

PNAB 8-950

69699

**A Review of
Colloquium Summary
"Symposium on U.S. Policy for the 1990s:
Science and Technology for Sustainable
Development"**

Sponsored by

BOSTID

October, 1988

Prepared by

Center for Research on Economic Development

In partial fulfillment of

Contract #PDC-0180-0-00-8121-00

Bureau of Program and Policy Coordination

U.S. Agency for International Development

Colloquium Summary

Symposium on U.S. Policy for the 1990s: Science and Technology for Sustainable Development

Sponsored by

Board on Science and Technology for International Development (BOSTID)

OVERVIEW

The Colloquium's summary document highlights the key points made by each of four plenary speakers and synthesizes the conclusions of each working group. They are as follows:

Speakers and Topics

Nyle C. Brady — issues in basic and applied research in developing countries

Jordan Baruch — issues in technology development

Francisco Sagasti — science policy and technology assessment

Kenneth Prewitt — rationale for the Rockefeller Foundation's present program in Africa

Working Groups

Pure and Applied Research in Developing Countries

Technology Development

Assessment, Management, and Policy

Least Developed Countries

Advanced Developing Countries

Mechanisms and Institutional Issues

The highlights of each speaker's presentation and of each working group are presented in BOSTID's summary as well as under separate covers in this review series.

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SYMPOSIUM ON U.S. POLICY FOR THE 1990S:
SCIENCE AND TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT

April 6-7, 1988

The two-day symposium focused on an intensive discussion of key issues in science and technology in United States foreign economic assistance programs for the decade ahead. Sponsored by the Board on Science and Technology for International Development (BOSTID) of the National Research Council, the symposium was part of a larger project undertaken by several American organizations and institutions and coordinated by Michigan State University to examine the future of development cooperation between the United States and the Third World and to analyze policy, program, and organizational options for U.S. cooperation with developing countries in the 1990s. Approximately 50 persons attended, representing several U.S. government agencies, universities, private companies, foundations, and international organizations.

The objectives of the symposium were to achieve a broader understanding of developing country people's needs and highlight major issues for U.S. planners and policymakers preparing for the next Administration. The symposium focused on mechanisms for enhancing the capacity of developing countries to pursue basic and applied scientific research, develop technology, and manage and assess science and technology in the interests of society. Special attention was paid to the least developed countries, the advanced developing countries, and institutions to implement scientific and technological cooperation programs.

Chaired by Ralph Smuckler, Chairman of BOSTID and Dean of International Studies and Programs at Michigan State University, the symposium featured an address by David Hopper, Senior Vice President for Policy, Planning, and Research of The World Bank, stressing the need to build the capacity within developing countries for absorbing the new science and technology. Four plenary speakers set the tone in the opening session. The speakers and their topics were:

Nyle C. Brady, Senior Assistant Administrator, Bureau for Science and Technology, Agency for International Development, who outlined the issues in basic and applied research in developing countries;

Jordan Baruch, President of Jordan Baruch Associates and former Assistant Secretary of Commerce for Science and Technology, who discussed issues in technology development;

Francisco Sagasti, Chief of Strategic Planning, The World Bank, who spoke on science policy and technology assessment; and

Kenneth Prewitt, Vice President of the Rockefeller Foundation, who described the rationale for the Foundation's present program in Africa.

Following the plenary presentations, the symposium participants divided into two sets of three working groups. The first set included working groups on basic and applied research, technology development, and assessment, management, and policy. The second set included working groups on the least developed countries, the advanced developing countries, and mechanisms and institutional issues. The symposium concluded with summaries from each of the working groups.

The following are highlights from the plenary presentations, which illustrate many of the points that were later discussed in the working groups. Following these are the main issues identified by the working groups.

Plenary Presentation Highlights

1. **Brady:** Although science and technology have brought about accelerated economic and social progress in the developed countries, they have not had such impact in the developing world. Significant advances have been made, however, in applying science and technology to problems of agriculture, health, and population in LDCs. As we look to the challenges of the future, we must question whether the priorities of the U.S. technical assistance program during the last 30 years are appropriate for the 1990s and beyond. We must be prepared to deal with the increasing problems of urbanization and other social and economic pressures in the least developed countries, as well as find methods for S&T cooperation with the advanced developing or middle income countries.

