

LESSONS

FROM THE FACTORY FLOOR

JAMIESON CAMPBELL

A cautionary history: In 1974, after foreign consultants identified a need for a cement factory, the heads of state of Nigeria and Benin signed an agreement committing the two countries to the establishment of a factory to produce 500 000 tonnes per year of ordinary Portland cement. Both countries were fully committed to the project before feasibility studies had been completed or the availability of raw materials had been confirmed.

A European cement manufacturer was invited to become the technical partner in the project, and to hold a 10 percent share of equity. Contracts for the design, engineering, and construction of the factory, as well as the contract for the monitoring consultants, were all awarded to European companies. Financing was arranged through a European bank recommended by the prime contractor.

In keeping with the agreement between the participating governments, a board of directors had been appointed to oversee the operation of the plant, but most of the members appointed were middle- or junior-level civil servants with no technical expertise. Too-frequent transfers and new appointments also created confusion.

After a number of setbacks, the factory was ready to begin producing cement in 1981. Unfortunately, the roads needed to transport the cement to markets had not been completed. When the project faltered, the European contractors used contract provisions to leave the two African governments to absorb costs and penalties.

Such an unfortunate situation must be viewed in the political and economic context in which it occurred, but a number of factors can be identified which can lead to the creation of similar "white elephants." These include reliance on foreign consultants and the absence of trained local personnel. A key factor is the relationship between policymakers — decision-makers at the political level — and researchers and

their products. All too often, there is no relationship. Decisions, even when they touch on strategic investments in key sectors of the economy, may often be made at a rarefied political level, without consultation with experts. Research designed to generate knowledge upon which rational choices can be made is clearly an important part of the process of economic development. More specifically, creating the research capability in the developing countries themselves is probably the key to long-run success in the area of technology policy.

Developing countries must build and expand the skills and experience of a cadre of professionals who can both draw on available research results and produce new knowledge to guide decisions about technology and development.

THE WORKSHOP PROJECT

It was to address these concerns that IDRC began in 1977 to support a program of science and technology policy training aimed at strengthening the capacity of developing countries to manage the technology policy process.

The broad aim of the technology policy workshop project is to stimulate the interest of individual researchers in technology-policy-related fields, and to foster links between policymakers and researchers generating the information upon which decisions on technology policy should be based. The project's approach to the "transfer" of research skills in technology policy is to bring together individuals from the applied sciences and from the humanities, both from research and government.

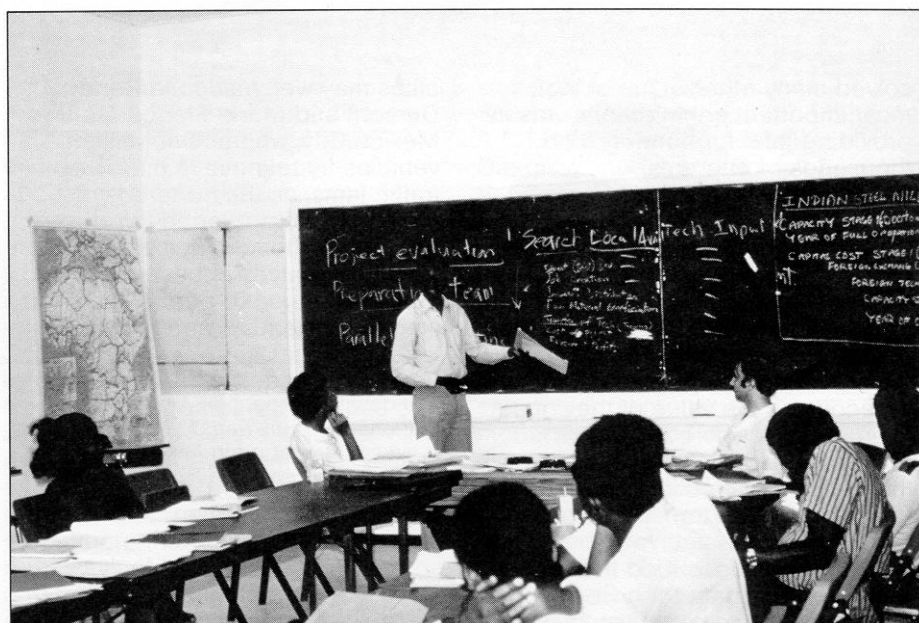
The current series of four workshops based in developing regions follows work begun by IDRC in 1977 at the Science Policy Research Unit (SPRU) of the University of Sussex in Brighton, England. A key lesson learned from the SPRU experience was that workshops should be held in developing

countries, allowing participants to study problems where they occur and allowing a greater level of input from local instructors. The opportunity for firsthand observation of the industries and enterprises discussed in the academic literature was an important benefit to be gained from shifting the workshops.

Each workshop is itself an experiment in the teaching of skills related to technology policy. The project has been organized to permit constant evaluation by both participants and staff, who are seen by the organizers as part of a process rather than as a static activity. Dr Norman Girvan, as director and senior consultant to the project, draws on his experience as an academic and policymaker in Jamaica to ensure the process is one in which every workshop participant is a teacher and a source of information. Throughout the preparation and execution of the workshops, Dr Girvan cautioned both staff and participants against the "...natural temptation to regard the staff as the principal dispensers, and the participants as receptacles, of knowledge about technology and technology policy."

Each month-long workshop is organized around three main activities: lectures and group discussions; an intensive program of guided reading; and the completion of small research projects based on field trips to selected industrial and agricultural sites. Lectures and discussions are organized around a sequence of study modules or themes adapted to the particular features of the region in which the workshop is being held.

