THE CHANGED CONTEXT OF SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

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"International support for development is now flagging. In some of the rich countries its feasibility, even its very purpose is in question. The climate surrounding foreign aid programs is heavy with disillusion and distrust . . . we have reached a point of crisis. . . . Our travels and studies have convinced us that we have come to a turning point. On all sides we sense a weariness and a search for new directions."

Partners in Development,
Report of the Pearson Commission, 1969.

"In the 1980s and the 1990s technological advances in a number of fields . . . are expected to converge leading to a significant measure of technical change. These advances are unique in their intensity and wide ranging impact. . . . (They) are expected to alter the rate and pattern of industrial production in the present and coming decades, . . . to widen the technological gap between developed and developing countries and accentuate the technological dependence of the latter, and to change the lifestyle of their people."

Report of the International Forum on
Technological Advances and Development, UNIDO, April 1983.

How has the international context for development evolved since 1970? What major changes and trends will condition the prospects of developing countries through the end of the century? The two quotations above — even though separated by 15 years — provide a good indication of the present climate for development assistance, and of the challenges faced by international support for science and technology for development.

There is no doubt that the 1970s and the early 1980s have been a period of accelerated and turbulent change, particularly in fields as dynamic as science and technology. This has modified the context for institutions, such as IDRC, which operate at the interface between science and technology and development assistance. A brief review of some major trends and changes will help to place the impact of IDRC in perspective.

A PERIOD OF FERMENT AND RENEWAL

The late 1960s were characterized by great optimism about the contributions that science and technology (S&T) could make to the benefit of mankind. The "if we can put a man on the moon, then we certainly can . . ." syndrome dominated thinking about S&T for development. The United Nations Committee on Science and Technology prepared a "World Plan of Action" for applying S&T in developing countries and the successes of the "green revolution" fueled the imagination of developing country governments and of international foundations.

The Canadian social and political scene also appeared quite favourable for exploring new ways of assisting developing countries. The Pearson Commission raised Canadian consciousness about development issues and also laid the foundations for a

renewed international commitment to multilateral development assistance.

The combination of renewed concern with development assistance and great hopes in the potential contribution of science and technology to development characterized that period of ferment of the late 1960s. Perhaps the creation of IDRC was the best institutional expression of this combination of concerns and hope.

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RAPID GROWTH IN R & D EXPENDITURES

As a consequence of these high expectations about the potential contribution of science and technology, many developing countries — often with the assistance of international organizations, development agencies, and private foundations — embarked on determined efforts to expand and consolidate their scientific and technological infrastructures. Emphasis was placed on applied scientific and technological knowledge, particularly in fields related to basic needs, such as food, housing, sanitation, and education. Science and technology policy agencies multiplied in the developing countries, the number of research institutes increased substantially, and human and financial resources devoted to S&T expanded rapidly.

Research and development expenditures in Latin America, for example, increased from about US $250 million in the mid-1960s to around $900 million in the mid-1970s, and to nearly $1,600 million in 1980 (all figures expressed in constant 1970 dollars). Efforts by some South Asian and Southeast Asian countries were also remarkable: S&T expenditures in India increased by a factor of ten between 1970 and 1980; South Korea raised R&D expenditures from 0.48 percent of GNP in 1970 to 0.91 percent in 1980, when the average annual GDP growth was 9.1 percent; and many other countries such as Thailand, Indonesia, and Singapore made significant efforts to consolidate their research and development capabilities. African countries such as Senegal, Kenya, and the Ivory Coast also expanded their scientific infrastructures, particularly in agriculture, while Egypt restructured its research institutions. Furthermore, countries like Saudi Arabia and Kuwait adopted ambitious plans for developing their scientific capabilities. However, despite all of these efforts, the share of world R&D expenditures accounted for by the developing countries remained quite low: estimates indicate that it may have risen only from 2 percent in the late 1960s to nearly 4.5 percent in the early 1980s.

The 1970s also witnessed the two oil price shocks that disturbed the placidity of economic growth in industrialized countries. This was accompanied by a growing retreat from the commitments to international development assistance by industrialized nations, partly as a result of economic difficulties at home, and by a slower pace of economic growth in most developing countries.

