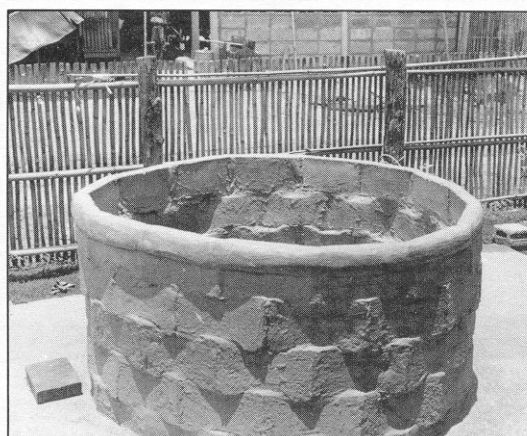
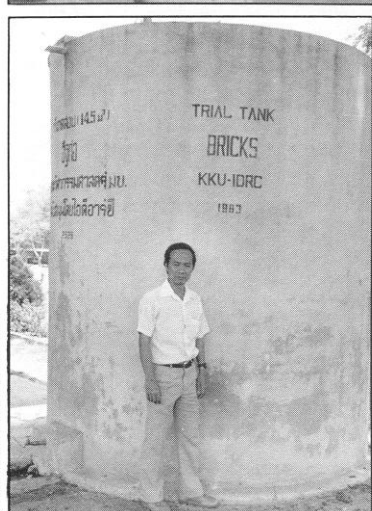
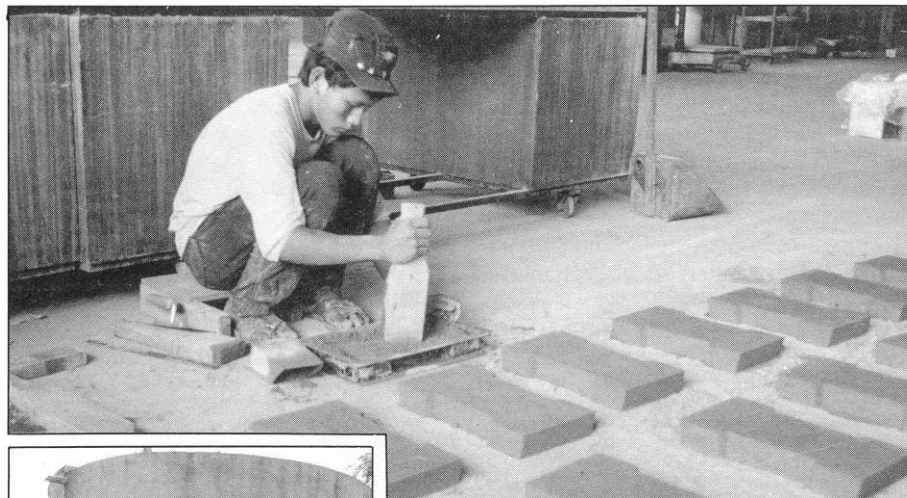


RUGGED RESERVOIRS

RAIN CATCHMENT IN THAILAND

By DENIS MARCHAND



Left, a 14.5 m³ reservoir. Dr Chayatit estimates that one person drinks 1 m³ of water during the dry season. Top, brickmaking is feasible even as a one-person operation. Right, mortar bricks for building reservoirs, wells, fences, or even terraces.

The 15 million inhabitants of the northeastern region of Thailand have a serious problem with their drinking water supply. The arid red soil here has a high mineral content which gives well water a bad salty taste. Even worse, the water becomes contaminated because of the poor hygiene of the people who also raise cattle within the confines of the village.

This region, regarded as the poorest in the country, contains about a third of Thailand's population and area (140 000 km²). It has two seasons, the rainy season from May to October, then a hot dry period for the remaining seven months of the year.

For most peasants, the most rational solution to the water supply problem has always been to drink rainwater. From time immemorial, people have set out earthen jars beneath the eaves to catch rainwater which they store for use during the hot dry season. The system is purely artisanal and not very efficient.

In the last 10 years, however, the government has been providing an alter-

native water supply system. It has constructed no less than 20 000 bamboo-reinforced cement reservoirs for rain catchment to supply drinking water to farmers in the northeastern region. But a serious problem has arisen: some reservoirs are cracking; in fact, with a third of them out of service, the whole program is in jeopardy.

With financial support from IDRC, a research team led by Dr Chayatit Vadhavikit of the Civil Engineering Department of Khon Kaen University went to work on this perplexing problem.

When Dr Chayatit analyzed fragments in the laboratory, he discovered that the cement was of good quality and had retained its strength. But the reinforcing bamboo pieces had rotted, demonstrating that they were not suitable for use in reservoir construction. Bamboo is not sufficiently elastic to withstand the water pressure and does not stand up well to moisture and bacteria, losing 90 percent of its strength within two years.

White ants, termites, rats, and rot often attack bamboo, so builders treat it chemi-

cally. This adversely affects the flavour and sometimes the quality of the water.

Bamboo has been used as a reinforcing material because of the high cost of steel. A cement and bamboo reservoir usually costs CAD\$220, compared with \$275 for cement and steel. Savings like this are important in an economy where the annual wage rarely exceeds \$750.

One person can easily make the blocks and assemble a reservoir.

"The research we did first permitted us to determine what caused the breakage and then led us to develop a new construction technique," Dr Chayatit explains during a tour of a brick-making workshop on the university campus.

"Look at the bevelled-end design of these mortar blocks; it makes it possible to fit them together to make the structure strong and firm. They are called 'interlocking blocks'.

"I think we have found a simple, inexpensive, efficient and solid alternative solution. There is no need for any additional reinforcing material and the system is the most practical one could find for a poor region," says Chayatit. He goes on to explain that one person alone can easily make the blocks with sand, mortar, and a mold, and assemble a reservoir of whatever size best suits the family's needs and financial situation. Using mortar blocks reduces the cost by 30 percent.

Reservoirs usually contain between 9 and 14.5 m³ of water, enough for the normal domestic needs of a six-person household for seven months, the duration of the dry season. Twelve of the new reservoirs have been installed in various villages and, after 18 months of use, they seem to be working well.

"This new construction technique is based on local skills," says Chayatit. "We managed to put our own knowledge to use to meet the real needs of the environment. Not only is the system entirely appropriate but the bricks can be used for other purposes such as building enclosures or terraces. This is not something we import but rather a local product, and I am very proud of it." □

Denis Marchand is a freelance Canadian journalist. He recently visited Asia under a project sponsored by the Fédération professionnelle des journalistes du Québec and funded by the Canadian International Development Agency.