

(see Reports Vol. 7, no. 2). FEPLAM had begun using available mass media to complement ongoing adult education efforts in rural and urban areas even before the concept gained popularity on the continent.

FEPLAM's goals are to "conduct educational and cultural extension programs aimed at human development, both as individuals and members of society; to make better known the importance of educational broadcasting as a development tool; and to encourage the efforts being made to improve educational broadcasting techniques". FEPLAM meets its objectives through the selection of the courses, the adaptation of the curriculum to radio, television, cassettes, slide/sound shows and printed materials, and the production and programming for these and other media.

Its status as a private, nonprofit foundation gives it great flexibility in managing resources available at state, private, and community levels. It also benefits from a ministerial decree that stipulates that radio and television stations must devote five hours a week to educational programming, to be broadcast during prime time.

Although FEPLAM currently employs 120 people — 2 of which are agronomists — it also draws on municipal and community organizations to promote and organize its rural education courses and to adapt them to local needs. By efficiently exploiting local resources, FEPLAM is able to keep the cost per student very low: in 1978, for example, the cost per student enrolled in rural education courses was 488 *cruceros* (approximately US\$20), and in rural development courses, 130 *cruceros*. The courses are also technically and financially supported by at least 12 state and private agencies, and are linked to several international organizations, such as IDRC, for research purposes.

Through the various media, FEPLAM offers general educational courses, civics and social studies, career guidance, and rural development courses. This last type of program began later than the others but has become so popular that it is now FEPLAM's principal activity. Between 1972 and 1978, more than 112 000 farmers have followed the rural development program, begun in 1972, and the training program begun in 1974.

The students taking these courses are for the most part men — adolescents and adults who either have not had any schooling, or who left school with only a primary education. Small landowners and farm workers, they are at least 16 years old and have a basic knowledge

of writing and reading. The population covered by the program is concentrated in the northern part of the state where small farms predominate.

Of the 16 different courses offered in the 1978 training series, the course on soil conservation was the most popular. The teaching methodology has been adapted to the needs of the participating students. Students can work either individually at home, or in groups, complemented with class meetings. Home learning materials are also provided. Their rural development series is now being broadcast by commercial radio stations: the programs last 15 minutes and the stations can choose from up to 70 different subjects.

To date, it has been difficult to measure the effectiveness of FEPLAM's services in terms of the adoption of new technologies or changes in behaviour that lead to greater productivity and economic well-being. With IDRC support, it has now launched a research project that seeks to measure behavioural changes as a product of its communications program.

Four regions in the state have been selected for the study: two for the experiment and two as control areas. In the first two regions, FEPLAM is offering new rural development programs. One offers technical advice on the production of potatoes, cassava and beans, concentrating on low-technology and labour-intensive methods. Because these crops make up the basic diet of the small-farm family, the course addresses the most significant items in the life of the target audience. The second course deals with cooperatives and is therefore much more concerned with the sociological behaviour of farmers.

The study will test the hypothesis that participation in the courses will change the behaviour of farmers, by changing their planting practices and by their degree of participation in cooperative activities, such as the maintenance of cooperative storage facilities.

This is the first attempt in Brazil to measure the effectiveness of tele-education in terms of its broad practical effects. And because of the popularity of mass adult education programs in Latin America that aim to influence the behaviour and attitudes of rural populations, this project will be of great interest to other organizations and countries concerned about the causal relationship between educational programs and subsequent behaviour. □

Something ventured, something gained

German Gutierrez



Photo: Jaime Rojas

The subsistence farmer is extremely important for the world: he produces food for almost half of the world's population, and works about 40 percent of all cultivated land.

In Colombia, as in most developing countries, small farmers make up almost three-quarters of all farmers, but own less than eight percent of the farmland. Their main problems include low income levels, limited access to credit and to modern inputs, deficient marketing channels, an imbalance between the cost of inputs and the prices obtained for the products, and a dearth of information on farm technology that has been tested and applied in their region.

In order to raise these farmers' living standards and production levels, researchers throughout the world have recently been seeking ways to increase the agricultural output of land currently in use through the application of new technology — a base-up approach. Following the limited success of several agricultural development policies, the Colombian government, through the Colombian Institute of Agriculture (ICA), began in 1971 to apply this approach to its rural development projects. One of the first such projects began in Caqueza, a region located in the eastern part of the Department of Cundinamarca, an area where small holdings predominate. During the first few years of the project, IDRC provided technical and financial assistance.