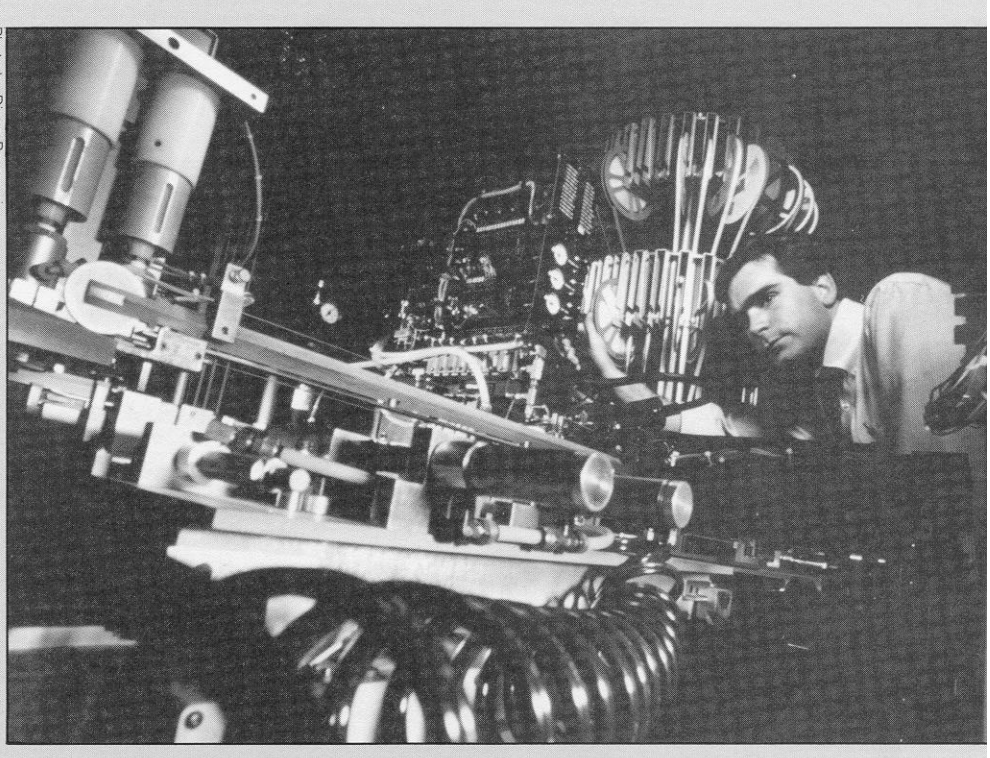

Photo by Diane Bourgeois

Scientific and technological advances during the decade were dominated by the spectacular progress in microelectronics. The increasing capacity and decreasing cost of microchips helped launch a veritable new industrial revolution. Furthermore, advances in biotechnology, new materials, telecommunications, new and renewable energy sources, space technologies, and so on, also began to herald the emergence of the new S&T context that is taking shape as the 20th century draws to a close.

DEVELOPING COUNTRY CONCERNS IN THE FIELD OF S&T POLICY

The UN Conference on Science and Technology for Development, held in Vienna in 1979, marked the international legitimization of a number of concerns of developing countries in the area of S&T policy. Many of the issues debated at the conference emerged from studies conducted during the 1970s on the role of S&T in developing countries, and out of the experience of nearly two decades of experimenting with S&T policies. As the only international funding agency supporting a sizable research program in the field of S&T policy, IDRC had a significant — although indirect — impact on the issues that were examined at the Vienna conference. Problems such as the effectiveness of various S&T policy instruments, the nature of the S&T infrastructure, the role of minor innovations in industry, the conditions for the absorption of imported technology, and others of similar character, were brought into the conference room as a result of studies conducted in many developing countries, many with IDRC support.

The "Vienna Programme of Action" approved at the Conference is a compendium of sensible recommendations for developing indigenous S&T capabilities, for restructuring international scientific relations, and for reorganizing the UN machinery in order to make it more responsive to the needs of developing countries in the field of S&T for development. As such, it embodies the accumulated knowledge about S&T policies for development and is still valid in the 1980s.

Unfortunately, many of these recommendations remain on paper only, particularly those involving international initiatives such as the creation of a UN financing system

to support S&T development in Third World countries. Furthermore, while the program of action synthesized the collective wisdom of those engaged in S&T for development during the 1970s, it did not cover adequately the S&T advances that were in the process of changing S&T in a global context.

THE TURBULENT '80s

The transition to the 1980s was rather upsetting and uncomfortable for most developing countries. The world crisis of 1981-1982 halted economic growth in practically all developing countries, and in many of them turned back the clock nearly a decade in terms of per capita income; the growth of world trade slackened, commodity prices fell, and the terms of trade between developed and developing countries changed significantly against the latter; the foreign debt of developing countries increased substantially, particularly in Latin America, and rising interest rates made the burden of payments almost intolerable; the redeployment of industrial production from developed to developing countries slowed down markedly; and ineffective and wavering economic policies in developing countries often compounded the impact of these negative factors. Social demands such as health, education, food, and housing continued to rise —in close association with population growth — while the ability of governments to cater to them became seriously impaired.

