

# Reason to cheer

by Adam Barclay, photography by Aileen del Rosario-Rondilla



*Thousands of Bangladeshi rice farmers kick the pesticide habit after proving to themselves that doing so saves money and safeguards their health and the environment*

**A**n American leads 3,000 Bangladeshi farmers in a rising Thai victory chant: "Chai yo! Chai YO! CHAI YO!" The scene is rousing, if odd, and the cheer is appropriate because these farmers in the district of Comilla, 80 km southeast of the capital, Dhaka, have won an extraordinary victory.

They are the vanguard of what could become one of the most beneficial rural movements in

modern Bangladeshi history. If the Livelihood Improvement Through Ecology (LITE) project, led by the International Rice Research Institute (IRRI), continues as it has started, in less than a decade, most of Bangladesh's 11.8 million rice farmers — almost a 12th of the country's population of 141 million, according to the Bangladesh Rice Research Institute (BRRI) — will have stopped using insecticides and optimized their fertilizer use, thereby increasing

their income by an average of US\$17 per year. That may not sound like much to some, but where the average annual farm income after expenses is around \$100, this money helps put children through school or buy grain to tide rice-deficit farm families over to the next harvest.

LITE — part of the IRRI-led project Poverty Elimination Through Rice Research Assistance, funded for Bangladesh by the United Kingdom's Department for International



A GROUP OF RICE FARMERS, led by rural development expert Jan Orsini (*hidden*), raises an incongruous but rousing Thai victory chant in Comilla, Bangladesh. Orsini (*inset*) enthuses from the podium of the previous day's workshop for 3,000 farmers about the success of the Livelihood Improvement Through Ecology (LITE) project.



Development — set out to discover the exact cause of an expected drop in rice yield when farmers stop spraying insecticide. The original aim, explains LITE principal investigator and IRRI senior entomologist Gary C. Jahn, was to identify safe alternatives to insecticides.

“To my surprise,” reports Dr. Jahn, “when people stopped spraying, yields didn’t drop — and this was across 600 fields in two different districts over four seasons. I’m convinced that the vast majority of insecticides that rice farmers use are a complete waste of time and money.

If they don’t spray they lose nothing, but they gain a lot — money, a safer environment and reduced risk to their health.”

LITE farmers also learn to reduce and optimize their application of nitrogen fertilizer (urea). They do this by comparing the four panels of the leaf color chart (LCC) to the leaves of their rice crop, and then fertilizing the crop just enough for the leaves to match the ideal color (see *Chart Hit for N Sync* on page 33). The practice allows farmers to spend less on fertilizer and so improves their efficiency and profitability. What’s more, in the 2004 dry season, farmers following the LITE strategy increased their yields by an average of 400 kg per hectare — a significant boost for struggling farm families.

The method used to expand the scale of LITE from a few hundred farmers to several thousand — and potentially millions — is known as success case replication (SCR). Lead farmers, identified as being more

successful than their neighbors, are trained to use the LCC and perform the experiments that prove they don’t need insecticides. They then train other farmers in their own village, as well as successful farmers from surrounding villages, who become the next lead farmers. The new lead farmers do the same, and the process repeats. The number of trained farmers grows exponentially each rice season — like recipients of a chain letter, but this time good things actually happen.

### Success stories

The strategy can help improve the way people manage an enormous range of enterprises, not just farming. Jan Orsini, an IRRI consultant to LITE and a former United Nations rural development officer, is the SCR expert who led the Thai victory chant (he lives with his Thai wife in Bangkok). Orsini brims with passion when he discusses SCR’s ability to improve people’s lives, describing

success stories ranging from farmer cooperatives in the Philippines to guitar manufacturing in Vietnam.

A major advantage of SCR is its cost effectiveness, eliminating the need for large numbers of paid staff or expensive equipment and infrastructure. “You don’t need a training center,” explains Orsini. “All the training is hands-on. There’s no theoretical training at all. It doesn’t matter if the successful person can’t read or write. All he has to do is explain and show others how to do it.”

With an average of more than 1,000 people per square kilometer — compared with 30 in the United States and 250 in the Philippines — Bangladesh is more crowded than Australia would be with every living human squeezed into it. Historically, Bangladesh was relatively prosperous, but political instability, war and overpopulation have reduced it in modern times to one of the world’s poorest countries.