2. Baruch: We must examine alternative models for technological cooperation with developing countries. The micro approach to development, as opposed to the macro approach with large capital projects, should be applied where appropriate. Models such as the BIRD (Binational Industrial Research and Development) Foundation for Israel and the PACT (Program for Acquisition of Commercial Technology) for India should be encouraged. Such programs link U.S. and host country commercial enterprises and provide loans for joint ventures. Some of the advantages of micro-development are that it produces change slowly, brings about improvements in the infrastructure when their absence impedes development, and helps build indigenous capacities by training local managers on the job. Finally, failure of a micro-enterprise is non-crippling to the country, and the risk takers are not labelled as failures just because the project did not evolve as planned.

3. Sagasti: We must find ways in which to apply scientific and technological solutions to improving the standard of living in developing countries without incurring tremendous social costs. In the next decades, slower economic growth, coupled with the explosion of demands for housing, health care, and other social services, will create a crisis in developing countries. Particular attention must be paid to technology policy in the process of applying science and technology to these problems. Developing countries face the need for new concepts of economic management and pragmatism. Generalized solutions cannot be applied to developing countries indiscriminately. The United States should not adopt narrow national policies of protectionism, which are counterproductive to efforts in LDCs. The United States should live up to its commitment of ten years ago to contribute to a United Nations financial system for LDC science and technology development.

4. Prewitt: The Rockefeller Foundation's program in Africa is based on four premises: (a) that scientists in the developed world must be constantly mobilized to work on developing country problems, (b) that indigenous capacity for science and technology must be created and strengthened, (c) that policy constraints at the national level in LDCs must be addressed, and (d) that scientists and development planners must understand and overcome the seemingly innumerable barriers that frustrate the development process. In Africa, building indigenous capacity in science and technology requires working with three sectors: scientists and technologists, policymakers, and the general population. In African countries, the United States must find ways to work with and link these sectors to create a demand for science-based development strategies.

Working Groups: Principal Issues Discussed

1. Working Group on Pure and Applied Research in Developing Countries

Moderated by Walter A. Rosenblith, Institute Professor at MIT and former foreign secretary of the National Academy of Sciences, this group focused on the role of American universities in the training of foreign scientists and engineers. The high number of foreign students in the United States poses a problem of brain drain for the developing countries, but it also offers them the opportunity to create a cadre of highly-trained scientists and engineers who will eventually return to their countries, one way or the other, to contribute to its development. Many developing countries cannot make effective use of their returning scientists, however, because of an inadequate infrastructure (facilities, equipment, etc.) Successful programs that have fostered cooperation between scientists in developed and developing countries were cited: the NAS Brazil Chemistry Program, the NSF Science and Engineering for Economic Development (SEED) Program, and the BOSTID Research Program are examples. International scientific organizations such as the Third World Academy of Sciences and the United Nations University, and global scientific programs such as the Global Change Program of the International Council of Scientific Unions and the proposed program for mapping the human genome, offer opportunities for collaboration. The group concluded by expressing concern that the terms "aid" and "development" have lost their urgency and need to be replaced.

2. Working Group on Technology Development

Moderated by Dale Corson, President Emeritus of Cornell University, the working group discussed the need for more private sector involvement in the development process. Models such as the BIRD Foundation and PACT in India, and the Small Business Innovative Research Program in the United States were cited as mechanisms for technology development. Concern was expressed over issues such as intellectual property rights and equal access to information. To develop technology in the developing countries, the United States must help establish an S&T base or infrastructure through technical support facilities, biotechnology laboratories, etc. Strong educational systems are also needed. The U.S. should look to models such as the international agricultural research institutes and to proposed institutions such as the ISTC (Institute for Scientific and Technological Cooperation). The group stressed that U.S. technological cooperation with developing countries should be of mutual interest and benefit and that programs must be tailored to a country, a region, or a sector -- not all-encompassing. In the more developed countries, emphasis should be on private sector activities and relatively little money spent on bilateral S&T programs.