Meanwhile, scientific and technological progress in the industrialized nations continued to make enormous strides in fields such as automation, composite materials, genetic engineering, tissue culture, and even space manufacturing that are being incorporated into production and service activities. In the field of telecommunications, for example, advanced telephone systems, computer facilities, video technologies, optical fibers and satellite transmission are creating a vast global network that a few years ago was not even considered feasible.

The complexity of the interactions between scientific research, technological development, and their economic exploitation has increased significantly. Combined with the application of technological advances to the conduct of scientific inquiry, this increased complexity is changing the very process of kowledge generation. For example, technological progress plays an important role in defining the agenda for scientific research, high-technology industries continuously identify new problems that can be addressed by science, and techniques of observation, testing, measurement and instrumentation are a major determinant of scientific progress.

The high cost of these advanced instruments makes them inaccessible to a large number of researchers, even in the industrialized nations, and places them out of reach for most scientists in developing countries. In addition, the institutional setting for the conduct of basic scientific research, applied technological research, and commercial development of new products is experiencing changes: links between university research and industry are being strengthened, collaborative industrial research has expanded, and venture capital firms are playing an increasingly important role in high technology fields.

It is clear that the concept of scientific and technological capabilities for developing countries will need a thorough revision in the near future. For most developing countries it will be necessary to select carefully the fields of specialization, to embark on a long-term process of developing human resources and research infrastructure, and to cooperate more closely with other developing and developed countries.

The paradoxical nature of the turbulent '80s — when scientific and technological advances appear to hold so much promise —is that the impact of the world economic crisis, of the adjustment policies followed by many developing countries, and of natural disasters is focusing attention and concentrating resources almost exclusively on the short-term problems of economic survival, while the essential but long-term task of building S&T capabilities to avoid those very same problems in the future is being neglected. The often quoted image of a peasant eating the seeds required for his next crop immediately comes to mind.

THE NEED FOR NEW INITIATIVES IN S&T FOR DEVELOPMENT

In 1985, 15 years after IDRC was founded, it appears that the international situation regarding S&T for development is rather similar to that prevailing at its time of creation. The worsening climate for development assistance is exemplified by the budgetary difficulties faced by the United Nations Development Programme (UNDP), the near collapse of the International Fund for Agricultural Development (IFAD), the troubles faced by the 7th International Development Association (IDA), and the failure of the United Nations Financing System for Science and Technology for Development. All indicate that there is a need for new initiatives in the field of development assistance. At the same time, the potential benefits of scientific and technological advances for developing countries continue to grow, although the process of making them effective is becoming more arduous.

However, a great deal has been achieved in the field of science and technology for development during the last 15 years. The few examples of research that are mentioned in this issue of *IDRC Reports* are an indication that, with the assistance of agencies like IDRC, the development of local S&T capabilities can contribute effectively to the improvement of living conditions in the developing world. The problem now is to modify the existing approaches to the mobilization of S&T for development objectives, adjusting them to the new situation, while simultaneously increasing the financial resources allocated for this purpose to a level commensurate with the task and the challenge. □

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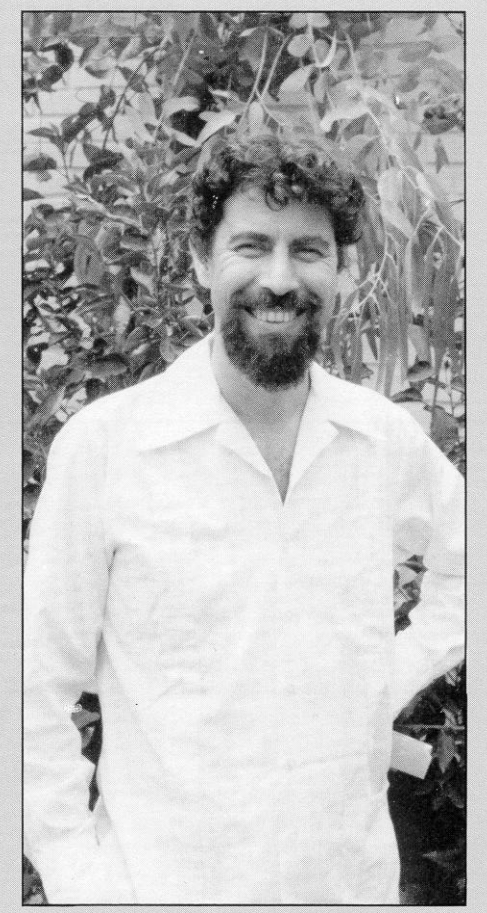

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