Rice farming is a tough life, and subsistence is as good as many Bangladeshis can hope for. So when the government began doling out free insecticides to rice farmers in 1956, spraying rapidly gained a firm foothold. Subsidies continued — 100% until 1974, then 50% — and the government conducted campaigns encouraging farmers to spray. Indiscriminate insecticide use became so entrenched that the end of government handouts in 1978 saw farmers simply shoulder the whole cost.

### Natural enemies

Why doesn’t spraying help yield? First, many supposed insect pests don’t attack the parts of the plant that affect grain production, or the grain itself, under farm conditions — and so aren’t pests at all. Second, many farmers use poor equipment to apply out-of-date or inappropriate insecticides at the wrong time. And third, insecticides can kill the natural enemies of rice pests more effectively than the pests themselves, compromising natural pest control. Nazira Qureshi Kamal, the head of BRR’s Entomology Division and



LITE PRINCIPAL INVESTIGATOR Gary C. Jahn (*below*) at a workshop for 1,500 farmers in Rangpur. LITE farmer Kamrul Hasan and his wife Jannatul Ferdous (*top*) use their savings to buy better food and clothes for their children. Thousands of women (*opposite bottom*) — most of them wives of LITE farmers — attend the farmer workshop in Comilla. While few women in Bangladesh tend rice fields, they often play an integral role in decision-making and help with crop management. Many farmers supplement their income by pedaling a rickshaw (*opposite top*), seen here passing a rice field in Comilla.



LITE’s in-country coordinator, points out that the mere presence of insects on the crop can panic farmers into spraying.

But it is not enough for a scientist to tell farmers, hey, don’t bother with insecticides. An outsider, with all the best intentions in the world, won’t be believed. And so it was that thousands of Bangladeshi farmers became

agricultural scientists themselves.

The two nongovernmental organizations working with LITE — AID-Comilla in Comilla and, 300 km northwest of Dhaka in Rangpur, Debi Chowdhurani Poribar Unnoon Kendra (DCPUK) — taught lead farmers how to conduct a simple experiment by partitioning their fields into quadrants receiving different



Insecticide	No insecticide
No leaf color chart	No leaf color chart
Insecticide	No insecticide
Leaf color chart	Leaf color chart

**LITE RICE FIELD:** Lead farmers partitioned their fields into quadrants receiving four different crop-management strategies.

management strategies, with and without spraying and the LCC (see figure above). Other participating farmers bisected their fields, spraying one half but not the other.

Each lead farmer helped four other farmers carry out the experiment and record their insecticide and fertilizer costs for each treatment in specially designed notebooks. Recording the data themselves lent farmers a sense of ownership over the project, and their supervisory duties earned lead farmers self-confidence and the respect of the other farmers, who, being social equals, were neither intimidated nor distrustful. To ensure the accuracy of the data, Dr. Jahn and Orsini paid unannounced visits to randomly selected farmers to verify their measurements.

Augmenting the farmers' data, BIRRI technicians collected insects from the LITE fields to determine how neighboring crops and insecticide and urea applications affect the diversity of rice pests and their natural enemies. Insecticides caused the greatest loss of overall biodiversity, perversely reducing the diversity of natural enemies more than that of pests.



**FOUR WOMEN THRESH** rice in the village of Sullipara, Rangpur. Farida Yasmin (left), a 17-year-old from Ghilatoli, Comilla, shows an environmental award she received for her role in the LITE project. Many of the farmers' wives and daughters helped to run, and participated in, double-blind taste and quality tests of rice grown under LITE's four crop management strategies. No differences were found. A Comilla farmer (below) bringing in the sheaves.

AID-Comilla founder Abul Kalam Azad stresses that the key to LITE's success is its simplicity. "A previous pest-management project I worked on was technically complicated," he explains. "It took 6 months to train the farmers, and they couldn't remember everything. As well as being poor, many farmers in Bangladesh are illiterate. They can't easily adopt complicated technologies. With LITE, the technology and the message are very simple — LCC, no insecticide."

**Wildest dreams**

"We quickly realized," says Dr. Jahn, "the most important thing to focus on was scaling LITE up. We've already trained 2,000 farmers. We've reduced insecticide use among participating farmers by 99%, and by 90% among nonparticipating farmers in the same villages. Even in the control villages, where no farmers conducted the experiments, the proportion of farmers using insecticide dropped from 80%

to 55% — largely because of casual contact with participating farmers.

"Our initial goal was to have 10% of farmers in the target villages reduce their insecticide use," he adds. "The result is beyond our wildest dreams."

