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A Review of
"A Strategic View of Science and Technology
For Development"

by

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for BOSTID Colloquium

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A Strategic View of Science and Technology for Development

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OVERVIEW

Mr. Prewitt addresses the sustainability of science and technology in development by voicing concern that the need for it is understood outside of traditional science circles. The first part of his speech was devoted to addressing four needs which the development community must do in order to promote technological development in LDCs. The second part of his speech addressed three critical segments of LDC society which must be convinced of the need for science and technology: the indigenous science and technology sector, the state/policy sector, and the general population.

HIGHLIGHTS

I. The General Problem

A. S&T will continue to act as engines of social and economic transformation.
   1. Developed countries will control these technologies
   2. These new technologies are currently being incorporated into developed economies
   3. This will increase the distance between rich and poor nations

B. While the least developed countries have developed, it has been done with the aid of S&T. They will continue to need this technological transfer.

C. Resources in the developed countries tend to be allocated to the commercial or military sectors at the expense of the LDCs.

II. Four possible solutions to urge S&T development in LDCs

A. Since S&T requires the participation by the S&T community, the development community must "constantly be pricking at (their collective) conscience."

B. Indigenous capacity in LDCs for S&T must be strengthened

C. National and international policy constraints on development need to be removed.

D. The development community needs to communicate the barriers they face so that the S&T community can focus upon these needs

III. Three areas in LDCs must understand the critical role of S&T in development

A. The indigenous S&T community

B. The state/policy sector

C. The general population

Ken Prewitt: A Strategic View of Science and Technology for Development

(Summary)

There is an enormous convergence both about analysis of the situation and the way in which science can be brought to bear on the development problem. We are clustered around a similar set of themes. That is the good news.

The troubling question is: is this because we are all reading each other's writings, participating in each other's conferences, responding to same data sets from World Bank or the bilaterals, etc.? Do we carry around the same metaphors in our head about the Green Revolution? Are we all excited about immunization? Or is it because we are all touching the same reality out there? A conference has got to be a little leary of a deep convergence in our conversation. I will contribute to it, giving a different perspective. But I am concerned that we figure out some way to get sufficiently out of ourselves to make sure that we are not just simply talking to each other.

Everything I am going to say has been said before. The 20th century has perfected two powerful elements of communication: statistics and pictures. They remind us that these are times of much suffering around the world. The lives of despair are not led by a few but by millions. It is good that the world should not be allowed to forget this suffering, but it should also not forget that extraordinary progress has been made over most of the world in our time. Over the last three decades, per capita income, agricultural production, school enrollment, literacy, life expectancy, and other measures of welfare have all improved, in some instances dramatically in the developing world.

In the developing regions, the annual gross domestic product per capita grew at an average of 2.4 in the 1950s, climbed to 3.5 in the late 1960s and early 1970s, before slipping back to just under 3.0 percent in the more recent period. These growth rates only slightly lag those of the industrial market economies. The serious slowing down of economic growth since the mid 1970s and Africa's alarming retogression are greatly troubling.

The development era has recorded its successes. Developing countries have, in fact, developed. In accounting for these successes, scholars give pride of place to the role of science and technology. It is obvious that countries could not be developing without some kind of technological advances. The great preoccupation of development doctrine has focused on how this might be achieved, and it has certainly organized the Rockefeller Foundation's recent program.

The foundation took as given two major world trends. First, science and technology have been, are, and no doubt will continue to be one of the great engines of social and economic transformation. Second, those nations that understand and control modern science and technology disproportionately benefit from the resulting advances in living standards, leading to substantial and growing inequalities in welfare across and within world regions.

