in the disbursement allocated to the group of 36 least developed countries, of which 25 or 69% are African, 1.6% of the funds went to science and technology for the period 1970-1980 only.

The Unesco experience shows a similar pattern in Africa. In the period 1978-1987, the Science Sector has executed 91 projects in Africa with a total volume of US\$61 million. Twenty-six countries were involved and 19 countries had no science projects with Unesco during that period. One interregional and 33 regional projects have been executed by Unesco.

In the interesting World Bank Report entitled "Accelerated Development in sub-Saharan Africa: An Agenda for Action", publicized in 1981, specific reference to science and technology needs is only made in connection with agricultural research and extension, and with some health issues¹.

It is thus not surprising that the World Bank's science and technology adviser who has since left his position, stated, "...compared with the overall size and scope of its operations, the Bank's efforts in science and technology are modest considering the importance of the subject and the Bank's potential contribution to it. Science and technology are not given systematic attention, nor is the Bank's work in this field widely known².

The reasons for such an unsatisfactory situation regarding the role of science and technology in African development has been identified on numerous occasions, by the United Nations, by Unesco and by the OAU.

Some of the shortcomings of the development of the scientific and technological base at the national level of many African countries have been traced in the OAU Lagos Plan of Action to the following factors:³

- (i) persistence of the old international economic order and its technological dimensions, which have not changed;
- (ii) ineffectiveness of existing national machinery in coping with indigenous technology development;
- (iii) negative effects of imported foreign technology;
- (iv) vagueness in the conception of science and technology policy and its contents;
- (v) inability of existing science education to provide students with the essential skills for development and inappropriate clinical settings for essential skill acquisition;
- (vi) rural/urban technological dichotomy;

(vii) ineffective linkage pattern of research and development and national production activity, in particular the persistent orientation towards research of general interest and free knowledge;

(viii) ineffective mobilization of the population for science and technology transfer transactions;

(ix) inadequacy of existing machinery for the regulation of technology transfer transactions;

(x) limited volume of financial resources devoted to science and technology;

(xi) low level priority accorded to science and technology, particularly where available material financial resources are concerned.

What should be done?

On any issue concerning science and technology, there must, in the first instance, be a massive national endogenous effort aiming to create the minimum of infrastructure needed for a country before external assistance can have the desired impact. Human resource development is thus the most important single pre-condition for the creation of the necessary science and technology infrastructure.

External assistance in science and technology will remain a mixture of multilateral and bilateral efforts. No outsider can, or should, influence the sovereign African countries in determining the order of priority in which they are using the UNDP-IPF funds. But if science and technology remain among the last items of national priority as in the past, the present unfortunate situation is likely to persist.

As the Lagos Plan of Action underlined: "For science and technology to play an effective role in national development, they must operate within national framework and be co-ordinated with other sectors of the economy". Like in all industrialized countries, the African science community must act as a powerful lobby group in influencing the priority-setting in the national plans. If this simple message could be understood, the first Congress of African Scientists will already have fulfilled its objective.

In their endeavour, the African scientists are not alone. The organized world science community as well as the influential science and engineering organizations in each industrialized country can be mobilized for Africa⁴. To reverse the present trend which has not particularly favoured science and technology in Africa, a number of considerations do come to mind.

As far as financing from external resources is concerned, experience shows that renewed efforts should be made by each African country to have science and technology projects included in the individual UNDP Country Programme. After all, although UNDP has spent 33.9% or 231.1 million dollars in 1986 of its total expenditures in Africa, very little of it went into science and technology. The scientific community in each country should organize itself so that it can see to this important step.

On bilateral relations, special attention should be given by each African country that a science and technology section is included in bilateral agreements. The attitudes of some major donors concerning their external funding of development related research is rather encouraging in this respect⁵. But, of course, if African countries do not ask for this type of assistance, donor countries may continue to neglect science and technology-related projects in their relations with African countries.

The concept of African regional and sub-regional projects (as opposed to classical national projects) in the field of science and technology is a very promising formula. For example, among the 91 operational projects which the Science Sector of Unesco has executed in Africa in the period 1977-1987 with the total value of 61.0 million dollars, more than one-third have been regional projects.

The same positive results can be reported from the Unesco experience in regional networks concerning science and technology issues, e.g.

- (i) *On-going*
 - ABN African Biosciences Network
 - ANSTI African Network of Scientific and Technological Institutions
 - ARCT African Regional Centre for Technology (Dakar)
 - AFAU Association of Faculties of Science of African Universities
 - NEIDA Network of Educational Innovation for Development in Africa
- (ii) *Proposed*
 - ANTTI African Network of Technician Training Institutes
 - NICA Network of Instrumentation Centres in Africa
 - NPRNECA Natural Products Research Network for Eastern and Central Africa
 - SRESSAC Seismological Recording and Earth Science Studies in the African Continent

The advantages of research networks were highlighted in a recent OECD study as follows:

*"Networking can boost the cost-effectiveness of the R&D-investments of donor and developing countries. It enables each participant to bring to the forefront his individual comparative advantage in a common effort. It enables a co-ordinated approach, with financial and human resources of both donor and developing countries deployed in a manner to achieve results in less time than an uncoordinated effort. Duplication and overlap are avoided through exchange of information and the adoption of common methodologies."*⁶

The experience of the last decade also shows that World Conferences may *not* be able to do justice to regional, sub-regional and national problems. The particular situation in Africa in the complex field of science and technology thus deserves special attention and special action proposals. The next OAU Summit could give a new momentum in the discussions with UNDP, The World Bank, the African Development bank and other funding institutions as well as with the bilateral donor community.

Another highly efficient mechanism is systematic twinning arrangements between African scientific institutions with similar institutions in one or several other countries outside Africa. Permanent contacts with university institutes in developed countries and/or with university institutes in developing countries (TCDC) can prove to be one of the fastest patterns to catch-up with research work elsewhere in the world.

