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A SWEETER COMBINATION: INTERCROPPING SUGAR CANE WITH MAIZE

Name: Noël Govinden
Age: 40
Nationality: Mauritian
Investigation: Does intercropping sugar cane with maize increase production?
Degree: Doctorate in Biology
Institution: University of Ottawa, Canada

Only within the last decade have scientists begun to appreciate the 3500 year-old Mexican technique of intercropping — planting more than one crop in the same field at the same time — and begun research aimed at making intercropping more productive.

Noël Govinden, a Mauritian supported by IDRC to pursue a doctorate in biology at the University of Ottawa in Canada, designed an experiment in Mauritius to measure the yields of sugar cane and maize when they are intercropped.

Sugar cane is Mauritius' dominant crop, accounting for 90 percent of the country's farm production and having guaranteed sales at stable prices through an agreement with the United Kingdom. Maize is an important animal feed which is far underproduced: in 1983 Mauritian farmers produced 1500 tonnes of maize while the country's needs stretched to over 14 000 tonnes. The Mauritian government recognizes the importance of other crops but maintains sugar is paramount to the economy and must not be sacrificed to new crop development.

Dr Govinden first discovered, during 15 field experiments in three climatic zones, that intercropped maize and sugar cane compete for light necessary for healthy growth. Still, planted at the right times and with carefully calculated spacing, they could be grown together because of sugar cane's resilient catching up ability. When first planted, maize competes for light with the sugar cane. But maize soon overtakes the cane in growth and wins in the competition for sunlight. As soon as it reaches this height however it is harvested, and the sugar cane is left alone in the field to catch up in growth lost because of low sunlight.

Ordinarily, the Mauritian farmer plants one sugar cane crop per year. But Dr Govinden found that by intercropping with maize at two-thirds of its normal density, the farmer can not only produce an additional crop, but sugar production remains very near its normal level. Professor John Arnason, Dr Govinden's thesis advisor, calls this a "high-tech cropping system with low capital inputs for developing countries".

During the course of his doctoral work, Dr Govinden was promoted from scientific officer to head of the Food Crop Agronomy Division of the Mauritius Sugar Industry Research Institute. He is now doing research on how to make intercropping of sugar cane with potato, bean and groundnut, more productive. These crops, he found, are more successfully intercropped with sugar cane than with maize. In fact, Mauritius is now self-sufficient in potato, 75 percent of which is intercropped with sugar cane, and in groundnut, 60 percent of which is intercropped with cane. Only 10 of the 21 major sugar cane growers intercrop with maize. Still, this has pushed the country's maize production to 8000 tonnes, fulfilling 40 percent of its maize needs.

Currently, Dr Govinden is creating a computer data base describing the characteristics of all the sugar cane growing lands in Mauritius. He hopes this information will show where intercropping is most feasible. Since he completed his thesis, Dr Govinden has shared his findings at conferences in Zimbabwe, Kenya and most recently at the International Symposium on Potato Intercropping in China. ■

Photo: E. Israel

The new Sino-Canadian Mariculture Research and Training Centre will offer courses for specialists from all over the region. Here, YSFRI representatives greet Brian Davy (holding a binder) in Qingdao.

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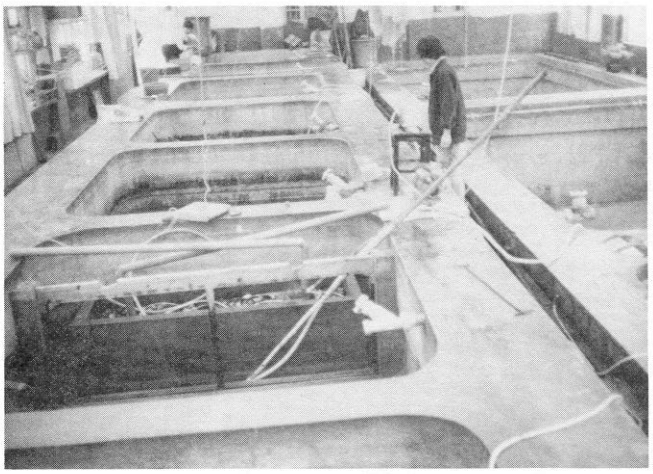

Photo: J.M. Fleury

EDWARD ISRAEL

Qingdao, a big, bustling summer resort on the northeast coast of China, has for years been home to one of China's most famous beers (also called Tsing'tao) and to over 80 percent of China's oceanography and mariculture experts. Last August, it became the home of the Sino-Canadian Mariculture Research and Training Centre, an organization aimed at training Chinese and other Third World researchers in mariculture — the cultivation of salt-water animals and plants.

