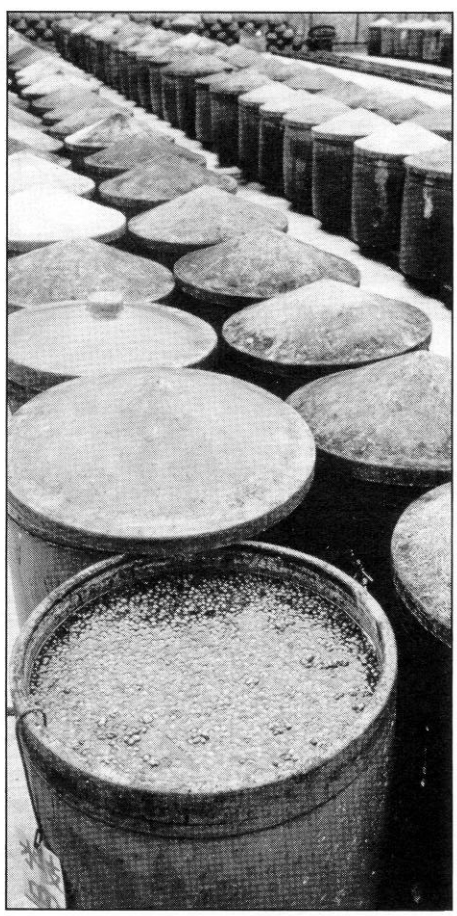
SMALL IS PRODUCTIVE AND NUTRITIOUS

NEW RESEARCH FOR IMPROVING SMALL-SCALE FOOD INDUSTRIES

LORNE PETERSON AND BILL EDWARDSON

Photo by Bill Edwardson, IDRC

In Malaysia, dough is formed to make fish crackers.



The origins of soysauce: Beans fermenting in the Singapore sun.

The beaches along the east coast of Malaysia are scattered with small fish cracker factories. One walks past the men who are deboning the fish outdoors, into the buildings where the fish is mixed by hand with flour and water. Women work rhythmically at a table, rolling out the dough which is then steamed over an open fire before it is sliced and taken outdoors to be sun-dried on racks.

In Santiago, Chile, almost every corner has a bakery that produces hot bread three times a day. In Singapore, the soysauce manufacturers blow piercing whistles to summon the neighborhood women from their homes to help cover the rows of porcelain fermentation jars when it begins to rain.

These small but ubiquitous food processing enterprises, often family owned and operated, provide employment and income for a large number of people. They are also a primary source of low-cost traditional foods for the majority of people in developing countries. Yet despite their importance in everyday life and their potential contribution to economic development, these enterprises will become less and less competitive as they are left behind in the thrust to modernize industry.

SMALL-SCALE OPERATIONS NEGLECTED

In the last five years, however, IDRC-supported projects have been initiated in several developing countries to begin building research and industrial extension services for small food processing enterprises. Most food-research scientists and technologists in developing countries have little experience in serving the needs of small- and medium-scale food processing enterprises. They usually work in national institutes and government programs that mainly provide technical and research support services relevant to large-scale companies. This has led to the neglect of the research and development needs of small food processing businesses, and food researchers have lost touch with the traditional food industries in their countries.

Because the small-scale food processing sector is made up of indigenous enterprises that use local skills and resources, often in rural areas, more governments are beginning to appreciate the vital role it can play in strategies aimed at producing self-reliant economies. There is also a growing recognition of the contributions small food processors can make towards achieving the goal of self-sufficiency in food, since these enterprises ensure the availability of indigenous processed foods.

LACK OF TECHNICAL PERSONNEL AND CAPITAL

For these reasons, government policymakers and food researchers are beginning to focus on the special needs of small food processing enterprises. Unlike large-scale food processors, small family-run businesses do not have the technical personnel and capital required to make use of the advice given by a conventional industrial extension service. They also have difficulties in identifying and articulating their needs. Therefore, extension and research agencies in several countries are developing, with IDRC support, a new approach to assisting small food processors in improving their operations.

Instead of just giving advice, food researchers and extension staff are working directly with small businesses in their factories. They are helping them to identify their problems, and are working with them, within the constraints of their businesses, to suggest, test and implement improvements. This type of service began in 1979, when IDRC supported a project of the Singapore Institute of Standards and Industrial Research (SISIR) to develop improvements in processing and production control for traditional noodle and soysauce manufacturers.

In the case of the soysauce manufacturers, the manager of a small factory in Singapore agreed to participate in a project with SISIR to design and test a large fermentation tank, with the aim of reducing labour and space requirements. The traditional method for fermenting soysauce involves the use of several thousand porcelain jars, which take up a large amount of space; and much time is spent in covering and uncovering the jars (three or four times a day) because of frequent rains.

