CASSAVA RESEARCH

A RETURN TO THE ROOTS

An interview with Barry Nestel on the cassava research network

Cassava. This drought-resistant root crop is the major staple of some 300 million people around the world. Yet, until 1971 and the start of the CIDA/IDRC program, it had been largely neglected by research.

Barry Nestel, formerly Associate Director of the Centre's Agriculture, Food and Nutrition Sciences Division, was responsible for the IDRC cassava program during its first seven years and, as consultant to the program, he remains very much interested in the crop's progress. He recently talked with Clyde Sanger at his home in Surrey, England.

Reports: How did the cassava program begin?

Nestel: "The program arose in 1970, I suppose out of the fact that, in 1969, CIDA (Canadian International Development Agency) put a proposition to the government for support for the two international centres — the wheat and maize one, CIMMYT (International Maize and Wheat Improvement Centre), in Mexico and the rice one, IRRI (International Rice Research Institute), in the Philippines. The concept of Canada supporting developing countries to increase their production of cereals was not particularly well received in some wheat-producing quarters in Canada and both propositions were turned down.

"At about this time, the Pearson report came out. Mr Pearson (the Right Hon. Lester B. Pearson, former Prime Minister of Canada) became the first chairman of IDRC, and CIDA decided that Canadian aid through research would be handled through IDRC. All of these factors linked up with a renewed CIDA interest in agricultural research. As a result, CIDA decided it would provide financial support for two new international agricultural research centres — CIAT (International Centre for Tropical Agriculture) in Colombia, and IITA (International Institute of Tropical Agriculture) in Nigeria.

"For IITA, it decided to give a block grant of $500 000 a year. For CIAT, it decided to pick one commodity. This was quite important because CIAT served as a regional centre for CIMMYT and IRRI, and had maize and rice programs. It wanted to divorce the Canadian aid from these, so it was decided to support a different commodity, cassava. Although it is a well-known crop in the tropics, it had never received much research input because it's a basic, staple food crop of poor farmers, it's highly perishable so it won't transport, and it's not particularly palatable to western palates."

Reports: How did IDRC become involved?

Nestel: "CIDA asked IDRC to subcontract the management of the financial support because, unlike most aid grants, they put some strings on this one. One was that, in addition to giving CIAT $500 000 over a five-year period, they would put $750 000 into Canadian institutions for back-up research. Clearly, the two had to be very closely tied in and this would require a managing agent for the funds. They also suggested that IDRC should be advised by a committee.

"When I was first asked to be responsible for managing the CIDA money, in 1970, IDRC was prepared to match the CIDA funding of $750 000 by a similar sum of money given as grants for programs to form linkages in other countries. However, we had to have the program underway at CIAT before we could develop these linkages, since most of the developing country programs involved training components at CIAT and testing CIAT-type technology. The first thing was to get the CIAT program going and identify where basic research support in Canada fitted in. Then we moved on, after about two years, to the developing-country program."

Reports: What were the first steps?

Nestel: "The first thing we decided to do was to identify what had already been learnt about the crop and who were the people who knew something about it. We found that although there were about 3000 literature references to the crop, only 20 or 30 were of scientific value.

Photo: Clyde Sanger

Barry Nestel

"We were able to pick out the names of living people who had done work on cassava. Most of them were retired or on the point of retiring, and had done their work on the crop prior to World War II. In conjunction with CIAT, we invited some two dozen people — virtually our whole list — to a three-day workshop. So we had a brainstorming session right at the start of the program. We also used this to identify a group of five or six people to act as an advisory committee.

"We did move on two other fronts very early on. We started a dialogue with CIAT on collecting the world literature on cassava. IDRC gave CIAT a grant for this purpose. They also worked on methods of disseminating the information, and, in fact, set up the Cassava Information Centre that both collects and distributes books, monographs, directories of workers, and so forth.

"This is quite important — I did a survey last year that showed that the last 300 articles on cassava appeared in something like 130 different journals. So this service enables someone like me to keep right on top of the literature with an absolute minimum amount of reading.

"The third thing we got off very early is that we decided there wasn't a great deal of point in pushing a crop unless there was a market for it. In fact, one of the reasons why Howard Steppler — then agricultural advisor to CIDA and the one who was really responsible for the program — became interested in cassava was that during the 1960s cassava took off in Thailand and Indonesia because the Germans and the Dutch, who were short of animal feed — energy feeds — found they could substitute dried cassava for cereal grains that were much higher priced.

"So we had a lead, and we knew that cassava produced more energy per acre per year than any other crop except sugarcane. In drier areas, it outproduced sugarcane. And as sugarcane has had 100 years of intensive research input, the feeling was that we had here a potential energy source, something that produced starch, and this could be the starting point for various industrial uses."

Reports: What were cassava's prospects?