3. Working Group on Assessment, Management, and Policy

Moderated by John H. Gibbons, Director of the Office of Technology Assessment, U.S. Congress, the group examined the present U.S. foreign assistance program in light of its tangled and often contradictory history. The group attached particular importance to the linkages among science, technology, and economics, as well as to the need for greater sensitivity to the cultural and environmental context. Because different countries and regions have differing needs, capacities, and comparative advantages, greater flexibility is required in the design of development assistance. The success of more culturally-sensitive programs, such as the National Center for Industrial Science and Technology Management Development in Dalian, China and the state level technology development effort based in Bangalore, Karnataka, India, underscores the importance of transmitting change through existing socio-economic structures, rather than attempting to transform or Westernize those structures. In the policy area, the group felt that, in many instances, AID had little comparative advantage and that a new mechanism for assistance with S&T policy was needed. Specific mention was made of the Carter Administration's unsuccessfully proposed Institute for Scientific and Technological Cooperation (ISTC). The importance of science to policy formulation was stressed, citing the need for early application of rigorous scientific analysis to development projects to generate a broad range of sustainable options. The group also explored issues regarding the commercialization of technology and financial aspects of development in general.

4. Working Group on Least Developed Countries

Moderated by Robert Morgan, Professor of Technology and Human Affairs at Washington University, this group discussed the rationale for U.S. assistance to the approximately 40 countries with GNP per capita below \$500 concentrated in Africa and South Asia. Because many of these countries are experiencing environmental degradation, traditional humanitarian motives for foreign assistance should be linked with broader and long-term environmental concerns to halt the degradation and restore the quality of life. Various types of development assistance programs were discussed. In general, it was agreed that assistance to LDCs should be directed at survival needs rather than economic growth, emphasizing the applied sciences to rebuild the resource base. Governmental, or bilateral, programs should focus on building infrastructure, including S&T capacity through strengthening universities and national research institutes, building research networks through regional programs, and involving LDC scientists in global scientific programs. Utilizing the private sector to introduce S&T into small-scale, technology-based enterprises in key areas was recommended. Funding for S&T development programs in these countries was judged grossly inadequate and may be further impaired by the attitudes of LDC policymakers who do not place a high value on science and technology in the allocation of their limited resources. New programs, new institutions, and new mechanisms specifically targeted at the chronic problems in these countries are needed.

5. Working Group on Advanced Developing Countries

Moderated by Deborah Wince, Deputy Director of the White House Office of Science and Technology Policy, the group discussed the rationale for U.S. scientific and technological cooperation with the advanced developing or middle income countries (ADCs). Because S&T activities are directly linked to broader national economic and trade interests, the U.S. should recognize that there are long-term benefits of S&T cooperation with the ADCs. In the future, "partnerships" should be developed between the U.S. and the ADCs, which take into account American concern for intellectual property rights and equal access to information and resources. Although such partnerships cannot be applied to the private sector, government policies can facilitate the involvement of U.S. companies in the programs. Closer links should be encouraged between professional associations in the United States and the ADCs and exchanges of scientists promoted. Official governmental collaboration should not be centralized in one U.S. agency but rather implemented in the current decentralized mode, with technical agencies making decisions on programs. The United States might also collaborate with the ADCs on programs that would benefit science and technology development in the lesser developed countries.

6. Working Group on Mechanisms and Institutional Issues

Moderated by Ralph Smuckler, the group considered delivery systems used by the United States government in S&T assistance and cooperation. It was also concerned with mechanisms to enable private resources to play an important role as well. While many of the new and rapidly-changing areas of S&T are in frontier fields, such as biotechnology, materials science, and manufacturing technologies, most of the governmental delivery mechanisms have been in place for over a quarter century. Technology development needs greater emphasis and the role of private organizations in technology development, such as the U.S.-Israel BIRD Foundation, and intermediate institutions such as the International Center for Insect Physiology and Ecology (ICIPE) in Africa, is extremely important. The idea for a central institution such as the Institute for Scientific and Technological Cooperation (ISTC) put forward a decade ago still has merit. Even if no new institutes were created, the U.S. foreign assistance agency should have a strong division that gives a central focus to science and technology, and it should retain its sectoral approach to S&T as a means of giving focus and providing expertise. There is need for better coordination of U.S. government activities in science and technology outside AID; an interesting mechanism in this regard is the Presidential Science and Technology Initiative with India. Multilateral mechanisms for delivering S&T, such as the World Bank and the UN agencies, deserve closer attention by the United States.