Close working relations on a continuous basis with non-governmental or semi-governmental organizations outside Africa are equally important schemes with which to reach out into the world science community. Many developed countries have established institutions which are specializing in issues of concern to the science community in developing countries (e.g.: SAREC, Sweden; IDRC, Canada; DSE, Federal Republic of Germany, etc.). Many worldwide operating scientific organizations (ICSU/COSTED) or national scientific organizations like AAAS have special programmes for developing countries or can be invited to sponsor activities in developing countries.⁷

Of high interest to the whole of Africa would also be the creation of an African Academic Computer Network similar to the existing European Academic and Research Network (EARN) and its counterpart in the United States, BITNET.

This proposed effort, which is presently under study by the AAAS, would facilitate the communication of scientists and engineers in sub-Saharan Africa through an information centre, including a mainframe computer and a leased satellite telephone line to EARN, which itself is tied in to BITNET.

In order to link the African science and engineering community more closely with the mainstream of thinking elsewhere in the world, the latest in satellite and video recording technology should be made available for both graduate education as well as for continuing education on the professional level.

Experience existing in other continents on distance education could be used with benefit in the African context. The plans to set up an International Technological University (ITU) under the auspices of Unesco could also be studied for their relevance for African needs.

This list of course is by no means complete. Its only purpose is to demonstrate to the African scientists that the classical cooperation mechanisms in science and technology are too slow to make a real impact in Africa.

On the world stage set by the United Nations and its specialized agencies, I have tried to demonstrate that as far as science and technology is concerned in a predominantly political context, the relations between scientists and politicians have been characterized by a series of endless mutual misunderstandings.

It is a historic event that the leaders of the political African organization, OAU, have called for this First Congress of African Scientists. If the dialogue between politicians

and scientists on the vital questions of your agenda which will shape the future of the Continent — is possible based on mutual respect, the long needed solutions for Africa can be found.

Let me conclude with the famous words of Albert Einstein on the delicate interaction between scientists and politicians. Nobody could say it better:

"As far as we, the physicists are concerned, we are not politicians and it has never been our wish to meddle in politics. But we know a few things that the politicians do not know. And we feel the duty to speak up and to remind those responsible that there is no escape into easy comforts, there is no distance ahead for proceeding little by little and delaying the necessary

*changes into an indefinite future, there is no time left for petty bargaining. The situation calls for a courageous effort, for a radical change in our whole attitude, in the entire political concept."*⁸

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Source." *From report of First Congress of African Scientists Brazzaville (Congo) 25-30 June 1987 International Co-operation in Science and Technology: Classical Options and New Opportunities for Africa.*

Notes

¹ World Bank, Accelerated Development in sub-saharan Africa, an agenda for action, Washington DC, 1981.

² Weiss, C. Jr., Science, Technology and The World Bank, unpublished paper, Washington. 21 July 1983, p. 18. See also the World Bank, Science and Technology in World Bank Operations, Washington D.C., September 1980.

³ OAU, Lagos Plan of Action, op.cit., p. 47.

⁴ cf. Gruhn, I.V., Unesco: Science, Technology and Africa, paper prepared for: Conference on: Perspectives on the UNESCO Crisis, San Diego, California. January 31 - February 1 1986.

⁵ Lewis, F.P., External-funding of development related research. A survey of some major donors. Unpublished manuscript, IDRC, Ottawa, Spring, 1987.

* OECD, R&D networks for developing countries: A conceptual study, prepared by D.Z Beckler, DSTI/SPR/86.39, 9 September 1986, p. 9.

⁷ For example the AAAS African Regional Seminar on the Role of Scientific and Engineering Societies in Development, 10-13 December 1984, Grand Bassam. Cote d'Ivoire, or the Programme of the German Foundation for International Development on the Promotion of Science and Technology for Development.

* Einstein, A., Out of my later years, Secaucus, New Jersey, 1956, pp. 202-203.

CORRIGENDUM

The article "The Cultural Perspective: Icing on the Cake or Pandora's Box?", from *C.A.O. van Nieuwenhuijze*, published in *DEVELOPMENT* 1987:1, pp. 13-17 was an abbreviation of a longer text published in the book: *The Many Faces of Development; A Debate in Seven Lectures*, C.A.O. van Nieuwenhuijze (Ed.). This book was published by, E.J. Brill, P.O. Box 9000, NL 2300 PA Leiden, The Netherlands (ISBN 90 04 08175 5) and costs Dfl. 70,-. Other articles in this publication are:

- Development, Multidimensional notion, complex practice — C.A.O. van Nieuwenhuijze
- Development from above, Planning as a learning process — J.G.M. Hilhorst
- Development from below — S.M. de Boer
- The economic dimension, the part that will stand for the whole? — B. van Arkadie
- Social factors, barriers to development? — C.A.O. Van Nieuwenhuijze
- The institutional-organizational framework of development interventions — J.H. Kraak
- A postscript on decolonization — C.A.O. van Nieuwenhuijze

2. The article "Calcutta's Backyard: Food and Jobs from Garbage Farms" from *Narendra Panjawi*, published in *DEVELOPMENT* 1986:4, p. 29, was an abbreviation of a longer document written by Mr. Panjawi. This abbreviation was carried out by SID. The result of SID's abbreviation was that the text as published is almost a complete paraphrase of material written by *Christine Furedy*, Associate Professor at the Division of Social Science and Faculty of Environmental Studies of the University of York (Ontario, Canada) and *Dhrubajyoti Ghosh*, Institute of Wetland Management and Ecological Design (Calcutta, India). The original text was published in *Conservation and Recycling*, Vol. 8 n. 2-4, 1984.