LITE farmers' optimism is palpable. The day after Orsini drew a Thai victory chant from 3,000 participants — the Comilla region's 120 original lead farmers plus the current round of newly recruited participants — Dr. Jahn met the leaders to thank them for their hard work. After another chorus of "chai yo," a couple of farmers suggested the organizers reciprocate with an "American farm song." So it was that an IRRI senior scientist, a former UN scale-up expert and an Australian reporter (yours truly) found themselves moo-moo-mooing a hastily arranged but surprisingly well-received rendition of *Old Macdonald Had a Farm*.

In terms of cost-benefit, LITE is extremely successful. Orsini

explains that the World Bank and other funding agencies traditionally consider projects worthwhile if they result in a 13% improvement in income. That is, for every dollar spent, the project must generate, after a certain number of years depending on its type, at least \$1.13 of income. LITE's cost-benefit ratio is 1:4 — bringing a return of \$4 for every dollar spent — in the first year alone, without factoring in subsequent years' savings.

"This will only get better with



**Double taka**

Until a couple years ago, 35-year-old Joinal Ahmad (pictured right) grew rice on a little over half a hectare in his village of Tatoipara, annually eking out a farm income of 2,800 Bangladeshi taka, or US\$48. He and his wife of 18 years struggled to look after their two toddler sons and put their two older daughters through school. In 2002, Ahmad was recruited by Livelihood Improvement Through Ecology (LITE) to test the effect of ceasing to spray insecticides on his rice crop. After establishing that spraying did not improve grain yield or quality,



he did away with insecticides. He also reduced his nitrogen fertilizer (urea) use by employing a leaf color chart to guide applications.

While LITE hasn't made Ahmad wealthy, it has helped him a great deal. With the money he saves, he has been able to buy more land and boost his planted area to almost two-thirds of a hectare. He



has cut his exposure to health- and environment-threatening chemicals. And he has almost doubled his annual farm income to 4,800 taka.

"I can grow rice at lower cost because I use less urea and no insecticide," Ahmad explains. "With the money I save, I help my family and pay for my children's education."

A few kilometers away in Ghilatoli, 20-year-old Mohammed Mashuk Miah (pictured above, at right), who combines rice farming with his accounting studies, enthuses about the difference LITE has made to him. His savings have capitalized a rice-milling business and helped him buy an ox. So keen is he to spread the good word, he has been teaching nonparticipating farmers on his own initiative.

"I tell other farmers to do the same thing," he says. "I invited 10 of my friends and trained them. They saw the faith I had in this method."

When farmers stop spraying, they save not only the purchase price of the pesticide but also on hiring labor and renting equipment — and on often exorbitant interest rates for the short-term loans they once needed to cover these costs. Many farmers have used their LITE-driven savings to buy more land or better-quality clothes and food for their families, and their newfound capital has allowed some to diversify into more profitable crops.

time," enthuses Orsini. "The longer that farmers use the LITE regime, the more they will save. After 5 years, say, the ratio will be 1:20, which is truly exceptional."

Dr. Jahn is confident that the farmers will adhere to LITE practices because, first, they saw the results of their own experiments in their own fields and, second, LITE goes straight to the bottom line. "Where farmer field schools rely on the farmers learning and understanding ecology," he explains, "LITE relies on understanding your wallet, which is almost innate."

The project's simplicity and direct appeal to farmers' interests are cited by the executive directors of both participating NGOs, AID-Comilla's Rokeya Begum Shafali and DCPUK's Nurul Islam Dulu, as strong arguments for more funding. "The last 2 years' results have been very good," says Shafali. "Now we need to explain the project, its aims and its mission to donors so that all Bangladeshi

farmers have a chance to participate."

The LITE team now has 27 nongovernmental partners implementing the project — at their own expense, as LITE funding has finished — in 32 new villages in Comilla and Rangpur, which means that nearly 4,000 new farmers are being trained to perform the no-spray experiment. If additional funding comes through, each of these villages will provide lead farmers to train new lead farmers in five neighboring villages, for a total of 160 villages. The new lead farmers in those 160 villages will train the other farmers in their village, then new farmers in five more neighboring villages, and the number of villages practicing LITE will leap to 800. And so on.

Given continued support, LITE and its benefits will ripple and radiate across Bangladesh's rice fields. Perhaps someday soon, an incongruous but inspiring Thai victory cry will ring out all over rural Bangladesh. 🍚