The study modules consist of a collection of journal articles and books, as well as unpublished papers and case studies, some prepared by researchers from the region. The module set consists of approximately 300 items, that vary according to the needs of the region where the workshop is being held. Many of the participants



Workshop in Liberia: theory in the classroom and in action.

REFINED TECHNOLOGY SKILLS

Dr Augustine Smith, a young physics instructor from Sierra Leone and a participant in the technology policy workshop held in Monrovia, Liberia, in October 1982, is launching an examination of the process through which industrial workers acquire the skills that lead to a gradual improvement of production processes.

The innovations that can result from understanding—and trusting—the technology in use can lessen dependence on outside suppliers of technology. But this type of knowledge is seldom acquired through technology transfer arrangements unless it is actively pursued by the recipient.

With project assistance from IDRC,

Dr Smith plans to focus his research on the process of "learning by doing" he believes has taken place at the Sierra Leone Oil Refinery.

The refinery is a joint venture between the government of Sierra Leone and a consortium of multinational oil companies. The refinery is 50 percent owned by the government of Sierra Leone; 98 percent of its staff are Sierra Leone nationals. In its 12 years of operation the refinery has maintained a high level of performance, characterized by the management's success in solving problems.

Dr Smith believes that a substantial degree of technological capability has been acquired by the management and staff. He plans to investigate the degree to which technological capac-

ity has increased during the life of the refinery and to identify the conditions that have promoted or retarded the learning process.

Of particular interest will be the analysis of contract conditions established in the period prior to the investment in the project. Agreements signed during this stage of the project's development will have had a significant influence on the opportunities for learning incorporated in the operating stage of the enterprise.

The results of the investigation will provide much needed information and firsthand knowledge of how the process of technological skills acquisition can be promoted in developing countries.

have commented that the collection is one of the most valuable features of the workshop, and the materials are taken home to become the core of a technology-policy-oriented "mini library."

For the most part, workshop participants are well suited to the task of both observation and analysis. Chosen from more than 300 applicants, the 40 individuals who participated in the first two workshops represented a wide range of professions, disciplines, levels of seniority, and nationalities. In recognition of the multidisciplinary nature of the workshop, the selection committee endeavoured to select participants whose professional background, experience, and interests enabled them to make a contribution to the group and at the same time ensured that they could benefit from the training provided.

Felix Kani, for example, was a participant in the technology policy workshop for Eastern Africa, held in Arusha, Tanzania. Nominated by his employer, the Bank of Zambia, Mr Kani holds a degree in economics, and has worked for several years as an economist in the bank's research department. Partly as a result of his participation in the workshop, Mr Kani's department has begun organizing a small industries development program. Using some of the research skills developed in the workshop, and drawing on expertise within Zambia, the bank will now move forward with a program that it hopes will be able to identify and promote local entrepreneurs who are interested in investing or developing small-scale industries in Zambia.

A key part of each workshop is the preparation of a research paper based on the field visits. In the East African workshop held in April 1982, papers were prepared on the Small Industries Development Organization, which provides small industries in Tanzania with assistance in the form of equipment and training, and on a privately owned foundry and small-scale metal fabricating company.

In the first of the West African workshops, held in Liberia in October 1982, the research papers presented a critical analysis of the operation of several multinational corporations engaged in the extraction and concentration of iron ore, of the Firestone rubber plantation, and of a rural development project supported by the World Bank.

GROWING CAPACITY

The effects of this series of technology policy workshops are likely to be felt over both the short and long term and at national and regional levels. It is hoped that, over the short term, workshop participants and their colleagues will form a core of people who will begin to apply their training more effectively to the very real problems of the use of technology in developing countries. Over the long term, and with the organizational assistance of their national research bodies, it is hoped that the relatively small number of people trained in IDRC workshops will form a "critical mass" of researchers and policymakers, whose interest and training will generate more activities involving others in their region.

There are signs of a growing capacity and interest in the conduct of technology policy research in the regions where workshops have been held. For example, the Institute of Development Studies of the University of Dar-es-Salaam, host of the Eastern Africa workshop, is now including technology policy research as part of its regular course of studies.

In West Africa, both the anglophone and francophone workshops are being co-hosted by the African Regional Centre for Technology (ARCT) and the Council for the Development of Economic and Social Research in Africa (CODESRIA). The ARCT is a good example of both capacity building and the intellectual and geographic "multiplier effect" of the training provided in the technology policy workshops. The

Director of Training at ARCT, Dr Paul Vitta, took part in the East African workshop as a participant, and in the West African workshop as an instructor. Partially as a result of his participation, Dr Vitta and the ARCT will organize their own series of six training workshops on technology development and transfer.

By the time the last two IDRC-supported workshops are held in Dakar, Senegal (April 1983), and Kingston, Jamaica (November 1983), it is hoped that the effects will be self-sustaining.

As Dr Girvan observed at the October 1982 Liberian workshop: "If you are talking about unpackaging (technology), you can have a nice discussion about unpackaging, but it is only when you go into a plant and see the production technology, and you breathe in the dust and you feel the heat, and you see the massive quantities of rock going in one end and the iron pellets coming out the other end that you begin to get a feel for what technology is all about." Although all of the workshop participants had responsibilities that required an intimate understanding of technology in its various forms, the workshops provided many of them with their first visit to the "shop floor."

By bringing together, in an intellectually stimulating environment, individuals who have relatively little experience, it is hoped that many more people will be persuaded to base research and policy formulations on visits to local manufacturing enterprises. After breathing in dust, and feeling the heat of the process, perhaps they will be able to make better policy recommendations on the use of technology for the development of their countries and regions. □

Jamieson Campbell is Program Assistant to the science and technology policy workshops project at IDRC in Ottawa.