The scenario has already been written by a number of visionaries. The peasants in developing countries start by using microcomputers to calculate whether it is most profitable to raise cotton, peanuts, or sorghum. Once they become accustomed to the powerful intellectual stimulant offered, it persuades them to rethink their agricultural techniques. Then groups of farmers start to swap their experimental results by satellite. The new networks they set up increase the political power of the peasant masses to the point where they are able to demand a fairer redistribution of resources. Finally, according to the vision of journalist-editor-politician Jean-Jacques Servan-Schreiber in his book *Le Défi Mondial* (The Global Challenge), a Third World unified by computers arises as a new force to be reckoned with.

The foundation of this scenario is the microcomputer. What a load, what tremendous responsibilities to put upon a tiny little gadget that appeared only 10 years ago.

### TEACHING TOOL

So far, the most widely discussed experiments have been those in schools. In Senegal, for example, the Centre mondial informatique et des ressources humaines (world centre for computerization and human resources), founded and set up by Servan-Schreiber, is conducting a computer education project. Despite the useful progress made by some of the young students, it is difficult to imagine a tidal wave of microcomputer usage in schools in the developing countries. If national ministries of education cannot even afford to replace broken window panes in the schools, how are they going to pay for microcomputers? Besides, the lack of appropriate instructional software is still a serious limitation (see *IDRC Reports*, April 1984).

Although it is true that portable cassette recorders have penetrated even the most remote areas of the poorest countries, it is not only because they are inexpensive, but also because they are so easy to use. All one has to do is press a few buttons. With microcomputers, there has to be software suited to the needs of the users. Even if the machine displays easy-to-follow operating instructions, the user still has to be able to read. The fact is that illiteracy is the companion of poverty — in the world's poorest countries most of the population cannot read or write.

So far it is only those who are already well equipped who can use microcomputers, which are becoming increasingly common in Third World countries. Still, some of the projects funded by IDRC's Information Sciences Division suggest interesting directions for the advanced use of microcomputers in the developing countries. Even though they are not yet in the hands of the millions of peasants or the urban poor, it is more than likely that they will soon have a really significant impact.

### PROGRAM FOR AGROFORESTRY

The microcomputer that comes closest to fulfilling the visions of Servan-Schreiber is perhaps one supplied to extension workers and farmers in Sri Lanka and Kenya by two researchers from the Australian National University, Dan Etherington and Peter Matthews.

A portable microcomputer with a Z80 microprocessor uses "MULBUD" software to analyze the economics of a given crop or of several, such as pineapple, ginger, or corn raised in the shade of coconut palms or banana trees. Farmers enter a precise description of their farms and crops into the microcomputer: the size of plots, the space between plants and trees, the amount of sunlight each season, the cost of fertilizer and labour, and so on. They are then able to compare the profitability of a variety of crops over several seasons and years. The great utility of this system lies in its capacity to help farmers make the most advantageous choices.

Since the microcomputer obliges farmers to describe their resources and projects, MULBUD is able to reply to a host of questions about how their choice will work out. Among other things, users can see what their income will be if the price of fertilizer doubles, or if disease halves the crop, or if there is a drought, or if the price of bananas drops to keep pace with the increasing size of the harvest.

The program was specially designed to analyze complex agroforestry systems in which plants and trees are closely associated. The computer can aid farmers in planning their crops both to use their land wisely and to suit the seasons, and in alternating seasonal, annual, or perennial crops with trees. By making it possible to analyze the many options, MULBUD can be of enormous assistance in making agroforestry profitable. Agroforestry is a much more complex form of farming than traditional monoculture, but...
it has the outstanding benefit of protecting soil from erosion and depletion. These are the reasons that led the International Council for Research in Agroforestry, in Nairobi, Kenya, to push ahead with this experimental program in East Africa.

MACRO-DEBTS ON MICROCOMPUTERS

Another area as complex as agroforestry is the management of developing countries' foreign debt. It is difficult for those in charge to decide how and where to borrow and how to make the payments. And the sums of money involved are large.

Until recently, only the banks could supply the computer programs needed by customers to plan their borrowing. Not only was this an expensive service, but it goes without saying that the borrowers would have preferred greater independence in their dealings with their creditors.

Now, the Technical Assistance Group (TAG) of the Commonwealth Secretariat, an agency in which most former British colonies are members, is offering special services to indebted developing countries. Its experts were already providing advice on the legal and institutional steps that would help countries to manage the inflow and outflow of loans and payments. Since last year, TAG has had the software available to enable developing countries to manage their debts better using a microcomputer. Thus, for about CAD$50 000, a developing country can equip itself with its own computer system consisting of a pair of microcomputers, each with 256 kilobytes of memory.

A Sri Lankan programmer is trained on the CS-DRMS computer system designed to help developing countries manage their external debts.

If national ministries of education cannot even afford to replace broken window panes in the schools, how are they going to pay for microcomputers?

Random Access Memory (a byte represents the capacity to store a single number or letter), and all the necessary peripheral equipment. The software is supplied free of charge. IDRC contributed to the development of the software in England and its first installation in Sri Lanka.

It takes four to five weeks to train a user on the system, but what countries find most difficult is to gather up the files on each loan. Sri Lanka's foreign debt, which stands at US$2 billion, is relatively small, but far too many countries do not know the exact size of their debt because files are scattered around in several ministries. Even if the only thing it did was to give governments a chance to collect all their loan documents together, the system would already have indirectly achieved something really useful.

The system is set up to record 250 loans or donations (gifts represent an inflow of foreign currency) on each 10-megabyte hard disc. If the repayment period is relatively short, less than 25 years, it can record a greater number of loans.

The system, which ensures a certain measure of confidentiality, should be thought of primarily as a management tool — it cannot yet write out the repayment cheques. Its main utility is that it enables financial managers to consider a multiplicity of options. A wide range of borrowing and repayment schemes can be rapidly checked out. If, for example, large numbers of American tourists arrive bearing dollars, should the dollars be retained or immediately applied to paying down debts denominated in dollars or in other foreign currencies? Debt managers can immediately determine the effects upon future disbursements of taking out further loans. "In the end," says Robert Valantin, IDRC's Associate Director, Information Tools and Methods, "borrowers will be able to carry their computers into a bank office and use them to negotiate a loan."

The various possibilities of microcomputers continue to stir the imagination.

In Chile, a team from the UN Economic Commission for Latin America has begun to break down the data from recent national censuses so that they can be handled on microcomputers. A large computer is used for the first stage. The plan is to classify the information by regions, cities, or districts. Even if the resulting blocks of information still contain a great deal of data, it is possible to process them on microcomputers equipped with hard disc drives. A person in charge of, say, building a new school or hospital for a district will be able to find out precisely what the local residents need by examining the detailed profile produced by the microcomputer.

The network envisioned by Servan-Schreiber is beginning to take shape in various parts of the Third World. In Santiago, Chile, for example, the Latin American Institute for Transnational Studies is attempting to link up the microcomputers of several non-governmental organizations in Argentina, Brazil, Chile, Mexico, and Peru. The project has the support of IDRC's Information Sciences Division. Who knows, this may be the genesis of that string of networks which will be able to unify and strengthen the initiatives of the developing countries. What is promising in all this is that microcomputers seem to foster a greater will to communicate. Although it is unlikely that Servan-Schreiber's scenario will materialize exactly as he envisioned it, a large number of people have already taken steps to make it a reality for the benefit of the Third World.