

June 17, 2008

SCIENTIST AT WORK | NORMAN T. UPHOFF

Food Revolution That Starts With Rice

By [WILLIAM J. BROAD](#)

ITHACA, N.Y. — Many a professor dreams of revolution. But Norman T. Uphoff, working in a leafy corner of the [Cornell University](#) campus, is leading an inconspicuous one centered on solving the global food crisis. The secret, he says, is a new way of growing rice.

Rejecting old customs as well as the modern reliance on genetic engineering, Dr. Uphoff, 67, an emeritus professor of government and international agriculture with a trim white beard and a tidy office, advocates a management revolt.

Harvests typically double, he says, if farmers plant early, give seedlings more room to grow and stop flooding fields. That cuts water and seed costs while promoting root and leaf growth.

The method, called the System of Rice Intensification, or S.R.I., emphasizes the quality of individual plants over the quantity. It applies a less-is-more ethic to rice cultivation.

In a decade, it has gone from obscure theory to global trend — and encountered fierce resistance from established rice scientists. Yet a million rice farmers have adopted the system, Dr. Uphoff says. The rural army, he predicts, will swell to 10 million farmers in the next few years, increasing rice harvests, filling empty bellies and saving untold lives.

“The world has lots and lots of problems,” Dr. Uphoff said recently while talking of rice intensification and his 38 years at Cornell. “But if we can’t solve the problems of peoples’ food needs, we can’t do anything. This, at least, is within our reach.”

That may sound audacious given the depths of the food crisis and the troubles facing rice. Roughly half the world eats the grain as a staple food even as yields have stagnated and prices have soared, nearly tripling in the past year. The price jolt has provoked riots, panicked hoarding and violent protests in poor countries.

But Dr. Uphoff has a striking record of accomplishment, as well as a gritty kind of farm-boy tenacity.

He and his method have flourished despite the skepticism of his Cornell peers and the global rice establishment — especially the International Rice Research Institute, which helped start the green revolution of rising grain production and specializes in improving rice genetics.

His telephone rings. It is the World Bank Institute, the educational and training arm of the development bank. The institute is making a DVD to spread the word.

“That’s one of the irons in the fire,” he tells a visitor, looking pleased before plunging back into his tale.

Dr. Uphoff’s improbable journey involves a Wisconsin dairy farm, a billionaire philanthropist, the jungles of Madagascar, a Jesuit priest, ranks of eager volunteers and, increasingly, the developing world. He lists top S.R.I. users as India, China, Indonesia, Cambodia and Vietnam among 28 countries on three continents.

In Tamil Nadu, a state in southern India, Veerapandi S. Arumugam, the agriculture minister, recently hailed the system as “revolutionizing” paddy farming while spreading to “a staggering” million acres.

Chan Sarun, Cambodia’s agriculture minister, told hundreds of farmers at an agriculture fair in April that S.R.I.’s speedy growth promises a harvest of “white gold.”

On Cornell’s agricultural campus, Dr. Uphoff runs a one-man show from an office rich in travel mementos. From Sri Lanka, woven rice stalks adorn a wall, the heads thick with rice grains.

His computers link him to a global network of S.R.I. activists and backers, like Oxfam, the British charity. Dr. Uphoff is S.R.I.’s global advocate, and his Web site (ciifad.cornell.edu/sri/) serves as the main showcase for its principles and successes.

“It couldn’t have happened without the Internet,” he says. Outside his door is a sign, “Alfalfa Room,” with a large arrow pointing down the hall, seemingly to a pre-electronic age.

Critics dismiss S.R.I. as an illusion.

“The claims are grossly exaggerated,” said Achim Dobermann, the head of research at the international rice institute, which is based in the Philippines. Dr. Dobermann said fewer farmers use S.R.I. than advertised because old practices often are counted as part of the trend and the method itself is often watered down.

“We don’t doubt that good yields can be achieved,” he said, but he called the methods too onerous for the real world.

By contrast, a former skeptic sees great potential. Vernon W. Ruttan, an agricultural economist at the [University of Minnesota](http://www.umn.edu) and a longtime member of the [National Academy of Sciences](http://www.nas.edu), once worked for the rice institute and doubted the system’s prospects.

Dr. Ruttan now calls himself an enthusiastic fan, saying the method is already reshaping the world of rice cultivation. “I doubt it will be as great as the green revolution,” he said. “But in some areas it’s already having a substantial impact.”

Robert Chambers, a leading analyst on rural development, who works at the University of Sussex, England, called it a breakthrough.

“The extraordinary thing,” he said, “is that both farmers and scientists have missed this — farmers for thousands of years, and scientists until very recently and then some of them in a state of denial.”