The Chinese are undisputed experts in cultivating fish in fresh water ponds, a practice in which they have thousands of years of experience. But scientifically-based mariculture is only a few decades old and until recently Chinese mariculture was based mainly on single species cultivation, or monoculture. However, monoculture suffers from high production costs, underutilization of water and food resources and high mortality rates because of disease and pollution. One of the goals of the Sino-Canadian project is to develop an efficient multi-species, or polyculture, system for marine ponds.

The Chinese government is eager to develop commercial mariculture operations to meet expanding domestic and international demand for profitable seafood such as oysters, scallops and giant shrimp. The Chinese hope the Centre, located on the grounds of the Yellow Sea Fisheries Research Institute (YSFRI), will strengthen the country's mariculture research capabilities.

The first step in the project was to improve the training of YSFRI scientists in the detailed biology of the animals and seaweeds they plan to cultivate.

Xueliang Xu, head of YSFRI's fish nutrition project, came to Canada's Dalhousie University in Halifax to study the role of lipids and fatty acids in marine animal nutrition, specifically the giant prawn *Penaeus orientalis.* Hong-wei Yu, another YSFRI scientist, travelled to the University of Alberta's department of microbiology to learn about fish disease.

The second step is to develop training courses for Third World scientists based on the Chinese experience in mariculture. When Dr Xu and Dr Yu return to YSFRI with their increased knowledge of marine biology and English, they will design training materials on seaweed with the help of a Canadian expert on education, from the World University Service of Canada. YSFRI researchers have little experience in teaching but Brian Davy, associate director for fisheries at IDRC, says they are eager to share their technology.

"This project is very much in the spirit of South-South cooperation. There's a lot of potential here; they're very interested in passing their knowledge on to other developing countries. It's a good marriage," says Dr. Davy.

This type of South-South cooperation ensures that insights and expertise gained by researchers in one area of the developing world are transferred and applied to other areas of the developing world. Researchers believe this is a more sensitive and appropriate approach to development than countries of the North can provide.

In the last 40 years China has pushed monoculture production of the *Haidai* species of seaweed from 40 tonnes to more than 200 000 tonnes. As a result *Haidai* has become China's main seaweed product and China one of the world's largest producers. Seaweed, apart from being a popular seafood, is used in industry as a thickening agent for such foods as jams and jellies, as a stiffener in cloth, and has applications as varied as cosmetics and dog food manufacture.

Scientists plan experiments on two species of seaweed, *Laminaria* and *Undaria,* in combination with scallops. Researchers will examine light, water currents, depth and fertilizer to develop higher yielding varieties and growing methods that maximize harvests.

The first course at the Sino-Canadian Mariculture Research Centre is scheduled to be held in 1990 and will last eight weeks. All courses will be held in English, the language used in most international scientific journals. Construction of dormitories and other facilities for the trainees is already underway. It is hoped that this form of human resource development will ensure that the development YSFRI undergoes is sustained rather than ephemeral. It is when the Chinese researchers begin to teach modern mariculture technology to other researchers from developing nations that South-South cooperation will begin.

But Dr Davy says planners and researchers still have a lengthy path in front of them. "The teaching materials have to be prepared, and prepared for maximum benefit in a very heterogeneous class. Then we have to identify the trainees, ones from nations about to get into seaweed farming, ones from appropriate institutions. There's still a lot of work to be done," he says.

For more information about the courses at YSFRI please write:

Sino-Canadian Mariculture Research and Training Centre
19 Laiyang Road, Qingdao
People's Republic of China ■