The methodology used in the project involved accelerating rural development in the area and raising the standard of living of its inhabitants through the creation of a new farm technology that would increase the production per hectare of the region's most important crop: corn. For generations, Caqueza's small farmers employed traditional technologies and obtained, on average, yields of 907 kilos of corn per hectare which generated a net income of US\$57.

The research conducted on the new corn technology incorporated the farmers' traditional methods and took into account their physical and institutional constraints. After more than 30 experiments and two or three replications, a comparison of results between the experimental and the traditional systems revealed that under the new system, production per hectare increased by 202 percent, and net profits by 253 percent. Returns from labour and land use rose by 73 percent and 155 percent, respectively. Although the new technology required an almost sevenfold increase in investment over the traditional system, the return on the capital invested grew by 58 percent.

In 1972-73, as the new corn tech-

nology spread, economic and other factors were observed in Caqueza, which, at the regional level, hindered the adoption of the new technology. Increasing production and the greater use of fertilizers and pesticides, for example, required more manpower — often not available. Several of the methods recommended in the new technology raised the cash outlay, and were therefore rejected by the farmers. Although credit was available at the nominal interest rate of 13 percent, its real cost varied between 36 and 56 percent annually, which limited its use. The effect of variables such as climate, crop pests, and market and institutional conditions also meant that the returns were not assured. The new corn technology therefore involved risks beyond the farmers' control, whereby the potential high returns were offset by a great variability of profits.

The new corn technology was therefore reformulated to promote its adoption. Despite the adjustments made, studies carried out on the adoption rate revealed that when the farmers used credit but received no technical assistance, the rate of adoption barely exceeded 20 percent. When credit included technical assistance, the adoption rate tripled, but was still low. The obstacles to adoption were not evident, but studies showed that farmers who adopted only part of the new technology obtained poorer results than those who continued using traditional technologies.

Four risk measurements of the new corn technology were carried out at the beginning of 1974. It was found that the risk of production increased with the increased cost of production and with an increased variance in the value of production obtained. It was concluded that the small farmer resisted adopting the new corn technology because of its high initial cost and the risk connected to the investment. A strategy therefore had to be found to overcome these constraints.

In 1974, the Caqueza project introduced a risk-sharing plan whereby the project shared the risk with the farmers who wanted to use the new technology, assumed the initial input costs, and also shared in the profits and losses. A minimum subsistence level of 800 kilos per hectare was set to enable farmers to meet their needs.

If the yield per hectare fell below 800 kilos, the farmers did not pay the project for input costs. If the yield was between 800 and 1600 kilos, the first 800 kilos belonged exclusively to the farmer who also received half of the excess. The project received the other half to cover the cost of inputs and

technical assistance. Everything over 1600 kilos belonged to the farmer.

By comparing the results obtained with the new corn technology in the risk-sharing plan, and those obtained without risk-sharing, it was found that although production and net profit per hectare fell by 35 and 18 percent respectively, the probability of total costs exceeding total income decreased by 70 percent. One of the prime objectives of the project was therefore achieved — risks were distributed.

In 1975, after this risk-sharing plan had been widely implemented, all participating farmers adopted 95 percent of the new corn technology package. Since then, the risk-sharing plan introduced for corn production in Caqueza has become a means of teaching the new technology and an effective extension agent. It has been observed that the farmers, after participating in the risk-sharing plan for two years, continue to use the new technology by themselves assuming all the costs and risks. A similar plan was designed in 1975 for onions — the most profitable horticultural crop in the region.

Since 1976, the risk-sharing methodology developed in the Caqueza project as a means of increasing the adoption of a new farming technology has been recommended nationally. One of the first replications was started in the Department of Santander for growing sugarcane. Similar plans have also been employed in the Department of Tolima and Cundinamarca for sugarcane, and in the Department of Cauca the risk-sharing program was introduced to extend farm technologies for the cultivation of tomatoes, cassava and peppers. In the Department of Narino, the system is applied to peas and cassava crops.

To date, 30 risk-sharing plans using the methodology developed during the Caqueza project have been implemented in Colombia. And although there is not yet enough information to evaluate the social and economic impact of these programs, the growing demand for the risk-sharing schemes in small farm areas is a clear indication that the research work and the experience acquired in Caqueza have been crucial, both in terms of understanding the farmers' behaviour towards new farm technology, and of promoting policies that benefit Colombia's small farmers. □

German Gutierrez, agricultural economist, was an IDRC research assistant to the Caqueza project. He subsequently received an IDRC post-project award to complete his master's degree in Canada. Caqueza: living rural development has recently been published by the Centre (see page 27 for details).