
Michael Yates tells how new technologies were introduced to farmers in Haiti through on-farm research

INCLUDING THE SMALL FARMER

Despite some important advances in agricultural research in the Third World, the rate of adoption of improved technologies in many countries has been disappointingly low.

Traditional research based on the experiment station can be far removed from the farmers problems, resources, and objectives, and there is now a growing awareness that farmers will not adopt new technologies if the technologies are not suited to their particular circumstances.

The Mexican based International Maize and Wheat Improvement Center (CIMMYT) has developed procedures for generating information about farmer circumstances to help orient agricultural research and generate technologies that will be accepted by farmers.

These procedures include explicit efforts to understand farmers circumstances through farm surveys and field visits, as well as experiments in farmers fields with farmer participants.

In 1981 the Haitian Ministry of Agriculture decided to evaluate the effectiveness of these procedures in improving the productivity and living standards of Haitian farmers who number among the world's poorest. An on-farm research (OFR) program was initiated in Les Cayes (southwestern Haiti), with technical assistance from CIMMYT and funding from the Canadian International Development Agency (CIDA).

Maize, the basic subsistence crop and the one most widely grown, was selected as the target for the programme.

Problems

Following an initial survey of area farmers, the OFR team found important production problems common to the majority of farmers. They identified research opportunities with high probabilities for increasing yields and incomes with acceptable levels of risk. These included variety, fertilizers (nitrogen, phosphorus), plant population, and weed control.

After three years of experimentation two new technologies were found promising for area farmers, maize varieties and nitrogen fertilization. Two varieties (La Maquina selections, CIMMYT populations 27 and 28) in particular performed well, out-yielding the local

maize in 16 of 21 locations with an average yield increase of 0.5 tons/ha.

Milling quality, colour, and taste were also evaluated (especially among the rural women, who dominate food preparation and marketing activities), and both new maizes scored as well as or better than the local maize.

Nitrogen fertilization had a significant effect on yield in almost every location (20 of 22 experiments). Rates of return to investment in fertilizer (80 kg N/ha.) were generally excellent when urea was the source of nitrogen and regardless of the variety planted.

But changes in the maize/nitrogen price ratio from year to year, and the risk they implied for a farmer recommendation, indicated that priority should be given to safety considerations when determining a nitrogen recommendation. Field trials on levels of nitrogen were therefore implemented, and subsequent analysis (using long-term price trends) identified 40 kg N/ha. as the best rate to recommend. Yield increases at this level exceeded 0.4 tons/ha., and rates of return to investment were over 100%.

Results with phosphorus fertilization,

plant population, and weed control, on the other hand, were not promising.

Land Tenure

Two elements strongly conditioned economic returns to nitrogen fertilization—land tenure and fertilizer availability. About half the farmers interviewed were sharecropping some maize. Typical arrangements compel sharecroppers to give half the harvest to the landowner, though fertilizer costs are generally not shared. Economic returns to nitrogen were therefore dramatically different for sharecroppers and for landowners.

The type of fertilizer available was also important. Nitrogen prices varied significantly according to whether urea (46% N) or an N-P-K blend was used as the source of N. While rates of return were generally unsatisfactory with the blends, they were excellent with urea (i.e. well above the minimum acceptable rate of return on investment, estimated to be 65% for the crop cycle).

The farmer recommendation was therefore targeted to landowners only,

specifying urea as the source of nitrogen. It should be noted, however, that urea represented only 5% of the total fertilizer provided by the Ministry of Agriculture to the area in 1981, and none was provided in 1982, 1983 or 1984.

In the case of variety it was not necessary to carefully target the recommendation to landowners only, since research results indicated the new varieties also performed slightly better than the local maize without fertilizers.

After issuing the farmer recommendations, the OFR team then developed information for key policy makers in both the public and private sectors, to help them make the policy environment more conducive to widespread adoption of these technologies.

Since the nitrogen recommendation was closely linked to the availability of urea, the OFR team argued that policies giving priority to increasing supplies of urea would most benefit local maize producers.

Provision of urea did in fact increase substantially after this recommendation. In 1985 the Ministry provided more than 90 tons of urea, some 60% of the fertilizer they distributed to Les Cayes.

Similarly, sales increases in the private sector have been explosive, with an almost ten-fold jump from 1983 to 1984 (the year the program issued the farmer recommendation). Sales growth from 1984 to 1985 was 174%, and urea's share of total fertilizer sales increased from 9% to 36% in three years (with over half going to maize).

Adoption of the improved technology—and realization of the important benefits this implied—was blocked by the problem of input supply. The OFR team presented careful arguments to both the public and private sectors, and these helped lay the foundations for a comprehensive national strategy for seed production.

Private companies are now providing substantial amounts of La Maquina seed, and the Ministry is organising facilities and drafting legislation for seed certification.

These results demonstrate how effective integration of information from diagnostic surveys and field experiments can be used to develop recommendations for both farmers, to use improved technology, and for policymakers to help make the policy environment more conducive to adoption.

As this case from Haiti illustrates, it can have important implications for the productivity and incomes of small farmers, who have often been by-passed by traditional agricultural research.

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Good results on maize through farmer involvement Cr:FAO/IF. Botts