ROLE FOR FACTORY MANAGER

The factory manager provided labour, land and processing facilities, so that SISIR could do the research work in his factory. And he was fully involved in the design of the tank that was tested. The tank was made of fibreglass and had a capacity equivalent to 40 porcelain jars. It also had a transparent lid and a gap between the cover and tank body to reproduce the fermentation process of open jars, while at the same time, protecting the soysauce from rain.

A comparison test showed that the yield from the tank was 100 percent greater than that from 40 jars. The unique taste and aroma produced by the small-jar method, which is preferred by Singapore people, was not altered by the large-tank processing method. The tank also used 75 percent less space than the jars, and reduced labour costs considerably.

The factory owner was impressed with the success of the experiment and although he will keep some jars for particular customers who insist on soysauce made the traditional way he decided to install large tanks at the rate of two per month. Space is now available for expansion with more job opportunities.

One of the important lessons learned by the SISIR researchers in this project was the need to develop appropriate methods for working within a small company environment. For this reason, IDRC decided to support an on-going program to assist food and industrial researchers to design and apply effective techniques for improving the production processes of small-scale food businesses.

Work has been done on developing appropriate research techniques through other IDRC-supported projects now operating in bakeries in Santiago, Chile, with coffee processing co-operatives in Guatemala, with fish-cracker producers in Malaysia and with fish-sauce producers in the Philippines. The research activities geared to small industries will likely become incorporated into existing research institutes in developing countries. This will ensure that more attention is paid to small industries and may lead to the identification of priorities in other fields such as product development, process development and packaging.

As the approach toward small-scale food processing becomes increasingly more scientific and systematic, the words of John Hawthorne, former head of Food Science at the University of Strathclyde, Glasgow must be remembered. "Before we even start to think about research, appropriate technology, systems analysis, technical services, resource audits etc. and long before we begin to talk about science," he said, "we must try to understand the motivations of the business we are considering, the attitudes of the man who is running it, his level of education, his business worries, the family he has to support from it and his standing in his local community. We have to try, with sympathy, to understand his problem from his point of view, and also the needs of the people who work for him."

As government attitudes change and research efforts mature and strengthen the small-scale food industries, the 1980s may become known as the decade when "small" was demonstrated as being not only beautiful, but also productive and nutritious. □

Lorne Peterson is an Ottawa freelance writer. Bill Edwardson is IDRC's program officer for Post-Production Systems, currently posted in Bogota.

Photo by Bill Edwardson

In-factory experiments have improved noodle-making in Thailand.

BROKEN NOODLES

The owner of the mung-bean noodle factory was worried. Ever since he had moved his factory to a new site close to Bangkok, he was having a problem with broken noodles. The packages of noodles were being returned by buyers, and his business was suffering.

Bankruptcy loomed.

He thought the water at his new site was responsible for the breakage, and approached the Thailand Institute of Scientific and Technological Research (TISTR) to help him solve his problem. TISTR showed him that the water was not to blame, but rather poor control over the key stages of noodle making.

LEVELS TOO HIGH

The noodle maker asked researchers to work on a more detailed study to improve his business. TISTR obliged, and concentrated on the sulphur and freezing stages of noodle making.

Noodles are exposed to sulphur (SO_2) fumes to preserve and to bleach them. This factory was using unnecessarily high levels of SO_2, which may have been responsible for impurities and subsequent breakage in the final product.

In northern China, extruded noodles were packed in snow, outdoors — a freezing stage believed to contribute to the structural strength of the noodles. The modern factory in Bangkok followed the freezing practice, but put its noodles in large freezing rooms for 19 hours or more. However, TISTR found the noodle cooling racks were arranged so they blocked the flow of cool air. Each rack was brought into the room separately so the door was continually being opened, making the freezing even less efficient. These simple factors caused the temperature to fluctuate and reduced the quality of the noodles.

PRODUCTION TIME CUT

TISTR researchers experimented with process operations in the plant until they found the most efficient arrangement of cooling racks, loading systems and sulphur treatments. The time it took to make a batch of noodles was reduced from four days to two days. The owner saved money on electricity and sulphur and got a consistently high quality product. Not only was the owner saved from bankruptcy, but he is expanding his business and hiring more workers.

With experience in this and three other factories, the team organized a workshop to which all 23 small-scale mung-bean noodle manufacturers in Thailand were invited. Since many of the manufacturers had not welcomed previous approaches by TISTR, the research team was amazed when every manufacturer attended. The industry representatives prepared a list of issues that they wanted addressed by the research team.

The in-factory, individual, approach to research was obviously a success in this small-scale industry. □