Nestel: "The market study, which was

done by Dr Truman Philips of Guelph, indicated that, in the animal feed market alone, the prospects for expansion in Europe alone appear very promising without taking into account Japan or the developing countries. The starch market did not have particularly attractive growth potential because cassava starch can be substituted with corn and potato starch. And, based largely on FAO predictions, the prospects of growth as food were quite limited because as people's economic status improved, they tended to go for cereals rather than root crops."

Reports: What has happened since?

Nestel: "In brief, the CIAT program has developed from a one-man operation to a professional team of about 12 that sees as its prime goal the development of high-yielding varieties of cassava widely adapted to a large range of ecological conditions. They're producing a wide range of germplasm, screening it, and putting the most promising into international testing trials in 30 or 40 different countries. The second major role is using their superb training facilities to train people from client countries in all aspects of the program.

"The Canadian program, which grew to a little bit over $1 million, is now phased out. By all accounts, it appears to have been very successful: we had over 20 different programs looking at specific problems where there was a comparative advantage of doing work in Canada rather than in developing countries. An outstanding example was a technique developed at the National Research Council's Prairie Regional laboratory in Saskatoon to grow cassava in test tube tissue culture (see box page 10).

"The third part of the program is the IDRC support for national programs which, in the main, has tried to help national aspirations to set up this sort of team approach which, to some degree, CIAT pioneered.

"The IITA cassava program is much smaller than CIAT's. They work particularly on trying to produce plants resistant to mosaic." (see page 10)

Reports: Can you tell us about some of the results?

Nestel: "I think probably the prime accomplishment has been in terms of developing research teams in cassava-producing countries. When we talk about accomplishments in terms of high yields, I think IITA's highest yield is around 70 tonnes per hectare and CIAT's a little higher — typical farm yields are in the order of about 12 tonnes per hectare.

"One of the programs at Guelph was to use cassava starch as the substrate for growing microorganisms rich in protein. This has been very successful experimentally and has moved down to CIAT on a pilot scale, to provide enough feed for about 40 pigs. To actually put it into commercial practice now would entail some type of commercial enterprise taking it on.

"The other side of this was the work that started in Colombia before the program began — feeding cassava roots to pigs. We have supported a number of projects, particularly in Thailand, Malaysia, and Nigeria, just to look at the economics and system of using cassava in place of cereals for poultry, pig, and cattle feed. With appropriate processing and supplementation, you can substitute it entirely for corn in broilers and pigs.

"There is a team at Khon Kaen University in Thailand that has done a superb job of looking at cassava from 20 or 30 different suppliers on a weekly basis throughout the year, and mapping the range in chemical composition and correlating the chemical value with the biological value. At the same time, there is a team at the Asian Institute of Technology in Bangkok that looked at the drying and pelleting process."

Reports: Are there other significant aspects to the program?

Nestel: "Brawijaya University in Eastern Java had a project for five years for IDRC working on Mukibat cassava — a tree cassava grafted on the root of ordinary cassava. They've found out a great deal about the process: the grafting is very labour-intensive, and so is getting the roots up! A big root from one plant can weigh up to 100 kilos — it takes three or four men half a day to dig it up. I'm not sure what commercial application it has, but I think the fact that the farmers themselves developed and use this process very extensively shows that it has practical application.

"This project illustrates another rather exciting feature of the whole network — the extent to which we have been able to work with other people. Brawijaya is one of the universities Australia has singled out for particular help in the Australian-Asian University Program. People in the program are coming back from Australia much better trained, and our grant has enabled them to get their teeth into something when they get back."

Reports: Where is the program now headed?

Nestel: "We started something that is largely self-sustaining now. CIAT funds come through the World Bank Consultative Group on International Agricultural Research without any problems. More and more aid donors are getting involved in supporting national programs. We helped create a lot of national teams.

"The two things that we should try to continue are: first, getting small programs in African countries that have very limited research resources. Secondly, maintain our interest through keeping going the workshops that bring together people from around the world to look at problems, particularly since they have led to a series of very widely-accepted publications.† Every eight or nine months we have had a workshop to look at a particular problem area. We've used these workshops very extensively to identify research that we should support and where it might be done.

"There is still scope, but the large inputs into Latin America and Southeast Asia should now phase down and out."

Reports: What has been most satisfying for you?

Nestel: "I think the most satisfying thing has been the relationships with people. You've only got to visit one of the countries where we're involved, and you're whipped into a car to see their latest stuff. The enthusiasm, the satisfaction of seeing it, the spirit! The network involves 30 or 40 countries and 400 or 500 people. It pulls together as a team. People exchange results and it's a very friendly group to work with." □

Cassava variety trials in Sri Lanka: "... probably the prime accomplishment has been in terms of developing research teams ..."

† IDRC has published 17 monographs dealing with various facets of the cassava research program. For information, write IDRC, Communications Division, P.O. Box 8500, Ottawa, Canada K1G 3H9