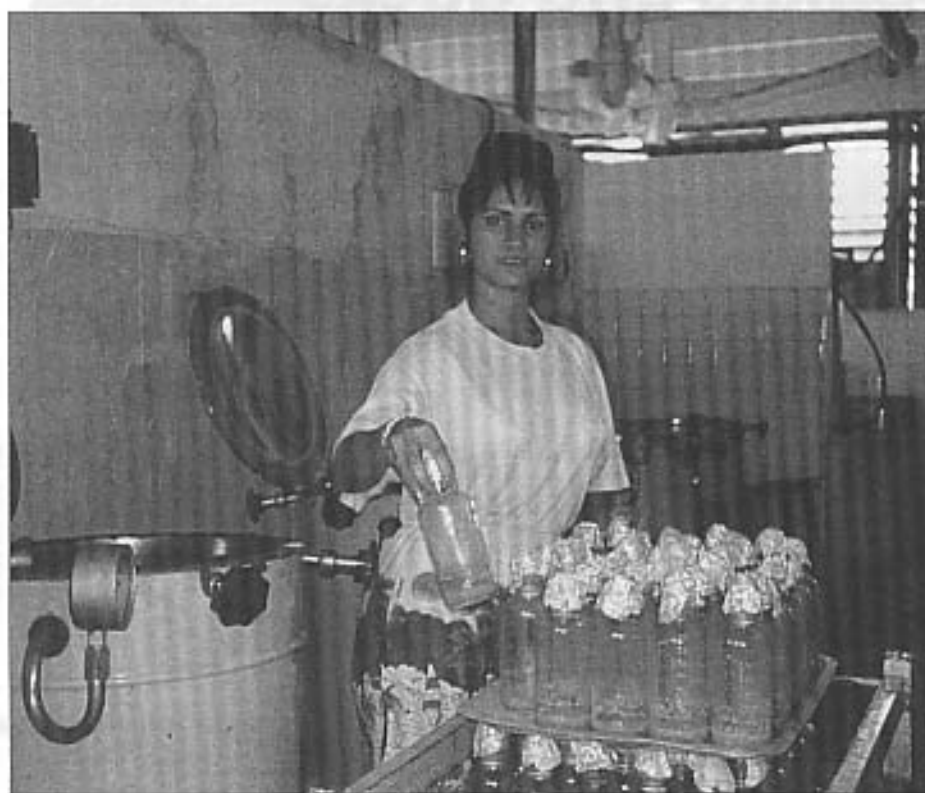


# Food security and local production



Artisanal biopesticide production

*Until recently, Cuban agricultural production was based almost entirely on the conventional industrialised model characterised by a strong dependence on synthetic pesticides and fertilisers, fossil fuels and other Green Revolution inputs. With the collapse of the socialist trading bloc in 1989, however, the country's access to pesticides and other inputs it had relied on vanished almost overnight.*

**Peter Rosset and Monica Moore**

The simultaneous loss of most of the country's imported agricultural and industrial inputs, direct food imports, international markets and sources of foreign exchange resulted in a profound and continuing crisis for the Cuban people and government, a crisis amplified by escalation of the US government's long-standing economic and political blockade of the island nation. Most critically, agricultural production and food access plummeted to record lows, resulting in acute food shortages in a country that for decades had guaranteed an ample, low-cost food supply as a right of citizenship.

In 1990, the Cuban President Fidel Castro declared the start of an indefinite 'Special Period in Peacetime' as the framework for the dramatic policy reforms necessary to meet the basic food requirements of the island's population. It was to be a period in which Cuba's agricultural and economic productivity would be rebuilt. As a direct result of the Special Period, Cuba has embarked on an unprecedented national transition from high-external input to low-input and organic agriculture, including the implementation of biological, control-

based, integrated pest management (IPM) approaches throughout the country.

Drawing on experience and investments in human resources that predate the Special Period by many years, policy makers, producers and researchers began adapting and reconstructing Cuba's agricultural infrastructures to facilitate low external input production, including the breakup of state farms into smaller units under more direct management by producers; the creation of a national network of small laboratories producing an increasing variety of biological control agents, botanical pesticides and bio-fertilisers; legalisation and promotion of private sector farmers' markets; widespread development of urban agriculture; and a new emphasis on farmer-to-farmer and farmer-to-extensionist exchanges, on-farm research and agro-ecological training for producers and scientists alike.

Cuba's agricultural conversion not only challenges the common belief that feeding a nation's population depends on pesticides, but also highlights the strengths and limitations of two different versions of IPM: the 'input substitution' approach as opposed to using IPM as a component of an ecological agricultural system.

## Local Production of Biological Agents

Coping with a more than 80 percent drop in the availability of pesticides and fertilisers was among the more desperate challenges at the start of the Special Period. Cuba's decades of experience with biological control proved crucial in meeting this challenge. Historically, much of this experience was with mass-reared parasitoids. Since 1968, the parasitic fly *Lixophaga diatraeae* had been used against the sugar cane borer in almost 100 percent of the areas planted with sugar cane. Parasitic wasps (*Trichogramma* spp.) have been widely used since the early 1980s against Lepidopteran pests in pasture management, and later in tobacco, tomato and cassava. Also in the early 1980s, the sweet potato weevil *Cylas formicarius* began to be controlled in sweet potato using predatory ants (*Pheidole megacephala*). Reservoir populations of these ants were established where they were naturally abundant, and colonies moved into sweet potato fields from these areas, achieving up to 99 percent control.

Despite such successes and the adoption of a national policy favouring IPM in 1982, pesticides remained the main form of pest control in Cuba until the onset of the Special Period. At that point, researchers working on biological control and other aspects of ecologically-based agricultural production systems were mobilised from within different universities, ministries and research institutions to respond to the crisis. In effect, this instantly mainstreamed the ideas of a number of younger scientists whose exposure to the environmental movement and ecological principles had led them to develop a critique of Cuba's dependent modernised agriculture, but whose ideas were marginalised within the infrastructure supporting that system.

Based on the work of such researchers and using existing technologies, the Ministry of Agriculture significantly accelerated and expanded existing plans to increase the production of natural enemies in order to replace the lost pesticide imports. By 1994 some 222 decentralised 'artisanal' laboratories were in operation and provided insects, nematodes and entomopathogens (bacteria, fungi and viruses that cause insect diseases) throughout Cuba's 15 provinces. These labs, which are called Centres for the Production of Entomophages and Entomopathogens (CREEs), facilitated the rapid adoption of IPM systems in crops previously managed under pesticide-based systems.

A typical CREE we visited in Pinar del Rio province employed 4 technicians with col-