AGRICULTURAL TECHNOLOGY

A New Study Finds There's Life Left in the Green Revolution

The controversy over how many mouths the Earth can feed dates back almost 200 years, to the time of Thomas Malthus. These days, the debate focuses on the pace of the "green revolution" that has more than doubled world grain production over the past three decades. Pessimists such as Lester Brown, president of the Worldwatch Institute in Washington, D.C., worry that the revolution is slowing as agricultural researchers run out of new ideas. "There's not much more you can do," Brown says. Furthermore, he and others argue, environmental ills such as soil degradation and groundwater depletion are already dragging down crop yields in many regions. But a study announced last week by the Consultative Group on International Agricultural Research (CGIAR), a network of agricultural research centers with offices in Washington, D.C., says it's far too early to write the green revolution's obituary.

The new analysis, which looks at grain yields per hectare in countries around the world, shows that with few exceptions, yields have continued to increase dramatically over the past 10 years. The study's author, Donald Plucknett, an agronomist and senior science advisor for the CGIAR, also stresses the remarkable success of a few countries in boosting yields despite relatively poor land. These success stories, together with the overall trends, suggest that many developing countries have room for similar improvements, Plucknett says. But although his colleagues are listening carefully to Plucknett's findings, they're not entirely convinced.

Plucknett says that he began his analysis because he was concerned that earlier studies might not be capturing the full picture of crop yields. Those earlier studies, he says, concentrated on total yields, which are sensitive to changes in the amount of cultivated land, or on per-capita yields, which measure farmers' relative—not absolute—progress. Plucknett decided instead to look at per-hectare crop yield data from the United Nations Food and Agriculture Organization.

In spite of his doubts about the existing studies, he says that when he started his work, he expected the conventional wisdom about plateauing yields to be borne out. Instead, for country after country, he observed that yields per hectare of all three major grain crops—wheat, rice, and corn—continued to increase into the 1990s. "Nobody was more surprised than I was when this began to emerge," Plucknett says. "No doubt there's a limit waiting for us somewhere, but the evidence says we don't seem to be there yet in farm yields."

Plucknett's optimistic assessment, reported at an invited public lecture at the International Food Policy Research Institute (IFPRI) in Washington, D.C., surprised many of his colleagues, who feel the same data do indeed show that yields of certain crops, in certain countries, began to increase more slowly or even flatten out in the mid-1980s. Rice yields, for example, enjoyed their most rapid growth in the 1970s and early 1980s, says Prabhu Pingali, leader of the irrigated rice program at the International Rice Research Institute in the Philippines. Since then, yields have been nearly flat in Japan, Korea, Taiwan, and the Philippines. In the most intensively cultivated regions of those countries, Pingali says, yields have actually declined somewhat. "Our thinking is that because of the intensive use of irrigated paddyland with double or triple cropped rice year after year, you're beginning to see effects on paddy soils and pest and weed ecology," Pingali concludes.

Plucknett's analysis misses this recent shift, his critics say, because he concentrates on longer term trends in yields over periods of a decade or more. "It's only when you look at the last few years that you begin to see that the trend of this period is not the same [as the 1960s, 70s, and early 80s]," says Brown. "It's essentially plateauing."

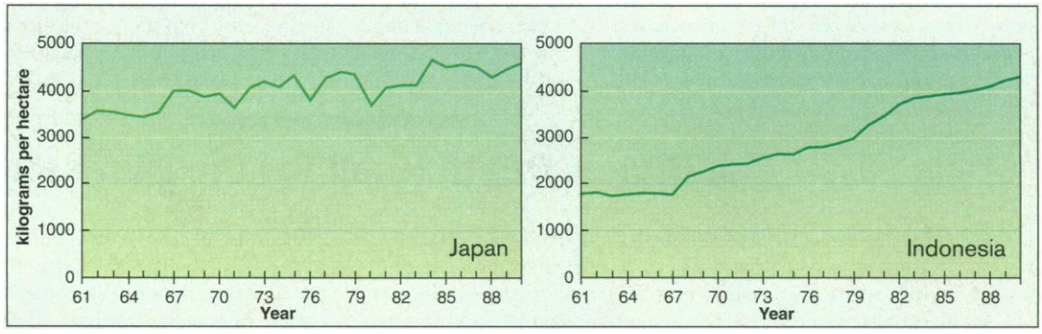
Plucknett, however, thinks that such short-term fluctuations are probably little more than natural fits and starts of agricultural progress. Innovations boost yields sharply for a few years, often followed by a period of retrenchment as the boom in production brings prices down. In just a few years, he argues, productivity tends to rocket up again. "Certainly, you cannot dismiss the idea that yields may be leveling off," Plucknett says. "But the question is, Are they level for all time, or will they take off again?"

Plucknett's survey convinces him that they will. Countries such as North and South Korea have attained remarkably high yields despite poor farmland, he says, and a few African countries, such as Cameroon, Mali, and Egypt, are now showing impressive rates of yield growth. If other countries can duplicate such success, grain production will continue to rise substantially. Plucknett also notes that farmers' yields—especially in developing countries—often lag well behind those achieved on experiment stations. The gap implies that the agricultural technologies in use on the test plots still haven't reached many farmers. Better distribution of improved crop varieties, equipment, and knowhow could boost worldwide harvests by as much as 50%, he estimates.

Even optimists like Plucknett agree, however, that it won't be easy to boost food production enough to keep up as the global population doubles over the next few decades. "A lot of people see this as a job that's almost finished," says Plucknett. "It's not at all. We have some tremendous challenges ahead of us to double production, and I'm worried about whether we're going to keep up research support at a level that will allow this yield growth to continue."

And world hunger won't be ended even if research funds continue to flow, the environment holds up, and farmers continue to push yields upward. Most of the people in the world who are chronically hungry—and there are nearly a billion of them—are starving because of distribution problems and a lack of purchasing power, not a lack of agricultural capacity, notes IFPRI economist Peter Hazell. Putting enough money in the hands of the world's poorest inhabitants, he says, may prove to be a much tougher problem than keeping the green revolution churning.

–Bob Holmes



SOURCES: WORLDWATCH (JAPAN) PLUCKNETT (INDONESIA)

Different shades of green. Japan's rice yields have flattened, while Indonesia's are still climbing steadily.

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