The method, he added, “has a big contribution to make to world food supplies. Its time has come.”

Dr. Uphoff grew up on a Wisconsin farm milking cows and doing chores. In 1966, he graduated from Princeton with a master's degree in public affairs and in 1970 from the University of California, Berkeley, with a doctorate in political science.

At Cornell, he threw himself into rural development, irrigation management and credit programs for small farmers in the developing world.

In 1990, a secret philanthropist (eventually revealed to be [Charles F. Feeney](#), a Cornell alumnus who made billions in duty-free shops) gave the university \$15 million to start a program on world hunger. Dr. Uphoff was the institute's director for 15 years.

The directorship took him in late 1993 to Madagascar. Slash-and-burn rice farming was destroying the rain forest, and Dr. Uphoff sought alternatives.

He heard that a French Jesuit priest, Father Henri de Laulanié, had developed a high-yield rice cultivation method on Madagascar that he called the System of Rice Intensification.

Dr. Uphoff was skeptical. Rice farmers there typically harvested two tons per hectare (an area 100 by 100 meters, or 2.47 acres). The group claimed 5 to 15 tons.

"I remember thinking, 'Do they think they can scam me?' " Dr. Uphoff recalled. "I told them, 'Don't talk 10 or 15 tons. No one at Cornell will believe it. Let's shoot for three or four.' "

Dr. Uphoff oversaw field trials for three years, and the farmers averaged eight tons per hectare. Impressed, he featured S.R.I. on the cover of his institute's annual reports for 1996 and 1997.

Dr. Uphoff never met the priest, who died in 1995. But the success prompted him to scrutinize the method and its origins.

One clear advantage was root vigor. The priest, during a drought, had noticed that rice plants and especially roots seemed much stronger. That led to the goal of keeping fields damp but not flooded, which improved soil aeration and root growth.

Moreover, wide spacing let individual plants soak up more sunlight and send out more tillers — the shoots that branch to the side. Plants would send out upwards of 100 tillers. And each tiller, instead of bearing the usual 100 or so grains, would puff up with 200 to 500 grains.

One drawback was weeds. The halt to flooding let invaders take root, and that called for more weeding. A simple solution was a rotating, hand-pushed hoe, which also aided soil aeration and crop production.

But that meant more labor, at least at first. It seemed that as farmers gained skill, and yields rose, the overall system became labor saving compared with usual methods.

Dr. Uphoff knew the no-frills approach went against the culture of modern agribusiness but decided it was too good to ignore. In 1998, he began promoting it beyond Madagascar, traveling the world, "sticking my neck out," as he put it.

Slowly, it caught on, but visibility brought critics. They dismissed the claims as based on wishful thinking and poor record keeping, and did field trials that showed results similar to conventional methods.

In 2006, three of Dr. Uphoff's colleagues at Cornell wrote a scathing analysis based on global data. "We find no evidence," they wrote, "that S.R.I. fundamentally changes the physiological yield potential of rice."

While less categorical, Dr. Dobermann of the rice research institute called the methods a step backward socially because they increased drudgery in rice farming, especially among poor women.

In his Cornell office, Dr. Uphoff said his critics were biased and knew little of S.R.I.'s actual workings. The method saves labor for most farmers, including women, he said. As for the skeptics' field trials, he said, they were marred by problems like using soils dead from decades of harsh chemicals and monocropping, which is the growing of the same crop on the same land year after year.

"The critics have tried to say it's all zealotry and religious belief," Dr. Uphoff sighed. "But it's science. I find myself becoming more and more empirical, judging things by what works."

His computer seems to hum with proof. A recent report from the Timbuktu region of Mali, on the edge of the Sahara Desert, said farmers had raised rice yields 34 percent, despite initial problems with S.R.I. guideline observance.

In Laos, an agriculture official recently said S.R.I. had doubled the size of rice crops in three provinces and would spread to the whole country because it provided greater yields with fewer resources.

"Once we get over the mental barriers," Dr. Uphoff said, "it can go very, very quickly because there's nothing to buy."

The opponents have agreed to conduct a global field trial that may end the dispute, he said. The participants include the rice institute, Cornell and Wageningen University, a Dutch institution with a stellar reputation in agriculture.

The field trials may start in 2009 and run through 2011, Dr. Uphoff said. "This should satisfy any scientific questions," he added. "But my sense is that S.R.I. is moving so well and so fast that this will be irrelevant."

Practically, he said, the method is destined to grow.

"It raises the productivity of land, labor, water and capital," he said. "It's like playing with a stacked deck. So I know we're going to win."

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