To elaborate, the advanced industrial nations are in the early stages of a new scientific revolution, in which many science-based technological advances are now being incorporated into production and service sectors of their economies. Automation, biotechnology, computers, fiber optics, microelectronics, robotics, telecommunications, etc. improve living standards. In comparison, the technology of the 19th century was

importantly advanced by tinkering, or engineering that was not science-based. Electricity, the telephone and telegraph, automobiles, and airplanes were introduced by talented inventors, not derived from scientific understanding of the laws of nature. The turning point in the history of science and technology (forcing a close interaction between inquiry about the basic laws of nature and resulting technological advances) really came in the chemical industry around the turn of the century, when theoretical knowledge guided the practical manipulations that led to chemical synthesis. Communication, computation, material processing, agricultural developments, biomedicine, contraception follow this pattern.

Theoretical knowledge is now closely linked with new products and new processes. This has led to striking improvements in the physical condition of life. However, as the gap between theoretical knowledge and practical application grows, we face the second major trend -- the likelihood that the already great inequalities between the wealthier and the poorer nations will grow. The vast private and governmental investment in science and technology in the industrial countries is organized around two key issues: the arms race and the consumer product race. There, all the enormous energy of human resources, intellect, capital investment, laboratories, new advances (superconductivity, laser technology, new merging of molecular biology and chemistry) are enormously focused on competitive advantages, either militarily or in terms of consumer products. This is the serious situation we face as we look especially at the potential contributions of science and technology.

We in the Rockefeller Foundation are trying to advance four notions. First, energy must be focused on mobilizing the talents of leading scientists around the world, especially in First World countries, to find solutions to the problems of hunger, disease, illiteracy, and poverty in the developing countries. If left to their own devices, for example, researchers in biotechnology in agriculture will not work on problems of the developing countries (rice, cassava). Likewise, biomedical efforts will not be focused on diarrhea or malaria on their own accord. Something has got to intervene to focus some of this energy and talent on Third World conditions. Point one is to constantly be pricking at the conscience of the S&T community in the First World.

Second, the indigenous capacity for S&T development must be strengthened in the Third World. The Third World is not simply a problem to be solved, but a voice to be heard.

Third, the national and international level policy constraints on development, such as field research conditions that retard science-based development, must be addressed.

Four, science-based development strategies have to be somehow informed about the seemingly innumerable barriers that frustrate the development process. This perspective is sometimes called the end-user perspective, or demand side strategy -- an understanding that will allow us to deal with the effective use of technologies and services by the target groups.

I would like to talk about these concerns from point of view of Africa, which presents unusually difficult challenges. The problems are: the population is not declining, food production is declining, infant mortality rates are very high, problems of political instability (weak states, corrupt states) debt crisis, ethnic, religious, and linguistic cleavages,

small countries landlocked, problems of soil, water, transportation infrastructure. Now we have an aid-dependent set of countries. Can we do anything against this daunting array of problems?

Think of Africa as three domains: the science and technology sector, the state/policy sector, and the general population. What's gone wrong? So far, attention has been focused on the S&T sector alone (the supply side). We have tinkered with it, creating universities, developing appropriate technologies, doing applied research, introducing the end-user perspective and micro-development strategies -- all not unimportant, but none of them really made a difference. Why? There are two reasons: real science and technology (as practiced in the West) never got connected to the population. (Results, even of research conducted in international agricultural research centers in Nairobi, were not put into practice or transmitted to international scientific community.)

The other problem is that there is no real African government demand for science-based development strategy because the leaders do not come from the S&T community. They are military or local politicians, as for example in Kenya. How to generate this demand is more than just tinkering with policies. We also did not create an effective demand for science-based development among the general population. In African countries, there is no deep popular culture for science (there is an historical tradition, but it was mostly snuffed out during the colonial period, and then we superimposed a First World apparatus and language on top of that, which was not very effective.) In Africa, the leaders come out of the general population, not the S&T cirle.

The Rockefeller Foundation's strategic view is that demand must also be created out of the state/policy sector and the general population, or all the tinkering with the S&T sector will have no results. The foundation's strategy is to work simultaneously at all three levels.

In science, the foundation works in three areas: agriculture, health, and population. In agriculture, we have to broaden the boundaries: move away from just food production to sustainable development (a whole new vocabulary); in health it is more than just the generation of vaccines and technologies, it is also primary health care; in population, it is more than just contraception.