

Aquaculture: Appropriate Technology in China

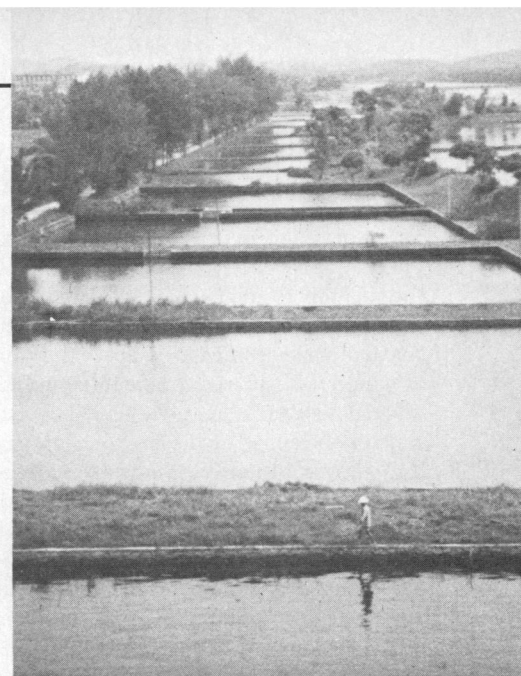
In stillwater ponds that stretch row after row for acres at the Pearl River Fisheries Research Institute in the Guangzhou (Canton) countryside, Chinese carp are thriving, testament to the fact that aquaculture is a Chinese success story. Indeed, pioneer aquaculturist Chung Lin, the institute's deputy director, claims that "Fish fry (hatchling) production here at Pearl River and elsewhere is now more than enough for all of China."

Under the auspices of the United Nations, scientists at the fisheries institute are training fish specialists from ten other Asian countries and proving the merits of "appropriate technology" at the same time. According to Chung, many of the 105 trainees who have studied at Pearl River since the UN program began in 1975 had previously been to Russia, Japan, or the United States. "They tell us that our technology is comparatively backward but nonetheless most applicable to their Third World countries," he says. Chung calls the Chinese system "adaptable, cheap, and low in energy"—one in which "nothing is wasted."

The four species of carp being grown at Pearl River are as ecologically compatible as they can be. Grass carp, which grow to 18 pounds, feed on waste vegetation from nearby farms as well as grass cut from the edges of the ponds. Silver carp consume phytoplankton; big head carp eat both plant and animal plankton in the ponds. And mud carp, which dwell at the bottom, live on the detritus from the other species, and consume directly some of the animal and human excrement that, after fermentation to remove pathogens, is used to fertilize the ponds themselves. To make the chain complete, when the ponds are cleaned, humus from the bottom is returned to farmers as fertilizer for their fields.

The key to China's present-day aquaculture came in 1958, when scientists, Chung among them, learned that by injecting carp with hormones, they can be induced to spawn in stillwater ponds. Before that, Chung says, "For nearly a thousand years the Chinese people had to collect fry from running streams and transport them to ponds in their local areas."

Breeder females can be injected with hormones extracted from carp pituitary glands or with human chorionic gonadotropin extracted from the urine of pregnant women.



Photos by B. J. Culliton

Fish ponds stretch row after row at the Pearl River aquaculture center.

However, a synthetic luteinizing hormone releasing hormone analog has, in the past few years, become the principal agent for the induction of spawning. "Our LRH experiments began around 1972," Pearl River researcher Zhao Jizu said, recalling that LRH was first synthesized in the United States in 1970 and that Chinese scientists at the Shanghai Institute of Biochemistry succeeded in LRH synthesis in 1972. Subsequently, the Shanghai group came up with a synthetic analog that is better still.

According to Wang Ying Lai, director of the Shanghai Institute of Biochemistry, workers at the Deng Feng (East Wind) Reagent Factory, the production arm of the institute, now produce about 100 grams of LRH analog a year, enough for all of China's aquaculture centers. Synthesis of LRH analog is proudly mentioned as an example of Chinese basic research of substantial practical value.

What everybody hopes, of course, is that aquaculture will become a major solution to the challenge of producing enough protein for China's phenomenal population—currently estimated at 1 billion persons and growing. In Guangdong province, of which Canton is the capital, freshwater fish farming yielded 200,000 metric tons of carp last year. Of that, 40,000 tons were exported, mostly to nearby Hong Kong. Altogether, China produces about 1.8 million tons of fish from freshwater aquaculture a year—an estimated one-third of her total catch. Chung thinks production in still water, using our system, is 1000 kilos of fish per mou (1 mou = 0.1518 acres) per year," he says, "but the average figure is only about 200 kilos," leaving lots of room for expanded production. Furthermore, China has millions of acres of ponds and lakes that could be turned over to aquaculture.

Aquaculture, the Chinese way, is relatively simple and certainly inexpensive, two reasons why Chung predicts that "the future lies with standing water culture."

—BARBARA J. CULLITON



Workers wade into the stillwater ponds to net adult carp to transport to breeding stations.